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Comparing ACT and NLN PAX Exams for Preadmission to an Associate's Degree Nursing Program

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Capstone:

Comparing ACT and NLN PAX Exams for Preadmission

to an Associate's Degree Nursing Program

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For NRSG-594

Capstone

Southern Adventist University

School of Nursing

Abstract

Outside of using the ACT exam for admission into the University, a pre-admission exam for the School of Nursing has never been required until recently. A correlational study was completed to determine the relationship between the performance on the ACT and NLN-PAX pre-admission for the students entering the School of Nursing program in January 2015. Additional statistics were calculated comparing gender, ethnicity, and student status (transfer vs. non-transfer) to further validate the student's performance on the ACT and NLN-PAX exams. Mid-term grades of a fundamentals course were compared to the pre-admission exams to predict success in the nursing program. The sample consisted of 63 undergraduate students who had just started the first semester of the nursing program, and had completed the necessary pre-requisite courses. Sixty-two students took the ACT exam as required by the University; 60 students took the NLN PAX; and 59 students took both exams. The study validated the NLN PAX as a new exam admission criteria, but scoring parameters will need to be set by the Admissions Committee should they decide to continue to use this exam as an admission criteria.

Comparing ACT and NLN PAX Exams for Preadmission

to an Associate's Degree Nursing Program

CHAPTER 1

Introduction

Demands on the increasing number of nurses needed in the workforce is becoming more and more urgent. With the recent changes in health care, researchers are finding that nurses will continue to hold a primary role in bedside care, but also an increasing need is occurring in the community based setting. With over 85% of new graduate nurses working acute care and hospital based settings, many experience nurses have gone back to school or transferred to positions outside the hospital settings, impacting the nursing shortage in the hospitals (Tanner, 2010).

The Institute of Medicine (2010) recommends a greatly increased number of "well trained, highly educated" nurses produced over the next decade (Institute of Medicine, 2010). The Bureau of Labor and Statistics projects that nursing jobs will grow exponentially with over one million job position openings expected between 2012 and 2022 primarily due to the aging "Baby Boomer" population and the aging nurse work force (Rosseter, 2014). From their studies and actuaries, it is expected that over 500,000 jobs will become open due to current staff retiring and change positions, plus an additional half a million jobs will be available due to the increased patient care needs.

With over one million nursing job openings expected, these incredible predictions have been crucial for nursing education. To meet the demands of this forecasted employment landscape reviews of the current nursing education process was evaluated. The *Carnegie Foundation for Advancement of Teaching National Nursing Education Study*, a landmark nursing education report, made many eye raising realizations about nursing education. Benner, Sutphen,

and Leonard (2009) found that programs across the United States had weak classroom and clinical experiences, limited teaching strategies within the curriculum, the faculty and students felt unprepared for the work force and clinical situations, and high variability between school admission criteria and within the curriculums (Benner, Sutphen, Leonard, Day, 2009). It was also realized that the core concepts and approach to nursing education had not changed significantly since the 1930s (Tanner, 2010). In response to these realizations, the National League for Nursing (NLN), reported several factors contributing to the limited number of students admitted into nursing programs across the country for both associate and baccalaureate programs. According to the NLN's Annual Survey of School of Nursing from Fall 2012, 50% of the schools reported that clinical placement for students was a primary issue; 28% reported not having enough faculty; and 7% reported lack of classroom space (NLN, 2012). Forty percent of associate degree nursing programs reported having unfilled openings within their faculty, including their director positions (NLN, 2012). These shortages in faculty, clinical space, and classroom space contributes to 84% of associate degree nursing programs turning away qualified applicants, ultimately compounding the future nursing shortage (NLN, 2012).

With these constraints upon the schools of nursing and the evaluation from the Carnegie Foundation Report, schools of nursing are examining their admission criteria, preadmission exams scores, and curriculum content. Just a brief comparison of schools of nursing in the eastern Tennessee region found some notable differences between programs. Of the five nursing programs assessed, GPA minimums ranged from 2.0 to 2.9, some schools looked at the SAT and ACT scores, two other schools required an additional pre-admission exam that was geared toward nursing and health care, but none of the five schools had exactly the same requirements (See Table 1, Appendix A).

Definitions of Terms

American College Testing (ACT) exam is a standardized exam generally taken by high school seniors, and is required by most colleges to complete the initial application process. The composite score carries a high probability of success in first year, credit-bearing college courses—*English Composition, College Algebra, social sciences courses, and Biology.* (Radnuzel, Noble, 2012). The exam contains 215 questions: 75 English, 60 math, 40 reading, and 50 science questions. Every correct question is counted into the section score, and wrong answers do not count against the student. Each section is calculated in to a score between 1 and 36, then the four sections are averaged for the total composite score (ACT, Inc, 2015).

The National League for Nursing Pre-Admission Examination (NLN PAX) is a standardized entrance exam for potential nursing students who seek admittance into nursing schools nationwide. The NLN PAX RN is comprised of three main areas: *Verbal skills,* which consists of both word knowledge and reading comprehension**;** *Mathematics*, which includes basic calculations, word problems, and incorporates algebra, geometry, conversions, graphs, and applied mathematics; and *Science*, which examines general biology, chemistry, physics, and earth science. The NLN PAX Pre-Admission Exam contains 214 questions: 60 verbal, 40 math, and 60 science, with one hour allowed for completing each section (NLN, 2015). Overall scores range for 0 to 200, then a percentage is determined based the number of correct answers. Additionally, a "relative performance" score is determined. This is the percentage of students who scored lower on the exam. The higher the "percent correct score" and "relative performance" the stronger the candidate is likely to perform in nursing school (NLN, 2015).

The Health Education Systems, Inc Exam (HESI) A² is commonly used by nursing schools but can be used for different purposes. Some use it as an entrance exam while others use

it as an exit exam to help determine the likelihood of passing the NCLEX (National Council

Licensure Examination) exam. There are a total of 10 sub-tests. Two of the ten sub-tests evaluate

personality and learning styles, and are not counted in the final score, but help determine how a

student will perform in the program. Seven sub-tests are based on high-school level learning in

basic math, science, verbal knowledge, reading comprehension, general knowledge with focus

on health care terminology, and grammar. One of the reasons the HESI A2 is so popular with

nursing schools is that it is so customizable. Every school has different scoring requirements.

Generally, most schools require at least a 75% score (Wilson, 2015).

The entrance exam for the College of Nursing is the Test of Essential Academic

Skills (TEAS) V, which measures basic essential skills in the academic content area of reading,

mathematics, science and English and language usage. The reading section has 48 questions;

math has 34 questions; science has 54 questions, and the English section has 34 questions. The

test is intended for use primarily with adult nursing program applicants. The objectives assessed

on the TEAS V exam are those which nurse educators deemed most appropriate and relevant to

measure entry level skills and abilities of nursing program applicants. This exam is also used by

other health care programs, such as emergency medical technician, (EMT), paramedics, and

respiratory therapy school (Wilson, 2015).

Nursing Council Licensure Exam for Registered Nurses (NCLEX-RN) is a computer

based high stakes examination that all nursing students completing either associate or

baccalaureate degree in nursing are eligible to take. Passing the NCLEX allows nurses to

practice and provide care to the general population, granting them a state nursing license. The

exam contains 264 questions about nursing based practice, evaluating the student's critical

thinking about health care provider safety and knowledge. However, once the student reaches a

95% confidence score of passing or failing the exam, the exam ends. This means the student may take a minimum of 75 questions or the maximum 264 questions. The NCLEX is a computerized adaptive test making it unique than the entrance exams already described. The questions escalate in difficulty based on the previous answer. If the student gets the question incorrect, a lower level knowledge question is asked (National Council of State Boards of Nursing, 2015).

For the SPSS statistical portion of this study, the following acronyms were used for the calculations:

GPACUM   Cumulative GPA upon applying to the School of Nursing

GPAUniv   University GPA, only applies to courses taken at SAU

GPATransfer GPA for the students who transferred into the University prior to
                     starting the nursing program.

ACTComp   comprehensive ACT scores

ACTReading ACT reading scores

ACTMath   ACT math scores

ACTScience ACT science scores

PAXCOMP   comprehensive NLN PAX exam scores

VERB %   percentage score in the verbal section of the NLN PAX exam

MATH %   percentage score in the math section of the NLN PAX exam

SCIENCE % percentage score in the science section of the NLN PAX exam

FUNDgrade   midterm grade of Fundamentals of Nursing course

Theoretical Framework

Betty Neuman's Systems Models is used by the SAU School of Nursing (Undergraduate Catalog, 2014). In applying her theory and diagram to this study, the student (or the client) is the focus in the center of the circle accepting all the different variables needed to successfully complete the nursing program. Neuman describes the client to have five innate variables (psychological, sociocultural, development, spiritual, and physiological). These variables might become stressed or defenses for the student during the times within the program, and can be used during any level of defense. In a similar diagram, in the center circle are all the components (or variables) learned within the curriculum, such as evidenced based practice, cultural competence in, health promotion, informatics, patient-centered care, professionalism, safety, and teamwork/collaboration.

Outside of the center circles of these two diagrams are flexible lines of defense. The outer most circle is the primary intervention, such as being admitted to nursing school and going to class. As a primary intervention, it is was the student should do to stay involved, engaged, and perform in a healthy state during the program. The next line of defense is a solid line representing the "normal line of defense". As a secondary intervention, the student might recognize how stressed or out of balance they are in keeping up with the course work, and need to request extra help with assignment or studying for exams. The most inner three concentric circles are one's natural "lines of resistance" when handling stressors. The distance between the lines of defense are proportionate to the stability of the student's well-being. These are defenses employed by the student when internal or external stressors impact their performance in school.

Theoretically the center of the circle for this study are the admission criteria for this particular school of nursing. The flexible lines of defense correlate with the primary criteria such as graduating from high school or an equivalent college preparation education, being enrolled in

this particular University, and completing the necessary pre-requisites. The solid line of defense could correlate with the application to the nursing program since that is non-negotiable for entry into the program. The inner three circles are the different variables within a student's application, such as how well the student did on the pre-admission exams, required pre-requisite course, and their cumulative and/or University GPA. This study examines particular variables found within the three inner circles of the diagram in applying to the nursing program.

Problem Statement

Historically, the associate degree NCLEX pass rate at Southern Adventist University School of Nursing has been higher than the national average up until the end of 2012. In 2013 the combined graduating classes in May and December (N=132 students), the NCLEX pass rate fell to 88.64% and continued to drop to an all-time low of 78% (third quarter) for the graduating classes of December 2013 and May 2014, putting the program below the national average pass rate of 82.86%. Conditions that may have contributed to this decline in pass rate. One possible reason could be an increase in admission class size from 65 to 78 students (a 20% increase), and the other recognizes that the National Council of State Boards of Nursing raised *the passing standard* in April 2013 which likely led to the lower pass rate for this program (Lavin, Rosario-Sim). The program is continually making reviews of the course work and testing style to ensure a high quality education for nursing students. There is currently a doctoral study in progress to examine the NCLEX-RN scores, nursing school grades, pre-requisite grades, and entrance exams for these past graduating classes.

In attempts to improve the NCLEX-RN pass rate, the School of Nursing Admission Committee reviewed their program's admission criteria to decipher stronger versus weaker candidates prior to admission. Traditionally, admission into the Southern Adventist University

School of Nursing is determined on the applicants' high school ACT scores. A minimum score of 20 on reading; a minimum of 18 on English; and a minimum score of 16 on math is expected. The applicant's cumulative GPA ($\geq$ 2.9), and the number of semesters the applicant has already accumulated at Southern Adventist University in Collegedale is also evaluated. The School of Nursing has never required an additional entrance exam, such as the NLN-PAX pre-entrance exam, the HESI exam, or the TEAS exam, as many other programs generally do.

For the first time in the history of the SAU, SON students who applied to begin the associate degree nursing program in January 2015 were highly encouraged to take the NLN PAX pre-admission exam, in addition to submitting their high school ACT exam scores. The purpose of this correlational study is to determine if there is a relationship between the performance on the ACT and NLN-PAX pre-admission for the students entering the School of Nursing program in January 2015. Outcomes of this research will be reviewed by the School of Nursing Admission Committee to determine if future program applicants will be required to take the NLN-PAX pre-admission exam for acceptance into the associate's degree program at this institution.

CHAPTER 2

Literature Review

A literature review was conducted using CINAHL, the National League for Nursing journal, and Google Scholar library databases, inclusive of years 2003 through 2015. Search terms included *entrance exams, nursing school, passing NCLEX, admission criteria, NLN PAX, ACT, HESI exam, critical thinking, GPA, nursing shortage, health care, validity of NLN PAX exam, and validity of the ACT exam.*

A correlational study from 2004, supported the validity of NLN PAX and success in their nursing program to ultimately improve their poor retention rates during the program (Kirking, 2004). For the 312 students incorporated in the study, the total composite and verbal scores of the exam strongly correlated with their student's success and completion in their nursing program. The evaluation established a standard of achievement for each of the three areas of testing. The students who scored below a 35% in mathematics, science, and reading were denied entrance into the nursing program. Those that scored $\geq$50% in each of the three concentration areas were granted admission. Remedial counseling and courses were available for those that did not meet the $\geq$50% minimum (Kirking, 2004). The study also indicated the students older in age also were more successful on the NLN-PAX and the nursing program.

A correlational quantitative study was performed on a small sample size of 41 associate-degree nursing students evaluating their NLN PAX scores for minority disadvantaged students (Levine, 2011). Ethnicity was determined not only by the student application, but also by recorded completion of English as Second Language (ESL) and/or remedial courses prior to beginning the nursing program. The study identified 29 minority students and 12 Caucasian students in an urban nursing school. The NLN PAX scores were compared to student's first and second semester success in the program. Nine of the minority students did not pass the first

semester of nursing school, but did well on the NLN PAX. Results of this study showed positive predictive value for the NLN PAX for minority disadvantaged students for the first semester, but may not be predictive of success in the first year of a two year nursing program.

The ACT exam has a long standing reputation as a positive indicator for college readiness in high school students. Radunzel and Noble (2012) evaluated predictors of ACT Composite scores against high school grade point averages, and first year college GPA at several two- and four- year institutions across the United States. A large scale quantitative study evaluated 190,000 students from 2000-2006 determined there was a positive correlation between high school grade point averages, ACT Composite scores, and first year of college grade point averages to predict overall college success. This supports the validity of consideration of the ACT composite score as an admission criteria into two- and four-year nursing programs.

Sayles, Shelton, and Powell (2003) performed a small sample (N=78) correlational study on their chosen pre-admission exam and their practice licensure exam, the PreRN examination and success on the NCLEX exam after completion of their nursing program. The study showed positive correlations between success on all three exams. This indicates if a student is successful on a pre-admission exam and on the practice licensure exam, then the student should be successful in passing the final licensure exam. This study also validated their pre-admission exam, the NET exam, as a strong correlation to success in their program.

McGahee, Grambling, Reid (2010) evaluated possible predictors to passing the NCLEX-RN exam. The study examined 153 graduates from a baccalaureate degree nursing program over three year span. Data were collected on SAT/ACT scores, any failed prerequisite courses, science GPA prior to admission into the nursing program, a critical thinking test score designed by the school, all individual nursing course grades, a writing portfolio required to complete

during the nursing program, the graduating GPA, the number of semesters to complete the nursing program, and practice licensure exam, and whether the student passed the NCLEX-RN on the first attempt. With all of these variables to consider, three significant variables stood apart as statically significant: the practice licensure exam, and the student's grades in the fundamentals course and pathophysiology (McGahee, Grambling, Reid, 2010). Pre-admission exams of any sort did not statistically predict success in the program or on the NCLEX-RN.

Cline (2013) performed a qualitative and quantitative study at a baccalaureate nursing program to determine the validity of their admission process, characteristics that were most important to have to complete the program, and opinions on graduation rates. The study focused on the faculty members of the admissions committee. The qualitative portion of the study collected information through interviews on their understanding and opinions of the current admission process and criteria. A quantitative survey collected data on faculty's viewpoints regarding the admission criteria, personality traits of the students, and graduation rates. The twenty question survey was designed so faculty could rank on a zero to six scale rate their opinion of these factors. This two-part qualitative and quantitative study revealed science grades, cumulative GPAs, perseverance, and hardiness of the student were most important. Although this particular program used the HESI entrance exam as a qualifier for admission, it did not determine a student's acceptance. In fact, several faculty were against having an entrance exam. It was their opinion that admission exams and test scores were not evaluated as defining contributors to being successful in nursing school, as the nursing profession should not rely on a student's test taking aptitude to produce quality nurses.

Critical thinking continues to be a common thread and struggle for instructors to teach and students learn and has been extensively studied in multiple areas of education concentrations

(Carrick, 2011; Romeo, 2010; Romeo 2013). Critical thinking is necessary for safe nursing practice and patient care. Levin and Rosario-Sim (2011) state, "NCLEX-RN success is validated with NLN PAX exam plus pre-clinical nursing courses", but no published study could be found by these authors to support this statement (p. 197). The researcher of this study and Cline (2013) both recognized the paucity in research involving scrutiny of the rigor of the NLN PAX exam in relation to predict critical thinking, especially for the associate degree nursing level. A recent search for this literature review thorough CINAHL, the National League of Nursing, and Google Scholar found no research analyzing the NLN PAX pre-admission exam.

CHAPTER 3

Methodology

The sample was obtained from the incoming class of new nursing students beginning the associate degree program in the Winter semester 2015. The sample consisted of 63 undergraduate students who had just started the first semester of the nursing program, and had completed the necessary pre-requisite courses. Sixty-two students took the ACT exam as required by the University; 60 students took the NLN PAX; and 59 students took both exams. Analysis of gender and ethnicity revealed 21 males and 42 females with 40 non-Caucasian and 23 Caucasian students. Data on exact ethnicity and age were not collected.

Prior to initiating this study, approval was obtained by the campus Institutional Review Board at Southern Adventist University. The researcher and advisors had access to the names of students included in this study; therefore confidentiality was maintained. Data analyzed in this study were obtained from admission files, NLN test reports, and course grades. Statistical Package for the Social Sciences (*SPSS®)* version 22 was used for all statistical calculations. Pearson correlational comparisons were made to compare the ACT Comprehensive scores to the NLN PAX comprehensive scores. The correlation coefficient for this *SPSS®* version indicated values ≤ 0.3 are considered a weak significance, 0.5 are moderate, and ≥ 0.7 are strong significance. Independent *t* tests compared the mean scores of the admission exams to gender, ethnicity, and student status. The *p* value on both the Pearson correlations and independent *t* tests were valued at $p < 0.05$ were strong significance and $p < 0.01$ were very strong significance (Cronk, 2012).

The dependent variables were the cumulative GPA, transfer GPA (if applicable), ACT comprehensive score, ACT Reading score, the NLN PAX exam scores, and the mid-term grades of their Fundamentals nursing course. The independent variables were gender, ethnicity, and student status (transfer vs. non-transfer students). Transfer status was dependent on if there was

a recorded transfer GPA, so the number of credits of the transfer status was not considered.

Theoretically the transfer GPA could be one course or many courses were taken at another

school and the credit(s) were transferred in.

CHAPTER 4

Results

With the permission of the advisor for computer access, the data collector first collected the initial information on the entire sample set, including names, student ID numbers, gender, ethnicity, student status, cumulative GPA, university GPA, transfer GPA (if indicated), ACT comprehensive scores, ACT Reading scores, ACT math scores, ACT science scores, and NLN PAX scores.

Using *SPSS®* version 22, descriptive statistics were completed to determine the minimum, maximum, mean, and standard deviations for the GPA cumulative, GPA transfer, ACT comprehensives and NLN PAX comprehensive scores. All calculation results can be found in the Data Table, Appendix C. It was found that the mean GPA cumulative was 3.30 for all the students. For the students who transferred in to the University, the mean GPA was 3.38, indicating a comparable group of students. The mean ACT Comprehensive score was 21.72, and the mean NLN PAX comprehensive score was 116.9.

Pearson correlation coefficient statistics. A Pearson correlation coefficient was calculated for the following relationships between GPAs and standardized exams. Comparing GPACUM and ACTComp a positive correlation was found (r (61) = .352, p <.01), indicating a moderate significant linear relationship between these two variables. Comparing GPACUM and PAXCOMP another positive correlation was found (r (59) = .348, p < .01), indicating a moderate significant relationship between the two variables. These correlations showed students who have higher GPAs, scored higher on the NLN PAX and ACT exams. It can be argued that although the correlations between GPAs and standardized tests are statistically significant (p<.01), the value of the correlations may not be all that meaningful.

Comparing the ACTComp and the PAXCOMP a positive strong correlation was found (r (58) = .757, $p <$. 01), indicating a strong significant relationship between the two variables. These findings indicated the ACT and PAXCOMP exam scores are statistically comparable.

Since cumulative GPAs and the standardized exams were statistically significant and over one-third of the sample set were transfer students, calculations were conducted to compare the transfer students' GPA with their standardized exam scores. A Pearson correlation coefficient was calculated for the PAXCOMP and GPATransfer students. A positive correlation that was not significant was found (r (40) = 0.301, $p >$ 0.05). In this sample set, GPAs for the transfer students might not be comparable to the PAXCOMP scores. See Appendix C for the correlations.

The individual sections within each standardized exam were correlated for statistical purposes. These correlations were quite interesting and supported the final results of this study. Since the ACT has both a Reading and English section, both were compared individually to the NLN PAX Verbal section. All of the sections were strongly correlated with p < .01. See Appendix C for the values collected.

Additional Pearson correlations were made between ethnicity and gender against the ACT comprehensive scores and the NLN PAX scores. As expected, even in this small sample set, the correlations found were statistically insignificant. A Pearson correlation coefficient was calculated for the relationship between gender and the standardized exam scores. A weak correlation that was not significant was found (r (61) = 0.106, p > 0.01). ACTComp scores were not related to gender in this sample set. Likewise, when comparing PAXCOMP to gender, a weak correlation that was significant was found (r (59) = -0.082, p > .05), indicating a positive linear relationship between the two variables. This indicates both standardized exams are non-bias to gender and ethnicity, as one would expect.

Independent *t* tests. When evaluating gender on the independent *t* tests against the standardized exams, both females and males did comparably on the ACT and the PAXCOMP, showing equal variance between the groups. An independent *t* test between the means of the two groups: ACTComp *(t (60) = -0.823,* p < 0.05*)*, and PAXCOMP (*t* (58) = .626, p > .05). The mean for the ACT Comprehensive exam for the males (*m* =21.2, *sd* = 3.9) and the females (*m*=22.1, *sd* = 4.0). The mean for the PAXCOMP exam scores for the males *(m = 119.0, sd = 13.6)* and females *(m = 116.0, sd = 17.88).* Note that the PAXCOMP t test is considered not significant. The only explanation for this statistical difference is the wide range of test scores recorded.

Ethnicity, Caucasian to non-Caucasian students, was compared using an independent *t* test. The groups showed equal variance and the results were statistically significant. ACTComp independent *t* test (*t* (60) = 1.153, *p* < .05). The mean of the Caucasian group (*m*= 22.6, *sd* = 3.6) and the non-Caucasian group (m = 21.3, *sd*=4.2). PAXCOMP independent *t* test (*t* (58) = 1.261, p < 0.05). The mean of the Caucasian group (m=120, *sd* = 13.7) and the non-Caucasian group (*m*=114.1, *sd*=17.9). These calculations reiterate the fact that the exams are non-bias to gender and ethnicity.

Calculations were completed to compare the transfer to the non-transfer students on their standardized exams. Independent *t* tests indicated equal variances on these groups that were equally statistically significant. The independent *t* test was statistically significance for the ACT Comprehensive scores *(t (60) =2.150, p < .05)*, with the non-transfer group *(m = 23.2, sd = 4.03)*, and the transfer students *(m = 21.0, sd = 3.8).* When compared to the NLNPAX scores the independent *t* test was found to be statistically significant *(t (60) = 1.59, p < 0.05).* The mean scores of the NLNPAX scores for the non-transfer students *(m = 122.0, sd = 12.8)* and the transfer students *(m = 114.7, sd = 17.74).*

Looking beyond the pre-admission exams, the student grades for their Fundamentals of Nursing course were followed during the semester. This course is an 8-credit hour course that encompasses their lecture participation, course work, exams, and clinical hours. It is imperative for a student to do well in this course to maintain their overall GPA standing and gain the foundations of nursing practice to build on during the course of the nursing program.

Statistical calculations were completed for the midterm fundamentals grade, then compared to the GPACUM, ACTComp and PAXCOMP scores for the sake of further validity and to reveal a small predictor in how the students are doing in their first semester of nursing school compared to their entrance exams. The descriptive statistics for the Fundamentals of nursing indicated the mean grade of 85.1, or a B average. The minimum midterm grade was a 65.6 and the maximum midterm grade was 97.9, with a standard deviation of 6.02.

Comparisons of the entrance exams against the midterm grades showed positive results. Pearson correlation coefficients were calculated for the relationships between the GPACUM score, the ACTComp, and the PAXCOMP against the midterm fundamentals grade. All three correlations were shown to be strong positive correlations: GPACUM (r (62) $=0.451$, $p<.01$), ACTComp (r (62)$=0.406$, $p<.01$), and the PAXCOMP (r (62)$=.391$, $p<.01$), indicating all three variables have a significant linear relationship when compared the midterm fundamentals grade. These results indicate that the students in this sample set are maintaining strong academic standards during their first semester nursing course.

Discussion

Southern Adventist University School of Nursing looks for the students with a GPA ≥ 2.9 and with that comes average or just above average ACT and NLN PAX. The statistical

comparison of these two pre-admission scores indicate the exams are non-bias to gender and ethnicity, and overall comprehensive scores are comparable. The detailed admission criteria for SAU SON requires an ACT Reading score > 20, ACT English score > 18, and ACT Math score > 16. This sample set were above these minimums with 23, 22, and 21, respectively. Interestingly the ACT Science score is not considered on the detailed admission criteria. The students in the study sample set either met or exceeded these criteria, with a mean cumulative GPA of 3.3. Therefore these two exams can be used for admission criteria when evaluating applicants for the program. According to the NLN PAX scoring instructions, an average overall score is 100. The students in this sample exceeded this average score as their mean score was 116. Reviewing the results of the sample set, the students scored exactly average on the ACT (sample mean = 22) and above average on the NLN PAX (sample mean = 117). This would indicate as a whole the students in this sample are of average or just above average standard. From their scores of the ACT and the NLN PAX it is safe to project that this sample will be successful in the nursing program.

It is noted that the ACT scores were likely taken when the students just graduated high school or equivalent, whereas the NLN PAX is taken with at least two years of college course work and prerequisites completed. It could be said that maturity of the student and standardized testing experience might lend to higher than average NLN PAX scores over ACT scores. There is also a difference in content knowledge within each test. As stated the ACT covers general education knowledge learned in high school. The NLN PAX content focuses on specific biological sciences, medical terms, and college math, which a student may have to spend time studying on these concepts not yet covered in their pre-requisite courses.

Individual sections of the NLN PAX the student's means were verbal 63%, math 67%, and science 62%. Since this sample set scored >60% on each section it leads the researcher to believe the students will continue to do well in the nursing program and on the NCLEX-RN. It appears there is no particular reason why a nursing school chooses to use a particular entrance exam. It is possible that the NLN PAX pre-admission exam was chosen simply because it was written by the NLN, the leader in the nursing education. Should the SAU SON continue to use the NLN PAX exam for the admission criteria, the admission committee will need to determine minimum parameters for NLN PAX percentiles for each section. If it is decided that this sample set should set the standard, the minimum percentage should be >60%. By comparison, another institution who uses the NLN PAX for admission, has set $\geq$65% as their minimum score on all sections for admission into their program and it must be taken within three years of applying to the program (found at [Associate Degree Nursing Admission Criteria](#)). Our sample set is in close parameters of this other institution making it a comparable guideline.

The SAU SON keeps a progression checklist for each student while in the program. The program guidelines allow for one course to be repeated, but a second failure of any nursing course in the first or second year will result in expulsion from the program without any chance to restart. This gives a student who may be struggling on any one given semester a chance to recuperate their grade and school goals the following semester. Students must maintain a C+ or higher on each nursing course. This follows the initial GPA $\geq$ 2.9 at admission, and any nursing program needs a concrete GPA standard on which to base screening criteria. As the literature review and this study shows, it is arguable that the correlation between GPA and success on the NCLEX are marginal. However, a very surprising note, is for this particular school of nursing a minimum of a 2.30 in Nursing and 2.50 overall for graduation is acceptable! Theoretically, this

expectation allows the students to perform less than average in the nursing courses than their pre-requisite courses to get into the program. This being the case, why the minimum requirements set lower after gaining the education than when coming in? How is it logical to expect that the students will pass the NCLEX-RN exam or in practice and graduate with below average grades? Further study should be done to continue to follow these same students through the program, monitoring their grades, and compare them with the NCLEX pass rate in two years. Those results may ultimately raise the expectations of an acceptable GPA both for admission and graduation in the future.

An important realization is a school of nursing's success is not based on how many students they admit or graduate; it based on their NCLEX board certification pass rate. In 2013, the NCSBN increased *the standard passing rate*, meaning the Council raised the bar of nursing programs and the quality of newly licensed nurses. Prior to this change, a student who made an average GPA, meaning a "C" could still pass the NCLEX (Carrick, 2011). Since this hallmark change in the NCLEX passing standard nursing programs will need to increase their student's performance in their nursing courses. It is likely that students maintaining a C average in nursing school will not be able to pass the NCLEX-RN on the first attempt.

CHAPTER 5

Evaluation

Originally it was hoped this study was thought to possibly define some new standards for the admission committee. The study validated the NLN PAX as a new exam admission criteria. It also calculated the pre-admission exam scores and GPA results from a small sample set and applied them to what the literature shows and what the national standards are currently advocating. It was rewarding to gain an understanding in how to interpret the statistical analysis for the given sample set based on to their exam scores, GPAs, and course grades. It was surprising to find that the SAU SON accepts the highest minimum GPA for our area, and disappointing to find that a lower GPA is acceptable when going through the nursing program.

There is potential for future study to be gained from following this particular sample set each semester in the nursing program. Based on their pre-admission scores, and how they perform in future classes, prospective performance studies could be done to predict how they will do on the NCLEX-RN exam in January 2017. The study was limited by a small sample size and the data was not compared with other schools of nursing in the local area. Despite the strong correlational data found, more research is needed regarding the NLN PAX exam, success in nursing school, and on the NCLEX exam post-graduation.

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Appendix A

Comparison of local school of nursing

Name of Institution	Public/Private	Type of Program	Admission Standard GPA/Exams	Accreditation
Southern Adventist University	Private	AS BSN	GPA $\geq$2.9 ACT No preadmission exam required	NLNAC/ACEN
The Baroness Erlanger Nursing School at Chattanooga State Community College (CSCC)	Public	AS	GPA 2.0 min TEAS exam	NLNAC/ACEN
Cleveland State Community College	Public	AS	GPA 2.75 min TEAS exam	NLNAC/ACEN
Fort Sanders Nursing Program at TN Wesleyan College (TWC)	Private	BSN	GPA 2.7 min ACT or SAT No pre admission exam required	CCNE
University of Tennessee at Chattanooga	Public	BSN	GPA 2.75 min ACT or SAT No preadmission exam required	CCNE

Appendix B

Diagram of Betty Neuman's Systems Model
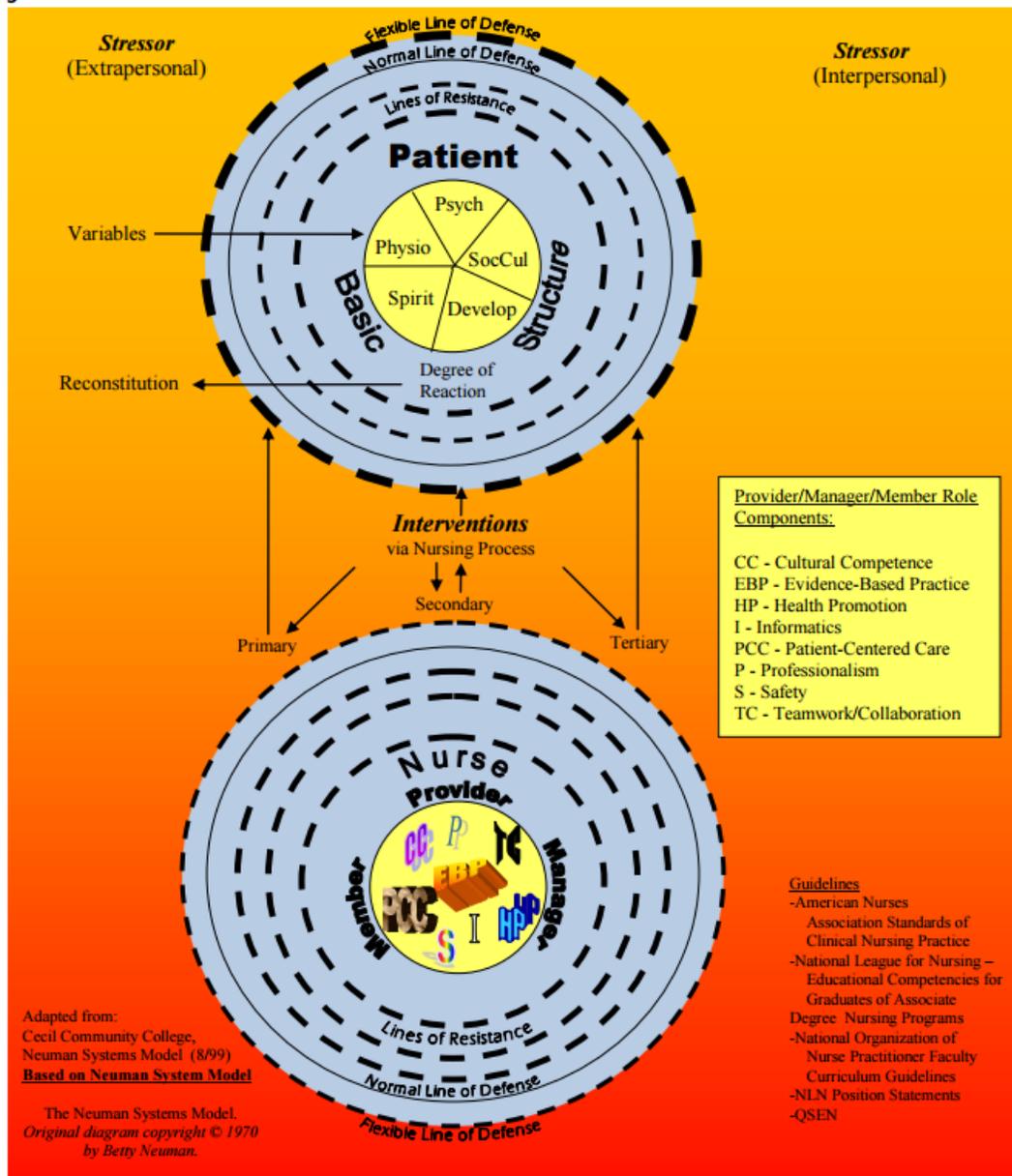
The Neuman Systems Model. *Original diagram copyright © 1970 by Betty Neuman.*

Appendix C

Descriptives and Pearson Coefficient Data Table

	Mean	Standard Deviation	Act COMP	ACT English	ACT Math	ACT Reading	ACT Science	PAX COMP	VERB %	MATH %	SCIENCE %
GPACUM	3.30	.374	.352**	.429**	.380**	.191	.214	.348**	.212	.389**	.358**
GPAUniv	3.30	.416	.475**	.524**	.518**	.303*	.322*	.446**	.288*	.390**	.499**
GPATransfer	3.38	.432	.260	.366*	.193	.203	.162	.301	.231	.317*	.299
ACTComp	21.80	3.99		.903**	.827**	.887**	.862**	.757**	.633**	.607**	.604**
ACTEnglish	21.72	5.22			.670**	.741**	.706**	.658**	.588**	.522**	.503**
ACTMath	20.64	4.16				.592**	.691**	.637**	.358**	.670**	.618**
ACTReading	22.59	5.25					.708**	.671**	.668**	.433**	.475**
ACTScience	21.74	3.55						.700**	.538**	.582**	.579**
PAXCOMP	116.9	16.59							.864**	.759**	.824**
VERB %	62.61	13.97								.451**	.550**
MATH %	66.93	15.89									.541**
SCIENCE %	61.88	10.61									
FUNDgrade	85.10	6.02	.406**					.391**			

*. Correlation is significant at the 0.05 level.

**. Correlation is significant at the 0.01 level (2-tailed).