

PREDICTORS FOR SUCCESS ON THE NCLEX-RN  
FOR ASSOCIATE DEGREE  
NURSING GRADUATES

by

KATRINA C. SWAIN

LINDA DUNN, COMMITTEE CHAIR

CYNTHIA ANTHONY  
RICK HOUSER  
AARON KUNTZ  
MARIETTA STANTON  
VIVIAN WRIGHT

A DISSERTATION

Submitted in partial fulfillment of the requirements  
for the degree of Doctor of Education in the  
Department of Educational Leadership,  
Policy, and Technology Studies  
in the Graduate School of  
The University of Alabama

TUSCALOOSA, ALABAMA

2012

Copyright Katrina C. Swain 2012  
ALL RIGHTS RESERVED

## ABSTRACT

The nursing shortage is a national issue that has ignited an increasing demand to address the importance of preparing students to be successful on the initial National Council of Licensure Examination for Registered Nursing (NCLEX-RN). Nursing programs are charged by the Board of Nursing to prepare graduates to be successful on the initial NCLEX-RN writing. Nursing programs have implemented admission criteria and advancement policies, in conjunction with computerized testing, to ensure that this is a plausible mandate. The purpose of this proposed dissertation research is to identify predictors that will determine measures of success on the initial writing of the NCLEX-RN for graduates of Associate Degree Nursing (ADN) programs in central Alabama.

## DEDICATION

Delight thy self in the Lord, and He will give you the desires of your heart. (Psalms 37:4)

I would like to dedicate this dissertation to so many people who have given me that extra nudge when I needed it. First, I dedicate this dissertation to my husband Christopher L. Swain. I truly thank God for you and I love you. I also want to dedicate this dissertation to my children Christina Jamise and Lamar Javon Swain. I want you to always remember to do your best, no matter how hard the task; rewards are sometimes given for the efforts you display. I also want to dedicate this dissertation to my mother, Mrs. Minnie M Coleman, my first mentor, and to my best friends, Ms. Angela Coleman and Ms. Jennifer (Mike) Jones. I also dedicate to two great men who loved life to the fullest and I love and miss very much to the late Mr. L.J. Coleman and the late Mr. Franklin Lamar Coleman. I also dedicate this to the late Mrs. Carol Copeland, a great nurse educator. Finally, I would like to dedicate this to my second family Roderick and Denise Swain, Dexter and Cynthia Swain and Ronald and Sanjanetta Battle. Keep pushing!

## LIST OF ABBREVIATIONS AND SYMBOLS

ANOVA	Analysis of variance
BIO	Biology
d.f.	degrees of freedom
IRB	Institutional Review Board
N	number in population
NCLEX-RN	National Council of Licensure Examination for Registered Nurses
$p$	Probability that observed data are consistent with null hypothesis.
$r$	Pearson's product-moment correlation
SPSS	Analytical software product originally standing for Statistical Package for the Social Sciences.
Wald	True value

## ACKNOWLEDGMENTS

I would like to first thank my Lord and Savior Jesus Christ for whom all blessings flow. I want to thank my wonderful family, my husband, Christopher and children, Christina and Lamar. I want to thank my mother and my siblings for their love and support.

I want to thank my doctoral committee members: Dr. Rick Houser, Dr. Cynthia Anthony, Dr. Aaron Kuntz, Dr. Marietta Stanton, Dr. Vivian Wright and a special thank you and acknowledgment to Dr. Linda Dunn, my doctoral chairperson. Thanks you for your guidance and support throughout this educational journey.

I want to thank my Cohort 1 family for their support throughout this process. I want to thank those that assisted in this process, Dr. Shelia Marble, Ms. Shelby Hayes, Dr. Charmaine Rodgers, Ms. Dorothy Young, Ms. Debra Craig, Ms. Tracey Riggins, Ms. Tanita Moore and Ms. Collina Washington for all your help with this educational endeavor. A special thanks to Ms. Jo Lynne Clayton for your support and friendship throughout this process.

Thanks also to Mrs. Bobby Daniels for your pursuit of making me step out on faith and becoming a nurse educator that I always wanted to be. I also want to especially thank my colleagues for their kind words of encouragement. Your support has helped me immensely.

## CONTENTS

ABSTRACT.....	ii
DEDICATION.....	iii
LIST OF ABBREVIATIONS AND SYMBOLS .....	iv
ACKNOWLEDGMENTS .....	v
LIST OF TABLES .....	ix
CHAPTER I: INTRODUCTION.....	1
Problem Statement and Background.....	1
Nursing Shortage .....	4
Nursing Educator Shortage.....	5
Educational Levels of Registered Nurses .....	6
NCLEX-RN .....	8
Admission and Curriculum Criteria.....	9
Statement of Purpose .....	11
Theoretical Framework.....	11
Conceptual Definitions .....	14
Research Questions.....	16
Summary.....	18
CHAPTER II: REVIEW OF LITERTURE .....	19
GPA (Cumulative and Prerequisite GPA) .....	19
Placement Tests .....	22

Selected Course Grades .....	23
Standardized Testing.....	26
Health Education Incorporated System (HESI).....	27
Registered Nurse Entrance Examination (RNEE) and Nurse Entrance Test (NET) .....	29
Mosby Assess Test.....	30
Educational Resources, Inc./Assessment Technologies Institute .....	32
Gaps in the Literature.....	35
<b>CHAPTER III: RESEARCH METHODOLOGY.....</b>	<b>37</b>
Research Design.....	38
Sample and Data Collection.....	38
Data Analysis .....	40
<b>CHAPTER IV: RESULTS.....</b>	<b>41</b>
Demographical Data .....	41
Multiple Logistic Regressions .....	42
Data Analysis .....	43
Preadmission Data .....	43
Nursing Course Grade.....	45
End of the Program Variables.....	46
Summary.....	47
<b>CHAPTER V: DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS .....</b>	<b>49</b>
Significant Findings and Discussion.....	51
Implications.....	57
Limitations .....	60



Recommendation for Future Research.....	61
Conclusions.....	62
REFERENCES .....	64
APPENDICES .....	70

## LIST OF TABLES

1.	NCLEX-RN Results for BSN versus ADN Graduates from 2008-2010.....	2
2.	Alabama Board of Nursing NCLEX-RN Results from 2000-2010.....	10
3.	Higgs Model for Prediction of Success in Nursing Education and Practice.....	13
4.	Data Entry Page .....	17
5.	Demographical Data .....	42
6.	ACT Compass Reading Score and GPA.....	43
7.	Science Course Grades .....	45
8.	Nursing Course Grades .....	46
9.	ERI/ATI .....	47

## CHAPTER I:

### INTRODUCTION

#### **Problem Statement and Background**

The decline in the number of registered nurses eligible for employment is a major healthcare crisis that must be addressed immediately. The U.S. Department of Labor announced that by 2012 the healthcare industry will need an additional 27% increase in nursing school graduates to meet the nationally projected increase in healthcare workforce demands for registered nurses (Yordy, 2006). The nursing shortage is expected to increase by 2025 to 260,000. This number is a far greater amount than the increase in nurses experienced in the mid 1960s (AACN, 2009).

There are several reasons why there is a decline in the number of registered nurses. First, there is a decline the number of nursing graduates, especially Associate Degree Nursing (ADN) graduates, passing the initial writing of the National Council of Licensure Examination (NCLEX) for registered nursing (RN). For the last three years, the number of ADN graduates who passed the initial attempt on NCLEX-RN has steadily declined; more so, than the decline in Baccalaureate Science Nursing (BSN) graduates' initial passage rates. According the National Council of State Boards of Nursing (NCSBN) (2011) 2010 report, there were 55,414 BSN first-time graduates taking the NCLEX-RN with an 88.69% passage rate. In the same year, there were more ADN graduates taking the NCLEX-RN, a total of 88,618 to be exact, but with only an 86.49% passage rate. Although the prominence of ADN registered nurses is well known, Simon

and Augustus (2009) cited that there has been a greater decline in the number of ADN graduates who pass on the initial writing of the NCLEX-RN than BSN graduates (see Table 1).

Table 1

NCLEX-RN Results for BSN versus ADN Graduates from 2008-2010

Year	Type of Candidate	Passage Rate	Type of Candidate	Percentage Rate
2008	BSN	87.50%	ADN	86.20%
2009	BSN	89.49%	ADN	87.61%
2010	BSN	88.69%	ADN	86.46%

The second reason there has been a decline in the number of graduates passing the initial writing of NCLEX-RN, and a decline in nurses, concerns patient safety, a major emphasis of the NCSBN (Carrick, 2011). The NCSBN seeks to ensure safe practice of nurses, evaluating current practices every three years and implementing changes to the NCLEX-RN. These changes have resulted in higher standards, and subsequently, difficulty in passage of the initial writing of the NCLEX-RN (Carrick, 2011).

Advancements in modern medicine are the third reason for the nurse shortage of nursing. Average life expectancy has increased and it is anticipated that by 2030 one in every five Americans will be 65 years of age or older (AACN, 2009; and CDC, 2007). This graying population results in more acute and chronic disease, more disability, and greater health care expenses, all of which will impact the healthcare industry by increasing the demand for registered nurses as never before experienced (U.S. Administration on Aging, 2007).

This aging population factor also extends into the progressively growing nurse educator shortage, the last reason for a decline in registered nurses. The Southern Regional Educational Board (SREB) (2002) noted that there were approximately 432 faculty positions not filled in the

sixteen SREB states. There are various reasons for this decline in nurse educators including budgetary constraints, lack of preparation for students being recruited for a faculty role, and impending retirements of current nurse educators (SREB, 2002). Not only is the nursing shortage impacting the healthcare industry, nursing programs are being affected as well. Nursing programs face a multitude of challenges in the midst of a healthcare environment that is forever changing. Many programs have increased enrollment to offset the national nursing shortage, without necessarily increasing nursing faculty. However, an increase in the number of students admitted to nursing programs will not overcome the challenges alone. The nursing shortage problem is more complex because each nursing program is held accountable to their respective state board of nursing for a specified NCLEX-RN passage rate of graduates on the initial writing. For example, the Alabama Board of Nursing requires all nursing programs in Alabama to maintain an 80% or higher passage rate on the initial writing of the NCLEX-RN. Failure to maintain minimum the passage rate will result in a program losing board approval status and possibly nursing program closure (ABN, 2011). Schools of nursing are also held accountable by accreditation bodies, such as the National League of Nursing Accreditation Commission (NLNAC) and the Commission on Collegiate Nursing Education (CCNE), to maintain minimum state board requirements (Giddens, 2009; Norton, Relf, Cox, Farley, & Tucker, 2005). Thus, the NCLEX-RN passage rates reflect the merits of each nursing program and serve as a student recruitment tool for both future students and faculty (Jones & Bremner, 2008; Norton et al., 2005). NCLEX-RN passage rates are significant for a program's preeminence (De Lima, 2011; Jones & Bremner, 2008). In an effort to enhance the likelihood that the mandated minimum passage rate on the NCLEX-RN is met, nursing programs have established admission criteria with the anticipation that students admitted are likely to be successful in the nursing program and

on the initial writing of NCLEX-RN after graduation. Nurse educators have the responsibility of equipping students with the knowledge and skills necessary to become a registered nurse.

Therefore, student admissions and curriculum plans are both critical components for the success of a college of nursing program (Morrison, 2005). Qualifications for becoming a registered nurse include both the completion of a nursing program and successfully passing the National Council of Licensure Examination for Registered Nurses (NCLEX-RN) (National Council of State Boards of Nursing, 2010).

There has been staunch federal program legislation through the years to contend with both nursing and nursing educator shortages (Lively, Campbell, & Green, 2007). Federal support arrived under the umbrella of the *Higher Education Act of 1965*, which provided Federal Perkins Loans and Federal Pell Grants to those seeking a nursing or higher level nursing degree (Lively et al., 2007). Nationally, Title VIII programs, within the Health Resources Services Administration (HRSA), support higher education for nurses through research fellowships and grants to assist nursing students who may eventually decide to become nurse educators (Lively et al., 2007).

### **Nursing Shortage**

The recent economic downturn, at a time when the need for qualified nurses is already a growing problem, adds to the nursing shortage crisis in the healthcare industry. In November 2009, the work force lost 85,000 positions in major industries, while the healthcare industry (hospitals, long term care facilities and ambulatory care settings) actually created 21, 000 jobs (BLS, 2009). In addition, the U.S. Bureau of Labor Statistics (BLS, 2009) estimates that by 2018 an estimated 581,500 new RN jobs will be available, increasing the RN workforce by 22% (AACN, 2011). However, these gains are offset by the number of registered nurses who will

soon retire. By 2015, Alabama alone expects to lose 15-25% of nurses currently in practice due to retirement and lack of recruitment for nursing faculty (Ehrhardt, 2009). Due to the anticipated state and national nursing shortage, it is imperative that nursing programs prepare competent graduates who will be successful on the initial writing of NCLEX-RN and to address the anticipated nursing shortage.

### **Nursing Educator Shortage**

The 2009-2010 AACN *Enrollment and Graduations in Baccalaureate and Graduate Programs in Nursing* cited that 54,991 qualified applicants were denied entrance to U. S. baccalaureate and graduate nursing programs because of budgetary constraints limiting the number of faculty hired. In 2007, there were 5,000 qualified nursing applicants turned away from nursing programs across the state of Alabama due to a shortage in nursing professionals available to teach (Alcarzar, 2008). Allen (2008) asserted that one of the reasons contributing to this shortage concerns the disparity between salaries in the educational field versus salaries in the hospital setting, and the educational level of most registered nurses. Most colleges and universities require a master's degree for nursing faculty members with the expectation of a doctoral degree being obtained at some point (Allen, 2008). Bradley (2007) also cited that there have been major issues with retaining current faculty and attracting new faculty in the BSN and ADN nursing programs. Hospitals and other agencies are able to offer more competitive salaries and schedule flexibility to recruit and retain nurses. However, most ADN programs reside in public institutions and cannot afford the adjustments to salaries and incentives, decreasing the competitive edge of those institutions (Bradley, 2007). Due to the cost of educating students and the mandated faculty to student ratio, there are a limited number of spaces for those seeking a

degree in nursing (AACN, 2005). Students who occupy these nursing program placements must be successful; otherwise, the nursing shortage will be further aggravated (Higgins, 2005).

### **Educational Levels of Registered Nurses**

A nursing candidate may complete a registered nursing program through three different pathways: diploma nursing program, the Associate Degree in Nursing (ADN), and the Baccalaureate of Science in Nursing (BSN). Currently, most registered nurses' educational foundations come from the ADN or BSN programs. However, historically, diploma nursing programs were responsible for educating the majority of nurses and were established by hospitals during wartime, dating back to the years of Florence Nightingale (Ruby, 1999). In the 1970s, there were over 800 diploma nursing programs throughout the United States (All Stars Directory, Inc., 2011). As a result of the push in advancement of the educational components in college and university settings, there are currently less than 100 diploma nursing programs in the United States (All Stars Directory, Inc., 2011). In order to understand the extent in the decline of diploma programs as it relates to numbers, Ellis (2006) cited that 9% of RN graduates were from diploma nursing programs in 1992. This decreased to 4% in 1999. In 1980, there were approximately 1,051,000 registered nurses who received their initial nursing education through a diploma program. However, in 2004, there was a marked decrease in the number of those registered nurses initially prepared through a diploma program to 733,000 (HRSA, 2010). Although diploma nursing programs have been phased out, some have been incorporated into ADN and BSN programs (Bureau of Labor Statistics, U.S. Department of Labor, 2010; Ruby, 1999).

The Associate Degree Nursing (ADN) program came into existence because of nursing shortages after World War II (Mahaffey, 2002). By 1945, the educational system at the junior



college level sought to include nursing as a program in response to several factors: increased enrollment and interest, federal government funding, support and concern from the consumer, and professional conscientiousness and liability (Mahaffey, 2002). Since the 1960s, the advancement of medical technology has created a need for specialized nursing care for patients. Many proponents of nursing education advocated for the education and training of nurses to take place in colleges and universities, with an emphasis in science and math course work (Ruby, 1999).

The National Organization of Associate Degree Nurses (NOADN)'s position statement (2006) puts forth that the education obtained through an Associate Degree Nursing (ADN) program is an avenue into professional practice in the health care arena. The emergence of Associate Degree Nurses in the work force resulted in an additional 309,000 registered nurses entering the work force in the 1980s. That number quadrupled in 2004 to 1,227,000 ADN-prepared registered nurses. Although there are proponents of the ADN, some professional organizations, such as the Commission on Collegiate Nursing Education (CCNE) (2011) and Sigma Theta Tau International (2011), recognize the BSN as entry-level professional nursing.

The BSN usually takes four to five years to complete and is obtained in a university setting. The BSN curriculum combines clinical and scientific-based learning with nursing management and leadership skills to prepare graduates to work in any area of nursing (AACN, 2009). There has been a steady rise in registered nurses obtaining their initial education at the BSN level. In 1980, 290,000 registered nurses were educated at BSN level. However, that number more than tripled in 2004 with a total of 903,000 BSN registered nurses entering the workforce.

Research supports increasing the enrollment of students in all nursing programs to address the growing nursing shortage (Allen, 2008; Bradley, 2007; Higgins, 2005). Rogers (2010) stated that students must not only finish a nursing program but also obtain licensure. Hence, all graduates from diploma, ADN, and BSN nursing programs must take NCLEX-RN test to obtain registered nurse licensure.

### **NCLEX-RN**

In 1978, the newly-created version of the National Council of State Boards of Nursing (NCSBN) provided guidance in the development and revision of the NCLEX-RN. The NCSBN (2010) seeks to make the NCLEX-RN psychometrically sound, legally defensible, and reflective of current nursing practices. Overall, the NCSBN (2010) has served to protect the public's health and welfare by overseeing and ensuring the safe practice of nursing. The NCSBN supervises the licensure examination for both registered and practical nurses (Benefiel, 2011). However, the NCLEX-RN test has evolved from a paper and pencil examination in the early 1960s to a computerized adaptive test (CAT) in 1994, and is used to assess the graduating nurse's knowledge, skills, and critical thinking ability. This is essential in providing safe, effective care to meet a patient's need for health promotion, maintenance, and/or restoration (NCSBN, 2010). The NCSBN Board of Directors evaluates the passing standard for the NCLEX-RN examination every three years to ensure the minimal competence for entry-level RN's. Bovin (2010) reported that the recent change in nursing practices replicates the test plan over a three-year analysis. An analysis of the revisions to the 2010 test plan gives rise to speculation that there may be a decline in NCLEX-RN passage rates nationwide. Therefore, it is imperative to identify the criteria that identify the students who are most likely to be successful in a nursing program and on the initial

NCLEX-RN attempt. The community college selected for this study can assist in addressing the projected nursing shortage in Alabama, as well as the nursing shortage nationally and globally.

### **Admission and Curriculum Criteria**

All public community colleges in the state of Alabama operate under the Alabama Community College System (ACCS). In 2005, mandated nursing curriculum and admission criteria were implemented at all community colleges within the state of Alabama. These changes standardized nursing program admission criteria and nursing program curriculum throughout the state college system (see Appendix A). Alterations were made in the order in which nursing courses were introduced with course content remaining constant. The minimum requirements for admission to the nursing program included a cumulative grade point average of 2.5 (based on the 4.0 scale) on the most recent 24 credit hours (see Appendix B). This radical change in admission criteria also incorporated a point system based on grades earned from selected coursework. Points from ACT Compass reading scores are also obtained (a minimum of 76 and a maximum of 99), and a possibility of an additional 11 points that could be determined at the college's discretion. A formula was derived to determine the points from selected course work at the institution of the study. This included *Human Anatomy and Physiology I* (BIO 201), *Human Anatomy II* (BIO-202), and *Microbiology* (BIO 220). The following points were given for each grade earned 1) A=30 points; 2) B=20 points; and a 3) C=10 points. The point system determines if a student is admitted to the registered nursing program at the proposed study site (see Appendix C).

The Board of Nursing monitors NCLEX-RN results quarterly and reports annually the NCLEX-RN results on a candidate's initial attempt to schools of nursing for public record. The Board of Nursing scores of the selected college for this study, before the implementation of the

mandated curriculum, ranged from 70%-100%. With changes brought about by the above-described curricular mandates, there was a noted decline in nursing board scores at the selected study site (see Table 2).

Table 2

Alabama Board of Nursing NCLEX-RN Results from 2000-2010

Reporting Year	Number of Candidates	Percentage Pass
2000-2001	26	70.80%
2001-2002	30	70.00%
2002-2003	23	100.00%
2003-2004	25	92.00%
2004-2005	22	100.00%
2005-2006*	27	85.20%
2006-2007	28	92.90%
2007-2008**	82	68.30%
2008-2009	100	79.00%
2009-2010	60	76.70%
Last Quarter 2010	21	95.23%

\* New criteria implemented \*\* First (full) graduates board results admitted under the new criteria

As discussed by Jones and Bremner (2008), NCLEX-RN pass rates can decline on the initial writing for a number of reasons, including an increase in standards, curricular changes and/or administration changes. The first full class to graduate (2007-2008) under the new criteria noted an overall passage rate of 68.3%. This was a significant decline from the 2006-2007 NCLEX-RN passage rates of 92.9%. In 2008-2009, the NCLEX-RN passage rate was 79%, resulting in a notice of deficiency from the Board of Nursing (see Table 2). It is also noted that the number of students enrolled for the academic year increased with three admissions to the ADN program (two in the day program and one admission in the evening program).

An entrance test and comprehensive computerized test were used at the proposed research site to determine the best candidates for completing the nursing program and the best candidates to pass on the initial writing on NCLEX-RN. Tests used included the Nursing Entrance Test (NET), National League of Nursing (NLN), and the Psychological Corporation Examination and Assessment Technology Institute (ATI)/Educational Resource Incorporated (ERI). These examinations are a predictor for NCLEX-RN success and show mastery of nursing knowledge. However, using these tests alone failed to correlate to the passage of the initial writing of NCLEX-RN (see Table 2).

### **Statement of Purpose**

The purpose of this study was to identify academic predictors for success of Associate Degree Nursing Graduates on the initial NCLEX-RN writing in a selected ADN program.

### **Theoretical Framework**

The conceptual framework selected to guide this study was the Higgs (1984) Model for Prediction of Success in Nursing Education and Practice (see Table 3). This model was developed to predict success in nursing on the initial writing of the NCLEX-RN and to evaluate nursing program curriculum. The research was designed to determine predictors of success in an associate-degree nursing program, particularly on the initial writing of the NCLEX-RN. The data to be reviewed for this proposed study will encompass student records from 2006 through 2010 as this was inclusive of the students enrolled in the program following the admission criteria and curriculum change at the proposed study site. The Higgs Model (1984) also suggested future research be conducted utilizing this model to establish the interactions between variables as well as how the variables correlate within the model. This study will add to current research regarding the model.

Each of the three levels within Higgs' model (1984) includes both academic and nonacademic variables: pre-major, nursing major, and post graduation. The selected study site for this research instituted a mandated curriculum in 2005. At the same time, the study site began using academic factors as criteria for selection of a candidate for admission and progression in the nursing program. Because of this, this researcher chose to only use academic factors to study in predicting success on the initial writing of the NCLEX-RN. The academic variables that will be the main focus of this study included independent variables, the GPA from the most recent 24 hours of coursework, the ACT Compass reading score, biology course grades (BIO 201, 202, and 220), nursing course grades (NUR 102, NUR 103, NUR 104, NUR 105, NUR 106, NUR 201, NUR 202, NUR 203, and NUR 204), and the initial ERI/ATI comprehensive test score predicting success of the dependent variable on the initial writing of the NCLEX-RN

Table 3

Higgs Model for Prediction of Success in Nursing Education and Practice

Pre-Major Variables	Nurse Major Variables	Post-Graduation
<ul style="list-style-type: none"> <li>a. Intellectual Ability/aptitude               <ul style="list-style-type: none"> <li>1. Intelligence Test</li> </ul> </li> <li>b. <b>Aptitude Test</b></li> <li>c. Locally Constructed Tests               <ul style="list-style-type: none"> <li>1. Tests of Creativity/Critical Thinking/Learning</li> </ul> </li> <li>d. Scholastic Performance               <ul style="list-style-type: none"> <li>1. High School Rank</li> <li>2. High School GPA</li> <li>3. <b>GPA on Previous Coursework</b></li> <li>4. <b>GPA on course/subjects</b></li> <li>5. Late Bloomer</li> <li>6. Probation/Patterns Of grades</li> <li>7. Previous Degree</li> <li>8. Total # of elective credits</li> </ul> </li> <li>e. <u>Demographic</u> <ul style="list-style-type: none"> <li>1. Age</li> <li>2. Sex</li> <li>3. Marital Status</li> <li>4. Number of Dependents</li> </ul> </li> <li>f. <u>Personal/Personality</u> <ul style="list-style-type: none"> <li>1. Interest/Occupational Preference</li> <li>2. Motivation: Parents/students</li> <li>3. Style: Introversion, Locus of control</li> <li>4. Self concept/self esteem</li> <li>5. Study Habits</li> <li>6. Personality Inventories</li> <li>7. Anxiety Scales</li> <li>8. Interview Data</li> <li>9. Letter of Reference</li> </ul> </li> <li>g. <u>Sociological-Situational/Interactional</u> <ul style="list-style-type: none"> <li>1. Ethnicity</li> <li>2. Socioeconomic Status</li> <li>3. Parent's Education/Occupation</li> <li>4. Educational Aspirations: Student/Parent</li> <li>5. Religion</li> <li>6. Urban-Rural</li> <li>7. Size-Type of Previous School</li> <li>8. Student-Teacher Role Expectations</li> <li>9. Social/Academic Integration</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>a. <b><u>Progression: Completion/Attrition</u></b> <ul style="list-style-type: none"> <li>1. <b>Yearly</b></li> <li>2. <b>Terminal</b></li> </ul> </li> <li>b. <u>Level of Achievement</u> <ul style="list-style-type: none"> <li>1. <b>Individual Courses, Term, Yearly</b></li> <li>2. <b>Terminal-Major/Degree</b></li> <li>3. GPA Categories used as categorical data.</li> <li>4. GPA as interval data</li> </ul> </li> <li>c. <u>Performance Criteria</u> <ul style="list-style-type: none"> <li>1. Clinical Behaviors</li> <li>2. <b>Course, yearly, terminal</b></li> </ul> </li> <li>d. <b><u>NLN Exams</u></b> <ul style="list-style-type: none"> <li>1. <b>Individuality, Composite</b></li> </ul> </li> <li>e. <u>Organization Variables</u> <ul style="list-style-type: none"> <li>1. Curriculum Design</li> <li>2. Teaching strategies Content/Learning Experiences</li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>a. <u>Career</u> <ul style="list-style-type: none"> <li>1. Performance</li> <li>2. Advancement</li> <li>3. Satisfaction</li> </ul> </li> <li>b. Aptitude Tests: GRE</li> <li>c. Scholastic               <ul style="list-style-type: none"> <li>1. Graduate School Admission</li> <li>2. Graduate School Performance</li> </ul> </li> <li>d. <b>State Board Tests Scores</b> <ul style="list-style-type: none"> <li>1. Individual, Composite</li> <li>2. Level of achievement-Interval Data</li> <li>3. <b>Pass/Fail-categorical Data</b></li> </ul> </li> </ul> <p>Organizational Variables in work setting</p>

Note: Those bolded are independent and dependent variables.

Nonacademic factors were included in Higgs Model for Prediction of Success in Nursing Education and Practice (age, race, gender, previous experience, etc.) and have been found to be valuable in predicting NCLEX-RN success in several studies (Beeson & Kissiling, 2001; Haas, Nugent, & Rule, 2004; Humphreys, 2008; Potolsky, Cohen, & Saylor, 2003; Vanderhouten, 2008). However, nonacademic factors, as predictors of success on the NCLEX-RN, have been found to be unrelated factors in many other studies (Beeson & Waterhouse, 2001; Gallagher, Bomba, & Crane, 2001; Higgins, 2005; Sayles, Shelton, & Powell, 2003; Tipton et al., 2008; Uyehara et al., 2007; Yin & Burger, 2003). Most importantly, ACS postsecondary institutions require strict adherence to policies that forbid the exclusion of individuals on the basis of race, creed, sex, nationality or age (ACCS, 2009). For these reasons nonacademic factors, although relevant, were not the focus of this study. Some of Higgs' academic variables were not included in this study (i.e intelligence tests, high school ranking/GPAs, previous degrees, academic probation, patterns of grades, total number of elective credits, teaching strategies, and content/learning experiences) because the variables are outside the curriculum of the selected study site.

### **Conceptual Definitions**

There are independent variables that will be analyzed to predict success on the dependent variable. The independent variables that will be used as predictors of success are the ACT Compass Test (Reading) score, the GPA from the most recent 24 hours of coursework, and biology grades in BIO 201, BIO 202, and BIO 220. All of these are pre-admission criteria. Independent variables also include grades in nursing courses (NUR 102, NUR 102, NUR 103, NUR 104, NUR 105, NUR 106, NUR 201, NUR 202, NUR 203, and NUR 204) and the initial



score on the ERI/ATI comprehensive examination. The dependent variable is successful passage on the initial NCLEX-RN writing. Other terms to be clarified include the following:

- a. **ACT Compass Test:** This test is used by postsecondary colleges for placement in mathematics, writing, and reading skills (ACT, 2003);
- b. **Nursing Courses:** These are courses within the nursing curriculum and include Fundamentals of Nursing (NUR 102), Health Assessment (NUR 103), Pharmacology (NUR 104), Adult Health (NUR 105), Maternal Child Health (NUR 106), Nursing Through the Life Span I (NUR 201), Nursing Through the Life Span II (NUR 202), Nursing Through the Life Span III (NUR 203) and Role Transition NUR (204) (See Appendix B-Associate Degree Nursing Curriculum);
- c. **Most recent 24 credit hour GPA:** This is a student's overall grade point average on the most recent 24 hours of undergraduate coursework as measured on a 4.0 scale. GPA is measured by dividing the number of quality points by the number of hours attempted. Each course has assigned credit hours. Each letter grade is awarded a specified number of quality points (A=4; B=3; C=2; D=1 and an F=0; see Table 4);
- d. **Grade Point:** This is the mean to assess the quality of work: A=4; B=3; C=2; D=1; F=0; and WF= 0. <http://www.accs.cc/>.
- e. **Grading Scale for the Nursing Program:** The grading scale is based on the following criteria: A=90-100; B= 80-89; C=75-79; D=60-74; 59 and below. There is no rounding of test scores. Only the final course grade is rounded <http://www.accs.cc/>.

- f. **NCLEX-RN success:** This is a graduating nursing student passing the NCLEX-RN exam on the first time writing;
- g. **Prerequisite courses:** This is coursework is completed prior to admission to a nursing program and may include math and biology courses (BIO 201, BIO 202, and BIO 220); and
- h. **Prerequisite Nursing GPA:** This includes GPA on course work prior to entering the nursing program.

### **Research Questions**

The overarching research question for this study is, “What are the best academic predictors of success for a passing score on the NCLEX-RN exam on the initial writing? Other questions in addition to the major research question are as follows:

1. Does the ACT Compass Reading Score predict success on the initial NCLEX-RN writing;
2. Does the GPA on the most recent 24 hours of undergraduate study predict success on the initial NCLEX-RN writing;
3. Do the scores achieved in the required prerequisite courses (BIO 201, BIO 202, and BIO 220) provide a strong indication of success on the initial NCLEX-RN writing;
4. Which courses in the nursing curriculum (NUR 102, NUR 103, NUR 104, NUR 105, NUR 106, NUR 201, NUR 202, NUR 203, and NUR 204) best predict success on the initial NCLEX-RN writing; and
5. Does the initial ERI/ATI comprehensive test predict success on the initial NCLEX RN?

Table 4

Data Entry Page

What are the best predictors of success on passing the NCLEX RN exam on the initial writing?										
Do the ACT Compass Reading Score and the GPA on the most recent 24 hours of undergraduate study predict success for the Associate Degree Nursing (ADN) student on the initial attempt NCLEX-RN writing?										
Student		Reading Compass (76-99)			GPA			NCLEX-RN Pass=1 Fail=0		
Do the scores achieved in the required prerequisite courses (BIO 201, BIO 202, and BIO 220) provide a strong indication of success on the initial NCLEX-RN writing? These grades are coded as A=4.0; B=3.0; C=2.0										
Student	BIOLOGY 201		BIOLOGY 202		BIOLOGY 220			NCLEX-RN		
Which courses in the nursing curriculum (NUR 102, NUR 103, NUR 104, NUR 105, NUR 106, NUR 201, NUR 202, and NUR 203) predict success on the Initial NCLEX-RN writing? These grades are coded as A=4.0; B=3.0; C=2.0										
Student	NUR 102	NUR 103	NUR 104	NUR 105	NUR 106	NUR 201	NUR 202	NUR 203	NUR 204	NCLEX-RN
Does the ERI/ATI comprehensive test predict success on the initial NCLEX-RN? These grades are coded as 1=pass and 0=failed										
Student			ERI/ATI				NCLEX-RN			

## **Summary**

The need for registered nurses should be addressed both locally and nationally. Schools of nursing are required to equip students with the skills and knowledge necessary to become a registered nurse. However, schools of nursing are held to strict standards by boards of nursing to ensure nursing graduates maintain a minimum board passage score on the initial NCLEX-RN writing. In an effort to enhance the likelihood that this mandate is accomplished effectively, nursing programs have established admission criteria with the anticipation that students admitted will be successful both in the nursing academic program and on the initial writing of NCLEX-RN upon graduation. This research served as a two-fold purpose. First, this research can assist in addressing the local and national nursing shortage by identifying predictors that determine measures of success on the initial writing on the NCLEX-RN for graduates of an Associate Degree Nursing (ADN) program in central Alabama. Also, this research can serve as a preemptive strategy for students already admitted to the nursing program, to help ward off potential student failure in the nursing program as well as failure on the initial NCLEX-RN writing.

## CHAPTER II:

### REVIEW OF LITERATURE

A thorough review of nursing education literature was conducted of research articles published in English during the last 15-25 years as research parameters. The databases searched were CINAHL, ProQuest, and dissertations with an emphasis on research articles.

Keywords/phrases used were: prediction of success in nursing education and practice, National Council of Licensure Examination for Registered Nursing (NCLEX-RN) success, ADN programs, and factors/criteria for success on NCLEX-RN. A total of 21 relevant articles were found and categorized in the following manner: academic variables (15); standardized testing (10); and interventions (6). Searches were also made for the specific academic variables that were used for the study, including GPA (9); placement tests (5); and selected course grades, specifically prerequisite and nursing course grades (7). The review of literature also included research related to how allied health profession programs utilized the same variables, of which a total of five articles were found.

#### **GPA (Cumulative and Prerequisite GPA)**

Cumulative and prerequisite grade point averages (GPAs) have been used by nursing programs as admission criteria as well as predictors for success in the nursing program and on the NCLEX-RN with inconsistent results (Crow et al., 2006; Gilmore, 2008; Daley et al., 2003; Davenport, 2007; Frith et al., 2005; Haas et al., 2004; Sayles et al., 2003; Tipton et al., 2008; Uyehara et al., 2007; Yin & Burger, 2003). Gilmore (2008) reported that prerequisite GPA was a determining factor for Associate Degree Nursing (ADN) program success, but found no

correlation in GPA as a predictor of NCLEX-RN success. It was determined that graduates who passed on the initial writing of NCLEX-RN had a 0.03 higher nursing GPA than those that failed to pass the NCLEX-RN on the initial attempt. Sayles et al. (2003) conducted a study of 78 ADN and BSN nursing graduates to determine predictors of success in nursing education using several variables, including GPA in prerequisite courses. Utilizing Pearson R and *t* test to determine the strength of relationships and difference of the group mean, prerequisite GPA was found statistically significant at  $p \leq 0.05$  in predicting NCLEX-RN success for an associate and baccalaureate degree nursing graduates. Likewise, Daley & colleagues (2003) discerned that students who were successful on the first writing on NCLEX-RN typically had a GPA of 3.5 or greater in prerequisite courses. Also, Yin and Burger (2003), while employing correlational *t* test and chi square to determine relationships, found that 325 associate degree nursing graduates who passed the NCLEX-RN on the initial testing had significantly higher prerequisite GPAs ( $p < 0.01$ ) than those that failed.

GPA has been used by various allied health programs as pre-admission criteria, both as a predictor of academic success and as a predictor of success on board examinations (Collins & Browning 2002; Dockter, 2001; Downey et al., 2002). Downey and colleagues (2002) discovered that of the 134 records reviewed, the prerequisite GPA was the most significant factor ( $p \leq .001$ ) in predicting success on the National Board Dental Hygiene Examination. Additionally, Dockter (2001) revealed that in a review of 107 student records, GPA in core courses was the only pre-admission factor that predicted success ( $p < .01$ ) on the Physical Therapy Licensure Examination.

The Higgs Model for Prediction of Success in Nursing Education and Practice (1984) has been used by various researchers in predicting nursing program success using GPA as admission

criteria in a nursing program and on the NCLEX-RN exam. However, there have been very few studies to utilize the Higgs Model for Prediction of Success in Nursing Education and Practice. Allen, Higgs, and Holloway (1988) performed a study to identify students at risk for academic difficulty in a Baccalaureate Science Nursing (BSN) program. The findings revealed that there was a statistically significant correlation ( $p=0.001$ ) between a lower prerequisite GPA and failure to complete a nursing program. Also, Sands (1988) conducted a study among 67 BSN graduates to identify predictors of success on the initial writing of the NCLEX-RN. Utilizing the statistical methods of Pearson correlation, ANOVA, and stepwise multiple regression, the results were not found to be significant ( $p=0.15$ ), but the results indicated a positive correlation between GPA and NCLEX-RN success.

Several studies have examined the relationship between nursing coursework GPA and nursing program success (Gilmore, 2008; Daley et al., 2003; Haas et al., 2003; Tipton et al., 2008; Salyes et al., 2003; Uyehara et al., 2007). Interestingly, each of these studies revealed that a 3.5 or higher GPA in nursing courses was predictive of success on NCLEX-RN. Likewise, Daley and colleagues (2003) determined, using independent  $t$  test or chi square, that students with higher final cumulative GPA's ( $3.4 \pm .2$ ) in a BSN program were more successful on the initial writing of NCLEX-RN than those with a lower cumulative GPA ( $3.0 \pm .1$ )  $p < .001$

Nursing coursework GPA has been identified as a strong indicator in predicting success on the NCLEX-RN examination (Davenport, 2007; Frith et al., 2005). Davenport (2007) conducted a study among 300 ADN and BSN students at a Midwestern University. The Indiana State Board of Nursing mandates NCLEX-RN pass rates to decrease no lower than one standard deviation from the national pass rate in order to maintain accreditation (Davenport, 2007). Findings revealed that graduates with a higher GPA passed the NCLEX-RN at a significantly

higher rate than those who failed the NCLEX-RN. (No specific data was given in relation to raw numbers of the higher rate or statistical methodologies used).

Furthermore, Frith, Sewell, and Clark (2005) recognized that the majority of students who failed the NCLEX-RN typically have a lower GPA (3.07) as compared to peers who had higher GPA (3.14) and thus were successful on the first writing on NCLEX-RN. Beeman and Waterhouse (2001) employed discriminate analysis while Beeson and Kissling (2001) used logistic regression in which each of these studies found that students with a high average GPA, at the end of the nursing sophomore, junior and/or senior semester passed the NCLEX-RN at a significantly higher rate ( $p < .0001$ ) on the first attempt than other nursing students. Yin and Burger (2003) determined that the 325 ADN graduates that initially passed the NCLEX-RN had a 3.20 GPA, but those who were not successful on the initial attempt on NCLEX-RN had a GPA of 2.99 or lower while utilizing statistical analysis of correlational,  $t$  test and chi square. It was also found that when the preadmission GPA was less than 2.95, the average NCLEX-RN passage rate was 76%. When the GPA was greater than 2.95, the initial NCLEX-RN passage rate increased to 96%. However, De Lima, London, and Manieri, (2011) determined that cumulative GPA ( $p \leq 0.89$ ), the nursing curriculum GPA ( $p \leq 0.56$ ), and the graduating GPA ( $p \leq 0.37$ ) were not significant in predicting success on NCLEX-RN among ADN graduates.

### **Placement Tests**

Many nursing programs use placement tests as a means to identify a student's level of mathematical, reading, and writing abilities for entrance into a nursing program and ultimately as a predictor of success on the NCLEX-RN examination. Students with a significantly higher score on the American College Test (ACT) have been shown to be more successful on the NCLEX-RN. (Daley et al., 2003). Gilmore (2008) conducted a study, utilizing logistic regression, to help



determine selection criteria for an associate degree nursing program. The study revealed that the ACT English score was statistically significant ( $p=0.02$ ) in predicting NCLEX-RN success and the ACT Reading score had a positive correlation in predicting NCLEX-RN success.

Haas and colleagues (2003) used discriminant analysis and cited that BSN graduates with higher Scholastic Achievement Test (SAT) verbal scores ( $p=.001$ ) and SAT quantitative scores ( $p=.082$ ) performed significantly higher on the initial writing of the NCLEX-RN than those that failed on the initial writing of NCLEX-RN. Sayles, Shelton, and Powell (2003) determined that ACT verbal scores were statistically significant ( $p\leq 0.03$ ), employing Pearson R and  $t$  test, to NCLEX-RN success. Crow and colleagues (2004) conducted a study to find what requirements and interventions are used by BSN programs to predict NCLEX-RN success. With a total of 160 BSN programs reporting, significant findings were discovered using Scholastic Aptitude Test (SAT) scores for admission criteria that correlated with NCLEX-RN success.

Higgs Prediction of Success in Nursing Education and Practice Model (1984) has been used in studies examining the utilization of placement tests in predicting success in a nursing program, including success on the initial writing on the NCLEX-RN. Sands (1988) discovered a positive correlation between college SAT scores (mean verbal, 346.66 and mean math 340.9) and NCLEX-RN success. In addition, Allen and colleagues (1988) found that students with lower verbal fluency scores were at risk for failing required nursing course work ( $p=.005$ ) using various statistical analysis such as Chi square,  $t$  test, ANOVA, Pearson correlation and multiple regression.

### **Selected Course Grades**

Selected course grades have been employed to predict nursing program success as well as NCLEX-RN success (Beeman & Waterhouse, 2001; Beeson & Kissling 2001; Daley et al., 2003;

De Lima et al., 2011; Gilmore, 2008; Higgins, 2005; Simon & Augustus, 2009; Seldomridge & DiBartolo, 2004; Uyehara, et al., 2007). A significant correlation ( $p < .0001$ ) between biology, physiology, and/or pathophysiology grades and the successful passing of the NCLEX-RN exam were reported by other studies as well (Beeson & Kissling, 2001; Daley et al., 2003; Higgins, 2005).

In relation to science course grades, Seldomridge and DiBartolo, (2004) discovered that pathophysiology grades were the only pre-admission criteria that significantly ( $p < 0.000$ ) correlated with NCLEX-RN success among 186 BSN graduates. The research was conducted utilizing statistical methods of Pearson product moment correlation coefficients, and two sample  $t$  tests to predict possible predictors of success of the NCLEX-RN. Adding more to the research, Higgins (2005) found that grades in *Human Anatomy*, *Physiology I*, and *Microbiology* are good predictors for an associate degree nursing program success. However, *Human Anatomy* and *Physiology II* are the only prerequisite science courses that are significant for NCLEX-RN success. Yin and Burger (2003) reported that the 325 associate degree nursing graduates who passed the NCLEX-RN had higher grades in natural science courses. This research study supported the relationship completion of natural science courses have to nursing program success (Washington & Perkel, 2001; Yin & Burger, 2003) in that both sciences and nursing courses integrate critical thinking and application processes to discern information in a methodological format. Yin and Burger (2003) recommended that the GPA in natural science courses (biology, chemistry, anatomy, and physiology) be examined carefully when considering students for acceptance in to a nursing program. Washington and Perkel (2001) agreed with the importance of natural science course work. Their study revealed that if a student repeated science courses there was a strong likelihood the student would have difficulty in nursing coursework.

In relation to nursing course grades, Beeman and Waterhouse (2001) identified the best predictor ( $p=0.05$ ) of NCLEX-RN success was the number of C+ grades or lower earned in nursing theory courses and the relationship to initial passage of NCLEX-RN among 289 BSN graduates. The fewer the number of C+ grades or lower, the better the graduate's chance of having NCLEX-RN success. Daley and colleagues (2003) revealed that NCLEX-RN passage rates were significantly higher for students with a higher final grade in medical-surgical courses ( $3.4 \pm .4$  versus  $2.8 \pm 0.6$ ,  $p < 0.001$ ).

De Lima and colleagues (2011) examined academic and demographic data to predict success for ADN graduates on the initial attempt on the NCLEX-RN. Employing the use of *t* tests, terminal grades in the Fundamental ( $p \leq 0.01$ ), Maternal Child ( $p \leq 0.00$ ), and Mental Health nursing courses ( $p \leq 0.00$ ) were found to be statistically significant ( $p \leq 0.05$ ) with regard to NCLEX-RN success.

Salyes and colleagues (2003) conducted a study among ADN and BSN graduates to determine predictors of success in nursing education. Increases in nursing program attrition rates (starting at 82% and declining to 69%) and a decrease NCLEX-RN passage rates (98% dropping to 83.5%) promoted the study to be conducted among 78 nursing school graduates. Variables used to determine NCLEX-RN success included nursing course grades, specifically the final nursing course grades (in a class covering oxygenation and circulation through the lifespan), which were found to be statistically significant ( $p=0.05$ ) as a predictor of NCLEX-RN success. Additionally, Simon and Augustus (2009) conducted a study, with the use of Pearson moment correlation, comparing BSN to ADN graduates using the NLN NCLEX-RN readiness performance exam. There were a total of 316 transcripts reviewed for the study (171 from BSN students and 145 from ADN students). The findings for both programs revealed that the adult

health nursing course and the maternal child health nursing course had a positive influence on NLN readiness exam results and subsequently success on the NCLEX-RN exam. This study also stated that success in biology and chemistry courses were significant in predicting NCLEX-RN exam success. There was no data given in reference to percentile scores.

After the implementation of a new nursing curriculum, Uyehara and colleagues (2007) conducted a study, among 218 BSN students over a five-year period to determine program completion and NCLEX-RN success using statistical analysis of correlations and regression analysis. This study determined that there was a significant relationship ( $p = 0.0038$ ) between student grades in the *Fundamentals of Nursing* course and NCLEX-RN success. The ultimate goal of NCLEX-RN pass rates (97.25%) and program success (95.09) were achieved. No previous NCLEX-RN pass rate and program completion data was provided for NCLEX-RN passage rates achieved before implementation of the new curriculum.

Higgs' Prediction of Success in Nursing Education and Practice Model (1984) has been used in predicting success in nursing programs and on the NCLEX-RN. Allen and colleagues (1988) found that students with two or more "D" grades, two or more withdrawals, or a combination of a grade of "D" or "F," or with withdrawal in prerequisite course for nursing were at risk of earning an "F" grade in a nursing course. Subsequently, earning a "D" or "F" grade in a prerequisite nursing course would delay a student's admittance into a nursing program.

### **Standardized Testing**

Standardized testing has become vital in many nursing programs as an entrance, and/or exit exam, as well as a means throughout the program to assess student's readiness throughout the program and success on the initial writing of NCLEX-RN (Mosser, Williams, & Wood, 2006). Health Education Incorporated System (HESI), Assessment Technologies Institute (ATI),

[formally known as Educational Resource Incorporated (ERI)], Nurse Entrance Test (NET), Registered Nurse Entrance Examination (RNEE), and Mosby are a few companies that specialize in preparation and testing readiness for NCLEX-RN. A number of studies have been conducted evaluating the effectiveness of correlating standardized tests to NCLEX-RN success (Beeson & Kissling, 2001; Bondmass et al., 2008; Crow et al., 2006; Daley et al., 2003; De Lima et al., 2011; Ellis, 2006; Frith et al., 2005; Gallagher et al., 2001; Higgins, 2005; Lauchner, Newman, & Britt, 2006; March & Ambrose, 2010; McGann & Thompson, 2008; Mosser et al., 2006, Norton, et al., 2006; Sayles et al., 2003; Uyehara et al., 2007; Vandenhouten, 2008). However, there has been relatively limited research on effective approaches to best utilize standardized assessments to improve NCLEX-RN passage rates and student results (Carrick, 2011).

### **Health Education Incorporated System (HESI)**

HESI is a computerized exam that measures and compares the performance of nursing students nationally to assess readiness for the NCLEX-RN (Morrison, Walsh, & Free, 2002). Not only has HESI been used by nursing programs to assess NCLEX-RN readiness, but it has been the focus of several studies (Daley et al., 2003; De Lima et al., 2011; Frith et al., 2005; Harding, 2010; Higgins, 2005; Lauchner, Newman, & Britt, 2006; March & Ambrose, 2010). Harding (2010) explored the predictability of using HESI in relation to NCLEX-RN success. HESI was found to be 96.4% to 98.3% accurate in predicting success in a total of 17,432 students over the four-year period (Harding, 2010). This study also found that HESI is best used to predict NCLEX-RN success, not failure, when used in logistic regression models. Both Daley and colleagues (2003) ( $67.6 \pm 2$  versus  $48.0 \pm 9$ ,  $p=.001$ ) and Higgins (2005) found HESI exit examination scores to be statistically significant as predictors ( $r=0.281$ ) of NCLEX-RN success. Additionally, Daley and colleagues (2003) found that students who readily volunteered to take

HESI on their own were more likely successful on the initial writing of NCLEX-RN than those who did not readily volunteer to take the HESI ( $p=.001$ ). De Lima and peers conducted a study exploring academic and demographic variables that predict success on the NCLEX-RN among 650 ADN graduates. The HESI Examination that was given at the end of the program was statistically significant ( $p\leq 0.05$ ) in predicting success on the NCLEX-RN. Frith and colleagues (2005) also performed a study that assessed the NCLEX-RN passage rate when using the HESI Exit examination. In 2002, they found the average passage rate of the HESI Exit examination was 30% for first time test takers. This rate rose to 89% in 2005. Another study conducted by Lauchner, Newman, and Britt (2006) using the HESI as a predictor of NCLEX-RN success. Their sample incorporated a total of 62 nursing programs (54 Registered Nursing and eight Practical Nursing programs), including 35 ADN and 17 BSN programs (a total of 1991 ADN students, 583 BSN students, and 59 diploma students) The HESI exit exams were 99.49% accurate in predicting success in a proctored environment versus 96.82% accurate in predicting success in a nonproctored environment (Lauchner, Newman, & Britt, 2006). March and Ambrose (2010) explored the use of the computerized exit exam HESI as one of the components of an effective preparation process for success on the NCLEX-RN among 31 senior baccalaureate students. The benchmark score was 850. Before implementation of this preparation process for success on NCLEX-RN the board score had dropped to 83% in spring 2005. Following implementation, over the next few semesters, a strong improvement in the NCLEX-RN passage rate (October' 2005 to September 2006 yielded a 91% passage rate, October 2006 to September 2007 noted a 94% passage rate, October 2007 to September 2008 produced a 91% passage rate, and from October 2008 to September 2009 the passage rate was 94.9%) was noted. Although there have been several research studies supporting the use of HESI, Spurlock and

Hunt (2008) cautioned that only the first scores from HESI should be considered in predicting success on the NCLEX-RN. Additional HESI attempts alter the HESIs status as a predictor of passage on the initial writing of NCLEX-RN.

### **Registered Nurse Entrance Examination (RNEE) and Nurse Entrance Test (NET)**

Both the NET and RNEE are entrance examinations that assist in evaluating applicant admission to a nursing program as well as predictors of program completion and ultimately success on the NCLEX-RN (Gallagher et al., 2001). Ellis (2006) stated that the NET assesses reading, math, and critical thinking essential for success in pursuing a nursing degree. Gallagher and associates (2001) conducted a study among 121 ADN students to determine whether the NET or RNEE was a better predictor for success in the entry level course and later success on the initial writing on NCLEX-RN. Both the RNEE and NET were administered to randomly selected students enrolled in a Fundamentals of Nursing course. Among the selected students, there was no significant difference in the NET scores of those who passed the fundamentals course (“C” or better) than those who failed (lower than a “C”). It is important to note that the range for passing a prerequisite course or a nursing course is between 74.5 and 100%. However, of the 109 students who successfully completed nursing fundamentals courses, all had higher RNEE admission scores. The use of logistical regression analysis proved doubly beneficial because the RNEE test scores in reading comprehension subtest were statistically significant and established a benchmark score for entrance or admission (Gallagher et al., 2001).

Likewise, RNEE was found to predict NUR 101 success, subsequently predicting program and NCLEX-RN success. Gallagher and associates (2001) concluded that strong reading comprehension was essential for nursing program success. This finding is supported by the fact that the NCLEX-RN is written on an eleventh grade reading level. Students who are

unable to comprehend and read at this grade level may not be as successful on the NCLEX-RN as those reading at a higher level (Gilmore, 2008).

Ellis (2006) explored the use of Nursing Entrance Test (NET) scores as criteria for admission criteria to a diploma nursing program. By increasing the required NET score on the “critical thinking appraisal,” the nursing program increased the retention rate of level one nursing students. Two cohorts of admitted nursing students were evaluated (a total of 137 students). The first group consisted of students admitted prior the use of a higher NET score, and the second group consisted of students admitted after a higher NET score was required. Before the change in NET admission score criteria, there were 82 students (cohort 1) admitted. There were 70.7% (55 students) of cohort 1 that successfully completed level 1. In cohort 2 where higher NET scores were required, 55 students were admitted with 89.1% (49 students) retained in the nursing program. However, the study did not evaluate nursing program completion or NCLEX-RN passage on the initial writing in relation to the implementation of higher NET scores.

### **Mosby Assess Test**

Several nursing programs have employed the use of Mosby Assess Test (Beeson & Kissling, 2001; Crow et al., 2006; Daley et al., 2003; Frith et al., 2005; McGann & Thompson, 2008; Uyehara et al., 2007) to determine readiness for the initial NCLEX-RN writing. Daley and colleagues (2003) conducted a study among BSN undergraduate seniors in an effort to determine predictors of success on the NCLEX-RN. Multiple variables were examined among two groups of senior nursing students, including demographic factors and the comparison of scores from two standardized tests, the Mosby Assess Test and the HESI. The first cohort consisted of 121 senior nursing students that took the Mosby Assess Test. The NCLEX-RN results for the first group were 108 (89.25 %) passing and thirteen students (10.7%) failing the initial writing of NCLEX-



RN. The second cohort, 103 senior nursing students, took the HESI Exit examination. The NCLEX-RN results for the second group were 96 (93.2 %) passing with seven (6.8%) students failing the initial writing of the NCLEX-RN.

McGann and Thompson (2008) researched factors related to the academic success of at-risk senior nursing students. A total of sixteen at-risk students were identified to participate in the study. The nonparametric statistical tests they utilized were Wilcoxon Rank Sum ( $z$ ) and Spearman rank correlation ( $r_s$ ). The students participated in several activities as preparation for the initial writing NCLEX-RN exam; including faculty mentoring, journaling, tutorials, and taking the Mosby Assess Test determine NCLEX-RN readiness. The passage rate for this group was 87% on the initial writing of NCLEX-RN. Although the research group was small, the findings revealed the need for comprehensive computerized testing to promote NCLEX-RN readiness and initial writing success.

Beeson and Kissling (2001) and Frith et al. (2005) identified a significant correlation between those who passed the NCLEX-RN and the Mosby Assess Test. Beeson and Kissling (2001) conducted a study that examined predictors of success among BSN senior level students on the initial writing of NCLEX-RN. Several academic factors were used in this study that are similar to the factors to be used in the study proposed by this researcher (cumulative GPA, prerequisite biology and physiology course grades, nursing course grades and comprehensive testing using the Mosby Assess Test). The results in this study found that 463 students out of a total of 507 students passed the initial writing of NCLEX-RN. The students that passed had higher Mosby Assess Scores (MAS). This proved to be statistically significant ( $<.0001$ ) as the NCLEX-RN passage rate for this group was 91.7%. Crow and colleagues (2006) identified which requirements and interventions were used among 170 BSN programs that participated in

their study. Many programs used prerequisite requirements for admission (GPA, ACT/SAT scores, and course grades) and a comprehensive examination for predicting NCLEX- RN readiness (90%; N=144) including the Mosby Assess Test (31.9%; N=51), which was used the most frequently among all the BSN programs.

Adding more to the literature, Frith and associates (2005) examined best practices in preparation for NCLEX-RN readiness among BSN students while utilizing statistical analysis of chi square, Pearson correlation and *t* test. Before implementation of best practices, the NCLEX-RN passage rate ranged from 85% to 95% over the last ten-year period, but the passage rate dropped to 73% after the implementation of best practices. The variables examined included cumulative GPA, SAT scores, nursing course grades and Mosby Assess Test scores. The results revealed that students with lower GPAs ( $\leq 3.07$ ) had lower Mosby Assess Test scores and subsequently failed the NCLEX-RN.

#### **Educational Resources, Inc./Assessment Technologies Institute**

Educational Resource Incorporated (ERI) is another company that provided computerized testing of student readiness for the NCLEX-RN. ERI was founded in 1963 for the purpose of creating educational programs and testing to assist students in reaching their educational goals (Educational Resources, Inc., 2002). In 2008, ERI merged with Assessment Technologies Institute (ATI).

A number of studies employed either the ERI or ATI exit test to assess student readiness for the NCLEX-RN (Bondmass et al., 2008, Davenport, 2007; Mosser et al., 2006; Norton et al., 2006; Sayles et al.; Vandenhouten, 2008). Bondmass and colleagues (2008) explored the NCLEX-RN success rate in a BSN program following implementation of the Nurse Entrance Test (NET) and ERI computerized assessments throughout the curriculum. A total of 187

students were included in this study. Before implementing NET and ERI to assess nursing students during 2000-2005, the retention rate in the nursing program was 83 to 85%, with an NCLEX-RN pass rate of 80.9%. After implementation of the NET on admission and ERI testing throughout the curriculum, the NCLEX-RN passage rate increased to 87.8%, an 8.5% increase over the previous five years. Increasing the overall NCLEX-RN passage rate was the major goal in implementing the assessments.

Mosser, Williams, and Wood (2006) explored the use of the ATI examinations at two colleges as a way to promote standardized progression testing. Both the Rhode Island College and Waynesburg College nursing programs utilized the ATI to promote progression testing. Prior to utilizing the ATI, NCLEX-RN overall passage rates were less than 80%. Following the implementation of ATI examinations and remediation, the passage rate rose above 90% (Mosser et al., 2006).

Norton and colleagues (2006) used the ATI comprehensive assessment predictor to assess senior nursing students' readiness for success on the initial the writing of NCLEX-RN at Georgetown University School of Nursing Health Sciences(GU-SNHS) BSN program. ATI has 95% predictability for NCLEX-RN success when a score of 64 to 65% or higher was attained (Norton et al., 2006). There was a noticeable improvement in NCLEX-RN success after the implementation of the ATI Comprehensive Assessment Predictor. The initial benchmark was set at 91.7%, five percent above the national average. This benchmark exceeded the 86.7% national NCLEX-RN pass rate of first-time baccalaureate candidates educated in the United States in 2002. However, the school only achieved an 84.1% passage rate. In conjunction with other strategies, the NCLEX-RN passage rate improved from 84.1% in 2002 to 95.1% in 2004. It was also noted that there were 62 of GU-SNHS BSN graduates completing the initial exam with a

minimum of 92 questions. Additionally, 71% of these graduates had the minimum number of questions (75) passing on the initial attempt.

Sayles and associates (2003) examined predictors of success in nursing education programs including using ERI Total Testing with the Pre-RN Exam Overall Comprehensive Test Score and Remediation Package. This test assesses readiness for success on the NCLEX-RN. The study revealed that the Pre-RN Exam Overall Comprehensive Test Score was statistically significant ( $p=0.0003$ ) in predicting NCLEX-RN success. Before implementation of ERI Total Testing the NCLEX-RN passage rate dropped from 98% to 83.5% over a four-year period (1997-2000). After implementation of ERI Total Testing, the NCLEX-RN passage rate improved to 87.2% in 2001.

Vandenhouten (2008) investigated predictors of success and failure for 296 graduates of a BSN program over a five-year period. This study also used the ATI Comprehensive Predictor Exam. The ATI Comprehensive Predictor Exam is a commercially proctored test, compiled of 180 items to assess student's readiness for the NCLEX-RN. The comprehensive examination follows the National Council of State Board of Nursing blueprint of the licensure examination (Assessment Technologies Institute, 2011). Vandenhouten's study reviewed several factors as predictors of NCLEX-RN success that are similar to the factors this proposed study will use, including cumulative GPAs, placement test scores, nursing course grades, and ATI comprehensive test scores. Utilizing logistic regression, Vandenhouten (2008) concluded that the ATI exit examination was statistically significant ( $p=0.00$ ) with success on the NCLEX-RN. The results were only significant in predicting those likely to succeed on the initial writing on NCLEX, and not as predictors those students that would fail.

## **Gaps in the Literature**

This review of articles/studies in researching predictors for success on the NCLEX-RN reveals that there is a greater likelihood of predicting success and a lower likelihood of predicting failure on the NCLEX-RN (Beeson & Kissling, 2001; Haas et al., 2004; Seldomridge & DiBartolo, 2004). Only two studies were found that utilized the Higgs' Prediction of Success in Nursing Education and Practice Model (1984): Allen and colleagues (1988) and Sands (1988). Hence, this proposed research may support and add to the work of Higgs (1984). Numerous published articles and studies have explored multiple variables in predicting success on the NCLEX-RN. However, most studies were conducted among BSN program graduates (Beeson & Kissling, 2001; Beeman & Waterhouse, 2001; Bondmass et al., 2008; Crow et al., 2006; Daley et al., 2003; Davenport, 2007; Frith et al., 2008; Haas et al., 2004; Lauchner, 2006; March & Ambrose, 2010; Mosser et al., 2006; Norton et al., 2006; Potolsky et al., 2003; Seldomridge & DiBartolo, 2004; Uyehara et al., 2007; Vanderhouten, 2008; Waterhouse & Beeman, 2003) as compared with studies of ADN graduates (Baker, 2008; Davenport, 2007; De Lima et al., 2011; Gallagher et al., 2001; Gilmore, 2008; Higgins, 2005; Sayles et al., 2003; Humphreys, 2008; Rogers, 2010; Tipton et al., 2008; Yin & Burger, 2003). This area should be explored because, as stated previously, there are more ADN graduates each year than BSN graduates. However, the BSN graduates are passing NCLEX-RN at a higher rate than the ADN graduates (see Table 1).

There are very few studies (Bondmass et al., 2008; Davenport, 2007; Higgins, 2005; Mosser et al., 2006; Sayles et al., 2003; Vandenhouten, 2008) that have examined the use of ERI/ATI in predicting success on the initial writing of NCLEX. This research investigated the use of ATI within a selected ADN program as a method of predicting success on the initial writing of the NCLEX-RN.

Logistic regression has been used to predict success on the NCLEX-RN by many researchers (Beeson & Kissling, 2001; Landry et al., 2010; Uyehara, 2007, Vandenhooten, 2008; Yin & Burger, 2003). Other research studies, (Beeman & Waterhouse, 2001; Bondmass et al., 2008; Daley et al., 2003; Davenport, 2007; Frith et al., 2005; Haas et al., 2004; Lauchner, 2006; March & Ambrose, 2010; Mosser et al., 2006; Norton et al., 2006; Potolsky et al., 2003) have utilized other methodologies such as chi square, *t* test, ANOVA, etc to predict success on the NCLEX-RN.

The Higgs Model for Prediction of Success in Nursing Education and Practice used academic and nonacademic factors to predict success on NCLEX-RN. Nonacademic factors were relevant in numerous research studies (Beeson & Kissiling, 2001; Haas, Nugent, & Rule, 2004; Humphreys, 2008; Potolsky, Cohen, & Saylor, 2003; Vanderhouten, 2008). However, nonacademic factors, as predictors of success on the NCLEX-RN, have been found to be unrelated factors in many other studies (Beeson & Waterhouse, 2001; Gallagher, Bomba, & Crane, 2001; Higgins, 2005; Sayles, Shelton, & Powell, 2003; Tipton et al., 2008; Uyehara et al., 2007; Yin & Burger, 2003). Most importantly, ACCS postsecondary institutions require strict adherence to policies that forbid the exclusion of individuals on the basis of race, creed, gender, nationality or age (ACCS, 2009). For these reasons nonacademic factors, although relevant, were not the focus of this study.

### CHAPTER III: RESEARCH METHODOLOGY

The purpose of this quantitative study was to identify predictors of success of nursing students in a selected Associate Degree Nursing Program in a community college in central Alabama. Success is defined as completion of all nursing coursework with a passing grade and passage of the National Council of Licensure Examination for Registered Nursing (NCLEX-RN) on the initial writing. A retrospective correlating design using multiple logistic regression was utilized. The conceptual framework that guided this study is Higgs Prediction of Success in Nursing Education and Practice Model (1984). The primary investigator examined which academic variables (GPA, ACT Compass Reading scores, biology course grades, nursing course grades and ATI comprehensive testing scores) predict success on the initial writing of NCLEX-RN. Data gathered came from the files of nursing program students enrolled in the years 2006-2010. The independent variables (GPA, ACT Compass Reading Score, biology course grades, nursing course grades and ATI comprehensive testing score) were chosen because these factors are a part of the admission process to nursing school, course work in the nursing program, and/or comprehension testing at the end of the nursing program. The dependent variable (NCLEX-RN) was chosen because the overall initial passage rate on the NCLEX-RN of nursing program graduates determines a nursing program's approval status with the State Board of Nursing. The timeframe selected was chosen because it coincides with the implementation of a new state mandated nursing curriculum.

## **Research Design**

A retrospective study examined data from past to present (Creswell, 2009). Previous studies have concerned research using a retrospective design to identify predictors, correlations, and/or factors that determine NCLEX-RN success (Vandenhooten, 2008; McGann & Thompson, 2008; Uyehara et al., 2007; Frith et al., 2005; Daley et al., 2003; Beeson & Kissling, 2001). This study examined predictors of success of Associate Degree Nursing (ADN) graduates from 2006 to 2010. This time frame was selected because of the implementation of the mandated curriculum in 2005 as well as the accompanying low NCLEX-RN passage rates. The mandated nursing admission criteria and curriculum was instituted by the Alabama College System (ACS) for all community colleges in the state of Alabama. The mandate was given to every nursing program in Alabama, requiring each nursing program follow the same guidelines. This was done in an effort to create consistency and equitability in nursing programs throughout the state. Also, by standardizing admission and curriculum requirements, a student may transfer or take nursing courses from other ACS schools without interference in completion of the program. Multiple logistic regression were utilized due to the dependent variable (pass or fail) being dichotomous.

## **Sample and Data Collection**

The inclusion criteria are all nursing graduates of the selected nursing program who attempted the initial writing of the NCLEX-RN from May 2006 - December 2010. This date was chosen because these students were the first nursing graduates to complete the nursing program after implementation of the mandated curriculum (one year prior, in 2005). The nursing graduates were over eighteen years of age and included both males and females with no exclusion due to ethnicity. A sample size of at least 300 records was required. This is comparable



to the sample sizes of other published studies that have used logistic regression (Introduction to SAS, 2010).

The study was conducted in an urban community college, located in central Alabama. The community college established an Associate Degree Nursing Program with a 50 students in 1970. In the first graduating class in 1972, 23 graduates took the NCLEX-RN. However, only eight graduates (34.7%) were successful on the initial writing of the test, only twelve were successful second time writers, and three on third time writers. Some improvement was noted in 1976; 21 out of 25 graduates (84%) were successful on the initial writing. Throughout the early 1980s and 1990s, the board's minimum requirement for passage on the initial writing of the NCLEX-RN at the college was maintained fairly well. A decrease was noted in early 2000, with initial passage rate results falling to 70%. However, in 2003, the passage rate was 100% (23 graduates). In 2005, the Alabama College System instituted a state mandated curriculum for all nursing programs within the state to follow. Since implementation of the curriculum, there has been a perceptible decline in the NCLEX-RN board results (see Table 2).

The researcher gained written approval from president of the college before accessing student records for this proposed research study (see Appendix E). The researcher has also obtained Institutional Research Board (IRB) approval from the University of Alabama before accessing any student records for this proposed study (see Appendix E). This study collected data from records of ADN students who graduated from the selected sited and took the initial NCLEX-RN between the years of 2006 thru 2010. A researcher-designed instrument was used for data collection (see Appendix F). The data collection form was completed on the student records of every nursing student who graduated between May 2006 and May 2010 from the college's ADN program. The data was entered into SPSS by the researcher (see Table 4). To

maintain confidentiality, student names were replaced by a numerical code for de-identification. A numerical scale was assigned to course grades, ATI results, and NCLEX-RN results. Earned course grades were entered using the grade point scale posted in the college catalog (see Table 4).

Although the NCLEX-RN scores at this selected college have been favorable in the past, a decline in the board scores was noted following the change in the curriculum and the admission policy that was state mandated and implemented in 2005. These findings can be used to develop admission criteria for the college's ADN program and to subsequently develop a prediction model for success of the college's ADN graduates on the initial NCLEX-RN writing.

### **Data Analysis**

Logistic regression was used to analyze the data to identify the variable(s) because the outcome variable is a nominal scale. The level of significance that contributes the most to NCLEX-RN success is at a 0.05 level (Creswell, 2009). The independent academic variables are the Compass Reading Score, cumulative GPA of the last 24 credit hours, biology grades (*Human Anatomy I, II, and Microbiology*), nursing course grades, and ERI/ATI comprehensive exam scores. The dependent variable is the result (pass/fail) on the initial writing of the NCLEX-RN. Ultimately, this researcher would like to formulate a predictive model to augment success on the initial NCLEX-RN for students enrolled at the selected site. Findings from this study may also be used to refine admission criteria for this college's nursing program.

## CHAPTER IV:

### RESULTS

The purpose of this research was to identify predictors that would determine measures of success on the initial writing of the NCLEX-RN for graduates of Associate Degree Nursing program. A retrospective study was conducted at one central community college in Alabama using archival data for 302 graduates from 2006-2010. Data were collected from their college records and nursing files. The researcher performed a review of every 10<sup>th</sup> file recorded via SPSS to ensure accuracy of data collected.

#### **Demographical Data**

The Alabama College System (ACS) postsecondary institutions require strict adherence to policies that forbid the exclusion of individuals on the basis of race, creed, sex, nationality or age (ACCS, 2009). For that reason, demographical data was not analyzed as a predictor for success on the initial writing of NCLEX-RN. However, a list of the 2006-2010 graduates' ages, gender and race was included for information only (see Table 5).

Table 5

## Demographical Data

Age	Total	Gender	Total	Race	Total
Under 19	0	Female	273	African American	256
19-25	57	Male	29	Caucasian	30
26-30	70			Hispanic	0
31-40	118			Asian	1
41-50	45			American Indian	1
51-60	12			Hawaiian	1
Over 60	0			Multi Racial	0
				Unknown/Not Reported	13

### Multiple Logistic Regressions

Archived records for 302 community college associate degree nursing graduates were examined retrospectively. Logistic regression was used to analyze the data to identify the variable(s) because the outcome variable was a nominal scale. Statistics were calculated based upon the level of significance at a 0.05 level (Creswell, 2009). The independent academic variables were the ACT Compass Reading Score, cumulative GPA of the last 24 credit hours, Biology grades (*Human Anatomy I*, *Human Anatomy II* and *Microbiology*), nursing course grades, and ERI/ATI comprehensive exam scores. Multiple logistic regression was utilized due to the dependent variable, NCLEX-RN, (pass or fail) being dichotomous.

## **Preadmission Data**

*Research Question 1: Does the ACT Compass reading Score predict success for the Associate Degree Nursing (ADN) student on the initial attempt NCLEX-RN writing? Research Question 2: Does the GPA on the most recent 24 hours of undergraduate study predict success for the Associate Degree Nursing (ADN) student on the initial attempt NCLEX-RN writing?*

Data were collected using a logistic regression on 302 graduates that included ACT compass reading score and the GPA on the most recent 24 hours of undergraduate study in predicting success on the initial writing of the NCLEX-RN. The ACT Compass reading, a standardized test, assessed reading comprehension. The GPA on the most recent 24 credit hour included a student's overall grade point average on the most recent 24 hours of undergraduate coursework as measured on a 4.0 scale. Students received four points for a course grade of "A", three points for a "B," two points for a "C," one point for a "D," and zero points for a "F." There was a statistically significant finding ( $p=0.018$ ) in the ACT Compass reading score predicting initial NCLEX-RN success (see Table 6). However, the GPA on the last 24 credit hour was not statistically significant ( $p=0.260$ ) in predicting success on the initial writing of the NCLEX-RN (See Table 6). These results were not consistent with results from other studies that found GPA was significant on the initial writing of the NCLEX-RN

Table 6

## ACT Compass Reading Score and GPA

Preadmission Data	Beta	Standard Era	df	Significance
ACT Compass Reading Score	.042	.018	1	*.018
GPA	.361	.320	1	.260
Constant	-3.361	1.637	1	.040

*Research Question 3: Do the grades achieved in the required prerequisite courses (BIO 201, BIO 202, and BIO 220) provide a strong indication of success on the initial NCLEX-RN writing?*

The science course grades were coded as A=4.0; B=3.0; C=2.0; D=1.0; F=0.0. If a graduate took the course more than once, the grades were averaged dividing by the number of times the course was taken, using the scale. A formula was derived to determine the points from selected course work at the institution of the study. Courses included *Human Anatomy and Physiology-I* (BIO 201); *Human Anatomy-II* (BIO-202); and *Microbiology* (BIO 220). The following points were given for each grade earned: A=30 points; B=20 points; and a C=10 points. Data were collected on 302 graduates that included *Biology 201*, *Biology 202*, and *Biology 220*. There was a statistically significant finding among the three course grades. *Biology 202* was statistically significant ( $p=0.044$ ) in predicting success on the initial writing of the NCLEX-RN (See Table 7). However, *Biology 201* ( $p=0.843$ ) and *Biology 220* ( $p=.0398$ ) were not statistically significant in predicting success on the initial writing of the NCLEX-RN (see Table 7).

Table 7

## Science Course Grades

Course	Beta	Standard Error	df	Significance
BIO 201	.040	.201	1	.843
BIO 202	.423	.210	1	*.044
BIO 220	-.170	.201	1	.398
Constant	.493	.757	1	.515

**Nursing Course Grade**

*Research Question 4: Which courses in the nursing curriculum (NUR 102, NUR 103, NUR 104, NUR 105, NUR 106, NUR 201, NUR 202, and NUR 203) predict success on the initial NCLEX-RN writing?*

These were courses within the nursing curriculum that include *Fundamentals of Nursing* (NUR 102), *Health Assessment* (NUR 103), *Pharmacology* (NUR 104), *Adult Health* (NUR 105), *Maternal Child Health* (NUR 106), *Nursing Through the Life Span I* (NUR 201), *Nursing Through the Life Span II* (NUR 202), *Nursing Through the Life Span III* (NUR 203) and *Role Transition* (NUR 204) (see Appendix B). These grades are coded as A=4.0; B=3.0; C=2.0. If a graduate took the course more than once, the grades were averaged dividing by the number of times the course was taken, using the scale. A student must make a 74.5 or higher in the final course average to have satisfactory passage of the course. There were several nursing courses that were statistically significant which included *Adult Health* (NUR 105); *Nursing Through the Life Span I* (NUR 201); and *Nursing Through the Life Span III* (NUR 203) (see Table 8).

Table 8

## Nursing Course Grades

Course	Beta	Standard Era.	d.f	Significance
NUR 102	.104	.282	1	.712
NUR 103	.129	.247	1	.601
NUR 104	.009	.226	1	.969
NUR 105	.882	.302	1	*.004
NUR 106	.027	.312	1	.930
NUR 201	.677	.318	1	*.033
NUR 202	.189	.309	1	.541
NUR 203	.897	.356	1	*.012
NUR 204	.033	.013	1	.911
Constant	-4.374	1.669	1	.009

### End of the Program Variables

*Research Question 5: Does the ATI/ERI comprehensive test predict success on the initial NCLEX-RN? These grades are coded as 1=pass and 0=failed.*

As a part of the requirements for the NUR 203 senior-level nursing course, students were required to take the Comprehensive Assessment that included all nursing content from the curriculum and a predictor for passage on the NCLEX-RN. A benchmark score of 850 or higher on the comprehensive assessment was a part of the requirements for passage of the NUR 203 course and indicative of initial passage of the NCLEX-RN examination. Although students were given three attempts to take the examination, the first score was used for this study because research supports the initial score being more indicative of success on the initial writing on the NCLEX-RN (Spurlock & Hunt, 2008). The initial results were coded as 1=pass and 0=failed. The results of the ERI/ATI were correlated because of determining the relationship of the



NCLEX-RN results. Also, there was only one independent variable analyzed against the dependent variable. There were 302 graduates who took the ERI/ATI examination. The initial results were coded as 1=pass and 0=failed results. Based on the Pearson Correlation  $r=.192$  or explained variable is four percent, but 96% is unexplained variance (see Table 9).

Table 9

ERI/ATI

	NCLEX	ERI/ATI
NCLEX Pearson Correlation	1	.192
Sig. (2-tailed)	.001	.001
N	302	302
ERI/ATI Pearson Correlation	.192	1
Sig. (2-tailed)	.001	.001
N	302	302

Summary

The researcher attempted to answer five research questions. Multiple Logistic Regression and Pearson Correlation 2-tailed were used to answer the research questions. There were statistically significant findings in research question one with the ACT Compass reading score predicting success on the initial writing of the NCLEX-RN. In question two, the GPA on the most recent 24 credit hours was not statistically significant in predicting success on the initial writing of the NCLEX-RN. Question number three examined the science course grades. Only one course was found statistically significant, BIO 202, in predicting success on the initial writing of the NCLEX-RN. Question number four examined the nursing curriculum. There were three courses, NUR 105, NUR 201, and NUR 203 that were statistically significant in predicting

initial success on the initial writing of NCLEX-RN. Question five assessed the end of program variable, ERI/ATI. This question was analyzed using Pearson Correlation because there was only one independent variable analyzed against the dependent variable. Based on the Pearson Correlation  $r=.04$  or explained variable was four percent, but 96% was a minimal association. These results as well as findings, implications, limitations, and recommendations for future studies will be discussed further in Chapter V.

## CHAPTER V:

### DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this quantitative study was to identify predictors of success for nursing students in a selected Associate Degree Nursing Program in a community college in central Alabama. Success is defined as completion of all nursing coursework with a passing grade and passage of the National Council of Licensure Examination for Registered Nursing (NCLEX-RN) on the initial writing. To alleviate the shortage of nurses, qualified nursing graduates must be successful on the initial writing of the NCLEX-RN. Nursing institutions have admission criteria for the selection of the best candidates who they anticipate will be the most likely to complete the nursing program curriculum. Due to the cost of educating students and the mandated faculty to student ratio, there are a limited number of spaces for those seeking a degree in nursing (AACN, 2005). Students who occupy these nursing program placements must be successful; otherwise, the nursing shortage will be further negatively impacted (Higgins, 2005). First, this research can assist in addressing the local and national nursing shortage by identifying predictors that determine measures of success on the initial writing on the NCLEX-RN for graduates of an Associate Degree Nursing (ADN) program in central Alabama. Also, this research can serve as a preemptive strategy for students already admitted to the nursing program, to help ward off potential student failures in the nursing program as well as failure on the initial NCLEX-RN writing.

Nursing institutions have admission criteria for the selection of the best candidates who they anticipate will be the most likely to complete the nursing program curriculum. All public

community colleges in the state of Alabama operate under the Alabama Community College System (ACCS). In 2005, mandated nursing curriculum and admission criteria were implemented at all community colleges within the state of Alabama. These changes standardized nursing program admission criteria and nursing program curriculum throughout the state college system (see Appendix A). Alterations were made in the order in which nursing courses were introduced with course content remaining constant. The minimum requirements for admission to the nursing program included a cumulative grade point average of 2.5 (based on the 4.0 scale) on the most recent 24 credit hours (see Appendix B). This radical change in admission criteria also incorporated a point system based on grades earned from selected coursework. Points from ACT Compass reading scores are also obtained (a minimum of 76 and a maximum of 99), and a possibility of an additional 11 points that could be determined at the college's discretion. A formula was derived to determine the points from selected course work at the institution of the study. This included *Human Anatomy and Physiology-I* (BIO 201); *Human Anatomy-II* (BIO-202); and *Microbiology* (BIO 220). The following points were given for each grade earned: A=30 points; B=20 points; and a C=10 points. The point system determines if a student is admitted to the registered nursing program at the proposed study site (see Appendix C).

## **Significant Findings and Discussion**

*Research Question 1: Does the ACT Compass reading Score predict success for the Associate Degree Nursing (ADN) student on the initial attempt NCLEX-RN writing?*

*Research Question 2: Does the GPA on the most recent 24 hours of undergraduate study predict success for the Associate Degree Nursing (ADN) student on the initial attempt NCLEX-RN writing?*

There was a statistically significant finding in the ACT Compass reading score predicting initial NCLEX-RN success (see Table 6). However, the GPA on the last 24 credit hours was not statistically significant in predicting success on the initial writing of the NCLEX-RN (see Table 6). Data were collected on 302 graduates that included ACT compass reading score and the GPA on the most recent 24 hours of undergraduate study in predicting success on the initial writing of the NCLEX-RN. These findings support the research conducted by Haas and colleagues (2003), Sayles et. al (2003), and Crow and colleagues (2004) that placement test (SAT, ACT, etc.) were statistically significant or correlated with NCLEX-RN success.

The ACT Compass reading, a standardized test, assessed reading comprehension. The GPA on the most recent 24 credit hours included a student's overall grade point average on the most recent 24 hours of undergraduate coursework as measured on a 4.0 scale. Students received four points for a course grade of "A," three points for a "B," two points for a "C," one point for a "D," and zero points for a "F." In the population reported, the mean score of the ACT Compass Reading was 87.6 (N=302) with a range 60-99. The reported GPA results ranged from 2.0-4.0. The calculation of the ACCS included only the last 24 hours of course work attempted on a 4.0 scale. If a student took only non nursing related course work, the GPA might not indicate aptitude to comprehend nursing curricula content.

In relation to GPA, the findings support the research conducted by Gilmore (2008) that GPA was not a determining factor for NCLEX-RN success. However, these results conflict with other research studies that found GPA was significant on the initial writing of the NCLEX-RN (Daley et al., 2003; Sayles et al., 2003; Yin & Burger, 2003). It was determined that graduates who passed on the initial writing of NCLEX-RN had a 0.03 higher nursing GPA than those that failed to pass the NCLEX-RN on the initial attempt (Daley et al., 2003; Sayles et al., 2003; Yin & Burger, 2003). Sayles et al. (2003) conducted a study of ADN and BSN nursing graduates to determine predictors of success in nursing education using several variables, including GPA in prerequisite courses. Prerequisite GPA was found statistically significant at  $p \leq 0.05$  in predicting NCLEX-RN success for an associate and baccalaureate degree nursing graduates. Likewise, Daley & colleagues (2003) discerned that students who were successful on the first writing on NCLEX-RN typically had a GPA of 3.5 or greater in prerequisite courses. Also, Yin and Burger (2003) found that associate degree nursing graduates who passed the NCLEX-RN on the initial testing had significantly higher prerequisite GPAs ( $p < 0.01$ ) than those that failed.

*Research Question 3: Do the scores achieved in the required prerequisite courses (BIO 201, BIO 202, and BIO 220) provide a strong indication of success on the initial NCLEX-RN writing?*

There was a statistically significant finding among the *Biology 202* course grades in predicting success on the initial writing of the NCLEX-RN (see Table 7). However, *Biology 201* and *Biology 220* were not statistically significant in predicting success on the initial writing of the NCLEX-RN (see Table 7). Data were collected on 302 graduates that included *Biology 201*, *Biology 202*, and *Biology 220*. The students' achieved grade in each of the courses was compared with NCLEX-RN success. These results validate Higgins (2005) who found that

grades in *Human Anatomy II* were the only prerequisite science course grade that was significant for NCLEX-RN success on the initial writing.

*Research Question 4: Which courses in the nursing curriculum (NUR 102, NUR 103, NUR104, NUR 105, NUR 106, NUR 201, NUR 202, and NUR 203) predict success on the Initial NCLEX-RN writing?*

There were several nursing courses that were statistically significant which included *Adult Health* (NUR 105); *Nursing Through the Life Span II* (NUR 201); and *Nursing Through the Life Span III* (NUR 203) (see Table 8). Data were collected on 302 graduates that included nursing course grades. The student's achieved grades in each of the courses were compared with NCLEX-RN success. These grades were coded as A=4.0; B=3.0; C=2.0. If a graduate took the course more than once, the grades were averaged by dividing the number of times the course was taken, using the scale. Daley and colleagues (2003) revealed that NCLEX-RN passage rates were significantly higher for students with a higher final grade in medical-surgical courses ( $3.4 \pm .4$  versus  $2.8 \pm 0.6$ ). Medical Surgical Courses in the research study include NUR 105, NUR 201 and NUR 203.

*Research Question 5: Does the ERI/ATI comprehensive test predict success on the initial NCLEX-RN? These grades are coded as 1=pass and 0=failed.*

The study revealed that the ERI/ATI comprehension exam was not statistically significant on the initial writing of the NCLEX-RN. This finding was inconsistent with other research studies that found ERI/ATI was significant in predicting success on the initial NCLEX-RN (Bondmass et al., 2008, Davenport, 2007; Mosser et al., 2006, Norton et al., 2006; Sayles et al.; Vandenhouten, 2008). The initial results were coded as 1=pass and 0=failed results. Based on the Pearson Correlation  $r=.192$  or explained variable was four percent, but 96% was unexplained

variance (see Table 9). Although students were given three attempts to take the ERI/ATI examination, only the first score was used for this study because research supports the initial score being more indicative of success on the initial writing on the NCLEX-RN (Spurlock & Hunt, 2008). The first scores were coded as 1=pass and 0=failed. The results of the ERI/ATI score were correlated in relation to the NCLEX-RN results because of determining the relationship between the two variables. Also, there was only one independent variable analyzed against the dependent variable. A low correlation may not have much impact and understanding.

The researcher attempted to determine the predictors of success on the initial writing of the NCLEX-RN at a central community college in Alabama. Findings indicated that there were significant findings in prerequisite variables, courses in the nursing program, and end of the program variables, that predicted NCLEX-RN success on the initial writing. ACT Compass Reading Score and Human Anatomy-Biology 202 course were the two prerequisite variables that were found to be significant in predicting NCLEX-RN success. These findings were consistent with other research in using admission criteria, placement test and science test scores, in predicting success with NCLEX-RN success (Crow et al, 2004; Haas, et al., 2003; Higgins 2005; Sayles et al., 2003).

The researcher compared the syllabus of the BIO 201 and BIO 202 *Human Anatomy I and II* courses because the BIO 202 course was found to be statistically significant in predicting NCLEX-RN success while BIO 201 was not statistically significant. Biology 201 course contains content that was more “cellular” in nature. The integumentary (skin), muscular tissue and muscular skeletal system are the major body systems that are included in the BIO 201 course. In review of the Biology 202 course syllabus, the nervous, endocrine, cardiovascular/circulatory, respiratory, gastrointestinal, genitourinary body systems and acid



base balance are the content areas covered in the course. The content covered in BIO 202 is thought to be more difficult for students to conceptualize. The NCLEX-RN test plan illustrates that these more difficult content areas are more emphasized on the actual on the NCLEX-RN. Although the study found one biology course significant, it is still recommended to consider biology course grades for admittance to the nursing program. Yin and Burger (2003) recommended that the GPA in natural science courses (biology, chemistry, anatomy, and physiology) be examined carefully when considering students for acceptance in to a nursing program. Washington and Perkel (2001) and Yin and Burger (2003) confirmed in that both sciences and nursing courses integrate critical thinking and application processes to discern information in a methodological format.

The researcher examined which courses within the nursing program predicted success on the initial writing of the NCLEX-RN. *Adult Health I* (NUR 105), *Nursing through the Lifespan I* (NUR 201), and *Nursing through the Lifespan III* (NUR 203) were all found to be statistically significant with NCLEX-RN success. In review of the syllabus of NUR 105, NUR 201, and NUR 203, the researcher noted that these courses contain content that cover the cardiovascular, respiratory, neurological, endocrine, gastrointestinal and genitourinary boy systems over the lifespan. Again in review of the NCLEX-RN test plan, these courses consist of content that are more inclusive on the actual licensure examination (NSCBN, 2010). There are four major content areas on the NCLEX-RN test plan that include Safety and Effective Care, Physiological Integrity, Health Promotion and Maintenance, and Psychosocial Integrity (NSCBN, 2010). Management of Care, the major NCLEX-RN topic area, consists of 16-22% of the distribution of content that is included on NCLEX-RN test plan (NCSBN, 2010). The topical areas include, but not limited to, related content of continuity of care, delegation and establishing priorities

(NSCBN, 2010). The information in the management of care topic area was emphasized mostly within the *Adult Health I* (NUR 105), *Nursing through the Lifespan I* (NUR 201), and *Nursing through the Lifespan III* (NUR 203) courses that were found to be statistically significant. It is recommended by the NSCBN that the information obtained in nursing courses must be tested on application or higher level to ensure attainment of needed knowledge base for a beginning nurse (NSCBN, 2010). These results are consistent with research conducted by Salyes and colleagues (2003) that concluded the final grades in nursing courses that contain oxygenation (respiratory) and circulation (cardiovascular) through the life span were found to be significant in NCLEX-RN success.

Numerous statistical analyses such as, t tests, chi square, ANOVA, etc. have been utilized for data analyses of data to predict success of the NCLEX-RN. However, a more predictive analysis, such as logistic regression, should have been used to more accurately analyze the data.

The researcher also included end of the program variables, standardized testing, to predict NCLEX-RN success. Several studies have utilized standardized testing in assessing readiness and ultimate NCLEX-RN success. Vandenhouten (2008) investigated predictors of success and failure for 296 graduates of a BSN program over a five-year period. This study also used the ATI Comprehensive Predictor Exam. Vandenhouten (2008) concluded that the ATI exit examination was statistically significant ( $p=.000$ ) with success on the NCLEX-RN. The results were only significant in predicting those likely to succeed on the initial writing on NCLEX, and not as predictors those students that would fail. The ERI/ATI exit exam had been used by the study site until 2010. The data was correlated to understand the relationship of the ERI/ATI comprehensive test to NCLEX-RN success and also because there was only one independent variable analyzed against the dependent variable. The explained variable is four percent, but 96% is unexplained

variance. These findings are consistent with other studies that have been conducted on predicting success on the initial writing of the NCLEX-RN. Success of the initial writing of the NCLEX-RN success could be predicted at one community college using prerequisite, program, and end of program variables.

### Implications

Nurse educators have several responsibilities in the educational arena. First, nursing educators must facilitate students learning and provide didactic and clinical experiences. This is not an easy task. Nursing education must produce qualified clinicians to work in the changing health care industry while also improving in the drastic nursing shortage and concurrently maintaining mandates from Boards of Nursing and accreditation agencies to maintain board passage percentage scores. Nursing education must find ways to promote entrance into the nursing profession while maintaining high scholastic standards in the nursing program thus upholding NCLEX passage rates. The results of this study had several implications for nursing education.

First, nursing programs have used placement tests (SAT, ACT, etc) and prerequisite courses to identify those students who will be successful in the nursing program and subsequently on the NCLEX-RN (Daley et al., 2003; Gilmore 2008; Haas et al., 2003; Sayles, Shelton, & Powell 2003; Sands, 1988). In this research study, the ACT Reading Compass was found to be statistically significant in predicting NCLEX-RN. This research further validated the use of placement exams in the selection of candidates to be admitted in the nursing program and, thus, be successful on the initial writing of the NCLEX-RN. However since conducting this research, the ACT Reading Compass has been replaced with the TEAS V examination. Further research will need to be conducted utilizing the TEAS V examination for significance of

placement exams in nursing school admission thus yielding NCLEX-RN success. One study (Rogers, 2009) has utilized the TEAS exam and found that significance with nursing program completion as well as NCLEX-RN success. However, If TEAS V is shown not to be significant in NCLEX-RN success in the ACCS, ACT compass reading score needs to be reinstated as admission criteria for the nursing program.

Second, this study revealed that a prerequisite science course Biology 202 *Human Anatomy II* was significant in predicting success on NCLEX-RN. Science courses have been identified as predictors of nursing program success since both must use critical thinking that must be assessed on an application level (Washington & Perkel, 2001; Yin & Burger, 2003). Nursing admission committees can utilize this result in promoting the use of science grades in the selection of those for admittance to the nursing program and consequently successful on the initial writing of the NCLEX-RN. However, only one course, Biology 202, was found to be statistically significant in predicting NCLEX-RN. In review of the syllabus for BIO 201 and BIO 202, it was found that BIO 202 had more content (cardiovascular, respiratory, neurological, endocrine, gastrointestinal and genitourinary over the lifespan) that is included on the NCLEX-RN test plan whereas BIO 201 had more “cellular content.” The curriculum committee needs to see if content could be rearranged between the two courses to have an equal distribution of the content be included in both courses that is covered on the NCLEX-RN test plan. Another suggestion would be for the admission committee to weigh the BIO 202 course heavier because of the information covered has an impact on NCLEX-RN success.

Third, several nursing courses have been found to be statistically significant in predicting NCLEX-RN success (Beeman & Waterhouse, 2001; Beeson & Kissling 2001; Daley et al., 2003; De Lima et al., 2011; Gilmore, 2008; Higgins, 2005; Uyehara et al., 2007; Simon & Augustus,

2009). The results of this study revealed that adult health courses (NUR 105, NUR 201, and NUR 203) were statistically significant in predicting success on the initial writing of NCLEX-RN. These results can be used two-fold. First, nursing programs can assess that those who are successful in adult health courses may also have success in the initial writing of NCLEX-RN. However, emphasis on content covered in NUR 105, NUR 201 and NUR 203 can be emphasized in all nursing courses to ensure NCLEX-RN success. Secondly, nursing students who have difficulty in passing adult health nursing courses may be identified as “at risk” students. These students may need to be placed in a remediation or intervention program to provide tutoring and test preparation in order to be successful in the nursing program and successful on the initial writing of NCLEX-RN. Nurse educators have an obligation to ensure students are given opportunities for success to ward off potential failures thus increasing NCLEX-RN passage and decreasing the nursing shortage.

Fourth, nursing educators must use correct statistical analyses when conducting research while analyzing data for predicting success in nursing programs as well as NCLEX-RN.

Fifth, the use of computerized testing in all levels of nursing education has been shown to be beneficial in predicating NCLEX-RN (Beeson & Kissling, 2001; Bondmass, et al., 2008; Crow et al., 2006; Daley et al., 2003; De Lima et al., 2011; Ellis, 2006; Frith et al., 2005; Gallagher et al., 2001; Higgins, 2005; Lauchner, Newman, & Britt, 2006; March & Ambrose, 2010; McGann & Thompson, 2008; Mosser et al., 2006; Norton et al., 2006; Sayles et al., 2003; Uyehara et al., 2007; Vandenhouten, 2008). Although computerized testing has been conducted especially at the end of nursing program to assess readiness for NCLEX-RN, the use of computerized testing throughout nursing programs will be more indicative of students’ attainment of knowledge at the end of a course, thereby identifying those who may need

additional resources (tutoring, remediation, etc) so that application of knowledge can be enhanced. ERI/ATI was used to assess readiness for the NCLEX-RN. Although ERI/ATI was not found to be significant in predicting NCLEX-RN success in this study, more research needs to be conducted to assess readiness for the NCLEX-RN by using computerized testing both throughout the curriculum as well as at the end of the nursing program. Nursing programs must consider methods that promote success in the nursing program as well as on the initial NCLEX-RN. This is important because schools of nursing are held accountable to their respective state board of nursing for a specified NCLEX-RN passage rate of graduates on the initial writing. Also, accreditation bodies, such as the National League of Nursing Accreditation Commission (NLNAC) and the Commission on Collegiate Nursing Education (CCNE), ensure nursing programs maintain minimum state board requirements (Giddens, 2009; Norton et al., 2005).

Sixth, this research was conducted at one of 20 ACCS community colleges with a RN program in the state of Alabama. Significant findings were noted in admission requirements, prerequisite and nursing course grades. These findings may or may not be consistent with other ADN within the state. ACCS needs to conduct more research to see if these findings are similar in other programs in the ACCS to see what is and what is not statistically significant with NCLEX-RN. More emphasis may need to be placed on one or more criteria for admittance or progression within the nursing program thus promoting NCLEX-RN success.

### **Limitations**

There were limitations to the study that need to be discussed so that they can be addressed in future research studies. The first limitation is that the research was conducted at one community college in one state. A larger national study may need to be conducted at multiple

sites or statewide in order for the research to be more generalizable to determine the correlation with the results.

Academic variables were only included in this research study. Perhaps more insight to student's failure or "at risk" students may be gathered by reviewing nonacademic variables. In this study, students received limited experience with computerized testing while in the nursing program. The NCLEX-RN has been computerized since 1994. However, tests given at the research site were mainly paper and pencil. Students may have felt anxiety while taking the NCLEX-RN because of limited exposure to computerized testing.

### **Recommendation for Future Research**

The results of this study revealed that there are prerequisite, program, and end of the program variables that predict success on the initial writing of the NCLEX-RN. In relation to the prerequisite variables, ACT Compass Reading Score is no longer being used by the Alabama College System to evaluate student readiness for the nursing programs. The TEAS V is the entrance exam for the nursing program that the ACS began utilizing in 2009 and then mandating statewide in 2011 (Assessment Technologies Institute, 2012). Research needs to be conducted to determine the statistical significance of using the TEAS V exam in predicting success with NCLEX-RN. There were only two prerequisite variables, ACT Compass reading score and Biology 202, which were found to be significant in predicting NCLEX-RN success. A combination of mathematics with biology scores may need to be considered for course work considered for entrance into the nursing programs.

The GPA on the last 24 credit hours of study was not found to be significant in predicating NCLEX-RN success. The reason for this finding could be that a student may take course work that is not in the nursing degree plan. More emphasis may need to be placed in

prerequisite courses for nursing (Math, Psychology, English, etc) to calculate the GPA for entrance into the nursing program. The research found that nursing course grades in *Adult Health I* (NUR 105), *Nursing through the Lifespan I* (NUR 201), and *Nursing through the Lifespan III* (NUR 203) were statistically significant in predicting success on the initial writing of NCLEX-RN. A research study could be conducted of nursing course work in ADN programs statewide to see if other nursing programs have similar findings.

There has been more research conducted at the BSN level than ADN level in predicting success on the NCLEX-RN. Although there are more ADN graduates than BSN graduates who complete nursing programs nationwide, Simon and Augusta (2009) found that from 2008-2010, BSN graduates had a higher NCLEX-RN passage rate than did ADN graduates (see Table1). More research needs to be done to prepare every graduate for success on the initial writing of NCLEX-RN.

### **Conclusions**

This study identified predictors of success for the initial writing of NCLEX-RN for an associate degree nursing program in central Alabama. The research showed significant findings in placement test (ACT Compass reading) and prerequisite course work (*Biology 202-Human Anatomy II*). There were also significant findings in specific nursing courses: *Adult Health I* (NUR 105), *Nursing through the Lifespan I* (NUR 201), and *Nursing through the Lifespan III* (NUR 203). Significant findings that were found by this study can assist nursing education. The significant findings in the prerequisite data (ACT compass placement and science course grade) can be used to assist in admission criteria to the nursing program. The significant findings in nursing course grades (NUR 105, NUR 201, and NUR 203) can assist the nursing program in student's progression in the nursing program and readiness for the NCLEX-RN. If a student is



having difficulty in one of these courses, these students could be identified as “at risk” so that interventions could be implemented and thereby decrease potential failures. The student should be directed to some type of remediation plan or invention program to assist in nursing program success as well as NCLEX-RN success.

This study represents a part of a whole, meaning there are 20 ADN programs within the ACCS system. Similar results may be found if a replication of this study was conducted across the state of Alabama. However, the results may differ, but still be important. Information obtained by conducting more research on “predictors of success” will be invaluable to the nursing graduates, nursing educators, and nursing programs all to impact the issue of nursing shortage.

## REFERENCES

- ACT. (2003). A comprehensive computerized placement and diagnostic assessment and support system. Retrieved January 1, 2012, from [www.act.org/compass](http://www.act.org/compass).
- Alabama Board of Nursing. (2011). Retrieved January 1, 2012, from <http://www.abn.state.al.us/>.
- Alabama Community College System. (2009). Retrieved January 1, 2012, from <http://www.accs.cc/>
- Alcarzar, C. (2008). *Fact finder: Nursing shortage*. Retrieved January 1, 2012, from [http://www2.alabamas13.com/news/2008/nov/12/fact\\_finder\\_nurse\\_shortage](http://www2.alabamas13.com/news/2008/nov/12/fact_finder_nurse_shortage).
- All Stars Directories, Inc. (2011). Entry-level nursing degree nursing programs: BSN, Diploma, Associate's Degree in nursing. *All Stars Nursing Schools*. Retrieved January 1, 2012, from <http://www.allnursingschools.com/nursing-careers/article/entry-nursing-programs>.
- Allen, C., Higgs, Z., & Holloway, J. (1988). Identifying students at risk for academic difficulty. *Journal of Professional Nursing*, 4(2), 113-118.
- Allen, L. (2008). The nursing shortage continues and faculty shortage grows. *Nursing Economics*, 26(1), 35-40.
- Amaro, D., Abraim-Yago, K., & Yoder, M. (2006). Perceived barriers for ethnically diverse students in nursing programs. *Journal of Nursing Education*, 45(7), 247-254.
- American Association of the Colleges in Nursing. (2011). *Nursing shortage fact sheet*. Retrieved January 1, 2012, from <http://www.aacn.nche.edu/Media/pdf/NrsgShortageFS.pdf>.
- American Association of the Colleges in Nursing. (2000). *AACN position statement*. from <http://www.aacn.nche.edu/publications/positions/baccmin.htm>.
- Assessment Technologies Institute. (2011). Retrieved January 1, 2012, from [www.atitesting.com](http://www.atitesting.com).
- Baker, M. J. (2008). *Predicting NCLEX-RN success through prerequisite and admission requirements*. Unpublished Doctoral Dissertation, University of Phoenix, Online.
- Beeman, P., & Waterhouse, J. (2001). NCLEX-RN Performance: Predicting success on the computerized examination. *Journal of Professional Nursing*, 17(4), 158-165.

- Beeson, S., & Kissling, G. (2001). Predicting success for baccalaureate graduates on the NCLEX-RN. *Journal of Professional Nursing, 17*(3), 121-127.
- Benefiel, D. (2010). The story of nursing licensure. *Nurse Educator, 36*(1), 16-20.
- Bovin, J. (2010). *Difficulty of the NCLEX to be increased. Garnett Health Care Group. Retrieved January 15, 2011 from*  
<http://news.nurse.com/article/20100315/NATIONAL01/103150001/-1/frontpagewww>.
- Brady, M. (2007). Recruitment and retention of associate degree nursing faculty. *Journal of Nursing Education, 46*(2), 190-192.
- Bureau of Labor Statistics, U.S. Department of Labor. (2011). *Occupational outlook handbook, 2010-11 Edition, Registered Nurses, Retrieved January 1, 2012, from*  
<http://www.bls.gov/oco/ocos083.htm>.
- Carrick, J. (2011). Student achievement and NCLEX-RN success: problems that persist. *Nursing Education Perspectives, 32*(2), 78-83.
- Center for Disease Control and Prevention and The Merck Company Foundation. (2007). *The state of aging and health in America 2007*. Whitehouse Station, NJ: The Merck Company Foundation.
- Creswell J. (2009). *Research design: Qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, California: Sage.
- Daley, L., Kirkpatrick, B., Frazier, S., Chung, M., & Moser, D. (2003). Predictors of NCLEX-RN success in a baccalaureate nursing program as foundation for remediation. *Journal of Nursing Education, 42*(9), 390-398.
- Davenport, J. (2007). A comprehensive approach to NCLEX-RN success. *Nursing Education Perspectives, 28*(1), 30-33.
- De Lima, M., London, L., Manieri, E. (2011). Looking at the past to change the future: a retrospective study of associate degree in nursing graduates' National Council Licensure Examination scores. *Teaching and Learning in Nursing, 6*(3), 119-123.
- Dockter, M. (2001). An analysis of physical therapy preadmission factors on academic success and success on the national licensing examination. *Journal of Physical Therapy Education, 15*(1), 60-4.
- Downey, M., Collins, M., & Browning, W. (2002). Predictors of success in dental hygiene education: A six-year review. *Journal of Dental Education 66*(11), 1269-73.
- Educational Resources, Inc. (2002). *Testing catalog*. Stilwell, KS: ERI

- Ehrhardt J. (2009). Nursing shortage still looms: nursing schools warn that ease in nurse shortage is an illusion. *The Alabama Nurse*, 1-2.
- Ellis, S. (2006). Nursing entrance test scores. *Nursing Educator*, 31(6), 259-263.
- Frith, K., Sewell, J., & Clark, D. (2005). Best practices in NCLEX-RN readiness preparation for baccalaureate student success. *Computers, Informatics, Nursing*, 23(6), 322-329.
- Gallagher, P., Bomba, C., & Crane, L. (2001). Using an admissions exam to predict student success in an ADN program. *Nurse Educator*, 26(3), 132-135.
- Giddens, J.F. (2009). Changing paradigms and challenging assumptions: redefining quality and NCLEX-RN pass rates. *Journal of Nursing Education*, 48(3), 123-124.
- Gilmore, M. (2008). Predictors of success in associate degree nursing programs. *Teaching and Learning in Nursing*, 3(4), 121-124.
- Haas, R., Nugent, K., & Rule, R. (2004). The use of discriminate function analysis to predict student success on the NCLEX-RN. *Journal of Nursing Education*, 43(10), 440-446.
- Harding, M. (2010). Predictability associated with exit examinations: a literature review. *Journal of Nursing Education*, 49(9), 493-497.
- HRSA (2010). Retrieved February 27, 2011 from January 1, 2012, <http://bhpr.hrsa.gov/healthworkforce/rnsurvey04/2.htm>.
- Higgs, Z.R. (1984). Predicting success in nursing: from prototype to pragmatics. *Western Journal of Nursing Research*, 6(1), 77-93.
- Higgins, B. (2005). Strategies for lowering attrition rates and raising NCLEX-RN pass rates. *Journal of Nursing Education*, 44(12), 541-547.
- Humphreys, J.A. (2008). *Academic and nonacademic predictors for future success on the NCLEX-RN licensure examination for nurses*. Doctoral dissertation. Retrieved January 1, 2012, from ProQuest (3315143).
- Introduction to SAS. (2010). *UCLA: Academic Technology Services, Statistical Consulting Group*. Retrieved January 1, 2012, from <http://www.ats.ucla.edu/stat/sas/notes2/>.
- Jeffreys, M. (2004). *Nursing student retention understanding the process and making a difference*. New York, New York: Springer Publishing Company.
- Jones, J., & Bremner, M.N. (2008). Essential steps in implementing a comprehensive testing and review program. *Nurse Educator*, 33(5), 206-209.

- Lauchner, K., Newman, M., & Britt, R. (2006). Predicting licensure success with a computerized comprehensive nursing exam. *Nurse Educator*, 31(3), 4S-9S. (Reprinted from *Computers in Nursing*, 17(3), 120-125).
- Livsey, K., Campbell, D., & Green, A. (2007). Yesterday, today, and tomorrow: Challenges in securing federal support for graduate nursing education. *Journal of Nursing Education*, 46(4), 176-183.
- Mahaffey, E.H. (2002). The relevance of associate degree nursing education: Past, present, future. *Online Journal of Issues in Nursing*. Retrieved January 1, 2012, from <http://www.nursingworld.org/MainMenuCategories/ANAMarketplace/ANAPeriodicals/OJIN/TableofContents/Volume72002/No2May2002/RelevanceofAssociateDegree.aspx>.
- March, K., & Ambrose, J. (2010). Rx for NCLEX-RN success: reflections on development of an Effective preparation process for senior baccalaureate students. *Nursing Education Perspectives* 31(4), 230-232.
- McGann, E., & Thompson, J. (2008). Factors related to academic success in at-risk senior nursing students. *International Journal of Nursing Education Scholarship*, 5(1), 1-18.
- MedTech Media (2010). API Healthcare announces best practices for managing looming nursing shortage. *Health Finance News*. Retrieved January 1, 2012, from <http://www.healthcarefinancenews.com/press-release/api-healthcare-announces-best-practices-managing-looming-nursing-shortage>.
- Morrison, S., Free, K., & Newman, M. (2002). Do progression and remediation policies improve NCLEX-RN pass rates? *Nurse Educator*, 27(2), 94-96.
- Mosser, N., Williams, J., & Wood, C. (2006). Use of progression testing throughout nursing programs: how two colleges promote success on the NCLEX-RN. *Annual Review of Nursing Education*, 4, 305-316.
- National Council of State Boards of Nursing (2010). NCLEX examinations. Retrieved January 1, 2012, from <https://www.ncsbn.org/1692.htm>.
- National Organization for Associate Degree Nursing (2010). Retrieved January 1, 2012, from [https://www.noadn.org/component/option,com\\_docman/Itemid,250/task,cat\\_view/gid](https://www.noadn.org/component/option,com_docman/Itemid,250/task,cat_view/gid).
- Norton, C., Relf, M., Cox, C., Farley, J., & Tucker, M. Ensuring NCLEX-RN success for first-time test takers. *Journal of Professional Nursing*, 22(5), 322-326.
- Potolsky, A., Cohen, J., & Saylor, C. (2003). Do prerequisite grades and tutoring make a difference? *Nursing Education Perspectives*, 24(5), 246-250.

- Rogers, T. (2009). Preadmission academic achievement criteria as predictors of nursing program completion and NCLEX-RN success (Doctoral dissertation). Retrieved January 1, 2012, from ProQuest (3395065).
- Rogers, T. (2010). Prescription for success in an associate degree nursing Program. *Journal of Nursing Education, 49*(2), 96-99.
- Ruby, J. (1999). History of higher education: educational reform and the emergence of the nursing professorate. *Journal of Nursing Education, 38*(1), 23-27.
- Sands, R. (1988). Predictive potential of social variables for black nursing students Performance on the National Council Licensure Examination. *Journal of Negro Education, 57*(4), 502-511.
- Sayles, S., Shelton, D., & Powell, H. (2003). Predictors of success in nursing education. *The ABNF Journal, 14*(6), 116-120.
- Seldomridge, L., & DiBartolo, M. (2004). Can success and failure be predicted for baccalaureate: graduates on the computerized NCLEX-RN? *Journal of Professional Nursing, 20*(6), 361-368.
- Southern Regional Education Board (2002). *SREB study indicates serious shortage of nursing faculty*. SREB: Atlanta, GA.
- Sigma Theta Tau (2011). Retrieved January 1, 2012, from <http://www.nursingsociety.org/Membership/FAQ/Pages/faqs.aspx>.
- Simon, E., & Augustus, L. (2009). Comparative analysis of NCLEX-RN readiness exam performance: BSN versus ADN. *Journal of Research in Nursing, 14*(5), 451-462.
- Spurlock, D. & Hunt, L. (2008). A study of the usefulness of the HESI exit exam in predicting NCLEX-RN failure. *Journal of Nursing Education, 47*(4), 157-166.
- Tipton, P., Pulliam, M., Beckworth, C., Ilich, P., Griffin, R., & Tibbitt, A. (2008). Predictors of associate degree nursing students' success. *Southern Online Journal of Nursing Research, 8*(1), 1-8.
- United States Administration on Aging. (2007). *Statistics on the aging population*. Rockville, MD: U.S. Department of Health and Human Services.
- United States Bureau of the Census, (2010, July-September). *Centenarians*. Retrieved January 1, 2012, from <http://en.wikipedia.org/wiki/centenarian>
- Uyehara, J., Magnussen, L., Itano, J., & Zhang, S. (2007). Facilitating program and NCLEX-RN success in the generic BSN program. *Nursing Forum, 42*, (1).

- Vanderhouten, C. (2008). *Predictors for success and failure of baccalaureate graduates*. (Doctoral Dissertation). Retrieved January 1, 2012, from <http://proquest.umi.com.libdata.lib.ua.edu/>.
- Washington, L., & Perkel, L. (2001). NCLEX-RN strategies for success: a private university's experience. *The ABNF Journal*, 12 (1), 12-16.
- Yin, T., & Burger, C. (2003). Predictors of NCLEX-RN success of associate degree nursing graduates. *Nurse Educator*, 28(5), 232-236.
- Yordy, K.D. (2006). The nursing faculty shortage: a crisis for health care. *Robert Wood Johnson Foundation*. Retrieved January 1, 2012, from [www.ahcnet.org/pdf/factors\\_affecting\\_the-health\\_workforce\\_2005.pdf](http://www.ahcnet.org/pdf/factors_affecting_the_health_workforce_2005.pdf)

## APPENDICES



## Appendix A

### DEPARTMENT OF HEALTH PROFESSIONS STANDARD ASSOCIATE DEGREE NURSE CURRICULUM-GENERIC

#### First Term

Course	Theory	Lab	Clinical	Credit	Contact
MTH 100 or higher	3	-	-	3	3
BIO 201 Human Anatomy and Physiology I	3	1	-	4	5
NUR 102 Fundamentals of Nursing	3	2	1	6	12
NUR 103 Health Assessment	-	1	-	1	3
NUR 104 Introduction to Pharmacology	-	1	-	1	3
<b>Term Total</b>	<b>9</b>	<b>5</b>	<b>1</b>	<b>15</b>	<b>26</b>

#### Second Term

Course	Theory	Lab	Clinical	Credit	Contact
English ENG 101	3	-	-	3	3
BIO 202 Human Anatomy and Physiology II	3	1	-	4	5
NUR 105 Adult Nursing	5	1	2	8	14
NUR 106 Maternal and Child Nursing	4	-	1	5	7
<b>Term Total</b>	<b>15</b>	<b>2</b>	<b>3</b>	<b>20</b>	<b>29</b>

#### Third Term

Course	Theory	Lab	Clinical	Credit	Contact
PSY 200 Psychology	3	-	-	3	3
BIO 220 Microbiology	2	2	-	4	6
NUR 201 Nursing Through the Lifespan I	3	-	2	5	9
<b>Term Total</b>	<b>8</b>	<b>2</b>	<b>2</b>	<b>12</b>	<b>18</b>

#### Fourth Term

Course	Theory	Lab	Clinical	Credit	Contact
Speech SPH 106 or SPH 107 or SPH 116	3	-	-	3	3
PSY 210 Human Growth and Dev	3	-	-	3	3
NUR 202 Nursing Through the Lifespan II	3	-	3	6	12
<b>Term Total</b>	<b>9</b>	<b>-</b>	<b>3</b>	<b>12</b>	<b>18</b>

#### Fifth Term

Course	Theory	Lab	Clinical	Credit	Contact
Humanities Elective	3	-	-	3	3
NUR 203 Nursing Through the Lifespan III	4	-	2	6	10
NUR 204 Role Transition for the Registered Nurse (Preceptor 3:1)	2	-	2	4	8
<b>Term Totals</b>	<b>9</b>	<b>-</b>	<b>4</b>	<b>13</b>	<b>21</b>

Copied and Retrieved from <http://intranet2.dpe.edu/coursedirectory/directory-view.aspx>.

DEPARTMENT OF HEALTH PROFESSIONS  
CAREER MOBILITY  
LPN TO ASSOCIATE DEGREE NURSE CURRICULUM

**Prerequisite Courses Prior to NUR 201:**

- MTH 100 or Higher Level Mathematical Applications (3 credit hours)
- BIO 201 Human Anatomy and Physiology I (4 credit hours)
- BIO 202 Human Anatomy and Physiology II (4 credit hours)
- ENG 101 English Composition (3 credit hours)
- Must hold a valid unencumbered Alabama Practical Nursing License with documentation of employment as an LPN for a minimum of 500-clock hours within 12 months prior to admission.

**Total Prerequisites: 14 credit hours Prior to NUR 201**

**First Term**

Course	Theory	Lab	Clinical	Credit	Contact
NUR 200 Nursing Career Mobility Assessment	3	3	-	6	12
Term Totals	3	3		6	12

**Second Term**

Course	Theory	Lab	Clinical	Credit	Contact
PSY 200 Psychology	3	-	-	3	3
BIO 220 Microbiology	2	2	-	4	6
NUR 201 Nursing Through the Lifespan I	3	-	2	5	9
Term Totals	8	2	2	12	18

**Third Term**

Course	Theory	Lab	Clinical	Credit	Contact
SPH 106 or SPH 107 or SPH 116 Speech	3	-	-	3	3
PSY 210 Human Growth and Dev	3	-	-	3	3
NUR 202 Nursing Through the Lifespan II	3	-	3	6	12
Term Totals	9	-	3	12	18

**Fourth Term**

Course	Theory	Lab	Clinical	Credit	Contact
Humanities Elective	3	-	-	3	3
NUR 203 Nursing Through the Lifespan III	4	-	2	6	10
NUR 204 Role Transition for the Registered Nurse (Preceptor 3:1)	2	-	2	4	8
Term Totals	9	-	4	13	21

Copied and Retrieved from <http://intranet2.dpe.edu/coursedirectory/directory-view>.

## Appendix B

### DEPARTMENT of HEALTH PROFESSIONS MINIMUM ADMISSION STANDARDS

Minimum admission standards include:

1. Unconditional admission to the college.
2. Receipt of completed application for the nursing program(s).
3. A minimum of 2.50 GPA based on the following criteria:
  - Student has undergraduate level credit hours: Compute the GPA based on the most recent 24 hours of undergraduate credit hours;
  - Student has 24 or more credit hours at the graduate level: Compute the GPA based on most recent 24 hours of graduate level credit hours- undergraduate level credit hours are ignored;
  - Student has less than 24 hours at the graduate level: Compute the GPA based on the most recent 24 hours of undergraduate credit hours—graduate credit hours are ignored.
  - For students who have completed any college course work; high school credits will not be used in calculating GPA except as required in the Early College Enrollment Program.
  - Students who have completed no college course work the final cumulative high school GPA should be a 2.5 or higher OR successfully passed the GED examination.
4. Associate Degree Program nursing applicants must also have a GPA of 2.5 on a 4.0 scale in BIO 201, BIO 202, and MTH 100 or higher.
5. Eligibility for BIO 201 during the first term of associate degree nursing programs. Students must successfully complete BIO 103 (prerequisite) or achieve a passing score on the ACS approved placement examination.
6. Good standing with college.
7. Meeting the essential functions required for nursing.
8. A score of 76 or higher on the COMPASS Reading Examination (or related ACT Reading Score of 17 or higher).

Admission to the nursing program is competitive, because the number of faculty and clinical facilities available are limited. Meeting minimal requirements does not guarantee acceptance.

Copied and retrieved from: <http://intranet2.dpe.edu/coursedirectory/directory-view.aspx>.

## Appendix C

### ASSOCIATE DEGREE NURSING PROGRAM & LPN TO ADN NURSING MOBILITY PROGRAM

#### Applicant Point System

#### Calculation of Points for Students Meeting Minimum Admission Standards

#### **COMPASS Reading Score-Minimum 76 – Maximum 99**

Points are awarded for reading, using the actual score on the COMPASS placement exam (example: 93 Reading Score = 93 points). The ACT Reading Score may be used to derive a COMPASS reading score, based on the chart below. Note: COMPASS placement scores or ACT scores cannot be more than 3 years old.

ACT Reading Score	Related COMPAS S Score	ACT Reading Score	Related COMPA SS Score	ACT Reading Score	Related COMPAS S Score	ACT Reading Score	Related COMPAS S Score
17	76	21	88	25, 26	94	29	97
18	80	22	90	27	95	30, 31, 32	98
19	83	23	91	28	96	33	99
20	85	24	92				

**1. Selected Coursework (maximum 90 points)**

Points for grades in selected college course work are awarded as follows:

**A=30 Points, B= 20 Points, C= 10 points in the following courses:**

	Grade	Points
BIO 201 Anatomy & Physiology I	_____	_____
BIO 202 Anatomy & Physiology II	_____	_____
BIO 220 Microbiology	_____	_____

**2. Additional points (Maximum 11) – Students may be awarded up to 11 points as determined by the College.**

<b>Total Points Awarded</b>			
		<b>Earned</b>	<b>Maximum Possible</b>
<b>1</b>	<b>Reading Score</b>		<b>99</b>
<b>2</b>	<b>Selected Course Work</b>		<b>90</b>
<b>3</b>	<b>Additional Points</b>		<b>11</b>
<b>Total</b>			<b>200</b>

Retrieve and

copied from

<http://www.dstc.cc.al.us/Uploads/files/Programs/LPN%20Program%20Application%20revised%207-01-10.pdf>

Appendix D  
Permission from Lawson State CC



November 3, 2011

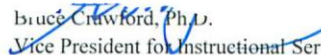
Katrina Swain, RN, MSN, Doctoral Candidate  
University of Alabama  
2733 Millbrook Road  
Birmingham, AL 35243

Dear Mrs. Swain:

You are hereby given permission to conduct research on the requested data elements regarding predictors of student success in the associate degree nursing program. Your proposed dissertation, "Predictors for Success on the NCLEX-RN for Associate Degree Nursing Graduates" as presented, will utilize a retrospective research design methodology investigating the following elements: a) nursing applicants most recent 24 credit hour GPA, b) biology course grades, and c) COMPASS placement scores, all of which will be analyzed to predict students' success on the initial writing on NCLEX RN. Additionally, your request included utilizing student grades from nursing courses - NUR 102, NUR 103, NUR 104, NUR 105, NUR 106, NUR 200, NUR 201, NUR 202, NUR 203, and NUR 204 and the ERI/ATI exit exam. Permission to utilize these elements has been given with the guarantee of the following conditions: anonymity of records, adherence to FERPA, and assurance that no personal data will be revealed in the process of compiling and analyzing the data as well as reporting the results from the analyses. Any violations of such will negate this agreement.

Thank you for your interest in advancing student success in nursing programs through this research. If the College or I can be of further assistance to you, please let me know.

Sincerely,

  
Bruce Crawford, Ph.D.  
Vice President for Instructional Services

cc: Dr. Perry W. Ward, President  
Dr. Myrtes D. Green, IRB and Sponsored Programs

Bessemer Campus: 1100 9th Avenue S.W. • Bessemer, AL 35022 • 205.428.6391  
Birmingham Campus: 3060 Wilson Road, S.W. • Birmingham, AL 35221 • 205.925.2515  
[www.lawsonstate.edu](http://www.lawsonstate.edu)

Appendix E  
IRB Approval

November 16, 2011

Office for Research

Institutional Review Board for the  
Protection of Human Subjects

THE UNIVERSITY OF  
**ALABAMA**  
R E S E A R C H

Katrina Swain  
Capstone College of Nursing  
The University of Alabama  
Box 870358

Re: IRB # EX-11-CM-093, "Predictors for Success on the Initial  
NCLEX-RN Writing for Associate Degree Nursing Graduates"

Dear Ms. Swain:

The University of Alabama Institutional Review Board has granted approval for your proposed research.

Your protocol has been given exempt approval according to 45 CFR part 46.101(b)(4) as outlined below:

*(4) Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens, if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects.*

Your application will expire on November 15, 2012. If your research will continue beyond this date, complete the relevant portions of Continuing Review and Closure Form. If you wish to modify the application, complete the Modification of an Approved Protocol Form. When the study closes, complete the appropriate portions of FORM: Continuing Review and Closure.

Should you need to submit any further correspondence regarding this proposal, please include the above application number.

Good luck with your research.

Sincerely,



Carpentato T. Myles, DPM, CIM  
Director & Research Compliance Officer  
Office for Research Compliance  
The University of Alabama

358 floor Administration Building  
Box 870127  
Tuscaloosa, Alabama 35487-0127  
(205) 348-8481  
fax (205) 348-7189  
TOLL FREE (877) 820-3066

Appendix F  
Variable Collection Sheet

**General Information**

Age \_\_\_\_\_

Race \_\_\_\_\_

Gender \_\_\_\_\_

**Information used for the study**

Marital status: \_\_\_Single \_\_\_Married \_\_\_Divorced \_\_\_Widow(ed)

Children: \_\_\_\_\_Y \_\_\_\_\_N (if stated)

Residence: on campus \_\_\_\_\_ off campus \_\_\_\_\_

Admission exams (Compass Score) \_\_\_\_\_

College GPA \_\_\_\_\_

Final Grades in: \_\_\_\_\_ MTH 100

\_\_\_\_\_ BIO 201

\_\_\_\_\_ BIO 202

\_\_\_\_\_ BIO 220

Final Grades in: \_\_\_\_\_ NUR 102

\_\_\_\_\_ NUR 200

\_\_\_\_\_ NUR 103

\_\_\_\_\_ NUR 201

\_\_\_\_\_ NUR 104

\_\_\_\_\_ NUR 202

\_\_\_\_\_ NUR 105

\_\_\_\_\_ NUR 203

\_\_\_\_\_ NUR 106

\_\_\_\_\_ NUR 204

ERI/ATI: \_\_\_\_\_

NCLEX-RN: \_\_\_\_\_