PREDICTING NCLEX-RN SUCCESS THROUGH PREREQUISITE AND ADMISSION REQUIREMENTS

by

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ABSTRACT

The current nursing shortage has caused post-secondary educational institutions to respond by increasing the number of students allowed to enroll in nursing programs. Recent fluctuations in NCLEX-RN pass rates raised concerns about student preparation for the nursing curriculum and warranted further study examining if a relationship exists between admission requirements and NCLEX-RN pass rates. This study used a mixed method approach. The quantitative portion was a statistical analysis, primarily using chi square and Spearman rho measurements, of prerequisite and admission requirements and NCLEX-RN first time pass rates. The qualitative portion of the study collected information regarding prerequisite and admission processes from nursing program directors through phone interviews. Although most directors of nursing interviewed stated that the use of standardized testing in the screening of students would select those students most prepared for the nursing program and thus able to pass the NCLEX-RN upon graduation, the statistical analysis did not support the use of standardized testing for preprogram screening. Similarly, some directors of nursing stated that science coursework and an increased number of prerequisite and admission criteria would select those students best prepared to pass the NCLEX-RN. The statistical results did not support the use of science coursework or an increased number of prerequisite and admission criteria as having a positive relationship to NCLEX-RN success. The selection of prerequisite and admission criteria is an important responsibility of those in leadership roles of nursing programs. The results of this study indicate that elements such as science coursework, number of prerequisite and admission criteria, and standardized testing used
in the screening of prospective students do not have a positive influence on NCLEX-RN pass rates.
DEDICATION

This work is dedicated to my parents, Nancy and John Julian. Thank you for being the people you are and for loving each of us unconditionally.
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CHAPTER 1: INTRODUCTION

The first time pass rates for students taking the National Council Licensure Exam for Registered Nurses (NCLEX-RN) vary greatly in the state of Arizona (Arizona State Board, 2006). While the curricula for the 2-year associate of applied science degree in nursing programs of the 10 community college districts in the state are similar, the prerequisite and admission requirements differ significantly (Arizona State Board, 2006). The selection of academically well-prepared students for nursing programs is crucial to creating an environment of success for learning and thus leading to passing the NCLEX-RN.

The NCLEX-RN is associated with two critical elements for nursing: licensure of nurses and accreditation of nursing schools. A student must complete the associate of applied science in nursing degree and pass the NCLEX-RN as part of the licensing requirements for becoming a registered nurse. An educational institution providing the nursing degree must maintain a first time pass rate of 75% of the students taking the exam in order to achieve and retain full accreditation of the program (Arizona State Board, 2006). This mixed method study addresses the appropriate selection of students for nursing programs. Due to the significance of the NCLEX-RN, it is critical to determine which students, upon admission, are capable of passing the exam upon program completion.

The independent variables under investigation included the admission and selection requirements for nursing students which include any combination of courses completed, standardized entrance exams, certifications, interviews, and written responses to posed questions. The dependent variable is the NCLEX-RN pass rate for each
community college included in the study. The admission and selection requirements
determined by each college do not require Arizona State Board of Nursing (ASBN)
approval and therefore can vary considerably.

The population for the study included public Arizona community college districts
offering the associate of applied science degree in nursing. There are 10 community
college districts in Arizona that comprise the state community college system. The 10
districts include 72 campuses and learning centers. The institutions range from urban to
rural and from large to small districts. The sample, which represents the population, for
the mixed method study included the 10 community college districts in Arizona offering
the nursing degree. Therefore, the sample population comprised the entire state of
Arizona.

The research design was a mixed method study. The quantitative portion
consisted of a statistical analysis between the admission requirements for each program
and the NCLEX-RN pass rates. The qualitative portion included interviews with selected
directors of nursing from the nursing programs under investigation.

Recent studies have indicated a positive correlation between preliminary
coursework, program coursework, and standardized exam scores with NCLEX-RN
success (Bonte-Eley, 2002; Briscoe & Anema, 1999; Burckhardt, 2004; Buttry, 2003;
Collins, 2002; Eddy & Epeneter, 2002; Engelmann, 2002; Hardin, 2005; Henriques,
2002, Luoma, 2003; Marshall, 2006; Matos, 2007; Milow, 2005; Sayles, Shelton, &
Powell, 2003; Silage, 2002; Simon, 2006; Turner, 2005; Washington & Perkel, 2001; Yin
& Burger, 2003). The studies, however, did not restrict the focus to prerequisites and
admission criteria for nursing programs but only included these criteria among many
other elements in nursing programs. In light of this, this study was unique as it sought to isolate that information most critical to consider in selecting students who are prepared for the rigor of a nursing program and thus able to pass the NCLEX-RN upon completion.

Background of the Problem

The process by which nursing programs obtain approval and accreditation began early in the 20th century (National Council, 2004). Prior to that time, individual states did not have agreed upon standards intra- or interstate. Nursing professionals came together to create boards charged with establishing and communicating standards for each state with other states. This convergence of professionals and creation of state boards led to the approval of nationally recognized nursing standards and the national nursing board known as the National Council of State Boards of Nursing (NCSBN). These boards set standards, including those governing the registration of nurses to ensure the protection of the health, safety, and welfare of the public while receiving nursing care (National Council, 2004). In line with the NCSBN, the ASBN adopted proof of a diploma, associate, or bachelor degree in nursing from an approved nursing program, a passing score on the NCLEX-RN, and satisfactory fingerprint results from the Arizona Department of Public Safety and the Federal Bureau of Investigation (Arizona State Board, 2006). Responsibility for all aspects of the NCLEX-RN lies within the realm of the NCSBN. These responsibilities include writing, editing and modifying the exam, setting the pass rates for the exam, and following research to determine the effectiveness of the exam. This exam tests prospective nurses who have completed an approved nursing program to determine preparation to enter the nursing field. The exam is an
application-based, computerized adaptive test that tests graduates in the areas of medical knowledge and nursing skills (a2zcolleges, 2004).

The number of students seeking admission to nursing programs is plentiful, leaving schools with the task of selecting those who will be successful in the program and able to pass the NCLEX-RN. The selection criteria imposed by schools assist the schools in sorting those students who are prepared from those who are not. Throughout the state of Arizona, the curricula of nursing programs are similar but the admission screening processes are not. Screening variables may include various coursework in science, mathematics, English, psychology, and pre-nursing as well as writing samples, standardized pre-nursing admissions tests, letters of reference, and grade point average (GPA) on selected coursework (Arizona State Board, 2004).

A growing shortage of nurses nationwide has placed pressure on nursing schools to produce increasing numbers of qualified graduates to meet this workforce need. These graduates must be prepared to pass the NCLEX-RN, one of the certification requirements for becoming a nurse. The NCLEX-RN is a national exam taken by a nursing student after completing either a 2-year or 4-year nursing program. The passage of this exam makes the graduate eligible to apply for a registered nurse status. The NCLEX-RN score represents the attained skill level of the student after successful completion of a nursing program. The NCLEX-RN pass rate for an institution expresses the percentage of graduates who took the exam and obtained a score of 75% or higher on the first attempt. Collectively, the NCLEX-RN pass rate for an institution indicates the quality of the program and the ability of the institution to provide appropriate training to nursing
students entering the profession. It is this pass rate that is considered for the accreditation of a nursing program.

Because of its influence on the accreditation status of a nursing program, the NCLEX-RN is important to the design of a nursing program. The ASBN closely monitors the pass rates for each nursing program within the state. According to the ASBN, an institution whose overall student pass rate falls below the accepted norm of 75% of those students taking the exam for 2 consecutive years places its accreditation in jeopardy (Arizona State Board, 2005). Therefore, admission requirements, program content, course content, testing practices, and NCLEX-RN practice exams focus on the passing of the NCLEX-RN.

Pass rates on the post program national examination for licensing vary throughout the state (Arizona State Board, 2006). To meet the nursing shortage, schools must select those who are most appropriately prepared for the rigor of the program enabling students to pass the licensing exam on the first attempt. The determination of which program prerequisites and selection criteria best indicate a well-prepared student for the nursing curriculum, and thus able to pass the NCLEX-RN, is invaluable in setting appropriate standards in the admission process to ensure NCLEX-RN success upon program completion.

Statement of the Problem

The current nursing shortage was expected to reach its peak in 2006 (Shiber, 2003); however, statistics indicate the need is continuing to rise (Arizona Hospitals, 2007). This shortage has caused schools to respond by increasing the number of students allowed to enroll in Arizona nursing programs. Students must complete the nursing
program and pass the National Council Licensure Exam for Registered Nurses (NCLEX-RN) to become a registered nurse. Recent fluctuations in NCLEX-RN pass rates have raised concerns about student preparation for the nursing curriculum. From 2001 to 2003, the percentage of students passing the NCLEX-RN on the first attempt from Arizona community colleges varied from 83% to 91% (Arizona State Board, 2006). Individual colleges also experienced differences in pass rates. In 2002, Northland Pioneer College had a pass rate of 44%. In 2005, Central Arizona College and Yavapai Community College recorded pass rates of 100% (Arizona State Board, 2006). The fluctuating pass rates among Arizona nursing schools (Arizona State Board, 2004) warranted further study examining if a relationship exists between admission requirements and NCLEX-RN pass rates.

This mixed method study examined Arizona community colleges that offer the associate of applied science degree in nursing. The quantitative component included a statistical analysis between admission criteria and NCLEX-RN pass rates. Admission requirements included any combination of courses completed, standardized entrance exams, certifications, interviews, and written responses to posed questions. The qualitative component consisted of interviews with program directors to determine which qualifications a prospective nursing student should possess prior to admission to a nursing program to ensure NCLEX-RN success.

Purpose of the Study

The purpose of this mixed method study was to examine the relationship between prerequisite and admission requirements and NCLEX-RN first-time pass rates of students graduating with an associate of applied science degree in nursing from programs in
Arizona. A mixed method was appropriate as it examined the admissions process from both a quantitative and qualitative view enabling the researcher to consider the admissions process from two perspectives.

The quantitative portion was a statistical analysis between prerequisite and admission requirements and NCLEX-RN pass rates for each college. The qualitative element included the collection of information from nursing program directors regarding student preparation for nursing programs that leads to passing the NCLEX-RN. The design was appropriate as it examined the relationship between student preparation prior to admission in a nursing program and NCLEX-RN success following program completion.

Examination of the data from each of the selected colleges for the quantitative portion of this study sought to determine if a relationship existed between the independent variables and the dependent variable. The independent variables included prerequisite and admission requirements for nursing programs from the 10 Arizona community college districts that offer the associate of applied science degree in nursing. These prerequisite and admission requirements included a combination of courses the students must complete, GPAs, standardized entrance exams, certifications, interviews, and written responses to posed questions. The dependent variable was the first-time NCLEX-RN pass rate. An analysis of prerequisite and admission requirements and the NCLEX-RN pass rates examined if there was a relationship between the independent and dependent variables.

Data collected included nursing program admission criteria for students admitted to the fall 2003 and fall 2004 nursing classes. The students admitted to each college in the
fall 2003 cohort are the students who graduated in the spring semester of 2005. Those admitted in the fall of 2004 graduated in the spring of 2006. After graduation, these students were eligible to take the NCLEX-RN. For each school, the collection and analysis of the first time pass rate with respect to the prerequisite and admission requirements revealed if a relationship between the independent and dependent variables existed.

The qualitative portion of the study used an interview format. Interviews took place with the directors of nursing from each school. The examination of the interview responses looked for patterns in the responses, indicating which pre-qualifications for admission to a nursing program a director perceived indicated NCLEX-RN success.

Significance of the Problem

Due to the current nursing shortage and the expenses for both the student and the institution, this study was significant. The current nursing shortage was expected to reach its projected peak in 2006 (Shiber, 2003) but has continued to climb (Arizona Hospital, 2007). The cost of educating a nursing student exceeds that of a general studies student. Nursing programs have a heavy impact on school resources (Career & Technical Education, 2006). The admission of students who are most ready for the intensity of a nursing program leads to program success as those who enter the program and do not complete or do not pass the NCLEX-RN represent wasted resources. This study was significant because the identification of properly prepared students results in higher NCLEX-RN pass rates and, therefore, more nurses to combat the nursing shortage.

This study was significant in the field of educational leadership in the areas of fiscal responsibility, curriculum alignment, and program stability. Distribution of fiscal
resources in an era of limited educational funding demands that leaders make sound judgments in the allocation of funds. Admitting students who are better prepared to be successful in a program ensures increased revenues for the institution by maintaining more students in the program.

Appropriate curriculum alignment places coursework in the correct sequence for students to move successfully through the program. Preprogram coursework is an important element of curriculum alignment as it increases the preparedness of students prior to entrance. Educational leaders make decisions regarding curriculum alignment. The results of this study will assist the leader in determining which admission requirements represent the most effective curriculum alignment.

Program stability includes continued accreditation of a nursing program by the ASBN. The ASBN, as with boards in other states, uses NCLEX-RN pass rates in the reaccreditation process for nursing programs. In the state of Arizona, schools must maintain a pass rate of 75% or higher on the NCLEX-RN. The results of this study will assist the directors of nursing with creating the appropriate program admission criteria, leading to increased NCLEX-RN pass rates and sustainable program accreditation.

Nature of the Study

This mixed method study viewed the selection of nursing students from a quantitative and qualitative perspective. The quantitative portion was a statistical analysis between the prerequisite and admission criteria of each program and NCLEX-RN pass rates for the program. The qualitative portion examined information collected from the director of nursing for each program in the study defining how the director determines which students possess the preparation required for the rigor of the nursing program and
the NCLEX-RN exam and the perception of the director as to how successful the process for this determination is.

The proposed method and design were comprehensive in nature. Previous studies provided information on preprogram coursework with relation to NCLEX-RN pass rates. These studies did not focus on the admission process, which can contain more than coursework alone. The study took into account the entirety of the prerequisite and admission criteria for students to provide a greater understanding of which elements relate to student success.

Previous studies used a scoring matrix (Barkley, Rhodes, & DuFour, 1998). Researchers were looking for specific coursework prior to or during the nursing program. An assigned score indicated the presence or absence of the course, and some studies indicated the level of the course. While this method accounted for the course in the curriculum, it did not consider the course solely as a prerequisite and did not consider that course in relation to other admission requirements for the program.

The mixed method study is unique and comprehensive in nature as it considers more than just the quantitative comparison of admission requirements with NCLEX-RN success. The qualitative portion brought to light the collective knowledge of the directors of nursing who have firsthand experience with student admissions and NCLEX-RN pass rates. Together, the results from each part helped to isolate those prerequisite and admission criteria that selected the most appropriately prepared students for passing the NCLEX-RN upon completion of the nursing program.
Research Questions

This research project had three questions. These questions were appropriate and focused on the independent and dependent variables. This study explored if a relationship exists between the admission requirements of a nursing program and the NCLEX-RN success rate. In the state of Arizona, there are no restrictions on the number or type of prerequisite coursework or admission requirements. Institutions may have no screening requirements and admit students from a wait list while other institutions have a large number of admission requirements and admit students through a selection process. The first research question was:

1. Is there a significant positive relationship between admission requirements and NCLEX-RN pass rates?

Recent studies have focused on science courses contained as prerequisites to and within a nursing program (Collins, 2002; Marshall, 2006; Washington & Perkel, 2001; Yin & Burger, 2003). These studies have found a relationship between NCLEX-RN pass rates and science courses without delineating whether the course is a prerequisite or co-requisite of the nursing curriculum. This study focused on the role of prerequisites and admission criteria in the selection of prepared students prior to admittance to the nursing program. The second research question viewed the science curriculum from a prerequisite perspective. The second research question was:

2. Is there a significant positive relationship between science courses in the admission requirements and NCLEX-RN pass rates?

Recent research determined a positive relationship between the use of standardized testing and NCLEX-RN pass rates (Briscoe & Anema, 1999; Luoma, 2003;
Sayles, Shelton, & Powell, 2003). Those programs using standardized testing throughout the program or as an exit requirement from the program had a higher pass rate on the NCLEX-RN than programs not using this type of testing (Briscoe & Anema, 1999; Burckhardt, 2004). Standardized testing is also available for the prescreening of students to determine the level of preparation for the nursing curriculum. The relationship between the use of standardized testing as an admission tool and NCLEX-RN pass rates needed to be determined. The third research question was:

3. Is there a significant positive relationship between standardized preadmission testing and NCLEX-RN pass rates?

These three questions guided the researcher in data collection. The prerequisite and admission criteria taken from each community college nursing program compared with the NCLEX-RN pass rate for that school was the foundation for the analysis of the study. The results of this analysis determined the answers to these research questions.

Hypotheses

In alignment with the above research questions, the following null and alternative hypotheses applied to this study.

\( H_0: \) Programs with a greater number of admission requirements will not have a higher pass rate on the NCLEX-RN than programs with fewer prerequisite requirements.

\( H_1: \) Programs with a greater number of admission requirements will have a higher pass rate on the NCLEX-RN than programs with fewer prerequisite requirements.
$H_0$: Programs with a greater number of science course prerequisite
requirements will not have a higher pass rate on the NCLEX-RN than
programs with fewer science course prerequisite requirements.

$H_1$: Programs with a greater number of science course prerequisite
requirements will have a higher pass rate on the NCLEX-RN than
programs with fewer science course prerequisite requirements.

$H_0$: Programs that require standardized preadmission testing with minimum
cut off scores will not have a higher pass rate on the NCLEX-RN than
programs not using standardized preadmission testing or with lower cut
off scores.

$H_1$: Programs that require standardized preadmission testing with minimum
cut off scores will have a higher pass rate on the NCLEX-RN than
programs not using standardized preadmission testing or with lower cut
off scores.

This study helped to determine the appropriate number and type of prerequisites
and admission criteria to predict NCLEX-RN success. The above hypotheses were
appropriate as they indicated the relationship between prerequisite and admission criteria
with NCLEX-RN success.

Theoretical Framework

The theoretical framework for this study was founded in the social cognitive
theory as defined by Albert Bandura (1986). A basic premise of the social cognitive
theory is that human functioning is defined through environmental events interacting with
each other to determine the best course of action for the desired results to occur. Systems
theory engrained in social cognitive theory can offer a structure for the development of an appropriate prerequisite and admission process for nursing programs as successful outcomes determine appropriate actions to obtain these outcomes (Bandura, 1986).

Although the social cognitive theory has a primary application to individual human behaviors, the theory can be applied to the behaviors associated with program prerequisites and admission processes (Bandura, 1986). The prerequisites and admission processes are behaviors that can be modified if the resulting outcomes do not reflect the desired outcomes. If the NCLEX-RN first time pass rates for a given program are unacceptable, the program manager can modify the prerequisites or admission process in order to achieve the desired outcome. The social cognitive theory defines itself through maintaining those behaviors that result in successful consequences and eliminating those that result in failure (Bandura, 1986).

Bandura (1986) stipulates that the proximity, difficulty, and specificity of the desirable goal can have an effect on the behaviors associated with achieving that goal. Proximity refers to the timing of the goal and whether it is a short term or long term goal. Difficulty refers to the amount of effort that must be expended in order to reach the goal. Specificity refers to selecting goals with precise standards in order to enhance performance. It is the concept of specificity that is most relevant to this study. Specific goals are beneficial to the learning process because they provide the learner with a clear path to success (Bandura, 1986). In the selection of nursing students, the appropriate prerequisite and admission criteria provide students with the proper preparation for successfully achieving the specific goal of passing the NCLEX-RN.
The principles of the social cognitive theory have also been applied to the concepts of self-regulation. Zimmerman, Bonner, and Kovach (1996) discussed the cyclical nature of self-regulation as containing three significant stages. These stages include forethought, performance, and self-reflection. Each stage lends itself to creating a successful outcome.

Forethought is the planning done to determine the course of action to be taken to reach the goal. Performance is following through with the determined course of action. Self-reflection is an evaluation of the performance, leading to forethought in determining if the same course or a different course should be taken the next time the goal is attempted (Zimmerman, Bonner, & Kovach 1996). If the self-reflection indicates the goal was attained in a positive and appropriate manner, no modifications in the course of action would be indicated. If the goal was not attained or indications show an alternative course of action would achieve the goal in a better way, modifications for the next attempt should be made.

In relation to the selection of well prepared nursing students for a nursing program, this three stage cycle of self-regulation assists in designing the screening criteria for applicants. The forethought component affects the way the department determines which prerequisites and admission criteria will be used. The performance stage refers to those students completing the program and taking the NCLEX-RN exam. The self-reflection stage occurs when the department reviews the first time pass rates and determines if modifications need to be made to the prerequisite and admission requirements. After making modifications, the cycle repeats itself, allowing the
department to review and improve the prerequisite and admission requirements in order to select those students most capable of passing the NCLEX-RN.

Social cognitive theory maintains that consequences due to choices made while pursuing a specific goal provide feedback regarding the accuracy and appropriateness of those choices. The theory emphasizes the importance of reflecting upon choices or actions made in the pursuit of a goal to determine if those choices or actions were correct or in need of modification. Nursing programs must constantly monitor student performance on the NCLEX-RN. If the program realizes a drop in first time pass rates, modifications to the program must be made in order to improve student performance of first time pass rates.

Definition of Terms

For the purpose of this research, the following were operationally defined:

1. The National Council Licensure Exam for Registered Nurses (NCLEX-RN) is the required professional examination for nurses. Passage of the exam at 75% is one of the requirements to be a registered nurse.

2. The Arizona State Board of Nursing (ASBN) is the professional organization that monitors and accredits nursing programs in the state of Arizona.

3. Prerequisite and admission requirements included any combination of (a) college composition I, (b) college composition II, (c) intermediate algebra, (d) college algebra, (e) cellular biology, (f) anatomy and physiology I, (g) anatomy and physiology II, (h) preparatory chemistry, (i) college chemistry, (j) introductory psychology, (k) certified nursing assistant, (l)
standardized testing, (m) reference letters, (n) interview, (o) grade point average, (p) written responses to posed questions, and (q) other courses.

4. Student selection process refers to the application of the prerequisite and admission requirements to choose those students admitted to a nursing program.

5. A first time pass rate refers to the percentage of students who have passed the NCLEX-RN on the first attempt.


Assumptions

This study assumed the curricula for the nursing programs throughout the state of Arizona are similar. The rationale for this assumption was that the development of the curriculum for each program follows policies set forth by the ASBN. Further, the education committee of the ASBN and the ASBN itself requires review and acceptance of curriculum for each program prior to program approval and delivery (Arizona State Board, 2006).

This study assumes the deliveries of the curricula are similar throughout the state and produce the same learning outcomes. The rational for this assumption was the ASBN sets the minimum competencies for instructors. The results of this study are most useful to nursing programs within the state of Arizona and to those states with similar nursing program standards.

This study assumed that admitted students fully meet the educational institutions prerequisite and admission criteria. Further, it assumed that those criteria are consistently
applied. If substitutions were made for any of the prerequisite or admission criteria, this study assumed those substitutions were equivalent to that which was being substituted.

Scope, Limitations, and Delimitations

This study was limited by the responses given by each director of nursing regarding the accepted admission requirements for each program. The study assumed each director of nursing provided accurate information regarding the fall 2003 and fall 2004 prerequisite and admission requirements applied. This study was further limited by the accuracy of the NCLEX-RN data provided by the ASBN. The ASBN collects and collates all NCLEX-RN pass rate data for the community colleges. The accuracy of the data presented in the study depended on the accuracy of the data contained in the ASBN database.

This study confined itself to surveying nursing programs at the 10 public community colleges in the state of Arizona. This study focused on the prerequisite and admission requirements for each program. Only the accepted prerequisite and admission requirements for each program were included in the study. This study confined itself to the NCLEX-RN pass rate data on record at the ASBN for the spring 2005 and 2006 graduating classes from each of the 10 Arizona community college districts.

The data analysis of this study used the chi square test and Spearman rho. The chi square is sensitive to small sample size and data that does not follow a normal distribution and is applicable to nominal and ordinal data (Pagano, 1986). Spearman rho is sensitive to small sample size and data that does not follow a normal distribution (Pagano, 1986). The data collected was summarized into a contingency table with ordinal data to avoid concerns of dichotomous data. The chi square test and Spearman rho are
reliable statistical tools that measure the strength of association among variables (Neuman, 2003).

Summary

The challenge of meeting the current nursing shortage requires the accurate selection and placement of students into nursing programs. This study looked to determine which prerequisite and admission criteria most accurately selected those students capable of completing a nursing program and passing the NCLEX-RN. Chapter 1 gave a brief overview of the study.

This mixed method study included the 10 Arizona public community college districts. The quantitative portion of the study compared the prerequisite requirements and the admission processes for each district against the NCLEX-RN pass rates. A statistical analysis determined which prerequisite and admission processes indicated NCLEX-RN success. The qualitative portion involved an interview with the directors of nursing from the 10 community college districts. Each director discussed what qualifications were perceived to best identify a student who is prepared for the rigor of the nursing curriculum and will be able to pass the NCLEX-RN.

Previous studies have indicated a positive relationship between science coursework, whether taken before or during the program, and NCLEX-RN success (Collins, 2002; Hardin, 2005; Marshall, 2006; Simon, 2006; Washington & Perkel, 2001; Yin & Burger, 2003). Other studies have indicated a positive relationship between standardized testing throughout the program and NCLEX-RN success (Briscoe & Anema, 1999; Buttry, 2003; Luoma, 2003; Matos, 2007; Sayles, Shelton, & Powell,
2003). Chapter 2 provides a thorough review of current literature related to this research topic.
CHAPTER 2: REVIEW OF THE LITERATURE

Due to the recent nursing shortage, schools and colleges must increase the capacity of their nursing programs to meet the critical need for nurses that is expected to reach its peak in 2006 (Shiber, 2003). A recent drop in pass rates has brought concern about performance on the National Council Licensure Exam for Registered Nurses (NCLEX-RN). To meet the nursing shortage need, students must complete the nursing program and pass the NCLEX-RN. The fluctuating pass rates among Arizona nursing schools (Arizona State Board, 2006) indicates further need for study examining the relationship between program prerequisites and NCLEX-RN pass rates. The purpose of this mixed method study was to determine if a relationship exists between admission and selection requirements and NCLEX-RN pass rates of students in associate of applied science degree in nursing programs in Arizona.

The scope of the literature available for the subject area of NCLEX-RN pass rates and what most influences the pass rate for an individual student or educational institution is not extensive. Data bases for dissertations and peer reviewed articles, journals, and books were reviewed to find all subject matter related to the NCLEX-RN. While this search produced a variety of feedback in multiple areas of concern for the NCLEX-RN, the amount of available information was limited. This limited amount of information emphasized the need for the study.

The analysis of data for this study from the 10 community college districts in the state of Arizona that offer associate of applied science degree in nursing programs produced the information needed to respond to the research questions. Data collected
included nursing student admission and selection criteria for the independent variables. The NCLEX-RN pass rate for each institution was the dependent variable.

The independent variables included the admittance requirements and process. The dependent variable for this study was the NCLEX-RN pass rate for each community college. This certification exam motivates the design of a nursing program due to its tie with accreditation. Research studies have analyzed the influence among program coursework (Bonte-Eley, 2002; Briscoe & Anema, 1999; Buttry, 2003; Collins, 2002; Engelmann, 2002; Hardin, 2005; Marshall, 2006; Matos, 2007; Milow, 2005; Simon, 2006; Washington & Perkel, 2001; Yin & Burger, 2003), standardized testing associated with the program (Briscoe & Anema, 1999; Campbell, 2006; Eddy and Epeneter, 2002; Engelmann, 2002; Hoffman, 2006; Luoma, 2003; Marshall, 2006; Matos, 2007; Sayles, Shelton, & Powell, 2003), program and preprogram academic performance, including work done in high school (Briscoe & Anema, 1999; Buttry, 2003; Campbell, 2006; Collins, 2002; Engelmann, 2002; Hardin, 2005; Harris, 2006; Milow, 2005; Simon, 2006; Washington & Perkel, 2001; Yin & Burger, 2003), required certifications prior to admission (Bonte-Eley, 2002), and demographic information (Bonte-Eley, 2002; Briscoe & Anema, 1999; Hardin, 2005; Milow, 2005; Washington & Perkel, 2001; Yin & Burger, 2003) with NCLEX-RN success rates. Studies also exist that analyzed the relationship between demographic information and the contextual factors related to this study with NCLEX-RN success rates. Discussion of these studies follows in this chapter.

Historical Perspective

The process by which nursing programs obtain approval and accreditation began early in the 20th century. Prior to that time, individual states did not have standards that
were agreeable within each state or with other states. In response to this, nursing professionals created boards in each state charged with establishing and communicating standards for each state. To facilitate communication between states and to develop nationally recognized nursing standards, the National Council of State Boards of Nursing (NCSBN) was established. These boards set standards, including those governing the registration of nurses, ensuring the protection of the health, safety, and welfare of the public while receiving nursing care (National Council, 2006).

The NCSBN now has a membership of the 50 states and approximately 10 United States territories (National Council, 2006). Along with program regulation, the NCSBN is responsible for the NCLEX-RN. These responsibilities include writing and modifying the exam as needed according to research and testing results. This exam tests prospective nurses who have completed an approved nursing program to determine preparation to enter the nursing field. The exam is a computerized adaptive test that is application based, and tests graduates in the areas of medical knowledge and the skills involved in nursing (a2zcolleges, 2004).

Independent Variable

The NCLEX-RN is the culminating experience for students who would become nurses. Given the fluctuating pass rates among Arizona nursing schools (Arizona State Board, 2004); further study examining the impact between program prerequisites, admission requirements, and NCLEX-RN pass rates at the program level was warranted. This section closely examines the independent variables and the relationship to the dependent variable through the findings in other research studies. Studies have analyzed the relationship among (a) preprogram preparation, (b) program coursework, (c)
demographic information, and (d) standardized practice exams with NCLEX-RN success rates. While the studies reviewed represent multiple perspectives on the best predictors of NCLEX-RN pass rates, outcomes from the various studies both contradict and reinforce each other.

*Preprogram Preparation as a Predictor of NCLEX-RN Success*

Preprogram preparation includes the coursework or other requirements completed by a student prior to entering a nursing program. This category also includes high school coursework, standardized high school graduation exams, high school rank and grade point average (GPA). Studies centered on preprogram preparation seek to determine the preparation of a student for the content and rigor of a nursing program. The NCLEX-RN serves as a determinant of this preparedness (Hawkins, 2000; Smith, 2002).

Briscoe and Anema (1999), Engelmann (2002), and Henriques (2002) determined preprogram GPA does not indicate whether a student will be successful on the NCLEX-RN. There is no significant difference in pass rates between students earning a preprogram GPA below 2.45 and those above 2.5. Contradicting this finding, Hardin (2005), Milow (2005), and Yin and Burger (2003) determined the GPA of college work prior to admission to the nursing program is a strong indicator of success on the NCLEX-RN. Additional findings by Yin and Burger (2003) indicated the GPA in science courses, psychology grade, and class rank in high school strongly relate to NCLEX-RN pass rates. Simon (2006) and Hardin (2005) concurred with the findings that a higher science course GPA indicates a greater chance of passing the NCLEX-RN on the first attempt. Yin and Burger (2003) also found that high school GPA, and American College Testing score held no relation to pass rates. Washington and Perkel (2001) found that transfer GPA has
a significant effect on NCLEX-RN pass rates reinforcing the findings of Yin and Burger (2003). Further, Collins (2002) found a positive relationship between preprogram GPA and pass rates. The author also considered the preprogram GPA in the four prerequisite science courses including microbiology, anatomy and physiology I and II, and chemistry. A positive relationship exists between the preprogram science courses GPA and NCLEX-RN pass rates. Concurring with these findings, Marshall (2006) found that GPA on the core program courses is the best predictor of NCLEX-RN success and is a more accurate predictor than the ACT test score. Contradicting these studies, Harris (2006) and Henriques (2002) found that GPA is not a factor in determining NCLEX-RN success.

Some nursing programs require a student to be a Certified Nursing Assistant (CNA) as a program prerequisite. Bonte-Eley (2002) found that 78% of the students passing the NCLEX-RN held CNA registrations. The findings of this study relate CNA to NCLEX-RN success.

The Nurses Entrance Test (NET), designed to measure the level of student preparation and to predict if a student will be successful in a nursing program, is a common tool used in the admission process of nursing programs. Sayles, Shelton, and Powell (2003) and Silage (2002) determined that the NET may be a useful predictor of NCLEX-RN success. Another pre-admission standardized testing tool is the National League for Nursing Practical Nurse Pre-admission exam (NLN PN Pre-admission). Luoma (2003) determined the verbal sub score on this exam holds a high correlation with NCLEX-RN success.

Other exams designed to measure preprogram preparedness include the Diagnostic Readiness Test (DRT), the California Critical Thinking Disposition Inventory
(CCTDI), the California Critical Thinking Test (CCTT), the Prenursing Guidance Test (PGT), and the Mosby Test. Findings regarding the relationship between preprogram testing with regard to the above mentioned tests and NCLEX-RN success vary. Henriques (2002) found that the DRT score is associated with NCLEX-RN success where the CCTDI, CCTT, and PGT are not related to NCLEX-RN success. Milow (2005) discovered that the Mosby test score is related to NCLEX-RN success. Campbell (2006) and Hoffman (2006) determined that standardized testing is a highly accurate predictor of NCLEX-RN success. Those students who score above a predetermined level on standardized tests will pass the NCLEX-RN while those falling below that cut off will fail. Yet in conflict, Turner (2005) found that standardized testing, in general, holds no relationship to NCLEX-RN success.

Standardized diagnostic reading exams are also used as an admission criteria for nursing programs. Henriques (2002) and Silage (2002) determined the Nelson-Denny reading test score is related to NCLEX-RN success. The scoring result of the Nelson-Denny exam is given as a reading level associated with grade level. Therefore, Henriques (2002) and Silage (2002) determined that the higher the reading level the greater the probability of passing the NCLEX-RN on the first attempt.

*Program Coursework as a Predictor of NCLEX-RN Success*

Program coursework included all coursework a student must take as part of the nursing degree after acceptance to the program. These courses can include but are not limited to nursing, anatomy and physiology, microbiology, nutrition, psychology, and liberal studies courses. Studies centered on program coursework seek to determine if a program of study or certain elements within that program convey the appropriate
knowledge so the student may become a registered nurse. The NCLEX-RN serves as an assessment of the learning of the nursing curriculum.

Briscoe and Anema (1999) found that students who had failed a nursing course within the nursing program had no difference in pass rates from those students who passed each class on the first attempt. Harris (2006) concluded that students who repeat a science course do not have a significant difference in first time pass rates from those who do not need to repeat a course. Contradicting this finding, Washington and Perkel (2001) determined that students who repeat nursing and science courses have a lower pass rate on the NCLEX-RN. Buttry (2003) concurs with these findings with regard to the medical/surgical nursing course. Bonte-Eley (2002) found that students who received an A in the Introduction to Nursing course pass the NCLEX-RN on the first attempt. Sayles, Shelton, and Powell (2003) determined performance in the final nursing theory course may be a useful predictor of NCLEX-RN success. Simon (2006) and Matos (2007) determined performance in all nursing courses is related to NCLEX-RN success.

Cumulative program GPA also holds a relationship with the success rate of students on the NCLEX-RN (Matos, 2007; Washington & Perkel, 2001). Collins (2002) investigated the relationship between the three nursing theory course GPAs and pass rates. These courses include Fundamentals of Nursing, Medical-Surgical Nursing I, and Drug Theory. Findings indicated a positive correlation between nursing theory courses GPA and NCLEX-RN pass rates. Matos (2007), Milow (2005) and Hardin (2005) studied the relationship between the GPA of students in nursing theory courses and NCLEX-RN success. The researchers obtained the same conclusion that nursing theory courses GPA is related to NCLEX-RN success.
Other Nursing Degree Curricula

Outside of the nursing course curriculum, but part of the nursing degree, Yin and Burger (2003) discovered that English grades held no correlation with NCLEX-RN pass rates. Luoma (2003) studied the relationship between the end of semester GPA and NCLEX-RN success rates. In this study, the author tracked the end of the semester GPAs for each student and the performance of the student on the NCLEX-RN. The results indicated that there is no correlation between these two variables. Although the findings of various research studies between nursing program coursework and NCLEX-RN pass rates are contradictory, the majority of the research points to a positive correlation between nursing program coursework and NCLEX-RN success.

Standardized Exams as a Predictor of NCLEX-RN Success

Standardized exams include exams given during the program modeled after the NCLEX-RN. National companies such as Education Resources Incorporated produce and validate these exams. Studies performed to determine the relationship between standardized tests and NCLEX-RN pass rates have a common positive outcome.

For example, Eddy and Epeneter (2002) performed a qualitative study interviewing an equivalent number of students who had passed the NCLEX-RN and those who had not passed to gain information regarding the students’ preparation for taking the exam. The findings indicated programs based on written work enhance the critical thinking skills of students but do not prepare the students for multiple choice tests. The NCLEX-RN exam is a multiple-choice, computer adaptive test. The authors recommend that nursing programs include practice on standardized, computerized multiple-choice tests to prepare students for the NCLEX-RN testing environment. Briscoe and Anema
(1999) found a correlation between those students who passed the National League for Nursing I (NLN I) and the NCLEX-RN and the National League for Nursing II (NLN II) and the NCLEX-RN. This study indicates that students who pass standardized exams have a stronger probability of passing the NCLEX-RN. Buttry (2003) found that students who pass the National League for Nursing Mobility Profile I (NLNMPI) exam have a higher pass rate on the NCLEX-RN than those who do not pass the exam. The NLNMPI exam is a transitional exam given to Licensed Practical Nurses prior to entering the second year of nursing school study to become an RN (Buttry, 2003). Sayles, Shelton, and Powell (2003) determined performance on the Preregistered Nurse (PreRN) examination may be a useful predictor of NCLEX-RN success. Luoma (2003) found the National League for Nursing Practical Nurse Comprehensive Achievement test scores, given at the end of the program, have a correlation to success on the NCLEX-RN. Matos (2007) found that the use of the Educational Resources Incorporated Registered Nurse Assessment exams throughout the nursing program had a positive relationship with success on the NCLEX-RN.

New Mexico State University (NMSU) implemented the Health Education Systems, Inc exam as a graduation requirement for their nursing program due to research findings indicating practice on standardized tests increases student performance on NCLEX-RN. Students must pass the exam in order to graduate from the nursing program at NMSU regardless of the performance of the students in the program. Guzman (2004) performed a qualitative study to determine the reaction of the students to this new requirement. Findings indicated students believe the low pass rate at the school related to inadequate instruction and not the lack of practice with standardized tests. Further,
students were highly resistant to the implementation of this requirement in such quick fashion. The opinion of the students in this qualitative study represents an opposing viewpoint to the quantitative research that found a positive relationship between standardized test practice and NCLEX-RN pass rates.

The Kaplan Diagnostic Exam is given to students after graduation from a nursing program and is part of the Kaplan Preparation Course. The Kaplan program is designed to prepare students to pass the NCLEX-RN. Burckhardt (2004) discovered that students who take the Kaplan Preparation Course and pass the Kaplan Diagnostic Exam have a higher probability of passing the NCLEX-RN than those who do not take the Kaplan program.

*Demographic Characteristics as a Predictor of NCLEX-RN Success*

Demographic information includes other factors not considered in program prerequisites, program curriculum, or standardized testing such as age, gender, race, socio-economic status, and the motives of students seeking additional degrees. The results of research studies covering demographics vary greatly with many contradictions in the findings and conclusions.

Briscoe and Anema (1999) and Milow (2005) determined there was a significant difference in pass rates with relation to the age of the student. Findings indicated older students had a higher pass rate on the NCLEX-RN than younger (less than 25 years old) students. Bonte-Eley (2002) concurred with this conclusion as the findings of her study indicated students under the age of 25 had a higher failure rate on the NCLEX-RN than those students over age 25. Seago and Spetz (2005) found racial and ethnic characteristics including language and culture may have a negative affect on NCLEX-RN success rates.
Students with a primary language or culture not associated with traditional white American ways will be disadvantaged when taking the NCLEX-RN. Contradicting these findings, Washington and Perkel (2001) found no significant relationship between ethnicity, age, and primary language with success on the NCLEX-RN. Hardin (2005) and Yin and Burger (2003) also found no correlation between ethnicity and age with relation to NCLEX-RN pass rates. The authors found gender was not significant in predicting pass rates.

*Predictors of NCLEX-RN Success Needing Further Study*

Within the literature, multiple studies exist involving the independent variables; however, these studies tend to focus on a sample of each cluster of the independent variables. For example, one study looked at age, science courses within the program, and the uses of the NLN I and II. Studies focusing solely on prerequisites and preprogram preparation with respect to NCLEX-RN success do not exist. Due to the rigor of nursing curriculum and the need to admit well-prepared students in order to develop competent nurses who can be successful in their program and pass the NCLEX-RN, this study was appropriate and timely.

The review of the literature primarily found a positive relationship among certain independent variables selected from preprogram preparation, program content, and standardized testing and NCLEX-RN success. With regard to preprogram preparation, the majority of research indicated GPA is a strong indicator of NCLEX-RN success (Briscoe & Anema, 1999; Campbell, 2006; Collins, 2002; Hardin, 2005; Milow, 2005; Simon, 2006; Washington & Perkel, 2001; Yin & Burger, 2003). During the nursing program, positive performance in nursing classes, particularly theory courses, indicated NCLEX-
RN first time success (Bonte-Eley, 2002; Briscoe & Anema, 1999; Hardin, 2005; Matos, 2007; Milow, 2005; Sayles, Shelton, & Powell, 2003; Simon, 2006). Further, standardized exams held the most agreement between quantitative research studies (Briscoe & Anema, 1999; Burckhardt, 2004; Buttry, 2003; Campbell, 2006; Henriques, 2002; Hoffman, 2006; Luoma, 2003; Matos, 2007; Milow, 2005; Sayles, Shelton, & Powell, 2003; Silage, 2002; Turner, 2005). Studies indicated that students who perform favorably on standardized practice exams are more inclined to pass the NCLEX-RN exam. Due to contradictions in the findings, global application of the results is not possible. Each researcher cautioned global application and indicated more study is necessary in the area of proper NCLEX-RN preparation and prediction of success.

Not found were studies that sought to determine the relationship between program admission and selection requirements and NCLEX-RN success. In order for a student to be successful in a nursing program, the student must be academically prepared for the rigor of the program. This study examined the relationship between prerequisite and admission requirements for associate of applied science degree in nursing programs, the independent variables, and NCLEX-RN pass rates, the dependent variable.

The studies included in this literature review looked at the independent variables as the student progresses through the program of study and the relationship with NCLEX-RN success. What is missing in the literature is attention paid to the characteristics of the inbound nursing students as a cohort of students that predict NCLEX-RN success. The study held the effects of instruction as a constant due to the constraints placed on each program by the ASBN. The study focused on the prerequisite and admission criteria with relation to NCLEX-RN success with the belief that it is not the treatment of the students
while in the program that indicates NCLEX-RN success but rather who enters the program.

Dependent Variable

Arizona community colleges are increasing the capacity of nursing programs to meet the need for more nurses due to the current critical nursing shortage (Arizona Hospitals, 2007). To meet this need, students must complete nursing program coursework and pass the NCLEX-RN. Pass rates in the state of Arizona have been unstable over the last 7 years. From 1998 to 2005, the statewide pass rate average changed from 83% to 91%. Individual colleges reported pass rates from 44% to 100% in the same period (Arizona State Board, 2004). Given the fluctuating pass rates among Arizona community college nursing schools, the need was clear for further study of possible relationships between program prerequisite and admission requirements and NCLEX-RN pass rates.

The dependent variable for this study was the NCLEX-RN pass rate for each community college. The ASBN closely monitors the pass rate for each nursing program within the state. An institution whose pass rate falls below the accepted norm of a 75% pass rate for 2 years in a row places their accreditation in jeopardy (Arizona State Board, 2006). Therefore, admission requirements, program content, course content, testing practices, and NCLEX-RN practice exams focus on the passing of the NCLEX-RN.

The NCSBN creates and monitors the NCLEX-RN. A committee appointed by the NCSBN whose membership is comprised of a variety of nursing professionals maintains the exam. The questions contained on the multiple choice, computer adaptive exam tests the students on skills practiced by nurses (a2zcolleges, 2004).
Research regarding the applicability of the NCLEX-RN to skills used by practicing nurses on the job is minimal. The NCLEX-RN exam is designed to determine if a prospective nurse is prepared to be a safe, practicing nurse. Research results indicated opposing conclusions regarding the validity of the NCLEX-RN.

For example, Smith (2002) performed a study that tested the relevance of the questions contained on the NCLEX-RN exam with those new to the nursing field. The study used the Registered Nurse (RN) Practice Analysis survey developed by a 12 member panel of expert, practicing nurses who either worked with or supervised entry-level nurses. The survey contained 189 activities an entry level nurse performs. From the 15,026 nurses who passed the NCLEX-RN from December 1998 to March 1999, the researcher used a stratified random sample of 3,450. Of the 1,776 returned, a 52% return rate, 391 were not working as nurses leaving 1,385 analyzable surveys. Results indicated 96% of the respondents reported the activities listed in the survey represented skills practiced on the job as an entry level nurse. The findings of this study supported the use of the NCLEX-RN as an appropriate testing tool to determine preparation for an entry-level nursing position.

Hawkins states, “NCLEX-RN is a high-stakes, psychometrically sound and legally defensible examination that all state boards of nursing use to measure entry level competence” (2000, p. 2). Due to this statement, Bersky (1994) studied the effective measure of abilities between multiple choice tests, as is the NCLEX-RN, with computerized clinical simulation testing. The findings indicated computerized clinical simulation testing is a better assessment of the competence and decision-making abilities of a nurse. The NCLEX-RN is not a clinical simulation test but rather a computerized
adaptive test covering situations in nursing. The findings of this study did not support the use of the NCLEX-RN as an appropriate evaluation tool for nursing readiness.

Although studies point to different independent variables as indicators of success on the NCLEX-RN, graduates of nursing programs place success or failure elsewhere. Eddy and Epeneter (2002) found that students felt no specific factor/element within the nursing program prepared them for the exam. This qualitative study sought to gain insight on the perception of the graduates on how the nursing program did or did not prepare the students to take the NCLEX-RN exam. The population for the study included 19 graduates from a nursing program in Oregon. Of the 19 graduates, 10 students had passed the exam and 9 had not. Through telephone interviews, the researchers found themes in three areas including the responsibility of the learner, examination issues, and program issues. The group of graduates who passed the exam indicated ownership of the responsibility for passing belonged to the students. The group who failed believed the students did not own the responsibility for failure. Both groups believed nothing had prepared the students for the exam. The amount of critical thinking skills and the way the exam switched from one area of nursing to another was quite difficult. “Program issues,” as reported by the students, related to the type of program in place at the Oregon university (Eddy & Epeneter, 2002). The program emphasizes critical thinking skills and assesses progress through written work. The NCLEX-RN is a multiple-choice exam. The academic environment at the Oregon university creates students not accustomed to the multiple choice environment of testing; therefore the students performed poorly on the NCLEX-RN.
Within the context of this study, the NCLEX-RN score represents successful completion of a nursing program by the student. Collectively, the NCLEX-RN pass rate for an institution indicates the quality of the program and the ability of the institution to provide appropriate training for the nursing profession to nursing students. The scope of the literature on this variable is not extensive but includes studies linking NCLEX-RN pass rates with program coursework (Bonte-Eley, 2002; Briscoe & Anema, 1999; Buttry, 2003; Collins, 2002; Engelmann, 2002; Hardin, 2005; Marshall, 2006; Matos, 2007; Milow, 2005; Simon, 2006; Washington & Perkel, 2001; Yin & Burger, 2003), standardized testing associated with the program (Briscoe & Anema, 1999; Campbell, 2006; Hoffman, 2006; Eddy and Epeneter, 2002; Engelmann, 2002; Luoma, 2003; Marshall, 2006; Matos, 2007; Sayles, Shelton, & Powell, 2003), program and preprogram academic performance, including work done in high school (Briscoe & Anema, 1999; Buttry, 2003; Campbell, 2006; Collins, 2002; Engelmann, 2002; Hardin, 2005; Harris, 2006; Matos, 2007; Milow, 2005; Simon, 2006; Washington & Perkel, 2001; Yin & Burger, 2003), and required certifications prior to admission (Bonte-Eley, 2002).

Barkley, Rhodes, and Dufour (1998) developed the Risk Appraisal Instrument (RAI) and used it to predict NCLEX-RN success in several studies. The RAI instrument is a rubric that incorporates student performance on different elements and courses contained within the program to predict success on the NCLEX-RN. The results of each study varied in both the findings and the relationship with NCLEX-RN success. For each study that found a relationship between a specific course in a nursing program and NCLEX-RN success, another study found a correlation with a different element.
The literature examined maintains a focus on the student within the nursing program as opposed to the preparation of the student prior to admission to the program. Literature directly linking student admission requirements to NCLEX-RN success could not be located. The use of appropriate measures to determine the preparation of a student entering the program is important as it selects students ready to successfully complete the program and pass the NCLEX-RN.

Passing the NCLEX-RN indicates a student has been successfully prepared to enter the nursing profession. In the process of assessing the effectiveness of a nursing program, the state of Arizona uses NCLEX-RN pass rates. Preparation of the students for the rigor of a nursing program prior to entering the program is essential in order to successfully complete the program and pass the NCLEX-RN. Passing the NCLEX-RN is important for those at the leadership level of the nursing programs for student access and program certification. The prerequisites and admission criteria are the filtering mechanism to determine which students gain access to the nursing program. Therefore, selection of the appropriate prerequisite and admission criteria ensures programs are admitting students for the right reasons. The need existed for further study examining the relationship between program prerequisite and admission requirements and NCLEX-RN pass rates.

Study Context

The NCLEX-RN is the culminating experience for nursing students. Certification of new nurses hinges on the ability of the student to pass the required NCLEX-RN. To meet the nursing shortage need, students must complete the nursing program and pass the NCLEX-RN. Given the fluctuating pass rates among Arizona nursing schools (Arizona
State Board, 2004); further study examining the relationship between program prerequisites and NCLEX-RN pass rates was warranted. This section closely examines the population and sample of the study, the environment, demographics, and setting of the study and the contextual factors associated with this study.

Several factors contribute to the nursing shortage. The average age of a registered nurse is the latter half of the forties. Baby boomers are aging, creating a large population in need of care. Nurses are choosing to work outside of the hospital environment due to lower job stress and shorter, less demanding hours. Regardless of where the nurse is working, the nursing profession has a high burn out rate (Bagnato, 2004).

In the educational environment, there is a nursing faculty shortage. The cause of this shortage includes an aging workforce and insufficient training opportunities for new faculty. The average age of a nursing faculty member with a doctorate is 54. Trends indicate a large number of faculty retirements will be forthcoming over the next few years. The same is true for masters prepared nursing faculty members. Due to budget cuts and current faculty shortages restricting the number of students in graduate-level nursing programs, there are not enough future nursing faculty members being prepared to replace the high number of expected retirees (Meyers, 2004).

Research studies have analyzed demographic information and the contextual factors related to this study with NCLEX-RN success rates. Results from such studies are in scholarly nursing and medical journals and published dissertations. Information regarding the population, environment, and setting are available from the United States Census reports and the Arizona State Board of Nursing. While the studies reviewed
represent multiple perspectives, outcomes from the various studies both contradict and reinforce each other.

Population and Sample

This study examined if a relationship exists between the prerequisite and admission requirements for students of 2 year, community college nursing programs and NCLEX-RN first time pass rates. The population consists of the 10 Arizona community college districts offering the associates of applied science degree in nursing. These districts comprise the Arizona community college system which services the entire state of Arizona. The sample included the 10 districts.

Environment/Demographics

The state of Arizona contains both urban and rural living environments. Over 5,580,800 people reside in the state of Arizona. The three largest populated areas in the state include the greater Phoenix area, Tucson, and Flagstaff. The greater Phoenix area has a population of 2,838,218 representing 50.5% of the population for the state. Tucson and Flagstaff have 486,699 and 52,894 residents respectively. Together, these three areas represent 60.5% of the state’s total population. Arizona’s population is growing at a dramatic rate. A 40% increase in the number of residents occurred from the 1990 to the 2000 census results. The national growth average during this time was 13% (United States Census, 2004).

The population of Arizona is 64% white, 25% Hispanic, 6% Native American, 3% African American, and 3% other (United States Census, 2004). The high numbers of Hispanic and Native American people creates an environment strong in English as a second language. Twenty-six percent of the households in Arizona speak a language
other than English in the home (United States Census, 2004). Twenty-one federally recognized Native American tribes exist in Arizona (Native Americans, 2004) (see Table 1).

Table 1

*Population of Arizona*

<table>
<thead>
<tr>
<th>Population</th>
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<tbody>
<tr>
<td>Total population</td>
<td>5,580,800</td>
<td>100%</td>
</tr>
<tr>
<td>Phoenix</td>
<td>2,838,218</td>
<td>50.5%</td>
</tr>
<tr>
<td>Tucson</td>
<td>486,699</td>
<td>8.7%</td>
</tr>
<tr>
<td>Flagstaff</td>
<td>52,894</td>
<td>0.9%</td>
</tr>
<tr>
<td>White</td>
<td>3,571,712</td>
<td>64%</td>
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<tr>
<td>Hispanic</td>
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<td>25%</td>
</tr>
<tr>
<td>Native American</td>
<td>334,848</td>
<td>6%</td>
</tr>
<tr>
<td>African American</td>
<td>167,424</td>
<td>3%</td>
</tr>
<tr>
<td>Other</td>
<td>167,424</td>
<td>3%</td>
</tr>
</tbody>
</table>

The state of Arizona encompasses 114,006 square miles and is the 6th largest state in geographic area. Federal land encompasses 42%, Indian reservations take 27%, private ownership covers 18%, and the state trust holds 13% (Arizona State Land, 2004). The average income per capita in 1999 was $20,275, which was slightly below the national average (United States Census, 2004).

The rural nature of Arizona and high representation of Hispanics and Native Americans in the population affects the recruitment and success of nursing programs. Dropout rates are higher in these populations than for white students. Testing, heavily
used in admission, program progression, and licensure of nurses, is a barrier to ethnic minority students due to cultural and language factors and affects minority students from being admitted and successful in higher education programs (McQueen & Zimmerman, 2004). The distance from home to the educational institution and clinical sites can be excessive, often times including unpaved roads that become treacherous and impassible during wet weather. Communication on a reservation is often difficult, as many do not possess televisions or telephones. Cellular telephones work in very few places on the reservations (O’Brien, Anslow, Begay, Pereira, & Sullivan, 2002). To address these barriers, institutions have provided special services to reservation students including counseling services, tutoring, clubs that help mitigate isolation issues, and monetary support. Community colleges and Northern Arizona University continue to provide educational services to a few sites on the Navajo reservation adding costs to an already costly program (Upvall, 1996). These programs continue to struggle to find well-prepared students academically ready for the rigor of the nursing program curriculum. In 2003, Northern Arizona University did not fill the nursing class for the distance education program offered on the Navajo reservation due to a lack of qualified applicants (Arizona State Board, 2004).

Contextual Factors

Throughout the state of Arizona, the curricula for the 10 community college nursing programs are similar. An organization known as the Healing Communities with membership from eight of the institutions develops the curriculum for those schools. Further, the ASBN passes all program curricula through a subcommittee known as the Education Committee (Arizona State Board, 2006). The Education Committee monitors
the curriculum to ensure it meets the state standards set forth by the Arizona Nurse Practice Act (Arizona State Board, 2006). According to the Nurse Practice Act, the program must provide within its classroom and clinical instruction the knowledge and skills that will allow the student, after completion of the program, to function as a registered nurse. Programs must also maintain a 75% pass rate on the NCLEX-RN (Arizona State Board, 2004).

Although the curricula of nursing programs are similar throughout the state of Arizona, the admission requirements and processes are very different. Eight out of the 10 districts used the Nurse’s Entrance Test (NET) as an admission tool. Of districts that use the NET test, one applies the scores as a ranking tool, seven use the national average composite score as a cut off score for the admission process, and two place an emphasis on the math and reading level scores. Four districts require the student to be an Arizona Certified Nurse Assistant (CNA). Two require either certification or the course that leads to becoming a CNA. This leaves four districts that do not require students to take the fundamental CNA curriculum prior to requesting admission to the program. Seven of the districts require either random, for cause, or all student drug screening. Prerequisite coursework differs impressively among districts. One district requires no prerequisite courses. Another district requires an extensive list that includes freshman level English, anatomy and physiology, microbiology, chemistry, college algebra, fundamental health care, and medical terminology. Three programs have a minimum grade point average requirement and four require cardiopulmonary resuscitation certification (Arizona State Board, 2004).
The ASBN sets the standards for the qualifications of the nursing faculty that teach in both the classroom and clinical settings for the Registered Nurse (RN) programs. The ASBN also sets the standards for the Director of Nursing of a program and the amount of time that individual can spend instructing students. In addition to the requirements on personnel, the ASBN sets the student to instructor ratio for nursing curricula coursework in the clinical setting. The ASBN requires one instructor for every 10 students in the clinical setting. No limit is set by the ASBN for the instructor to student ratio in the lecture setting (Arizona State Board, 2006).

Nursing faculty must have a nursing license that is in good standing. The majority of the didactic faculty members must have earned a master’s degree with a major in nursing. Those didactic faculty members who do not have a master’s degree in nursing must possess a bachelor in nursing. Clinical faculty must have a baccalaureate degree in nursing with 3 years experience as a nurse providing care to patients (Arizona State Board, 2006).

These requirements have created a challenge for nursing directors across the state of Arizona in hiring qualified instructors. There is a shortage both statewide and nationally for qualified instructors. According to the ASBN annual report (2003), there is a 5% vacancy rate in faculty placements in RN programs statewide. Two Arizona institutions received hiring violations (with adjunct or part time faculty) for not meeting state standards. Districts rely heavily on part time instructors due to the financial barriers. With the state mandated ratio of 10-to-1, institutions reach full time faculty loading maximums quickly with more students to serve in the clinical environment. The costs associated with hiring full time faculty and loss of resources due to statewide budget cuts
limit the ability of programs to attract and hire full time faculty. Wage competition with hospitals makes it more lucrative for nurses to work as nurses. Schools cannot compete with the wages offered to nurses in the medical field. Together, the wage and budget situation has created an increasing reliance on part time instructors.

Clinical placements for students are also difficult to coordinate, as clinical space is not readily available. This issue is a by-product of the current nursing shortage, as nurses are already overworked and not able to take on the added responsibility of student nurses. Clinical placements provide necessary on the job training for prospective nurses allowing the student to learn and enhance skills to be successful nurses.

Studies indicate demographic characteristics related to program success include age, gender, ethnicity, English as a second language, and high school performance. But the findings of these studies have conflicting results. Briscoe and Anema (1999) and Bonte-Eley (2002) determined there is a significant difference in pass rates with relation to the age of the student. Contradicting these findings, Washington and Perkel (2001) and Yin and Burger (2003) found no significant relationship between age and success on the NCLEX-RN. Washington and Perkel (2001) further found no significant relationship between ethnicity and primary language with success on the NCLEX-RN. Yin and Burger (2003) found no correlation between ethnicity and age with relation to NCLEX-RN pass rates. The authors discovered gender was not significant in predicting passing the exam. High school grade point average holds no relation to pass rates; however, class rank in high school is a strong indicator of success on the NCLEX-RN.

The scope of the literature addressing the context of the study is broad based but limited in availability. The results of the reviewed studies give a general overview of the
contextual factors involved in this study. Information contrasting the population of the nursing faculty with the nursing student population in Arizona is not available. Therefore, it cannot be determined if the population of nursing faculty is reflective of the student population.

The nursing shortage that currently exists in Arizona and nationwide continues to climb (Arizona Hospitals, 2007). Due to the increasing demand for nurses attributed to an aging population, the ability for current medical practices to increase the longevity of the critically ill, antibiotic resistant infections, the aging baby boomer population, and administrative and budget issues of hospitals, the shortage of nurses is not only going to continue but get worse (Arizona Nursing, 2004). The review of the literature with respect to the demographic characteristics was inconclusive due to the contradictions in findings among research studies. Due to these contradictions, global application of the results is not possible. Each researcher cautioned global application and indicated that more study is necessary in the area of proper NCLEX-RN preparation and prediction of success. Due to the rigor of nursing curriculum, the challenges and costs associated with maintaining a nursing program, and the need to admit appropriately prepared students who can develop into well prepared nurses that are successful in the program and pass the NCLEX-RN, this study was warranted.

Summary

The restrictions placed on nursing programs in the state of Arizona ensure quality programs but also create difficulties in offering nursing programs. The characteristics associated with the population and geography of the state of Arizona create unique challenges in being able to offer programs in locations that will have prepared students
available, provide the proper support for students, and procure qualified faculty and clinical opportunities (Arizona Nursing, 2004). These factors support the need to determine the appropriate admission requirements and processes to enable programs to admit students that are properly prepared for the rigor of a nursing program and pass the NCLEX-RN upon completion.

Schools are increasing the capacity of nursing programs to meet the critical nursing shortage (Arizona State Board, 2006). To meet this need, students must complete the nursing program and pass the NCLEX-RN. The fluctuating pass rates among Arizona nursing schools (Arizona State Board, 2006), indicated the need for further study examining the relationship between program prerequisites and NCLEX-RN pass rates.

The purpose of this mixed method study was to examine the relationship between prerequisite and admission requirements and NCLEX-RN first time pass rates of associate of applied science degree students in nursing programs in Arizona.

Conclusion

The nursing shortage that currently exists in Arizona and nationwide continues to climb (Shiber, 2003). Due to the increasing demand for nurses, the shortage of nurses is not only going to continue but get worse (Arizona Nursing, 2006). Two year community colleges are increasing the capacity of nursing programs to meet the critical need for nurses. To address the nursing shortage, students must complete the nursing program and pass the NCLEX-RN.

The NCLEX-RN score is a critical element for both students and nursing programs. This score represents the successful completion of a nursing program by the student and the ability to become a registered nurse. Collectively, the NCLEX-RN first
time pass rate for an institution indicates the quality of the program and ability by the institution to provide appropriate training for students. In the process of assessing the effectiveness of a nursing program, the state of Arizona uses NCLEX-RN first time pass rates (Arizona State Board, 2006).

The curriculum across the state of Arizona in associate of applied science degree in nursing programs is consistent; however, the entrance requirements and processes vary greatly. The fluctuating pass rates among Arizona nursing schools (Arizona State Board, 2006) warranted further study examining the relationship between program prerequisites and NCLEX-RN pass rates.

The selection and preparation of students for the rigor of a nursing program is a key element to the success of students in completing the program and passing the NCLEX-RN. Scholarly research for the independent variables, including preprogram preparation, program coursework, demographic information and standardized practice exams, have shown an impact in the final assessment of students within a nursing program and the retention of the competencies learned by the student (Bonte-Eley, 2002; Briscoe & Anema, 1999; Collins, 2002; Eddy and Epeneter, 2002; Harris, 2006; Luoma, 2003; Marshall, 2006; Matos, 2007; Sayles, Shelton, & Powell, 2003; Washington & Perkel, 2001; Yin & Burger, 2003). Conflicts exist in the results of these studies. The studies contain selected elements from each independent variable cluster and the effect on NCLEX-RN pass rates leaving the reader without a clear picture of the exact relationship between prerequisite and admission requirements and NCLEX-RN first time pass rates.

Studies focused on isolating prerequisites and preprogram preparations with respect to NCLEX-RN success do not exist. Further, the amount of information available
on what most influences NCLEX-RN pass rates is limited. Due to the rigor of nursing curricula and the need to admit well-prepared students in order to develop well-prepared nurses who can be successful in the program and pass the NCLEX-RN, this study was appropriate and timely.
CHAPTER 3: METHOD

The purpose of this study was to determine which prerequisite and admission requirements lead to first time NCLEX-RN success for nursing students in public 2 year community college associate of applied science in nursing programs. There are three hypotheses associated with this study. Programs with a greater number of admission requirements will not have a higher first time pass rate on the NCLEX-RN than programs with fewer prerequisite requirements. Programs with a greater number of science course prerequisite requirements will not have a higher first time pass rate of the NCLEX-RN than programs with fewer science course prerequisite requirements. Programs that require standardized preadmission testing with minimum cut off scores will not have a higher first time pass rate on the NCLEX-RN than programs not using standardized preadmission testing or with lower cut off scores. The method and design selected were appropriate to collect the evidence necessary to test the hypotheses for the study.

Research Method and Design Appropriateness

The purpose of this mixed method study was to examine the relationship between prerequisite and admission requirements and first time NCLEX-RN pass rates of associate of applied science degree in nursing programs in Arizona. The mixed method was appropriate since data associated with the prerequisite and admission process can be collected from quantitative and qualitative approaches enabling the researcher to view the admission process from two perspectives.

The mixed method approach provided a broader insight into the student selection process that is not easily explained by one method. If the results of the study vary, this would be an indication that further research in this area is warranted. The quantitative and
qualitative portions of the study contained similarities and differences allowing for an overlap between the two methods. The quantitative and qualitative approaches were similar with regard to the prerequisite and admission processes used at each institution. The director of nursing determines the prerequisite and admission criteria for the nursing program. The data collected in the qualitative portion related to which prerequisite and admission criteria the director felt best indicated NCLEX-RN success and mirrored the prerequisite and admission process for the director’s institution. Therefore, the director’s responses to questions centered on the current prerequisite and admission criteria providing a reflection of the effectiveness of the current criteria. The qualitative portion differs as it went deeper into the analysis by asking questions about the strengths, weaknesses, and what changes the director would make to the current criteria and why.

The design was two fold. The quantitative portion was a statistical analysis, primarily using chi square and Spearman rho measurements, of prerequisite and admission requirements and NCLEX-RN first time pass rates. The purpose of a statistical analysis is to determine whether or not a relationship exists between the independent and dependent variables. Chi square is a nonparametric measure of significance used to compare groups of data. The data collected for processing are frequency counts where the independent variables are categorical in nature. Chi square measures the distribution of the cases between the observed and expected frequencies (Gay, 1997). The larger the chi square value is, the greater the difference is between the observed and expected frequencies. In terms of accepting or rejecting a null hypothesis, if the calculated chi square value is determined to be significant, the null hypothesis would be rejected (Gay, 1997).
Spearman rho measurement is a rank difference correlation coefficient used with data ranked from highest to lowest score with the highest receiving a score of 1 and counting in rank order to a value equal to the number of subjects in the set. Researchers use Spearman rho with small data sets due to the tedious nature of ranking each score when data sets are large. When the data does not follow a normal distribution, researchers use Spearman rho which is an appropriate statistic to use for the first two hypothesis of this study to consider the strength of the relationship between the independent and dependent variables.

The study used a binary system to code the independent variables. A notation of zero indicated non-consideration of the prerequisite or admission requirement at the given institution. A notation of one indicated the institution considers the particular prerequisite or admission requirement. The data collected was then summarized into a contingency table. A contingency table sorts the data into mutually exclusive groups where the cell entries represent the frequency for each cell category (Pagano, 1987). Ordinal scaling of the collected data resorted the data into a two way contingency table. The table indicated for each community college district the number of science courses, number of English courses, number of psychology courses, number of math courses, standardized test, total number of admission criteria, and NCLEX-RN pass rate (see appendix A).

The chi square and Spearman rho measures were appropriate for this study. The NCLEX-RN pass rate data were not expected to follow a normal curve. The data were expected to be skewed to a high number of pass rates. The chi square and Spearman rho
measures are designed for distributions that do not follow the normal curve. Chi square and spearman rho are also suited for small sample sizes (Pagano, 1987).

The qualitative portion of the study collected information from nursing program directors through phone interviews. The interview format used predetermined questions regarding student preparation and selection for nursing programs with regard to what the nursing director believed lead to passing the NCLEX-RN on the first attempt. An analysis of the recorded and scored responses sought to determine if a relationship exists among prerequisite and admission requirements and passing the NCLEX-RN.

The design of this study was appropriate as it collected the data required to answer the research questions through quantitative and qualitative avenues. The simplicity of data recording and analysis led to the selection of this method. This method also allows for accurate and appropriate processing of the data obtained.

Population and Sample

The population for this study consisted of community college districts in the state of Arizona offering the associate of applied science degree in nursing. Each district offering the degree holds institutional accreditation by the Higher Learning Commission of the North Central Association of Colleges and Schools. These schools also have nursing programs approved and monitored by the ASBN. The districts included in the study are Arizona Western College, Central Arizona College, Cochise College, Coconino Community College, Eastern Arizona College, Maricopa Community College, Mohave Community College, Northland Pioneer College, Pima Community College, and Yavapai College.
The demographics for each community college throughout the state are similar with the exception of the Hispanic and Native American populations. Schools located closer to the Arizona border with Mexico have a higher percentage of Hispanic students when compared to those institutions further away from the border. These schools include Eastern Arizona College, Cochise College, and Arizona Western College. Similarly, institutions closer to the larger Native American reservations in the state have a higher percentage of Native American students in the population. These schools include Eastern Arizona College, Coconino Community College, Northland Pioneer College, and Pima Community College.

Pima Community College and Maricopa Community College are located in high population urban areas. Coconino Community College is located in a small city environment with a population of 60,000 in the city and neighboring communities. The remaining districts exist in rural areas throughout the state.

The population described above was also the sample for the study. The selection of the entire population as the sample produces data representative of the population. Given the demographics of the community colleges throughout the state of Arizona, elimination of a district might have compromised the balance between rural and urban districts as well as Hispanic and/or Native American populations. Inclusion of the 10 districts within the state of Arizona reduced the limitations to the study thus increasing the applicability of study results to other similarly populated programs.

Informed Consent

Participants, directors of nursing from each of the selected community college districts, for this study were contacted by phone to request participation in the study. The
purpose of the study, any foreseen risks, and possible benefits to the participant were covered prior to requesting participation by the individual. The informed consent form and a copy of the questions asked in the telephonic interview were sent to the director of nursing upon agreement to participate in the study. The telephonic interview did not take place until the signed informed consent form had been received by the researcher.

Instrument Selection and Reliability

The instrument selected for managing the data collected was systematic in nature and allowed for easy viewing of the data (see appendix A). It allowed the researcher to accurately track and process data with a simple coding system using first nominal and then ordinal entries. The instrument displayed data in an easy to view format for reflection and processing. Previous studies used similar tools allowing the researchers to collect and process their data accurately (Barkley, Rhodes, & DuFour, 1998).

Reliability refers to the dependability of the research results (Neuman, 2003). Reliable research results are those which hold no influence by characteristics that could modify the original measurements taken in the study (Neuman, 2003). The design of this study included elements to produce reliable results.

In order to ensure reliability of the results, consideration of three indicators of reliability influenced the design of this study. First, a clear definition existed for each of the measured items in the study. Second, the measurement tool was precise. These two characteristics speak to reducing the possibility for inaccurate measurements (Neuman, 2003). Third, the selection of a mixed method design allowed for multiple indicators. This increased reliability, as two indicators of the same outcome are stronger than one (Neuman, 2003). The study design allowed for two years of data analysis. First an
analysis of the data associated with the 2005 NCLEX-RN pass rates was done. Then the data associated with the 2006 NCLEX-RN pass rates was analyzed to further explore the relationship among the 2005 data. Repeatability of findings is a significant component of the scientific method and the reliability of study results. Reliability of results allows for the findings to be generalized to larger populations (Creswell, 2002; Gay, 1987).

Data Collection

The population for this study consisted of community college districts in the state of Arizona offering the associate of applied science degree in nursing. Each district offering the degree holds institutional accreditation by the Higher Learning Commission of the North Central Association of Colleges and Schools. These schools also have nursing programs approved and monitored by the ASBN. There are 10 community college districts in the state of Arizona. Collectively, these 10 districts represent the entire community college system for the state as well as all of the public two year nursing schools for the state of Arizona. The districts comprising the state community college system and included in the study are Arizona Western College, Central Arizona College, Cochise College, Coconino Community College, Eastern Arizona College, Maricopa Community College, Mohave Community College, Northland Pioneer College, Pima Community College, and Yavapai College.

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Two sets of data were collected. These sets were representative of the 2005 graduates taking the NCLEX-RN and the 2006 graduates taking the NCLEX-RN. The 2005 data set included the prerequisite and admission requirements for students graduating in 2005 and the NCLEX-RN pass rate for the institution. These students were admitted in the fall of 2003 under the prerequisite and admission criteria adopted by the institution for that year. The 2006 data set included the prerequisite and admission requirements for students graduating in 2006 and the NCLEX-RN pass rate for the institution. These students were admitted in the fall of 2004 under the prerequisite and admission criteria adopted by the institution for that year.
The qualitative portion involved interviews with the director of nursing from each of the 10 community college districts in the state. The interview responses were transcribed and coded to allow for analysis of the responses. The following table illustrates the data collected and the timeline for collection.

Table 2

Data Collection and Timeline

<table>
<thead>
<tr>
<th>Admission and prerequisite criteria followed</th>
<th>NCLEX-RN taken</th>
<th>Institutional prerequisite and admission criteria and NCLEX-RN pass rate collected</th>
<th>Interviews conducted</th>
</tr>
</thead>
</table>

Anonymity of respondents in the qualitative portion of the study was maintained by numbering the respondents to avoid the use of names. The data collected in the quantitative portion of the study was not directly linked to individual students as the NCLEX-RN first time pass rate is the percentage of students passing the exam for an institution and not individual student scores. The data was only viewed by the researcher and was kept in a secure, locked location during the data collection and analysis timeframe and will be for a period of three years from the completion of the study. After the three year time frame has passed, the informed consent forms and data will be destroyed by shredding the documents with a commercial shredding device.
The data collection method selected was appropriate for this study. The research design requires coding and recording of the data associated with admission criteria, prerequisites, and NCLEX-RN first time pass rates. The selected design of the collection method and tables (see appendix A) allowed for data entries to be recorded accurately and for data processing to take place.

The quantitative portion statistically examined program prerequisites and admission criteria to NLCEX-RN first time pass rates. The prerequisite and admission criteria were accessed through the ASBN web site and school web sites. The accuracy of the collected data was confirmed by contacting the ASBN and the director of nursing for each program to review the information collected from the web site. NCLEX-RN first time pass rates are available on the ASBN web site sorted by school. Confirmation of the collected data by the ASBN strengthened the accuracy of the data. NCLEX-RN first time pass rates and prerequisite and admission criteria for each school are not associated with individual students. Therefore, the elimination of identifiers occurred naturally.

Data Analysis

Analysis of the collected prerequisite and admission criteria and NCLEX-RN pass rates using frequency distributions, standard deviations, and general measures of central tendency showed the basic patterns in the data. The general measures of central tendency included means, medians, and modes. The chi square measure was calculated for each table of data (see appendix A). Spearman rho was calculated for the data contained in the ordinal table after the results were ranked (see appendix A). Calculating chi square and Spearman rho for each table of data for each year provided the researcher with two passes at viewing the results of the data collected. Computation of the chi square and Spearman
rho measures showed whether a statistically significant relationship existed between the independent variables and the dependent variable.

The measure of association was important to define as it determined which independent variables had the strongest indication of NCLEX-RN success. The analysis using frequency distributions, standard deviations, general measures of central tendency, chi square and Spearman rho were appropriate for the design as it enabled the researcher to categorize the level of influence each variable had on the dependent variable. The results of the quantitative portion statistically indicated the relationship between the independent and dependent variables but results were insufficient to confirm direct cause. A content analysis performed on the information gained in the qualitative portion assisted in the elimination of alternative explanations for the results obtained in the quantitative portion. This increased the reliability of the results. The content analysis consisted of summarizing the responses into themes. The number of occurrences of each themed response was then be counted and compared to the measures of central tendency including the mean, median, and mode derived in the quantitative portion of the study.

Validity

Internal validity refers to the removal of other factors that might affect the dependent variable in the study (Neuman, 2003). There are many threats to internal validity depending on the type of study performed. The design of this study included factors to ensure internal validity.

The selection of the entire population for the sample avoided selection bias. A study loses internal validity if the balance of the sample does not represent the population. The selection of the 10 districts which represent the entire community college
system for the state of Arizona, as the sample maintained an equivalent representation of the population. Another threat to internal validity occurs when other factors are introduced influencing the dependent variable. This study included community colleges in the state of Arizona offering the associate of applied science degree in nursing due to the restrictions placed on each college by the ASBN. These restrictions maintain an equivalent environment between colleges once the student is in the nursing program. Further, the study considered all prerequisite and admission criteria without omissions resulting in no gaps in data or bias towards particular admission criteria.

Testing instrumentation influences internal validity if the testing instrument changes during the study. The NCLEX-RN has undergone modifications over time; however, the exam content and delivery did not change during the study period. The design did not provide a benefit to any individual or institution during the course of the study. Similar treatment of the institutions and directors of nursing ensured no threat to internal validity due to one gaining benefit from participation over another.

Internal validity in a study carries high importance as it indicates the legitimacy of the study results. The design came from careful consideration of those items which may threaten the internal validity. Due to the attention to content and construction in the design, possible threats to internal validity were eliminated.

External validity refers to the applicability of the research results to settings outside of the study (Neuman, 2003). Considerations to external validity included if the design of the study was realistic, how the participants reacted in the study, and if the environment used for the study allowed for application to settings outside of the study. This study has taken into account each of these concerns.
The setting for this study was within the environment of nursing programs within the state of Arizona. The design of this study did not create the need for the directors of nursing to modify the nursing program environment for students as implemented by the ASBN. Further, it was not necessary to modify what the schools were practicing during the study time frame. Therefore, the results are applicable to other schools with similar environments since there was no modification of the nursing program or students within the programs of the sample.

The reaction of participants due to being included in a study can complicate external validity. If a participant reacts differently from normal behavior due to the knowledge of participating in a study, the threat to external validity occurs because the results do not represent the normal response or behavior of the individual. The data for the study was archival and aggregate in nature and represented program data as opposed to individual data. Therefore, a subject reacting differently due to the study was not possible and did not threaten external validity in this case. Further, the results can only be generalized to programs with similar parameters to that of the state of Arizona and not to individual student performance.

External validity enables application of the research study results beyond the boarders of the study. The design of this study took into account the barriers to external validity. Given the environment and timing of the study, the possibility exists for application of the results to related environments.

Summary

The careful design of this study increased data quality and the reliability and validity of the research results. The charting instrument selected presented easy recording
and viewing of data for accurate processing. The data analysis tool selected gave a clear picture of the data including the various strengths of the relationships between the variables. With these factors taken into account, application of the results of this study is possible to other environments of a similar nature.
CHAPTER 4: RESULTS

The purpose of this mixed method study was to determine if a relationship existed between prerequisite and admission requirements and NCLEX-RN first-time pass rates of students graduating with an associate of applied science degree in nursing from 2 year programs in Arizona. The marked difference in pass rates among Arizona community colleges, which have varied as much as 30 percentage points between institutions in recent years, warranted an examination of potential underlying causes. A mixed method study was selected as it examines the admissions process from both a quantitative and qualitative view, enabling the researcher to consider the admissions process from two perspectives.

The purpose of chapter 4 is to present the quantitative and qualitative findings from the data collected in the study. The chapter is organized by research question first presenting the statistical information from the quantitative perspective, then the trends of the interview responses from the qualitative portion of the study. The chapter begins with a review of the study purpose, demographics of the population, and the data collection procedures.

The state of Arizona is comprised of both urban and rural settings. Over 5,580,800 people reside in the state of Arizona with a highly diverse population (see Table 1). Ten community college districts comprise the public community college educational system for the state. The 10 districts provide for the public post secondary educational needs for the population of Arizona. Each district offers a nursing program accredited by the ASBN. Each community college district has a local elected board
whose members oversee governance of district operations. There is no central state higher education agency with which the districts have a reporting relationship.

Data Collection Procedures

Data collection for the quantitative portion included accessing the ASBN web site to obtain the 2003 and 2004 prerequisite and admission criteria and the NCLEX-RN pass rates for 2005 and 2006 for the 10 community college districts within the state of Arizona. A follow-up phone call was made to the Education Consultant for the state and the director of nursing at each community college district to confirm the accuracy of the prerequisite and admission criteria given on the web site. The prerequisite and admission criteria were recorded in a table. The table was a cross tabulation of prerequisite and admission requirements by college district. An entry of zero indicated the prerequisite or admission requirement was not considered at the institution. An entry of one indicated the prerequisite or admission requirement was considered in the admission screening process. The binary table was then processed into a contingency table with the cell entries representing the frequency for each cell category. This processing allowed for chi square statistics to be processed using the Statistical Package for the Social Sciences, Incorporated (SPSS) statistical software.

A table ranking the admission or prerequisite criteria by community college district was created from the contingency table for processing the Spearman’s rho statistics. The ranking process is done by scoring the district using a particular admission or prerequisite requirement the most with a 1, the second highest received a score of 2, and so on until all districts had been scored. If more than one district had the same number of prerequisites or admission requirements in a particular category, the scores
were averaged for those community colleges as is required for the use of Spearman’s rho measure. The data set was then imported into the SPSS software to generate the statistical output used for interpretation of data.

Data collection for the qualitative element involved transcribing the interviews conducted with each director of nursing. Prior to the interviews, the directors were contacted by the researcher. The telephone conversation included an introduction of the researcher, the purpose of the phone call, an overview of the research, a request for participation, and directions to complete the proper paperwork for the interview to take place. If the director of nursing agreed to participate, two copies of the informed consent form (see Appendix B) and a copy of the interview questions (see Appendix C) were sent to the participant with a self-addressed, stamped envelope. Each participant signed one copy of the informed consent form and returned it to the researcher in the self-addressed, stamped envelope. The participant retained the second copy. Once the form was received, the researcher scheduled the participant for the interview.

The interviews were conducted by telephone. Transcription of the responses was done as the interview took place allowing for review and correction of the response. Upon completion of the 10 interviews, the responses were sorted by question. All responses for each question were compiled together to allow the researcher to review related responses.

The survey for the qualitative portion of the study was developed from the research questions. The directors of nursing were asked 10 questions that related to the relationship among prerequisite and admission requirements and NCLEX-RN success.
The questions were open ended in nature and designed to investigate the relationship from different approaches.

No omissions existed in the data set. Participation of the directors of nursing from the 10 community college districts was 100 percent. All prerequisite and admission process data for 2003 and 2004 were housed in the ASBN data files and confirmed by the Education Consultant for the ASBN and the director of nursing for each institution. For each year, 2005 and 2006, a zero on the data collection sheet indicated the prerequisite or admission requirement was not used by the college and a 1 indicated the prerequisite or admission requirement was used by the college in the student selection process.

The presentation of the data analysis and findings is organized by research question. For each question, the quantitative data are presented first. The statistical results are presented in discussion format followed by a table summarizing the statistics. The qualitative information is presented next. The main themes and outliers discovered by the analysis of the interview responses are presented.

**Prerequisite and Admission Requirements and NCLEX-RN Pass Rates**

This research question sought to determine if the sheer number of prerequisite and admission criteria, as opposed to what the criteria are, have a significant relationship with NCLEX-RN success. The null hypothesis was that programs with a greater number of admission requirements will not have a higher pass rate on the NCLEX-RN than programs with fewer prerequisite requirements. The numbers of prerequisite and admission criteria varied throughout the state of Arizona. One institution had only 2 requirements while another had as many as 12 prerequisite and admission criteria.
In 2005 the 10 community college districts were above the 75% pass rate. College pass rates ranged from 80 to 100. Four districts had a pass rate at or above 90 and 6 fell below 90. The average pass rate for the 10 districts was 88. In 2006, 9 districts were above the 75% required pass rate and one college fell below. College pass rates ranged from 68 to 98 with an average pass rate of 90. Seven of the colleges were at or above a pass rate of 90 and 3 fell below 90.

The Spearman’s rho analysis (see Table 3) indicated there is not a significant relationship between the total number of prerequisite and admission requirements and NCLEX-RN success. The Spearman’s rho correlation coefficient and p-value for 2005 indicated the possibility of a relationship between the total number of prerequisite and admission process requirements and NCLEX-RN success as measured by first time pass rates. However, it was not found to be statistically significant. This relationship was not repeated in the data for 2006; therefore, there is not a significant relationship between the number of prerequisite and admission requirements and NCLEX-RN success. (2005: Spearman’s rho = 0.593, p < .05; 2006: Spearman’s rho = -0.359, p > .05).
Table 3

Spearman’s Rho Analysis for Number of Prerequisites

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
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<th>2006</th>
<th></th>
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<td>Significance</td>
<td>Correlation</td>
<td>Significance</td>
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<tr>
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<td>Coefficient</td>
<td>2-tailed</td>
<td>Coefficient</td>
<td>2-tailed</td>
</tr>
<tr>
<td>Number of prerequisites</td>
<td>0.593</td>
<td>NS</td>
<td>-0.359</td>
<td>NS</td>
</tr>
</tbody>
</table>

p=.05, NS=Not Significant

Cross Tabulation of Prerequisites and Pass Rates

An analysis was done comparing the prerequisites required with pass rates above 90 percent and those below 90 percent. For the 2005 data (see Table 4), 5 schools had pass rates below 90 percent that did not require anatomy and physiology I while 4 schools had pass rates above 90 percent that did require anatomy and physiology I. Only 1 school had a pass rate below 90 percent that required anatomy and physiology I. Six of the 9 college districts requiring standardized testing had a pass rate below 90 percent.

For the 2006 data (see Table 5), 5 schools requiring anatomy and physiology I had pass rates above 90 percent, while 2 schools that did not require anatomy and physiology I had a pass rate above 90 percent. Contradicting the 2005 pattern with standardized testing, 6 schools requiring standardized testing had pass rates above 90 percent, while 3 schools requiring standardized testing scored below 90 percent. Seven of 10 college districts that required preparatory chemistry and college chemistry as a prerequisite in 2006 had a pass rate above 90 percent. For the 2005 data, the pass rates associated with preparatory and college chemistry were split. Five college districts had a
pass rate above 90 percent and 4 schools had a pass rate below 90 percent that required preparatory chemistry. Four had a pass rate above 90 percent and 5 had a pass rate below 90 percent that required college chemistry.
Table 4

2005 Cross Tabulation of Prerequisites and Pass Rates

<table>
<thead>
<tr>
<th>Prerequisite Course</th>
<th>Do not require NCLEX&gt;90</th>
<th>Do not require NCLEX&lt;90</th>
<th>Do require NCLEX&gt;90</th>
<th>Do require NCLEX&lt;90</th>
</tr>
</thead>
<tbody>
<tr>
<td>College Comp I</td>
<td>1</td>
<td>5</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Intermediate Algebra</td>
<td>1</td>
<td>1</td>
<td>3</td>
<td>5</td>
</tr>
<tr>
<td>College Algebra</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Cellular Biology</td>
<td>0</td>
<td>3</td>
<td>4</td>
<td>3</td>
</tr>
<tr>
<td>Anatomy and Physiology I</td>
<td>0</td>
<td>5</td>
<td>4</td>
<td>1</td>
</tr>
<tr>
<td>Anatomy and Physiology II</td>
<td>2</td>
<td>5</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Preparatory Chemistry</td>
<td>0</td>
<td>1</td>
<td>5</td>
<td>4</td>
</tr>
<tr>
<td>College Chemistry</td>
<td>0</td>
<td>1</td>
<td>4</td>
<td>5</td>
</tr>
<tr>
<td>Psychology</td>
<td>3</td>
<td>5</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>C.N.A.</td>
<td>1</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Standardized Testing</td>
<td>1</td>
<td>0</td>
<td>3</td>
<td>6</td>
</tr>
<tr>
<td>GPA</td>
<td>2</td>
<td>4</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
Table 5

2006 Cross Tabulation of Prerequisites and Pass Rates

<table>
<thead>
<tr>
<th>Prerequisite Course</th>
<th>Do not require NCLEX&gt;90</th>
<th>Do not require NCLEX&lt;90</th>
<th>Do require NCLEX&gt;90</th>
<th>Do require NCLEX&lt;90</th>
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<tbody>
<tr>
<td>College Comp I</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td>Intermediate Algebra</td>
<td>1</td>
<td>1</td>
<td>6</td>
<td>2</td>
</tr>
<tr>
<td>College Algebra</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Cellular Biology</td>
<td>1</td>
<td>2</td>
<td>6</td>
<td>1</td>
</tr>
<tr>
<td>Anatomy and Physiology I</td>
<td>2</td>
<td>3</td>
<td>5</td>
<td>0</td>
</tr>
<tr>
<td>Anatomy and Physiology II</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>Preparatory Chemistry</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>College Chemistry</td>
<td>0</td>
<td>1</td>
<td>7</td>
<td>2</td>
</tr>
<tr>
<td>Psychology</td>
<td>5</td>
<td>3</td>
<td>2</td>
<td>0</td>
</tr>
<tr>
<td>Certified Nursing Assistant</td>
<td>2</td>
<td>2</td>
<td>5</td>
<td>1</td>
</tr>
<tr>
<td>Standardized Testing</td>
<td>1</td>
<td>0</td>
<td>6</td>
<td>3</td>
</tr>
<tr>
<td>GPA</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>1</td>
</tr>
</tbody>
</table>
Qualitative Results for the Number of Prerequisite and Admission Criteria

There was not a consensus among community college directors of nursing for the state of Arizona on whether a greater number of prerequisite and admission requirements indicated future success on the NCLEX-RN. Five of the directors had different rationales for the belief that having more prerequisite and admission criteria is better than fewer in relationship to NCLEX-RN success. Reasons included academic preparation, increased barriers that screened out students, and more available study time in core nursing program courses.

Responses involving academic preparation alluded to creating a stronger foundation for students to draw upon in nursing courses which allowed the students to comprehend the material more quickly. Increased prerequisites also allowed the faculty member to focus on nursing material when teaching as opposed to foundational material related to the nursing topic. Directors who responded positively in this area stated the students were more prepared for nursing school when they had taken all of the foundational curriculum prior to entrance, and students will struggle less under a curriculum model with an increased number of prerequisites.

The concept behind increased barriers involved screening out students simply due to the difficulty and time it takes to complete an elongated list of prerequisite and admission requirements. With increased barriers in place, the number of students wanting to get into the nursing program is diminished because some students are not willing to do the work or spend the time it takes to clear all of the barriers. The directors of nursing stated the increased number of prerequisites does not influence the NCLEX-RN pass rate due to more coursework; it influences the pass rate due to creating a system where only
the most driven students will go through the long process of achieving eligibility to apply to a nursing program.

Three of the 5 directors who indicated that having an increased number of prerequisite and admission criteria will have a positive impact on the NCLEX-RN pass rate, stated the effect was due to creating increased study time for students while in the nursing program. If students do not have to focus on other courses while in the nursing program, study time can be spent strictly on the nursing curriculum. The responses emphasized creating study time by students taking non-nursing courses prior to admittance to the program enabling students to focus only on learning nursing concepts.

Science Courses and NCLEX-RN Success

Recent studies focused on science courses found a relationship between NCLEX-RN pass rates and science coursework (Collins, 2002; Marshall, 2006; Washington & Perkel, 2001; Yin & Burger, 2003). The researchers did not delineate whether the science course was a prerequisite or a program requirement. This study focused on the significance of science courses as a prerequisite to program admission with respect to NCLEX-RN pass rates. The null hypothesis was programs with a greater number of science course prerequisite requirements will not have a higher pass rate of the NCLEX-RN than do programs with fewer science course prerequisite requirements.

The chi square analysis (see Table 6) revealed no significant relationship between science courses as prerequisite and admission requirements and NCLEX-RN success. The chi square statistic was used to compare cellular biology, anatomy and physiology I, anatomy and physiology II, college preparatory chemistry, and college chemistry with NCLEX-RN success. The data used in the chi square analysis were the pass rates for
individual colleges. The distribution for this data was contrasted to the predicted frequencies. The calculated chi square measure suggested that a relationship did not exist as it followed the predicted frequency. There was not a significant relationship between cellular biology and NCLEX-RN success (2005: chi square = 7.619, df = 7; 2006: chi square = 10, df = 8) nor was there a significant relationship between anatomy and physiology I and NCLEX-RN success (2005: chi square = 10, df = 7; 2006: chi square = 10, df = 8). Anatomy and physiology II and NCLEX-RN success (2005: chi square = 7.619, df = 7, p = .05; 2006: chi square = 10, df = 8) was also not found to influence NCLEX-RN success. Additionally, there was not a significant relationship between college preparatory chemistry (2005: chi square = 10, df = 7; 2006: chi square = 4.444, df = 8) or college chemistry (2005: chi square = 10, df = 7; 2006: chi square = 4.444, df = 8) and NCLEX-RN success. Level of significance for the above chi square measures was .05.

Table 6

*Chi Square Analysis for Science Courses*

<table>
<thead>
<tr>
<th>Prerequisite Course</th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Value</td>
<td>df</td>
</tr>
<tr>
<td>Cellular Biology</td>
<td>7.619</td>
<td>7</td>
</tr>
<tr>
<td>Anatomy and Physiology I</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>Anatomy and Physiology II</td>
<td>7.619</td>
<td>7</td>
</tr>
<tr>
<td>Preparatory Chemistry</td>
<td>10</td>
<td>7</td>
</tr>
<tr>
<td>College Chemistry</td>
<td>10</td>
<td>7</td>
</tr>
</tbody>
</table>

p = .05
Taken as a whole, the relationship between science courses and NCLEX-RN success was questionable. The Spearman’s rho correlation coefficient based on the 2005 data (see Table 7) indicates there was a significant relationship. However, the corresponding correlation coefficient collected for the following year indicates there was not a significant relationship between the total number of science courses required in the prerequisite and admission process and NCLEX-RN success. Although the relationship exists for the first set of data, the result was not repeatable; therefore there was a failure to reject the null hypothesis. (2005: Spearman’s rho = 0.626, p < .05; 2006: Spearman’s rho = -0.407, p > .05).

Table 7

*Spearman’s Rho Analysis for Science Courses*

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>2006</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Correlation Coefficient</td>
<td>Significance 2-tailed</td>
</tr>
<tr>
<td>science prerequisites</td>
<td>0.626</td>
<td>S</td>
</tr>
</tbody>
</table>

p=.05, NS=Not Significant, S=Significant

Qualitative Results for Science Courses

Of the 10 directors of nursing interviewed, 3 indicated a connection between science courses and NCLEX-RN success. The 3 directors did not agree on which science courses best indicated NCLEX-RN success. The first indicated the grade in chemistry, the second a B in anatomy and physiology I, and the third that the biology area indicated success on the NCLEX-RN.
Standardized Preadmission Testing and NCLEX-RN Success

Commercially produced standardized testing is available for the prescreening of students to determine the level of preparation for the nursing curriculum. Recent research studies state a positive relationship exists between the use of standardized testing and NCLEX-RN pass rates (Briscoe & Anema, 1999; Luoma, 2003; Sayles, Shelton, & Powell, 2003). Programs that used standardized testing throughout the program or as an exit requirement from the program had a higher pass rate on the NCLEX-RN than programs not using this type of testing (Briscoe & Anema, 1999; Burckhardt, 2004). The third research question sought to determine if there was a significant relationship between the use of standardized testing as an admission tool and NCLEX-RN pass rates. The null hypothesis was that programs requiring standardized preadmission testing with minimum cut off scores will not have higher pass rates on the NCLEX-RN than programs not using standardized preadmission testing or with lower cut off scores.

The chi square value (see Table 8) associated with standardized testing and NCLEX-RN success indicates there was not a significant relationship between standardized testing and NCLEX-RN success (2005: chi square = 10, df = 7; 2006: chi square = 10, df = 8). The chi square analysis was performed with the assumption of a normal distribution of pass rates. The Spearman’s rho analysis (see Table 9) also indicated no significant relationship between standardized testing and NCLEX-RN success. The statistical analysis indicated a failure to reject the null hypothesis.
Table 8

*Chi Square Analysis for Standardized Testing*

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>df</th>
<th>2006</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardized Testing</td>
<td>7.619</td>
<td>7</td>
<td>10.8</td>
<td>8</td>
</tr>
</tbody>
</table>

p=.05

Table 9

*Spearman’s Rho Analysis for Standardized Testing*

<table>
<thead>
<tr>
<th></th>
<th>2005</th>
<th>Significance</th>
<th>2-tailed</th>
<th>2006</th>
<th>Significance</th>
<th>2-tailed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Standardized testing</td>
<td>0.292</td>
<td>NS</td>
<td></td>
<td>0.058</td>
<td>NS</td>
<td></td>
</tr>
</tbody>
</table>

p=.05, NS=Not Significant

Qualitative Results for Standardized Testing

Nearly all the community college directors of nursing in Arizona share a unified perception that standardized testing is the best indicator for future success on the NCLEX-RN when screening new students for the nursing program. Nine out of 10 directors listed standardized testing as the criteria in their present admission process that best indicated future success on the NCLEX-RN. Survey results indicated the standardized testing provided information on the baseline abilities of the students in academic areas such as math, science, and reading skills as opposed to using completion of coursework for this measurement. Directors also indicated that the standardized testing
is a better measure because it yields information on academic preparation in comparison to national averages.

For the one institution that did not use standardized testing as an admission requirement, the director of nursing gave lack of standardized testing as a weakness of their admission process. It was also mentioned by that director that standardized tests could be difficult to pass which might restrict the number of students admitted to the nursing program. One director brought up the possibility of cultural bias in standardized tests. Specifically, this director held that Native Americans are unfairly disadvantaged in these standardized tests.

Three directors of nursing reported recent changes in the prerequisites involving standardized testing. Programs at 2 institutions changed the testing instrument being used based on the belief that the replacement exam more accurately measured the desired skill set. One institution raised the cut-off score of the standardized test due to the low performance of previously admitted students on the NCLEX-RN. The director of this program anticipated that raising the cut-off score would ultimately increase the NCLEX-RN pass rate.

In looking to the future, 5 of the 10 districts were considering making changes to their prerequisite and admission processes. Of those 5, 4 were considering changes associated with standardized exams. The institution that did not currently require a standardized test as part of the admission process, was considering adding one. One institution was considering changing the standardized exam currently used due to indications in the reading level of students. Two of the institutions were considering raising the cut-off score associated with the current exam used.
In ranking the importance of specific prerequisites and admission requirements on a scale of 1 to 10 with 1 being the most important and 10 being the least important, directors, on the average, selected standardized tests, science courses, and mathematics courses as the top three indicators. Directors marked standardized exams as having the most significance in predicting future success on the NCLEX-RN. The second most predictive element in the admission process is science courses. Mathematics courses were indicated as the third best predictor on NCLEX-RN success in the admission process.

Individual Interview Question Responses

Which criteria in your present admission process do you believe best indicates future success on the NCLEX-RN?

The information collected with regard to which criteria in the admission process indicates future NCLEX-RN success revealed two common answers. Nine out of 10 directors of nursing stated standardized testing as the top indicator for future NCLEX-RN success. Five out of 10 directors of nursing stated that science coursework holds a relationship with NCLEX-RN success.

What are the strengths of your admission process?

Responses for the strengths associated with the admission process centered on the academic foundation of the students. Directors agreed that the admission process in place at their institutions assisted the directors in selecting students with a solid academic foundation. Directors did not agree on what particular element in the prerequisite and admission process most relates to a solid academic foundation.
What are the weaknesses?

While the directors of nursing stated that standardized testing best indicated future success on the NCLEX-RN, many directors also indicated the standardized exam was a weakness of the admission process. Concerns with standardized exams included the ability of students to retake the exam a number of times, selecting the proper cut-off score, and minority population performance. Students were allowed to take the standardized exam more than one time in order to improve the earned score. The directors of nursing stated the score achieved on the exam became meaningless after several attempts at the test because the students have only learned how to take the test as opposed to the test measuring the knowledge students had concerning the material being tested.

Commercially produced standardized tests have recommended scores of achievement by students that guide users in translating student performance on the test with student ability and preparation for a nursing program. Students exceeding the recommended score are considered prepared for admittance while those who fail to achieve the score are not. Arizona directors of nursing indicated that the cut-off scores used for admittance may be too low and therefore students were admitted who do not possess a sufficient level of foundational skills.

Native American students were identified by the directors of nursing as a group that have difficulty with standardized testing. The directors of nursing indicated a high failure and frustration rate by Native American students with taking the standardized tests. The directors of nursing stated that the standardized tests are written at a national
level and do not take into account the fundamental differences of Native American people and therefore do not accurately measure the knowledge of these people.

*Have the prerequisite and admission criteria at your institution been modified in the past four years?*

The changes incorporated over the last four years at Arizona community colleges focused primarily on standardized testing and curriculum credit hours. Directors of nursing indicated changes associated with standardized testing in the area of cut-off scores and test used. Cut off scores exist for content areas and for the overall performance on the tests. Directors indicated changes made included raising the mathematics, reading, and science cut off scores and raising the overall cut off score for program admittance. Directors that had changed the choice of standardized test had moved from one commercially produced testing package to another.

*At this point, what criteria would you add to the admission process to select students who would be capable of passing the NCLEX?*

Future changes to prerequisite and admission requirements centered on standardized testing. Four out of 10 directors of nursing indicated if future changes were made to their prerequisite and admission process, it would be to increase the cut off score of the standardized test or to change from one standardized test to another. Five out of 10 directors of nursing indicated no changes were considered at the time.

*Which prerequisites have the most influence on NCLEX-RN pass rates?*

For this question, the directors of nursing were asked to rank prerequisite and admission requirements including science courses, mathematics courses, English courses, psychology courses, grade point average, certification as a nursing assistant, letters of
reference, candidate interview, written responses to questions, and standardized tests on a scale of 1 to 10 with 1 being the most revealing in predicting NCLEX-RN pass rates and 10 being the least revealing. The directors of nursing, on the average selected standardized tests as the best predictor of future NCLEX-RN success (see Table 10). Science and mathematics courses were the second and third choices respectively.
**Table 10**

*Ranking of Prerequisite and Admission Requirements*

<table>
<thead>
<tr>
<th>Admission Requirements</th>
<th>A</th>
<th>B</th>
<th>C</th>
<th>D</th>
<th>E</th>
<th>F</th>
<th>G</th>
<th>H</th>
<th>I</th>
<th>J</th>
<th>Mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science Courses</td>
<td>3</td>
<td>1</td>
<td>2</td>
<td>2</td>
<td>3</td>
<td>2.5</td>
<td>2</td>
<td>6</td>
<td>3</td>
<td></td>
<td>2.72</td>
</tr>
<tr>
<td>Math courses</td>
<td>4</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td>3</td>
<td>2</td>
<td>4</td>
<td></td>
<td>3.00</td>
</tr>
<tr>
<td>English courses</td>
<td>5</td>
<td>4</td>
<td>7</td>
<td>5</td>
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<td>5</td>
<td>4</td>
<td>4</td>
<td>5</td>
<td></td>
<td>4.44</td>
</tr>
<tr>
<td>Psychology courses</td>
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<td>8</td>
<td>6</td>
<td>6</td>
<td>8</td>
<td>8</td>
<td>6</td>
<td></td>
<td></td>
<td>6.33</td>
</tr>
<tr>
<td>GPA</td>
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<td>6</td>
<td>9</td>
<td>4</td>
<td>5</td>
<td>2.5</td>
<td>7</td>
<td>3</td>
<td>1</td>
<td></td>
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<td>7</td>
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<td>5</td>
<td>7</td>
<td></td>
<td></td>
<td>6.11</td>
</tr>
<tr>
<td>letters of reference</td>
<td>8</td>
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<td>8</td>
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<td>9</td>
<td>10</td>
<td>8</td>
<td></td>
<td>9.00</td>
</tr>
<tr>
<td>Candidate interview</td>
<td>9.5</td>
<td>9</td>
<td>5</td>
<td>9</td>
<td>9</td>
<td>5</td>
<td>9</td>
<td>10</td>
<td></td>
<td></td>
<td>8.28</td>
</tr>
<tr>
<td>Written responses</td>
<td>9.5</td>
<td>8</td>
<td>6</td>
<td>10</td>
<td>8</td>
<td>10</td>
<td>7</td>
<td>9</td>
<td></td>
<td></td>
<td>8.61</td>
</tr>
<tr>
<td>Standardized tests</td>
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<td>1</td>
<td>4</td>
<td>1</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>2.10</td>
</tr>
</tbody>
</table>

1=most, 10=least
Does the number of prerequisite and admission requirements have an influence on the NCLEX-RN pass rates?

Directors of nursing for the state of Arizona were asked if the number of prerequisite and admission criteria had an effect on NCLEX-RN pass rates. Do programs with more prerequisite and admission criteria have a higher pass rate than those programs with fewer requirements? The directors did not agree on whether a greater number of prerequisite and admission requirements indicated future success on the NCLEX-RN. Of the five directors that stated that having more prerequisite and admission criteria is better than fewer in relationship to indicating NCLEX-RN success, the reason for this belief differed. Reasons given included academic preparation, increased barriers screen students out, and allowing more time to study while in core nursing program courses.

Academic preparation, as defined by the directors of nursing, meant that more prerequisites created a stronger foundation for students to draw from in nursing courses allowing them to comprehend the material quicker. The increase in the number of prerequisites allowed the faculty member to focus on nursing material when teaching as opposed to foundational material related to the nursing topic. The directors of nursing defined increased barriers as a concept that involves screening out students simply due to the difficulty of and the time it takes to complete the list of prerequisite and admission requirements. Increased study time, according to the directors, referred to students having more time to focus on nursing courses because other coursework required for the nursing degree had been previously completed. The emphasis of the responses, as relayed by the directors to this question, was in enabling students to focus only on learning nursing concepts.
Are any modifications to prerequisite and admission requirements planned or contemplated?

Of the 10 directors of nursing interviewed, 3 were contemplating changes in standardized testing, 2 were considering modifying the sciences, and 4 had no changes planned. Changes in standardized testing involved selecting an alternative commercially produced exam and in adjusting cut off scores to a higher level. Science changes included moving more sciences from the core curriculum of the program to prerequisite requirements. The 4 directors with no plans for change were currently examining recent changes prior to deciding upon or implementing new changes.

Outliers of the Qualitative Information

The information obtained in the interviews conducted brought forth many common themes and shared impressions among the directors of nursing in Arizona. There were some responses that did not fit within those common themes. One director of nursing stated that influence of success on the NCLEX-RN did not come from prerequisite and admission criteria or by the curriculum of the nursing program. The director strongly believed success on the NCLEX-RN came from the quality of the faculty teaching the students in the nursing program.

In many programs around the state, students were allowed to retake exams to achieve a better score for consideration in the admission process. One director stated that retaking the exam was not beneficial in the measurement of student preparation as the test score becomes meaningless for a student who has taken the exam more than 2 or 3 times. The director stated the student had just learned how to take the test and did not actually have the knowledge base the test was measuring.
With the increased demand by students to gain entrance in a nursing program, nursing programs have a large group of students to select from. Further, with increased numbers, students are not as successful in gaining admission on the first attempt. This leaves the student with time to complete more classes. One director stated it was not the changes made to increase the demands of the prerequisite and admission process that lead to higher NCLEX-RN pass rates. Rather, the higher pass rates came from a stronger pool of applicants due to the academic work they completed while waiting to gain entrance to a nursing program.

Arizona nursing programs must be accredited by the ASBN. Some programs have gone on to achieve NLN accreditation. The NLN accrediting process is credit hour sensitive meaning that the NLN does not want programs with an excessive amount of credit hours for a two year nursing degree. The directors of nursing from the institutions that have NLN accreditation discussed the need to reduce credit hours in the prerequisite area in order to meet NLN standards. Some felt this compromised the ability to admit students to the program with the proper academic foundation.

Summary

The statistical analysis of the data obtained in the quantitative portion of this study resulted in a failure to reject each of the null hypotheses which pointed to the following conclusions. Programs with a greater number of prerequisite and admission requirements did not have a higher pass rate on the NCLEX-RN than programs with fewer prerequisite requirements. Programs with a greater number of science course prerequisite requirements did not have a higher pass rate than programs with fewer science course prerequisite requirements. Programs that required standardized
preadmission testing with a minimum cut off score did not have a higher pass rate on the NCLEX-RN than programs not using a standardized preadmission test or with a lower cut off score.

The Spearman’s rho statistical measures indicated a relationship between a greater number of prerequisite and admission requirements and NCLEX-RN success and science courses and NCLEX-RN success for the 2005 data. The statistical measures based on the data for the subsequent year did not indicate the same relationship. Therefore, the results were not repeatable resulting in a failure to reject the null hypothesis in each case.

The results of the qualitative portion of the study presented a conflict with the quantitative results. The majority of the directors of nursing for the state of Arizona stated that standardized testing in the prerequisite and admission process was the best indicator of future NCLEX-RN success. Interpretation of the chi square and Spearman’s rho statistical measure did not support a relationship between standardized testing and NCLEX-RN success.

The belief that standardized testing predicted future NCLEX-RN success created the strongest consensus among the directors of nursing. Three of the directors of nursing supported the concept that a greater number of science courses in the prerequisite and admission process predicted success on the NCLEX-RN. Therefore, 7 concur with the statistical findings. The directors of nursing did not concur on whether a relationship existed between a greater number of prerequisite and admission requirements and NCLEX-RN success but also on the reason why this relationship would exist.

Chapter 5 will discuss the findings of the study in further detail. This discussion includes how the findings relate to the results of other research studies and how the
findings of this research are significant to leadership. Chapter 5 will report the importance, meaning, and significance of the findings of this study.
CHAPTER 5: CONCLUSIONS AND RECOMMENDATIONS

The current nursing shortage in Arizona was expected to reach its peak in 2006 (Shiber, 2003); however, health care providers conclude that the need is continuing to rise (Arizona Hospitals, 2007). Arizona colleges have responded, in part, to the shortage by increasing the number of students admitted to nursing programs. However, the influx of more students does not necessarily lead to an immediate increase in the number of nurses available for employment. Students must complete the nursing program and pass the National Council Licensure Exam for Registered Nurses (NCLEX-RN) to become a registered nurse; the required credential for employment. Recent fluctuations in NCLEX-RN pass rates have raised concerns about student preparation for the nursing curriculum. The determination of the optimum way to prepare students for the nursing curriculum may result in higher NCLEX-RN pass rates, and thus, more credentialed nurses ready to enter the profession.

The purpose of this mixed method study was to examine the relationship between prerequisite and admission requirements and first time NCLEX-RN pass rates of associate of applied science degree in nursing programs in Arizona. The mixed method was appropriate since data associated with the prerequisite and admission process can be collected from quantitative and qualitative approaches enabling the researcher to view the admission process from two complementary methodological approaches. The quantitative approach assesses what admission requirements relate to positive or negative NCLEX-RN passage. The qualitative approach provided needed insight into the social and organizational dynamics of the admission and training processes. The mixed method
research used provided a broader and more comprehensive examination of the student selection process than can be reached by a methodology reliant solely on one approach.

The quantitative and qualitative approaches of the study contained similarities and differences allowing for an overlap and contrast between the two approaches. The quantitative and qualitative approaches are similar with regard to the prerequisite and admission processes used at each institution which is determined by the director of nursing. The quantitative portion is a statistical analysis, primarily using chi square and Spearman rho measurements, of prerequisite and admission requirements and NCLEX-RN first time pass rates.

The qualitative approach of the study collected information from nursing program directors through telephone interviews. The interview format used predetermined questions regarding student preparation and selection for nursing programs. The nursing directors answered these questions by providing their beliefs and perspectives concerning the factors that lead students to passing the NCLEX-RN on the first attempt. Directors of nursing hold college-level administrative positions that deal with nursing admissions, nursing students, nursing curricula, and nursing faculty on a daily basis. As such, the directors of nursing fulfill critical roles in supplying trained nurses. They are also in optimum positions to share qualitative evidence of the social and organizational factors involved in gaining high NCLEX-RN pass rates. The analysis of the recorded and scored responses determined what relationship existed among prerequisite and admission requirements and passing the NCLEX-RN.

This study was limited by the responses given by each director of nursing regarding the accepted admission requirements for each program. The study assumed
each director of nursing provided accurate information regarding the fall 2003 and fall 2004 prerequisite and admission requirements applied. This study was further limited by the accuracy of the NCLEX-RN data provided by the ASBN. The ASBN collects and collates all NCLEX-RN pass rate data for the community colleges. The accuracy of the data presented in the study depended on the accuracy of the data contained in the ASBN database.

The quantitative analysis approach of this study used statistical measures that matched the limitations of the constructed data set; namely, a small number of cases with nominal or ordinal data values. The statistical measures selected were the chi square test and Spearman rho. The chi square is sensitive to small sample size, data that does not follow a normal distribution, and is applicable to nominal and ordinal data (Pagano, 1986). Spearman rho is sensitive to small sample size and data that does not follow a normal distribution (Pagano, 1986). The data collected was summarized into a contingency table with ordinal data to avoid concerns of dichotomous data. The chi square test and Spearman rho are reliable statistical tools that measure the strength of association among variables (Neuman, 2003).

This chapter will discuss the conclusions and recommendations for this study. The data analysis and interview responses for each null hypothesis are summarized followed by the conclusion for that null hypothesis. The implications of the study results and the recommendations for further study are presented at the end of the chapter.

The first null hypothesis for the study was that programs with a greater number of admission requirements will not have a higher pass rate on the NCLEX-RN than programs with fewer prerequisite requirements. The Spearman’s rho analysis indicated
no relationship in 2005 or 2006. Therefore, programs with a greater number of admission requirements do not have a higher pass rate on the NCLEX-RN than programs with fewer admission and prerequisite requirements.

The correlations reversed direction from 2005 to 2006 indicating further that a relationship did not exist. During the study time frame, the pass rate of one college dropped significantly. This finding leads to the consideration of other factors that may influence the NCLEX-RN pass rate.

This finding contrasts the opinion held by one half of the directors of nursing interviewed who stated that having more prerequisites did influence the NCLEX-RN pass rate. The statement was made with the indication that an increased number of prerequisites and admission requirements would allow students more time to study their nursing curriculum, would admit students with better academic preparation, and would increase the barriers to attaining admission thereby screening out unprepared students. The data obtained in the quantitative portion of the study did not support the statement that a larger number of prerequisite and admission criteria lead to a higher NCLEX-RN pass rate.

Five of the 10 directors of nursing stated that increasing the number of prerequisites does not increase the likelihood of passing the NCLEX-RN on the first attempt. The discussion given by the group of directors who stated increased prerequisites and admission criteria did not influence the pass rate varied in their responses. One director stated that prerequisites have an influence on graduation and retention due to the aspect of devoting more time to study but not NCLEX-RN pass rates. Another director indicated the effectiveness of the prerequisites lies in what the
prerequisites are and not in the quantity of the prerequisites. A third director stated that pass rates are influenced by how the student progresses through the curriculum of the program and how well the student performs throughout that progression. The fourth director stated that the environmental factors of students needing to work decreases the amount of study time devoted to the program. The director stated that increasing the prerequisites to reduce the number of classes in the program might increase the study time for the student but the need to work still exists and therefore increased study time is not achieved. The fifth director had seen too many programs with successful NCLEX-RN pass rates that did not have prerequisites and therefore did not agree that the higher the number of prerequisites, the better the NCLEX-RN pass rate. This director stated the success on the NCLEX-RN is found in the quality of the curriculum and assessment practices of the institution.

The quantitative and qualitative approaches of this study agree that an increased number of prerequisites do not increase the pass rate on the NCLEX-RN. However, more research is needed in this area because the statistical analysis indicated a slight relationship in 2005 but not in 2006. Furthermore, the directors of nursing were split in the support of the statement that the number of prerequisite and admission requirements had an influence on the NCLEX-RN pass rates.

The second null hypothesis was that programs with a greater number of science course prerequisite requirements will not have a higher pass rate on the NCLEX-RN than programs with fewer science course prerequisite requirements. The chi square calculations indicated no significant relationship. The Spearman’s rho analysis indicated a relationship in 2005 but this was not repeated in 2006. Therefore, the null hypothesis
was not rejected. Nursing programs with a greater number of science course prerequisite requirements will not have a greater pass rate on the NCLEX-RN than programs with fewer science courses as prerequisite requirements.

Findings from previous studies (Collins, 2002; Hardin, 2005; Harris, 2006; Simon, 2006; Yin & Burger, 2003) that focused on preprogram science GPA and NCLEX-RN pass rates found a positive relationship between the two. These studies included high school science GPA as well as college science coursework GPA both before and during the nursing program. This study isolated the college science coursework with respect to that coursework being a prerequisite to entrance in a nursing program. The findings of this study contradict the findings of Collins (2002), Hardin (2005), Harris (2006), Simon (2006), and Yin & Burger (2003). With respect to science courses as prerequisite and admission criteria, the results of this study suggest there is no relationship among prerequisite science coursework and NCLEX-RN success.

The directors of nursing in the qualitative approach of the study paid particular attention to science courses in the selection of prerequisite courses. As a group, the directors selected science courses as the second best indicator of NCLEX-RN success. The directors also indicated in a minority response that having science courses as a prerequisite is a strength of the admission process and that recent and future changes contain the implementation of science courses.

Further research with respect to science courses and NCLEX-RN pass rates is warranted. The analysis of NCLEX-RN pass rates with respect to prerequisites in a cross tabulated format (see Table 3 and Table 4) indicates a relationship among prerequisite science courses and NCLEX-RN pass rates may exist. An analysis of the table indicates
this relationship. A greater number of schools requiring science courses such as chemistry and anatomy and physiology I had NCLEX-RN pass rates above 90 percent while schools that did not require those science courses as prerequisites had pass rates below 90 percent.

The third null hypothesis was that programs that require standardized preadmission testing with minimum cut off scores will not have a higher pass rate on the NCLEX-RN than programs not using standardized preadmission testing or with lower cut off scores. The chi square and Spearman’s rho analysis indicated that no significant relationship exists between standardized testing and NCLEX-RN pass rates. The null hypothesis was not rejected which indicated that standardized testing as a prerequisite or admission criteria did not indicate NCLEX-RN success.

Conflicting with the statistical results, nearly all the community college directors of nursing in Arizona share a unified perception that standardized testing is the best indicator for future success on the NCLEX-RN when screening new students for the nursing program. Nine out of 10 directors listed standardized testing as the criteria in the present admission process that best indicated future success on the NCLEX-RN. In ranking the importance of specific prerequisites and admission requirements on a scale of 1 to 10 with 1 being the most important and 10 being the least important, directors, on the average, marked standardized exams as having the most significance in predicting future success on the NCLEX-RN.

The statistical findings of this study suggest there is no relationship between standardized preadmission testing and NCLEX-RN pass rates. Further, the statistical findings do not support the statements made by the directors of nursing with regard to
standardized testing being the best indicator of future success on the NCLEX-RN. Further research is warranted in the area of standardized testing and NCLEX-RN success.

Core Themes and Implications to Leadership

The core theme and application to leadership for this study was based in the decisions a leader must make in order to provide the appropriate course of action for students to achieve the desired result of success on the NCLEX-RN. The prerequisite and admission process for nursing programs at two year community colleges in the state of Arizona are set by the director of nursing and endorsed by the higher leadership at each institution. Therefore, the director of nursing must be aware of which elements of the prerequisite and admission process best indicate NCLEX-RN success.

The results of this study suggest a structure for the development of an appropriate prerequisite and admission process for nursing programs. The prerequisites and admission processes can be modified based on the findings of this study. Particularly, institutions can look closer at standardized testing and which and how many prerequisite and admission items the institutions use to select and admit students to the nursing program. This study suggests that an increased number of prerequisite and admission criteria do not select those students best prepared to pass the NCLEX-RN. The study also suggests that standardized testing and science course work do not indicate those students prepared to pass the NCLEX-RN. Finally, given the disagreement in findings between the quantitative and qualitative portions of the study, leaders need to use data and statistical results in the decision making process.

There is a cyclical nature to the improvement of educational programming reflected in three significant stages. These stages include forethought, performance, and
self-reflection. Each stage lends itself to creating a successful outcome. Following the three stages of improvement, further study is warranted in each of the areas of this study with regard to prerequisite admission processes. If further study indicates the same findings with regard to NCLEX-RN pass rates no further modifications in the prerequisite and admission process would be indicated. If the findings of further study contradict this study indications would show an alternative course of action with regard to prerequisite and admission processes. The cycle repeats itself, allowing the department to review and improve the prerequisite and admission requirements in order to select those students most capable of passing the NCLEX-RN. Nursing program directors must constantly monitor student performance on the NCLEX-RN. If the program realizes a drop in first time pass rates, it is the responsibility of the director to react to this drop by making modifications to the program in order to improve student performance of first time pass rates.

Conclusion

This study sought to find a relationship among prerequisite and admission criteria and NCLEX-RN pass rates. The data obtained in the quantitative approach of the study suggests no relationship exists among science courses as prerequisites and NCLEX-RN pass rates, standardized testing as an admission tool and NCLEX-RN pass rates, or that a greater number of prerequisite and admission criteria indicate future success on the NCELX-RN. The qualitative approach to the study found the strongest support of prerequisite and admission criteria as an indicator of NCLEX-RN success in standardized testing. However, the support for standardized testing was confirmed by the statistical analysis performed in the quantitative approach of the study.
The qualitative approach to this study brought forth two alternative themes that deserve further study. These themes include curriculum and assessment and faculty. One director of nursing stated that the success of a student on the NCLEX-RN is not found in the prerequisite and admission process but rather in the quality of the faculty teaching the nursing curriculum. Another director stated that the success of a student is based on the curriculum of the program and the assessment of student learning coupled with continual improvement of that curriculum. Based on the findings of this study, further study in the areas of faculty impact, curriculum and assessment, and program sequencing and content with regard to first time NCLEX-RN pass rates is warranted. Also, a continuation of this study involving four-year baccalaureate nursing programs and more years of data from two-year and four-year institutions would be beneficial in identifying additional trends in the data.
REFERENCES


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APPENDIX B: INFORMED CONSENT FORM

Dear [Participant's Name],

I am a student at the University of Phoenix working on a Doctorate of Education in Educational Leadership. I am conducting a research study entitled Predicting NCLEX-RN Success through Prerequisite and Admission Requirements. The purpose of the research study is to examine the relationship between prerequisite and admission requirements and NCLEX-RN first-time pass rates of students graduating with an associate of applied science degree in nursing from programs in Arizona.

Your participation will involve a telephonic interview involving questions on prerequisite and admission requirements for the associate of applied science in nursing program in relation to NCLEX-RN success. The interview will be approximately 30 minutes in length. Your participation in this study is voluntary. If you choose not to participate or to withdraw from the study at any time, you can do so without penalty or loss of benefit to yourself. The results of the research study may be published but your name or institution will not be used and your results will be maintained in confidence.

In this research, there are no foreseeable risks to you.

Although there may be no direct benefit to you, the possible benefit of your participation is that the information obtained in the interview process may lead to the identification of properly prepared students admitted to nursing programs resulting in higher NCLEX-RN pass rates and, therefore, more nurses to combat the nursing shortage.

If you have any questions concerning the research study, please call.

Sincerely,

Monica J. Baker

By signing this form I acknowledge that I understand the nature of the study, the potential risks to me as a participant, and the means by which my identity will be kept confidential. My signature on this form also indicates that I am 18 years or older and that I give my permission to voluntarily serve as a participant in the study described.

________________________________________________________
(Participants name)                      Date

Please return this form in the enclosed envelope. Please be sure to seal the envelope prior to mailing.
APPENDIX C: PROTOCOL FOR TELEPHONIC INTERVIEWS

1. Which criteria in your present admission process do you believe best indicates future success on the NCLEX-RN?

2. What are the strengths of your admission process? (and what makes them so?)

3. What are the weaknesses? (and what makes them so?)

4. Have the prerequisite and admission criteria at your institution been modified in the past four years? What lead to these changes?

5. At this point, what criteria would you add to the admission process to select students who would be capable of passing the NCLEX?
6. Which prerequisites have the most influence on NCLEX-RN pass rates? Please rank all of the following prerequisites concerning influence on NCLEX-RN pass rates with 1 being the most influential and 10 being the least.

- Science courses
- Mathematics courses
- English courses
- Psychology courses
- Grade point average
- Certification as a nursing assistant
- Letters of reference
- Candidate interview
- Written responses to questions
- Standardized tests
- Other-Specify

7. Does the number of prerequisite and admission requirements have an influence on the NCLEX-RN pass rates? (If yes, what is that affect?)

8. Are any modifications to prerequisite and admission requirements planned or contemplated? If so, what and when?
APPENDIX D: PHONE SCRIPT

Hello, am I speaking with ______________________

My name is Monica Baker. I am a student at the University of Phoenix working on a Doctor of Education in Educational Leadership. I am conducting a research study entitled Predicting NCLEX-RN Success through Prerequisite and Admission Requirements. The purpose of the research study is to examine the relationship between prerequisite and admission requirements and NCLEX-RN first-time pass rates of students graduating with an associate of applied science degree in nursing from programs in Arizona.

I would like for you to participate in this study.

Your participation will involve a telephonic interview involving questions on prerequisite and admission requirements for the associate of applied science in nursing program in relation to NCLEX-RN success. The interview will be approximately 30 minutes in length. Your participation in this study is voluntary. The results of the research study may be published but your name will not be used and your results will be maintained in confidence.

In this research, there are no foreseeable risks to you.

Although there may be no direct benefit to you, the possible benefit of your participation is that the information obtained in the interview process may lead to the identification of properly prepared students admitted to nursing programs resulting in higher NCLEX-RN pass rates and, therefore, more nurses to combat the nursing shortage.

If you choose not to participate or to withdraw from the study at any time, you can do so without penalty or loss of benefit to yourself.

Are you willing to participate in this study? Great! I need to schedule a 30 minute phone call with you for the interview. What time is best for you?

Thank you. I will send you the informed consent form for you to sign and return to me.

What is the best way to address this form so that you are sure to receive it?

I will also send a copy of the questions included in the phone interview.

Thank you for agreeing to participate in this study.