THE CORRELATION OF THE TEST OF ESSENTIAL ACADEMIC SKILLS (TEAS) EXAM SCORES WITH SUCCESS IN A SECOND-DEGREE ACCELERATED-BACCALAUREATE OF NURSING PROGRAM

by

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ABSTRACT

In higher education nursing programs, there are continued questions regarding admission assessment requirements and their ability to predict success for nursing students. This concept is especially true for accelerated second-degree baccalaureate nursing programs. More research is needed on these newer programs. One of the more common admission criteria for these programs is the Test of Essential Academic Skills (TEAS). Researchers need to examine the predictability of the TEAS composite and categorical scores to determine if a significant correlation exists between how one scores on the TEAS and level of success in nursing school. In this research proposal, success is defined as completion of the nursing curriculum and also as passage of the National Council Licensure Exam for registered nurses (NCLEX-RN) on the first attempt.

Keywords: higher education, nursing programs, success, Test of Essential Academic Skills, admission criteria, National Council Licensure Exam for Registered Nurses.

DEDICATION

This dissertation is dedicated to the myriad of nursing students who have been a major part of my professional life over the past 22 years. I have been privileged to have been inspired by countless young minds seeking to enter the greatest profession on Earth. These students have challenged me, taught me, and inspired me in ways too numerous to mention. I trust that I will be reading their dissertations, research, and contributions to the nursing profession in the years to come.

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INTRODUCTION

Many admission committee members, faculty, and administrators define success in a nursing program as completion of the nursing school curriculum, commonly referred to as meeting the requirements to graduate from the program (Newton, Smith, & Moore, 2007a). Others have defined success as successful passage of the National Council Licensure Exam for Registered Nurses (NCLEX-RN) on a student's first attempt (Yeom, 2013). For this study, the researcher defined success using both criteria and examined each criterion separately. The first definition of success was successful completion of the nursing school curriculum. The second definition of success was passing the NCLEX-RN on the first attempt.

With the increased attention on student success, administrators of nursing programs have sought admissions exams that can predict success (Newton et al., 2007a). One popular choice among the many different admission exams is the Test of Essential Academic Skills (TEAS; Hinderer, Dibartolo, & Walsh, 2014). Nursing programs often require potential students to take the TEAS exam and submit their scores as part of the application process. Admission committees utilize the results of this exam to enhance the decision-making process of whether to admit a particular student or not. Performing well on this exam may enable an applicant to receive priority in the selection process. Admission committee members may elect to deny admission to a student who performs poorly. Because colleges and universities that offer degrees in nursing rely on TEAS exam scores, it is important to research the correlation of TEAS to nursing school success.

There are varieties of educational methods by which one can graduate from a pre-licensure nursing school. A pre-licensure nursing program is one in which the student does not currently hold a license as a registered nurse. A pre-licensure program differentiates from a RN-BSN program, for example, which allows students who have already completed a pre-licensure program to enhance their education by obtaining a higher degree. Currently, in the United States, there are four primary routes to graduating from nursing school and being eligible to complete the NCLEX-RN (Bureau of Labor Statistics, U.S. Department of Labor, 2016). Table 1 includes the four primary routes to graduating from nursing school in the United States.

One pre-licensure option is a diploma program. As a more popular option in the past, diploma programs, often sponsored by hospitals, provided a means to obtain an education in nursing. Students in these programs often completed didactic and clinical coursework in one specific hospital environment and many went on to work in the same hospital after completion of the program (Bureau of Labor Statistics, U.S. Department of Labor, 2016). In 1980, 55% of newly graduated nurses completed their education in a diploma program environment (American Association of Colleges of Nursing, 2011). By 2008, however, diploma program graduates comprised a much smaller 13.9% of the total nursing population (American Association of Colleges of Nursing, 2011).

Another pre-licensure option is through the achievement of an associate degree in nursing. Associate degree programs, existing primarily at community colleges, generally take approximately 2 years to complete (Bureau of Labor Statistics, U.S. Department of Labor, 2016). The growth of these programs has been slow but consistent; if current trends continue, the United States can expect to see a marked increase in the number of nurses who hold at least an associate nursing degree (Buerhaus, Auberbach, & Staiger, 2016).

A third option for a pre-licensure student is to complete a generic baccalaureate program. Baccalaureate degree programs usually include additional education in leadership, research, and community health (Bureau of Labor Statistics, U.S. Department of Labor, 2016). A baccalaureate degree or higher is often required for one to obtain a leadership position within the field of nursing (Bureau of Labor Statistics, U.S. Department of Labor, 2016).

A newer pre-licensure option is an accelerated program. Accelerated programs can be at either the associate degree or baccalaureate degree level. One accelerated option is the second-degree accelerated-baccalaureate degree program. Second-degree accelerated-baccalaureate nursing programs build on a student's prior learning experiences and provide a route for students to transition into the discipline of nursing (American Association of Colleges of Nursing, 2012). These programs offer the most rapid route to obtaining a baccalaureate of nursing degree for those who have already completed a bachelor's degree in another subject area (American Association of Colleges of Nursing, 2012). With the increasing emphasis on generating more baccalaureate graduates, accelerated baccalaureate nursing programs continue to gain momentum in the United States (American Association of Colleges of Nursing, 2012). With the recent addition and growth of second-degree accelerated-baccalaureate nursing programs, a need exists for new information about how nursing programs can best measure the success of graduates.

Table 1

Different Types of Nursing Programs in the United States

Type of program	Approximate length of curriculum	Percentage of highest educational credential in 1980	Percentage of highest educational credential in 2008
Diploma	2-3 years	55%	13.9%
Associate Degree (ADN)	2 years	18%	36.1%
Generic Baccalaureate Degree (BSN)	4 years	22%	36.8%
Second-Degree Accelerated Baccalaureate Degree (ABSN)	11-18 months	N/A	N/A

Note. Adapted from American Association of Colleges of Nursing, Nursing Fact Sheet (2011); Bureau of Labor Statistics, U.S. Department of Labor, *Occupational Outlook Handbook, 2016-17 Edition,* Registered Nurses.

How Nursing Programs Measure Success

Many individuals associated with nursing programs are typically interested in the success of students. Admission committee members, educators, and administrators closely monitor measurements of success. Attention has largely focused on concrete measures of student outcomes as their measures (Bremner, Blake, Long, & Yanosky, 2014; Cornelius, 2012; Crouch, 2015; Gilmore, 2008).

Many nursing program administrators see passing the National Council Licensure Exam for Registered Nurses (NCLEX-RN) on the first attempt as one measure of success (Gilmore, 2008). Nursing programs are often compared, evaluated, and closely scrutinized based on the institution's NCLEX-RN pass rate calculated as the percentage of graduates that passed the exam on the first attempt (Cornelius, 2012; Gilmore, 2008). Thus, nursing school administrators and admission committee members are likely concerned with the NCLEX-RN passing rates associated with their college or university (Trofino, 2013; Wolkowitz & Kelley, 2010). By increasing NCLEX-RN passing rates, an institution can work to increase its popularity,

reputation, and success (Salvucci, 2015). Having a favorable NCLEX-RN first-time passing rate can directly affect an institution in a positive manner (Salvucci, 2015). The ability to predict NCLEX-RN success can therefore have a significant positive impact on nursing education stakeholders (McCarthy, Harris, & Tracz, 2014). One way to positively impact student success is to be able to accurately identify those individuals who are most likely to be successful in a nursing program from the pool of applicants.

Pressure to Identify Successful Students

With the increased focus on ensuring program success, admissions committees may spend much of their time and effort in selecting students who have the best potential for success. Admission committee members are those individuals tasked with identifying and selecting students to enter a nursing program. These committee members are often composed of faculty and/or program administrators (Trofino, 2013). There is increasing pressure on admissions committees to choose students who are most likely to be successful in the nursing program (Scott & Zerwic, 2015; Ukpabi, 2008). That is, committees must choose students who are most likely to stay until graduation and to pass the NCLEX-RN on the first attempt. Thus, if admission committee members and program administrators can better predict student success during the application process, they can potentially increase program completion rates (Scott & Zerwic, 2015). Administrators and admission committee members need information that can help them readily identify those applicants who are most likely to be successful on their first attempt at the NCLEX-RN. In an effort to identify these applicants who are likely to be successful, nursing programs often require an admissions test prior to entry.

Nursing Program Admissions Tests and Correlation with Success

Nursing program admission committee members are likely to select students for admission who have the best chance at being a success (Scott & Zerwic, 2015). This identification of students likely to be successful is often the first step. In order to try to identify students with the most potential to be successful, nursing schools may opt to use the Assessment Technologies Institute (ATI) Test of Essential Academic Skills (TEAS), the National League for Nursing Comprehensive Achievement Test for Baccalaureate Students (NLNCATBS), the Nurse Entrance Test (NET), or the Health Education Systems, Inc. (HESI) Admission Assessment Examination (A^2 Examination; Hinderer et al., 2014) among others. Administrators and admission committee members will typically select one of these assessment examinations as part of the admission process (Ukpabi, 2008). College and university administrators have a vested interest in choosing the admissions test that is shown to have the highest correlation with student success. Accurately predicting which applicants are more likely to be successful can assist administrators ensure better graduation rates and NCLEX-RN pass rates for their institution (Scott & Zerwic, 2015). One of the most widely used assessment exams used in nursing programs is the Test of Essential Academic Skills (TEAS; Cunningham, Mainer, Anderson, & Sarnosky, 2014). Therefore, it may be beneficial for administrators to evaluate the correlation of the TEAS exam with student success.

The Trouble with TEAS

According to the Assessment Technologies Institute (2011), approximately 2100 colleges and universities use the TEAS examination. Of these colleges and universities, many involve nursing programs that rely heavily on the results of the TEAS examination as part of the admission selection process (Cornelius, 2012). The TEAS examination was developed

specifically for nursing programs in the United States (Assessment Technologies Institute, Inc., 2011). According to Wolkowitz and Kelley (2010), the TEAS examination assesses overall academic preparedness for nursing students and correlates with academic success in a nursing program. Admission committee members in nursing programs often use results of this exam in the admission selection process as one method to assess an applicant's potential to be successful in both graduating from the program and passing the NCLEX-RN on the first attempt (Manieri, DeLima, & Ghosal, 2015). There is little solid evidence, however, regarding how effective this exam is in predicting student success. Because second-degree accelerated-baccalaureate programs are relatively new, there is even less information regarding students from these programs. Therefore, there is certainly a need to examine second-degree accelerated-baccalaureate nursing programs in the United States.

Accelerated Degree Programs as a New Challenge

A more recent kind of nursing program, the accelerated second-degree baccalaureate nursing (ASDN) program (American Association of Colleges of Nursing, 2014a), is bringing with it a new admissions challenge. This innovative educational approach allows students who have a baccalaureate degree in a different discipline to receive credit for general education requirements, permitting these students to progress more rapidly through the required components of a baccalaureate in nursing curriculum (American Association of Colleges of Nursing, 2014a). Because these programs are newer, there is increased scrutiny on their success (Dogrell & Schaffer, 2016). This scrutiny stems from accrediting bodies, boards of nursing, other academic institutions, clinical facilities, and the general public as well (Lindsey, 2009). Admissions committees in these programs in particular may benefit from having information readily available to them in an effort to make careful selection of students who have the best

potential for success. Likewise, nursing program administrators may also benefit from actualizing positive outcomes and success with nursing students who attended their program. Selecting students who are most likely to be successful may contribute to the best outcomes for the program of nursing.

Background

The Test of Essential Academic Skills exam is widely used by colleges and universities within the United States that offer programs of study in nursing (Cunningham et al., 2014). Administrators and admission committee members use the TEAS as a method to identify those students most likely to be successful in a nursing program. The TEAS is a multiple-choice exam that assesses basic knowledge in reading, mathematics, science and English and language usage (Assessment Technologies Institute, 2011). Nursing schools may choose to utilize the results of this exam as a significant method of assessing an applicant's potential to be successful in both graduating from the program and passing the NCLEX-RN on the first attempt.

The TEAS assists with the identification of those applicants that are most likely to be successful. Assessment Technologies Institute, Inc. is a private testing company based in Overland Park, Texas (Evangelist, Orr, & Unrein, 2009). Participants have 209 minutes to complete 170 multiple-choice questions. Of the total number of questions, 150 contribute to the participant's score, while the remaining 20 questions are pretest questions (Evangelist et al., 2009). According to the Assessment Technologies Institute (2011), the TEAS can help an institution identify candidates who have the most potential for success prior to the start of a nursing program. Potential students often must take the TEAS exam and submit their scores as part of the application process.

Statement of the Problem

Administrators at institutions of higher education engage with identifying applicants from a vast applicant pool to determine which prospective students are likely to be successful in a nursing program. With many applicants, most nursing schools cannot accommodate everyone who applies. According to the American Association of Colleges of Nursing (2014a), nursing programs in the United States denied admission to more than 78,000 qualified applicants. Since many nursing schools rely on TEAS exam scores as admission criteria, it will be helpful to know how these scores correlate to student success.

When reviewing applicants for entrance into a nursing program, a common tool is the TEAS exam. Admission committee members and administrators often use the TEAS exam in nursing programs to help determine which candidates are most likely to be successful. According to the Assessment Technologies Institute (2016), the TEAS exam is a statistically significant predictor of student success in a nursing program. If a student scores poorly on the TEAS as a part of the admissions process, that student may not be a good fit for a specific nursing program (Assessment Technologies Institute, 2016). For a second-degree accelerated baccalaureate-nursing program, it is essential to identify students that are most likely to be successful, and therefore a good fit, for the program.

Since the TEAS exam is widely used for nursing program student selection, administrators and admission committee members can benefit by knowing how reliable the TEAS exam is with predicting student success. Because colleges and universities offering degrees in nursing rely on TEAS exam scores, the predictability of scores in determining nursing school success may be useful to administrators and admission committees. By doing so, program

administrators and admissions committee members can best attempt to admit students who are most likely to be successful.

Nursing Shortage

The profession of nursing is a growing one. According to the United States Department of Labor Bureau of Labor Statistics (2013), job growth in the profession of registered nursing should continue to grow through 2022. In fact, the registered nursing workforce should grow from 2.71 million in 2012 to 3.24 million by 2022, placing the profession of nursing among the top professions when looking at job growth in the country (United States Department of Labor, Bureau of Labor Statistics, 2013). When looking at job growth as well as the need to replace registered nurses leaving the workforce, the Bureau of Labor Statistics anticipated a need for 1.05 million new nurses by the year 2022. With the projected job growth comes the need to train individuals to become graduate and registered nurses; however, a shortage of registered nurses continues in this country. This shortage of nurses is not new. The nursing shortage in the United States started around 1998 (Buerhaus, Staiger, & Auerbach, 2000). Since then, healthcare in the United States has experienced a shortage of nursing staff available to care for patients (Buerhaus et al., 2000).

One factor contributing to the nursing shortage is the inability of nursing schools to accommodate the number of applicants. The inability to admit all qualified students who apply to a nursing program is due to several identified barriers. According to Ironside and McNelis (2010), the five most commonly identified barriers that nursing schools reported were lack of quality clinical sites, lack of qualified faculty, size of clinical group restrictions, clinical agency restrictions, and the time demands on students required to learn systems of multiple clinical agencies. These findings illustrate the challenges nursing program administrators face when

aiming to increase enrollments within a nursing program or open new ones. As four of the five identified barriers are directly related to clinical sites, one can see the impact the availability of clinical learning opportunities can have on a nursing program being able to accommodate the number of qualified applicants. In the State of Florida, for example, 70 percent of deans and directors of pre-licensure baccalaureate nursing programs responded limited clinical sites as the primary barrier to increasing student enrollment (Florida Center for Nursing, 2014).

Clinical sites are a mainstay of nursing education. In the clinical environment, a nursing student practices critical thinking and taking didactic information learned in the classroom and applying that information to the clinical setting. The clinical environment is therefore a major pedagogy within nursing education (Shullman, 2005). This lack of clinical sites continues to be identified as a significant barrier to nursing education (Nielsen, Noone, Voss, & Mathews, 2013). Adding to the problem associated with the number of qualified applicants denied admission to nursing schools, the United States continues to be dealing with the crisis of a nursing shortage.

Buerhaus, Staiger, and Auerbach (2004) predicted the nursing shortage to be 400,000 to 800,000 by the year 2020. Several researchers continue to support the pessimistic view of the availability of nurses for the future healthcare needs of the United States. For example, Juraschek, Zhang, Ranganathan, and Lin (2012) predicted the shortage of registered nurses to reach almost one million by 2030. Not all researchers have agreed with this stark projection, however. Spetz (2013) recognized the widely varying predictions of the level of the nursing shortage and even commented on a possible nursing surplus. Staiger, Auerbach, and Buerhaus (2012) recognized the economic recession that began in 2006-2007 brought the nursing profession out of a critical shortage and established a state of equilibrium. The recession led to a reduction of the nursing shortage albeit perhaps a temporary one (Snarely, 2016). Researchers

have expressed skepticism as to how long the nursing shortage will remain alleviated, predicting a return to similar levels of a shortage as was present in pre-2006-2007 (Staiger et al., 2012). With the new trends in national healthcare and increased accessibility in the United States, it is highly likely more nurses will be needed to meet the healthcare needs of the country (Saintsing, Gibson, & Pennington, 2011).

When looking at the nursing shortage, one can also examine the situation geographically. According to Juraschek et al. (2012), the nursing shortage projected to continue through 2030, will greatly affect the State of Florida. Juraschek et al. predicted that by the year 2030, California will rank first in having the highest number of open nursing positions (193,100), with Florida (128,364) and Texas (109,779) close behind. Nursing programs in these states and others will likely benefit by admitting students that will be successful in school and obtain licensure as a registered nurse. Producing more registered nurses can assist in alleviating the number of unfilled nursing positions projected to plague much of the United States by 2030.

In a widely circulated report, the Institute of Medicine (2011) recommended that 80% of practicing registered nurses be educated at the baccalaureate level as a minimum standard by the year 2020. Acute care facilities, as well as other organizations that hire registered nurses, have consistently been working to reach this 80% goal. In 1980, the number of registered nurses with at least a baccalaureate degree in Nursing was 22%; by 2008, the number had risen to 36.8% (American Association of Colleges of Nursing, 2011). By 2013, the number of registered nurses holding at least a bachelor's degree in Nursing had increased to 55% (United States Department of Health and Human Services, Health Resources and Services Administration, 2013). Although numbers are certainly trending toward a more educated nursing workforce, efforts continue to meet the 80% goal by the year 2020. According to Hewitt (2016), increases in RN-BSN

programs and overall enrollments in pre-licensure baccalaureate nursing programs play an instrumental part in reaching the 80% goal.

Administrators at healthcare agencies can employ various methods to increase the percentage of an organization's registered nursing workforce becoming baccalaureate prepared. One method is to encourage diploma or associate degree-educated registered nurses to enroll in RN-BSN programs in order for these employees to obtain a baccalaureate degree in nursing. Another method is to place more emphasis on hiring nursing graduates who have completed a baccalaureate program of nursing, limiting the employment of nursing graduates who complete a diploma or associate degree. Hewitt (2016) included the growth of accelerated baccalaureate nursing programs as a means to increase the overall percentage of nursing graduates holding at least a baccalaureate degree in nursing. Accelerated baccalaureate programs are one growing methodology of producing more graduate nurses who have such preparation.

More recently, the Georgia Nurses Association (2015) discussed the need for the United States to produce more than 1.1 million new nurses by the year 2022. In order to reach this lofty goal, higher education nursing programs throughout the United States may choose to consider admitting more students. Administrators of nursing programs are likely to support students being successful in becoming registered nurses in order to help alleviate the shortage of nursing staff available. Combined with the continuing shortage of nursing staff in the United States, the need to enroll students who are most likely to be successful in obtaining a degree in nursing and passing the licensure exam is even more of a prevalent issue (Wolkowitz & Kelley, 2010). In order for a student to enter the nursing profession, and thereby assist in alleviating the nursing shortage, the student must be successful in his/her program of study. Attrition of students, especially in nursing programs, should be examined.

Attrition of Students

Attrition is a facet many higher education administrators of nursing programs deal with regularly. Attrition is the "human processes involved in students leaving a course of study" (Urwin et al., 2010, p. 202). A student who is unsuccessful in completing coursework and graduating from the nursing program is part of the college or university's attrition rate. When considering success as completion of all courses, nursing administrators are often interested in reducing attrition. Attrition from nursing programs has been a subject of concern by higher education administrators and legislators alike. Nursing programs are often associated with high attrition rates, often above 50%, and therefore a continued focused attention on attrition exists (Newton et al., 2007a; Schmidt & MacWilliams, 2011). According to Hirschy, Bremer, and Castelleno (2011), the problem of nursing student attrition continues to receive increased attention from federal and state lawmakers and agencies. With a nursing shortage, administrators aim to admit students who are most likely to complete the entire nursing curriculum and graduate from the college or university (Newton et al., 2007a). In doing so, administrators can help to generate more nursing school graduates and ultimately, more nursing professionals. Reducing the national nursing shortage may be possible by eliminating, or reducing, the amount of student attrition.

Attrition is one of the most important challenges to nursing programs as it leads to increased costs for the college or university and limits the number of graduates who can go on to become a viable part of the nursing profession (Mulholland, Anionwu, Atkins, Tappern, & Franks, 2008). Administrators dedicate a significant amount of time, effort, and money for the recruitment of potential students (Shelton, 2012). Admission committee members also invest much into the process of selecting those applicants who are most likely to be successful in the

nursing program (Hopkins, 2008). There is no definitive clear picture as to which admission standards contribute most directly to student success. Trying to establish which admission criteria have the highest value is cloudy at best; however, requiring higher admission standards overall may be of importance.

According to Pitt, Powis, Levett-Jones, and Hunter (2012), higher qualifications on admission standards directly relate to a reduction in attrition. Administrators and admission committee members may strive to do their best to ensure they select students from the pool of available applicants most likely to be successful in completing the entire nursing curriculum. Identifying which specific admission standards are most important may be more complex and certainly requires investigating.

A student who does not succumb to attrition and completes the nursing program is classified as a graduate nurse (GN). Only after passing the NCLEX-RN does the student become a registered nurse (RN). It is possible for a nursing school graduate to never become a registered nurse if the student neglects to take the licensure exam, or if the student is unable to achieve a passing score on the exam, even after more than one attempt. Some have argued that a student who graduates from a nursing program but never actualizes into a registered nurse may be deemed as unsuccessful; therefore, a second method to measure students' success is by successful completion of this licensure exam on the first attempt.

Obtaining Licensure

Another reason for the placement of such high importance on NCLEX-RN pass rates is accrediting bodies. As part of the accreditation process, whether regional or national, institutions of higher learning offering nursing programs are required to report their NCLEX-RN pass rates (Commission on Collegiate Nursing Education, 2013). Accrediting agencies often hold a

minimally acceptable pass rate to which institutions remain accountable. A nursing program not meeting minimal standards of success on NCLEX-RN pass rates will likely face difficulty meeting accreditation standards. One can see that for multiple reasons, administrators at nursing programs are likely to monitor the program's NCLEX-RN first time pass rates carefully. It is important to be able to successfully predict, from the point of admission, those students that are likely to be successful on the licensure exam.

As second-degree accelerated-baccalaureate nursing students are not well-studied, it is helpful to gain an understanding of these accelerated programs. Researchers can then work toward contributing to the body of knowledge regarding these specific students and find characteristics and correlations that may assist administrators in helping these students to be successful.

Second-degree Accelerated-Baccalaureate Nursing Students

Accelerated nursing programs are not entirely new. The first accelerated program began at St. Louis University in 1971 (Danner & Preston, 2014). Since that time, a huge interest and increase in accelerated programs continues to proliferate across the United States. Part of the interest in such programs is the propensity to rapidly increase the number of nursing school graduates and therefore, increase the number of available registered nurses to help alleviate the nursing shortage. The pathway an accelerated program provides enables students to complete their required nursing education at a faster pace, and identifies as a method to assist in generating more nursing graduates and meeting the needs created by the nursing shortage (Giddens, Keller, & Liesveld, 2015; Siler, Debasio, & Roberts, 2008). Danner and Preston (2014) reported a 50% increase in the number of nursing school graduates when implementing an accelerated curriculum in an associate degree-nursing program. In 2002, the American Association of

Colleges of Nursing publically supported accelerated nursing programs (Danner & Preston, 2014). In 2013, the ACCN, in a published update, reinforced their support for accelerated nursing programs (AACN, 2013; 2014b).

The ASDN offerings are consistently increasing in popularity and are in high demand. In 2004, there were just over 6000 students enrolled in an ASDN program in the United States (American Association of Colleges of Nursing, 2014a). By 2012, the number of students enrolled in an ASDN program in the United States increased to over 15,000 (American Association of Colleges of Nursing, 2014a). ASDN programs usually hold higher admission standards, partly because the curriculum is often identified as rigorous and intense (Penprase & Harris, 2013). With higher admission standards, it is important for administrators and admission committee members to identify the most predictable measures of anticipated success in such a challenging nursing curriculum. Accelerated nursing programs attract quality applicants into nursing that previously were educated and/or practicing in another field (Payne, 2013). The higher education community may benefit from continuing research on the success of this unique group of students. As accelerated nursing programs are relatively new, educators have only recently started to identify measurable factors that affect overall success in a nursing program (Penprase & Harris, 2013). This research study will contribute to the current shortfall and gap in studies conducted on this population of students.

Purpose of the Study

The purpose of this quantitative study was to determine if a correlation exists with the TEAS examination and nursing student success in a second-degree accelerated-baccalaureate of nursing program. The researcher aimed to examine the relationships between the TEAS exam and student success. For this study, the researcher defined success as (a) successful completion of

the nursing school curriculum and (b) successful completion of the NCLEX-RN on a graduate's first attempt. The results of this study addressed all components of the TEAS. These components include the four subject areas (science, mathematics, English and language usage, and reading) along with the composite TEAS score obtained from scoring all four categories and producing one composite score.

Significance of the Study

According to Yates and Sandiford (2013), nursing schools across the country are attempting to increase their enrollments in response to the nursing shortage that exists in the United States. Therefore, it is imperative to choose the best students. Admission committee members aim to admit students that are most likely to be successful in the nursing program (Beeson & Kissling, 2001; Yates & Sandiford, 2013). Through this study, the researcher aimed to assist admission committee members with making the best prediction of student success when using the TEAS. Kaddoura, Van Dyke, and Yang (2016) indicated a definitive need for more research into which predictors are accurate for predicting first-time NCLEX pass rates. The results of this study can assist in identifying if the TEAS is one of the accurate predictors for NCLEX success.

Additionally, administrators at higher educational institutions that offer programs in nursing are also likely to benefit from this study. With increased pressure from regulatory and accrediting bodies, administrators are often eager to increase their NCLEX-RN pass rates. By increasing the NCLEX-RN pass rates, administrators can potentially ward off critical inquiries from agencies as well as strengthen the reputation of their nursing program. This concern is especially true in the State of Florida, which currently holds the lowest position in the United States of NCLEX-RN first-time test taker success (National Council of State Boards of Nursing,

2014). Administrators of nursing programs have a stake in selecting students that are most likely to pass the NCLEX-RN (Herrera & Blair, 2015). In doing so, faculty members may encounter students that are better prepared and more likely to succeed in a nursing program.

If the results of the study indicate no significant relationship, admission committee members and administrators might choose to put less value, or no value, on the TEAS examination scores of potential students. If, however, the results of the study indicate the TEAS exam and student success have a significant relationship, these same individuals may elect to place increased value on the TEAS examination scores. Therefore, the findings of this study will likely have an impact on admission practices of nursing programs, particularly among second-degree accelerated-baccalaureate programs.

Conclusion

With an existing nursing shortage, resulting in an insufficient number of registered nurses in the United States to care effectively for the population, there is an immediate need to train and graduate nursing students in an effort to supply the United States with an adequate supply of nurses (Snarely, 2016). In order to increase the number of graduate nurses, nursing programs need to graduate more nursing students. Once these students have graduated, they can take the NCLEX-RN and if successful on the exam, these graduates will become registered nurses and can enter the workforce, thereby alleviating the shortage. One recent method to increase the number of nursing school graduates is the introduction and growth of second-degree accelerated-baccalaureate nursing programs (Newton et al., 2007a). For these programs, administrators and admission committee members have a vested interest in selecting students for admission that are most likely to be successful in the program. The widely used TEAS exam as an admission

criterion, must be studied to determine the correlation between how an applicant scores on the exam and how TEAS scores correlate with nursing student success.

CHAPTER 2

LITERATURE REVIEW

Much research exists on the use of the TEAS examination as part of an admissions committee criterion when selecting students to accept into a higher education program of nursing. Even though a plethora of research already exists, researchers appear to have ignored one specific group of students. As a newer program offering, researchers have yet to study accelerated second-degree baccalaureate nursing students thoroughly.

Test of Essential Academic Skills (TEAS)

The TEAS exam serves as a method to assess an applicant's readiness, and predicted success, in nursing school (Assessment Technologies Institute, 2011). Each of the four primary sections on the exam (mathematics, science, English and language usage, and reading) are broken down into specific subsections. Under the category of mathematics, test-takers answer questions related to numbers and operations, algebraic applications, data interpretation, and measurement (Assessment Technologies Institute, 2011). Test questions focus on whole numbers, metric conversion, use of decimals, various algebraic equations, fractions, ratios, proportions, and percentages (Assessment Technologies Institute, 2011). There are 45 test questions in this category, and individuals have 56 minutes to answer the questions (Assessment Technologies Institute, 2011).

In the science category, prospective students have 38 minutes to complete 30 questions (Assessment Technologies Institute, 2011). Human body science, life science, earth and physical science, and scientific reasoning are subcategories (Assessment Technologies Institute, 2011).

Test-takers are likely to see questions related to cellular anatomy, physiological components, various body systems, and physics (Assessment Technologies Institute, 2011).

The English and language usage section concentrates on communication, a skill deemed essential to nursing practice. In this section, participants will encounter questions based on the subsections of grammar and word meaning, context, spelling and punctuations, as well as sentence structure (Assessment Technologies Institute, 2011). There are 55 questions in this section and individuals have 65 minutes to complete them (Assessment Technologies Institute, 2011).

The reading section of the TEAS examination contains 40 questions, for which students have 50 minutes to complete (Assessment Technologies Institute, 2011). The reading section is broken down into the two subcategories of passage comprehension and paragraph comprehension (Assessment Technologies Institute, 2011). With these subsections, test-takers must read a particular passage and using logical and critical thinking skills draw inferences from what they read (Assessment Technologies Institute, 2011).

Administrators of nursing programs tend to rely heavily on the TEAS exam as part of the admission process (Wolkowitz & Kelley, 2010). According to Cantwell, Napierkowski, Gundersen, and Naqvi (2015), the TEAS exam is a statistically proven predictor of student success in a nursing program. In their study, the researchers used the TEAS exam's composite score to examine the relationship between minority students and non-minority students when evaluating student success (Cantwell et al., 2015). When examining the composite scores on the TEAS exam of these two groups, they found little difference between the two (Cantwell et al., 2015). Cantwell et al. examined students enrolled in an accelerated second-degree nursing program, but specifically focused on students who spoke an additional language and came from a

different culture. The focus of Cantwell et al. was to determine if additional supportive practices could improve student success with this minority student population. Although they utilized the TEAS exam in their study, they did not specifically examine the relationship between TEAS scores and student success.

Cornelius (2012) identified preadmission testing as a major element in identifying nursing program applicants who are likely to be most qualified. Cornelius investigated factors related to first year success in nursing school. Cornelius examined 300 community college students enrolled in an associate degree level-nursing program between 2003 and 2009. Additionally, Cornelius indicated both grade point average and preadmission examination results as key factors to examine when predicting success in an associate degree-nursing program.

The researcher's review of the literature indicated after admission to a nursing program, it is vital that faculty and administration begin working with students immediately to best prepare them for being successful (Davenport, 2007; Sayles, Shelton, & Powell, 2003). Davenport (2007) described changes made to the curriculum of an associate degree-nursing program in an effort to enhance NCLEX-RN success. Davenport noted the importance of successfully passing the NCLEX-RN on the first attempt as passing the licensure exam on the first attempt is considered a visible measure of program quality.

Other researchers revealed the TEAS examination as the sole variable that predicted student success. Diaz, Sanchez, and Tanguma (2012) studied 174 junior level self-identified Hispanic students enrolled in their first Bachelor of Science academic course, Nursing Fundamentals, at a state-supported university in Texas. The goal of their research was to evaluate if relationships existed between students' pre-nursing grade point average, TEAS scores, and specific individual characteristics (age, gender, and first-generation college attendance, as well as

marital and employment status; Diaz et al., 2012). The researchers found the TEAS examination was the single significant predictor of student success with passing the Nursing Fundamentals course (Diaz et al, 2012).

Researchers have identified the TEAS examination to predict nursing program success but not to accurately predict success on the NCLEX-RN. Schmidt and MacWilliams (2011) conducted a concise, systematic review of nursing school admission criteria. The researchers examined criteria, which included pre-nursing grades, standardized preadmission examinations, essays, personal interviews, and measures of volunteer activity (Schmidt & MacWilliams, 2011). The review provided by the researchers may indicate further analysis would be helpful to determine which admission entrance examination best predicts successful completion of an associate degree nursing program.

Some research exists regarding the TEAS and predictability of nursing school success. Penprase and Harris (2013), when tracking 421 nursing students, found that the TEAS assessment test, along with a prenursing developmental psychology course, a health assessment course, and an NCLEX-RN predictor examination, all showed significant moderate relationships with NCLEX-RN success. However, these researchers only examined the mathematics and reading portions of the TEAS, ignoring the scores on the science and English and language usage categories. Additionally, the researchers ignored the composite score, obtained by utilizing the results in all four categories. Surprisingly, Penprase and Harris only discussed in any detail the significance of the prenursing developmental psychology course, the nursing assessment course, and the NCLEX-RN predictor examination. No detailed discussion by these researchers concerning the predictability of the TEAS is included in their study.

Other researchers investigated the predictability of the TEAS exam. Newton et al. (2007a) examined two cohorts of first semester nursing students who gained admittance to a baccalaureate program in nursing. They studied 184 first semester nursing students from these two cohorts (Newton et al., 2007a). Newton et al. stated that for one of the two cohorts, the TEAS composite score was most predictive of first semester grade point average. The cohort with the higher TEAS composite score also obtained a higher mean grade point average when completing the first semester. Newton et al. did not examine past the first semester of nursing school. Therefore, their research did not specifically address the predictability of the TEAS on graduating from nursing school, or successfully passing the NCLEX-RN on the first attempt

Other researchers have examined the effect of aptitude on nursing school success. Newton, Smith, Moore, and Magnan (2007b) explored whether scholastic aptitude and nursing aptitude are predictive of early academic achievement in a baccalaureate-nursing program. Their study consisted of 164 sophomore-nursing students admitted to the nursing major in one of two cohorts during a single academic year (Newton et al., 2007b). According to Newton et al., the TEAS score was a significant predictor of early academic achievement. However, the researchers noted that both preadmission grade point average and TEAS scores were significant predictors of a student's first semester grade point average in nursing school (Newton et al., 2007b). Again, the researchers only assessed successful completion of the first semester of nursing school.

Admission committees may choose to examine the specific selection criteria they use when selecting from a pool of potential students. Cunningham et al. (2014) examined the statistical selection criteria utilized by a baccalaureate-nursing program for 283 students enrolled between fall 2005 and spring 2013. One of the variables the researchers utilized was the TEAS composite score (Cunningham et al., 2014). The researchers found a significant positive

relationship between the TEAS composite score and overall average grade point average upon the students' completion of the nursing program (Cunningham et al., 2014). Cunningham et al. recognized that researchers could benefit from conducting further studies, including those studies that examine other types of nursing programs. This research would include accelerated second-degree baccalaureate nursing students.

One of the more popular methodologies when researchers use the TEAS exam is to consider the overall, or composite score, of the exam. Ukpabi (2008) determined that the composite TEAS score was a significant predictor of success on the NCLEX-RN. Ukpabi studied 39 students who graduated from North Carolina Central University's School of Nursing. The researcher used discriminant statistical analysis to identify which of 18 variables were significant in predicting success on the NCLEX-RN (Ukpabi, 2008). The researcher found that 11 of the 18 variables were statistically significant in predicting success (Ukpabi, 2008). One of the statistically significant predictors was the composite TEAS score (Ukpabi, 2008). However, the students studied were not accelerated second-degree students.

More recently, Bremner et al. (2014) studied 474 nursing students to determine the practicality of setting a specific benchmark of a composite TEAS score that would best predict first semester success. Bremner et al. did not study beyond a student's successful completion of their first semester. As a result of research, the authors recommended a composite score of 78 as being indicative of first semester success (Bremner et al., 2014). For this study, the researcher chose to examine the predictability of the TEAS exam score on student success but defined success as successful completion of the entire nursing program and also as successful passing of the NCLEX-RN with one attempt. The researcher wanted to go further than looking at the completion of only one semester.

According to the Assessment Technologies Institute (2011), students who scored at a proficient level on the TEAS also demonstrated success in nursing school. However, the researchers defined success in this study as successful completion of a fundamentals exam the Assessment Technologies Institute (ATI), Inc. developed. The researchers did not collect data to measure student success objectively by completion of nursing school in its entirety or by successful completion of the NCLEX-RN. It may be helpful to note that ATI is the same organization that creates, markets, and benefits from the sale of the TEAS exam. Therefore, reviewers may wish to evaluate the study for bias carefully. Additionally, researchers may choose to conduct an independent research study without the potential bias associated with ATI.

Some researchers question the predictability of the TEAS exam. Applicants who have lower admission examination scores with other demonstrated forms of achievement may be more successful in their academic program (Mattson, 2007; National Center for Fair and Open Testing, 1998; Sackett, Kuncel, Waters, Cooper, & Ameson, 2009; Scott & Zerwic, 2015). According to Scott and Zerwic, admission committees may have denied many applicants to nursing programs who achieved successful results if the TEAS exam was included in the weighting of academic metrics on admission selection processes. Researchers may choose to examine if preadmission testing has a direct correlation with student success. One method of determining the relationship between the TEAS exam and student success is to examine the institution's results on the NCLEX-RN.

National Council Licensure Exam for Registered Nurses (NCLEX-RN)

The NCLEX-RN exam ranges from 75-265 items. Individuals taking the exam must complete a minimum of 75 questions and no more than 265 items (NCSBN, 2013). The exam's structure is one of computer adaptive testing (CAT). A participant taking the NCLEX-RN

receives a more difficult question after answering a current question correctly (Norton et al., 2006). Exam questions consist of multiple choice, fill-in-the-blank, drag and drop, and analysis of charts, diagrams, and pictures (Norton et al., 2006). The purpose of the exam is to protect the safety of the public (NCSBN, 2013). Therefore, the NCLEX-RN assesses a test-takers ability to demonstrate a general knowledge of safe nursing care. If a tester is able to demonstrate competency after 75 questions, the exam will stop. Students may receive up to the full 265 test items before an analysis is made determining if the test-taker has demonstrated competency or not (NCSBN, 2013).

The National Council State Boards of Nursing reviews the passing standard for the NCLEX-RN every three years (NCSBN, 2013). The purpose of reviewing the passing standard is to ensure the protection of the public by ensuring that unqualified applicants do not pass the NCLEX-RN (NCSBN, 2013). The NCSBN Board of Directors considers recommendations from a panel of experts concerning changing the passing standard (NCSBN, 2013). The NCSBN Board of Directors evaluates entry-level practice requirements as part of the process (NCSBN, 2013). As the practice requirements of a newly graduated RN increase with the level of care required for patients, the NCSBN generally agrees to raise the passing standard of the NCLEX-RN. In what some consider a surprising move, the NCSBN elected to not raise the passing standard for 2016 but instead to keep the passing standard the same as 2013 (NCSBN BOD, 2016).

Another reason for the placement of such high importance on NCLEX-RN pass rates is accrediting bodies. According to Salvucci (2015), accrediting bodies evaluate first-time NCLEX-RN pass rates and results may affect accreditation and viability of a nursing program. As part of the accreditation process, whether regional or national, institutions of higher learning offering

nursing programs must report their NCLEX-RN pass rates (Commission on Collegiate Nursing Education, 2013). These accrediting agencies often hold a minimally acceptable pass rate to which institutions remain accountable. A nursing program not meeting minimal standards of success on NCLEX-RN pass rates will likely face difficulty meeting accreditation standards.

When nursing school graduates fail the NCLEX-RN, the impact often is highly negative for the individual. Individuals who fail the exam on their first attempt may have feelings of embarrassment, loss of self-esteem, failure, and anxiety (Conroy, Kaye, & Fifer, 2007; Griffiths, Papastrat, Czekanski, & Hagen, 2004; Roa, Shipman, Hooten, & Carter, 2011). Additionally, when students fail the NCLEX-RN on the first attempt, they are not able to begin practicing as a registered nurse, thereby contributing further to the already existing nursing shortage (Kaddoura et al., 2016). By failing the exam, graduates are not able to practice as an RN and must wait at least 45 days to try a second time to pass the exam (NCSBN, 2013). This practice will delay the graduate's ability to work as an RN as a newly graduated nurse must pass the NCLEX-RN in order to begin working as an RN. A graduate nurse who fails the NCLEX-RN may also experience the termination of a job offer and may delay the unsuccessful graduate from obtaining employment as an RN.

When graduates of a nursing program are unsuccessful on their first attempt at the NCLEX-RN, the ramifications affect more than just the graduate nurse. Institutions of higher education offering a program in nursing may experience a more negative reputation by having graduates who do not pass the exam. According to Kaddoura et al. (2016), nursing programs experiencing NCLEX-RN failures of graduates may experience negative repercussions for admissions and faculty. In order to avoid these negative repercussions, nursing schools often

consider first-time passage rates on the NCLEX-RN to be a top priority (McGahee, Gramling, & Reid, 2010).

Higher education administrators may choose to examine the financial burden a student incurs when he/she is unsuccessful in a nursing program. Yeom (2013) looked at 151 graduates from a traditional baccalaureate-nursing program from May 2010 to December 2011. In addition to examining the success of these students on the NCLEX-RN, Yeom identified the financial cost of being unsuccessful on the NCLEX-RN as another burden on the individual. Nursing institutions may bear the burden of failed graduates or poor performance of graduates on the NCLEX-, as negatively affecting admission applicants and potential students (Yeom, 2013). Potential applicants have access to review a college or university's NCLEX-RN pass rates and may base their decision on which institution to attend on these data.

Researchers have demonstrated the use of the NCLEX-RN as a tool to measure success. Crow, Handley, Morrison, and Shelton (2004) recognized the importance of including NCLEX-RN outcomes in their research. The researchers surveyed 160 deans of nursing programs throughout 38 states and the District of Columbia (Crow et al., 2004). The researchers developed a survey to answer specific research questions regarding admission requirements, predictors of NCLEX-RN success, interventions to assist students in being successful, how accurately did pre-admission criteria predict student success, and what influence did specific interventions have on NCLEX-RN performance (Crow et al., 2004). Crow et al. found the only admission criteria that significantly correlated with passing the NCLEX-RN was the use of standardized entrance examinations, such as the TEAS, and SAT scores.

Other researchers have also used passage of the NCLEX-RN in their studies. Gilmore (2008) studied 218 associate degree-nursing students who attended two different community

colleges in the Southeastern United States. Gilmore completed a logistic regression analysis and descriptive statistics in a quantitative study to examine the relationship of admission criteria with student academic success, as measured by nursing grade point average while in school and successful passing of the NCLEX-RN after graduating from the program. Admission committee members may have an interest in identifying which factors are related to student success. Gilmore found the reading subscore on the ACT to be the only significant predictor for both the completion of the program of study and passing the NCLEX-RN on the first attempt.

Finding the best method to predict success on the NCLEX-RN is a factor in research studies. Hinderer et al. (2004) sampled 89 nursing students from a traditional midsized public accredited baccalaureate-nursing program located in a rural area of the mid-Atlantic United States. The researchers completed an exploratory retrospective descriptive quantitative study to compare undergraduate nursing student predictors of successful passage of the NCLEX-RN on the first attempt, as well as progression through the nursing curriculum (Hinderer et al., 2004). The researchers found the A^2 to be the only statistically significant predictor of NCLEX-RN success (Hinderer et al., 2004).

Predicting whether a student will be successful on the NCLEX-RN is a well-studied facet of nursing programs. Haas, Nugent, and Rule (2004) completed a retrospective study of 368 students who graduated from a nursing school in the Southeastern United States between the years of 1991 and 2001. Hass et al. studied the variables of gender, race, age, nursing cumulative grade point average, transfer undergraduate grade point average, cumulative undergraduate grade point average, verbal and quantitative SAT scores, and campus location (main campus or outlying campus). Using discriminant analysis on these variables, the researchers found they could accurately predict which students were most likely to fail the NCLEX-RN with 71%

accuracy (Hass et al., 2004). The researchers also found they could accurately predict which students were most likely to pass the NCLEX-RN with 61.2% accuracy (Hass et al., 2004). The results of this study suggest administrators and admission committee members take into consideration multiple factors when predicting student success and which students to admit. Considering multiple factors is especially beneficial when looking at accelerated second-degree baccalaureate nursing students.

Accelerated Second-degree Baccalaureate Nursing Programs

Accelerated baccalaureate nursing programs continue to rise in popularity within the United States (American Association of Colleges of Nursing, 2012). One factor that may contribute to the increase in the number of accelerated baccalaureate programs is the recommendation for the baccalaureate in nursing education level to be the basic level of education for the nursing profession. The Institute of Medicine (2011) strongly suggested the need to increase the proportion of nurses with at least a baccalaureate level of education to 80% by the year 2020. Evidence suggests nurses with at least a baccalaureate degree are less prone to make critical mistakes. According to Sellers, Millenbach, Zittel, Tydings, and Murray (2014), registered nurses who completed their BSN demonstrated improved critical thinking, advocated more for patients and the nursing profession, were better equipped to see things more holistically, and demonstrated stronger communication skills and increased confidence when compared to colleagues with only an associate degree.

Simply having a baccalaureate degree in the profession of nursing, as opposed to an associate degree, may also positively impact the graduate nurse seeking employment. With the directive from the Institute of Medicine to increase the percentage of nurses holding at least a baccalaureate degree, agencies that hire registered nurses may be more inclined to hire a

baccalaureate-prepared graduate nurse over someone holding an associate degree. Shen, Peltzer, Teel, and Pierce (2015) found nurses with more education were more likely to gain employment. According to the American Association of Colleges of Nursing (2014d), 79.6% of employers expressed a strong preference for hiring graduates of a baccalaureate-nursing program. The demand for baccalaureate prepared nurses is likely to increase demand for baccalaureate nursing programs.

Researchers can examine accelerated second-degree baccalaureate nursing programs for their success and challenges. In 2002, the American Association of Colleges of Nursing (AACN) publically supported accelerated nursing programs (Danner & Preston, 2014). In an update published in 2013, the AACN reinforced their support for accelerated nursing programs (AACN, 2013). This support from a respected organization with nursing education may have aided the acceptance and growth of accelerated programs

Students enrolled in an ASDN program may be quite different from students enrolled in a more traditional program. Boellaard, Brandt, and Zorn (2015) identified accelerated nursing students as being different but did not list any specific characteristics comparing accelerated students to those in a more traditional program. The fast-paced nature of an ASDN curriculum may be attractive to some students while unattractive to others. Meyer, Hoover, and Maposa (2006) identified employment opportunities, the quick progression through the curriculum, opportunities for advancement within the profession, and the desire to work in a caring profession as key components of accelerated nursing programs that applicants found attractive. Just over 50% of students in an accelerated nursing program also identified the program's reputation, the short 12-month time period to complete the program, and the institution's high NCLEX-RN pass rate as the most important factors influencing their decision to attend a specific

accelerated nursing program (Meyer et al., 2006). Researchers have noted that students associated with ASDN programs are often identified as bright, high-achieving, motivated learners and are often considered to be very successful in the nursing profession (AACN, 2013; Cangelosi & Whitt, 2005; Danner & Preston, 2014; Korvick, Wisener, Loftis, & Williamson, 2008; Lyon, Younger, Goodloe, & Ryland, 2010).

Accelerated second-degree nursing programs are proliferating within the United States as one method to expedite the entry of new nurses into the nursing profession. However, many nursing faculty members may not be familiar with educating this group of students (Millett, Stickler, & Wang, 2015). Faculty working with accelerated nursing students may face challenges associated with the characteristics of this group of students. Boellaard et al. (2015) conducted a descriptive study to identify strategies to support nursing faculty members preparing for their teaching role in an accelerated second-degree baccalaureate-nursing program. The researchers conducted a descriptive study with data collected online from 93 accelerated second-degree baccalaureate nursing faculty across the Midwestern United States (Boellaard et al., 2015). Boellard et al. discovered six themes that emerged from their study. The six themes were to (a) plan for the program intensity that students and faculty will find stressful, (b) be available, flexible, open-minded, and patient with students, (c) uphold early established expectations and rigorous standards, (d) be prepared for challenging questions, (e) integrate student diversity, and (f) adapt content and teaching strategies to align with student and program characteristics (Boellard et al., 2015). Identifying these specific themes may allow researchers to identify characteristics of accelerated students and help to gain understanding of this unique student population. As more faculty members are likely to teach students enrolled in an accelerated

nursing program, faculty and admission committee members are likely to become more involved in selecting students for admission and/or aiming to ensure student success.

Some researchers have focused specifically on accelerated students. Penprase and Harris (2013) examined the relationship between ASDN students' performance in prenursing and core nursing courses, as well as on standardized tests, and NCLEX-RN first-time pass rates. The researchers examined the records of 363 nursing school graduates at a state-supported Midwestern baccalaureate school of nursing (Penprase & Harris, 2013). Penprase and Harris sought to examine which factors are accurate predictors of graduation and NCLEX-RN success of accelerated nursing students. The researchers used descriptive statistics and correlation analysis in this quantitative study (Penprase & Harris, 2013). Penprase and Harris found two courses in the accelerated curriculum had a predictive value of students' performance on the NCLEX-RN. These courses were the prenursing developmental psychology course and the nursing assessment course (Penprase & Harris, 2013). The researchers' concentration on accelerated nursing students is starting to fill the gap in the study of this student population.

There is some disagreement among researchers concerning accelerated nursing program graduates. Rafferty and Lindell (2010) found the clinical skills of graduates from an accelerated nursing program were equal to those that graduated from programs that are more traditional. The researchers compared clinical competencies of 93 accelerated baccalaureate-nursing graduates with 107 traditional baccalaureate-nursing graduates (Rafferty & Lindell, 2010). The researchers used descriptive statistical analysis with two-tailed *t*-tests to look for differences (Rafferty & Lindell, 2010). The researchers obtained results showing these two groups were not significantly different in their clinical competencies (Rafferty & Lindell, 2010).

In contrast, Oermann, Pooler-Dawkins, Alvarez, and Foster (2010) found that graduates from accelerated programs did not have equal clinical competency when compared to graduates from traditional programs. The researchers created focus groups to evaluate clinical competency (Oermann et al., 2010). Oermann et al. included 13 nurse managers who had hired six or more new graduate nurses within the past 18 months. These nurse managers had at least 3 years' experience as a nurse manager (Oermann et al., 2010). However, Oermann et al. also reported that hiring managers considered students who graduated from an accelerated program to be desirable new employees due to their motivation and maturity. Overall, researchers have shown accelerated nursing programs to be an efficient method to provide an increase of competent nurses into the workforce at a time when more nurses are needed to alleviate the effects of the current nursing shortage that exists in the United States (Aktan et al., 2009: Caldwell, Tenof, & Nugent, 2010; Lindsey, 2009; Masters, 2009). One aspect of increasing the nursing workforce is to assist more students in being successful in the nursing program, thereby producing more graduates and ultimately, more registered nurses.

Student Success

One primary goal of an admissions committee is to select students most likely to be successful in a nursing program. First, however, one must first define the term "success" in order to measure it properly. Researchers have conducted several studies that measured students' success, but many have defined such success differently.

One definition of success is successful completion of a nursing program. Manieri et al. (2015) defined success in this manner. Manieri et al. examined three preadmission examinations, the PAX-RN, A2, and TEAS. Manieri et al. compared the PAC-RN, A2 and TEAS to determine which one best predicted the successful completion of an associate degree-nursing program. The

researchers evaluated 339 students from an urban community college in the southeastern United States (Manieri et al., 2015). Manieri et al. found the A2 and TEAS to be statistically significant in predicting successful completion of an associate degree-nursing program. Manieri et al. also found that the PAX-RN was not statistically significant. Additionally, the researchers determined that the A2 explained 15.9% of the variance of success while the TEAS explained only 5.9% of the variance (Manieri et al., 2015). Because of the small percentage of variance accounted for in this study, the researchers could have strengthened their findings by looking at other admission criteria, in addition to preadmission examinations. Researchers have found these factors as having some degree of influence on student success and their inclusion might be of benefit to the study.

Other researchers have defined success as completion of the first semester of a nursing program. Newton et al. (2007b) studied 184 first semester nursing students in a large, state-supported baccalaureate-nursing program in the Midwestern United States. The researchers conducted an exploratory descriptive study aimed at determining if pre-nursing grade point average and TEAS composite score predict nursing first semester grade point average (Newton et al., 2007b). Newton et al. determined that differences between the fall and winter cohorts of two cohorts of students were significant. The data showed that students admitted to the fall cohort had significantly higher mean pre-nursing grade point average, mean TEAS composite score, and mean first semester nursing grade point average when compared to the winter cohort (Newton et al., 2007b). Additionally, the winter cohort had a higher attrition rate and therefore, was less successful (Newton et al., 2007b).

Newton et al. (2007b) found the TEAS composite score to be the best predictor of first semester grade point average but only for the winter cohort. Alternatively, Newton et al. found

pre-nursing grade point average as the best predictor. The study's data indicated that the fall cohort of students might have been better prepared academically as evidenced by their higher mean pre-nursing grade point average. It would make sense then, that the best predictor of success would be the pre-nursing grade point average (Newton et al., 2007b). Within the winter cohort, the researchers found a lower mean pre-nursing grade point average for these students. Therefore, this cohort's TEAS composite scores may have been a better predictor of their readiness for the nursing program (Newton et al., 2007b). In prior research, Newton et al. (2007a) indicated that the TEAS composite score is likely a more reliable predictor of student success in a nursing program than pre-nursing grade point average because the TEAS assesses core knowledge which is not necessarily assessed by grade point average. Newton et al. recognized the importance for admission committees to include pre-nursing grade point average and TEAS composite scores as part of their required admission selection criteria. Additionally, researchers determined the practice of rolling admissions might place students at a disadvantage, as the practice appears to support admitting poor quality students (Newton et al., 2007a). By utilizing admission criteria that best predict student success, admission committees at nursing programs can expect to see students and graduates succeed and experience less attrition in the program.

Measuring success as the completion of the first semester of nursing school may be premature. It may be more beneficial to measure success at a later point in time, such as with the completion of the entire nursing curriculum or with passing the NCLEX-RN on the first attempt. Wolkowitz and Kelley (2010) defined success as successful passing of the NCLEX-RN. These researchers studied 14,827 examinees who completed the TEAS (Wolkowitz & Kelley, 2010). Wolkowitz and Kelley used multiple regression analysis to determine the best predictors of

success on the TEAS. Wolkowitz and Kelley helped to identify the subject subscores on the TEAS that are the best predictors of student success in a nursing program. Wolkowitz and Kelley concluded that the science score is the strongest predictor of nursing student success, followed by reading, English, and mathematics, respectively.

Although studies exist to measure predictability of success, researchers cannot ignore the differences in defining success. Manieri et al. (2015) identified success as successful completion of a nursing program. The researchers' definition of success allows the researchers to follow the students for a longer period and enact their measurement of success only at the completion of the nursing program. Using successful completion of the entire nursing program as the measure of success may make more sense to individuals on admissions committees who are interested in admitting students who will make it through the entire nursing curriculum. In contrast, other researchers identified student success after completing only one semester in the nursing program (Newton et al., 2007a; Wolkowitz & Kelley, 2010). Newton et al. (2007a) utilized a student's first semester grade point average as the measure of success. Similarly, Wolkowitz and Kelley identified student success as performance on the RN Fundamentals exam which nursing faculty administer at the end of a student's first semester in nursing school. Both of these studies identified success early (at the end of the first semester) instead of measuring success at the completion of the program.

Administrators may determine the most reliable measurement of student success to be the percentage of graduates who pass the NCLEX-RN on the first attempt. A graduate must pass this exam in order to gain recognition and licensure as a registered nurse in the United States. According to the National Council of State Boards of Nursing (2014), the 2014 pass rate by graduates on the NCLEX was 85.54%. This passing rate compares to a pass rate of 83.04% the

prior year (National Council of State Boards of Nursing, 2013). Evaluators often measure nursing programs against this standard. These evaluators may include administrators, admission committee members, accrediting agencies, boards of nursing, and other institutions of higher education that offer a program in nursing. Nursing school administrators therefore often invest much effort in preparing graduates to perform successfully on this examination. Administrators and admission committee members may be particularly interested in such findings. Researchers may strengthen their studies by including NCLEX-RN performance as a measurement of student success.

When looking at the accelerated second-degree student population, various factors exist which may influence success. These factors include those that are not academic in nature. Millett et al. (2015) identified nonacademic factors that may affect the success of accelerated nursing students. There may be benefit to examining these nonacademic factors in addition to academic ones. The researchers determined motivation, ability to stay focused, and level of maturity were essential to student success (Millett et al., 2015). These nonacademic factors are often difficult to measure and admission committee members may struggle to quantify these variables when considering which students to offer admission. Examining the relationship of the TEAS to student success will offer a more quantifiable approach to determining the likelihood of student success. Additionally, one can examine multiple variables that may also have a correlation with student success.

Multiple Variables

In addition to the specific category and composite TEAS scores, it may be helpful to consider other variables when evaluating student success. These additional variables may include age at time of enrollment, subject of prior baccalaureate degree, gender, degree grade point

average from prior baccalaureate degree, and science grade point average from prior baccalaureate degree. Evaluating these additional variables may serve to reduce unanticipated outcomes that correlate with student success as defined in this study.

Researchers have examined the impact of age on NCLEX-RN success with varying results. Trofino (2013) conducted a study of 113 students at a private associate degree program and found adult students who were 22 years or older were more than 3 times as likely to pass the NCLEX-RN on the first attempt. Other researchers found similar results. Beeson and Kissling (2001) determined individuals over 35 years of age were more likely to be successful in passing the NCLEX-RN. In contrast, Haas et al. (2004) concluded that students below the age of 24 years were more likely to pass the NCLEX-RN on the first attempt. Other studies indicated age is an unrelated factor to a test-takers performance on the NCLEX-RN (Giddens & Gloeckner, 2005; Sayles et al., 2003; Sears, Othman, & Mahoney, 2015). Further research is needed on the correlation between age and NCLEX-RN success.

Subject of prior baccalaureate degree was also of interest to the researcher. This variable is not readily identifiable in current research. The current researcher elected to add the component of prior baccalaureate degree to determine if there is any correlation evident when comparing to NCLEX-RN success. With the current trend of increasing the number of second-degree accelerated-baccalaureate nursing programs in the United States, there may be great benefit to evaluating this variable and determining if there is any correlation with success on the NCLEX-RN.

Researchers have also examined the correlation between gender and successful passage of the NCLEX-RN examination. Predominantly, researchers consistently determine that there is no statistically significant difference in NCLEX-RN success with respect to gender (Beeson &

Kissling, 2001; Giddens & Gloeckner, 2005; Sayles et al., 2003; Sears et al., 2015; Trofino, 2013). Two groups of researchers, however, did determine that gender was indeed a factor. These researchers determined that females are more likely to pass the NCLEX-RN than their male colleagues (Haas et al., 2004; Seago & Spetz, 2005). Arguably, the small number of male students in sample sizes may have been a significant limitation in these studies.

Existing grade point averages from prior institutions is also a factor examined by researchers. Bosch, Doshier, and Gess-Newsome (2012) found entry grade point averages to be highly significant in predicting NCLEX-RN success and the most significant factor in predicting NCLEX-RN failure. Other researchers found similar results, determining entry grade point average to be a significant factor in predicting success on the NCLEX-RN (Beeson & Kissling, 2001; Daley, Kirkpatrick, Frazier, Chung, & Moser, 2003; Sears et al., 2015). The thought that grade point averages are a significant predictor is not fully embraced. Subsequent researchers have indicated there may not be any statistically significant correlation between entry grade point average and passage of the NCLEX-RN (Trofino, 2013: Uyehara, Magnussen, Itano, & Zhang (2007).

Another variable to consider is science grade point average. Although there appears to be less research on this specific factor, there is some evidence to indicate science grade point average deserves consideration. According to Simon, McGinnis, and Krauss (2013), science grades in courses such as chemistry and biology are predictors of NCLEX-RN success. Similarly, Besson and Kissling (2001) determined courses in anatomy, physiology, and microbiology had a higher correlation with NCLEX-RN pass rates as long as the student achieved a grade of at least a “C”.

Theoretical Framework

The researcher identified two theoretical frameworks to conduct this study. The first framework is Carroll's (1963) model of school learning. According to Carroll (1963), school learning is a function of five variables: (a) aptitude, (b) opportunity to learn, (c) ability to understand instruction, (d) quality of instruction, and (e) motivation or perseverance. These five variables affect a student's ability to succeed (Figure 1).

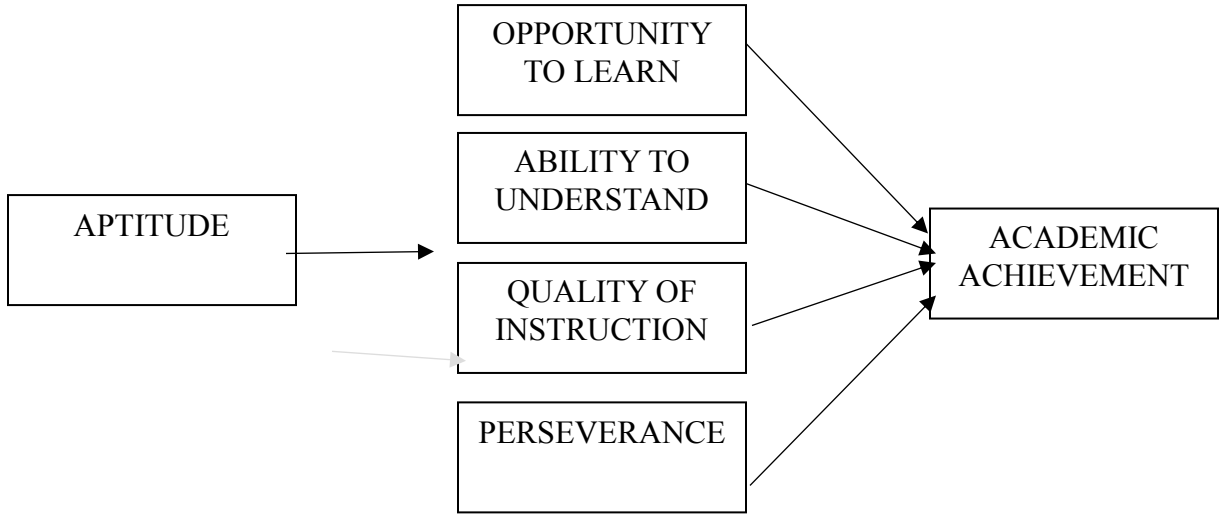

Figure 1. Carroll's (1963) model of school learning.

The first variable, aptitude, is the one variable supposedly measured by the TEAS exam. Another variable, the ability to understand, is one the TEAS exam measures as part of the reading and the English and language usage portion of the exam (Assessment Technologies Institute, 2011). Two of the variables, opportunity to learn and perseverance, are more likely to be pre-existing characteristics that are already in place, or lacking, in a potential student. One variable, the quality of instruction, is dependent on faculty and administrators at higher education institutions, as it is these individuals who likely control curriculum.

Carroll's (1963) model is time-based. The question of how much time it takes for learning to occur is an essential component of the theory (Carroll, 1963). It is likely that students will vary in the time it takes for each one to learn a specific task or the more complicated idea of how to think critically. The fact that students differ in the time it takes to learn is an assumption made by this model (Carroll, 1989). The basic formulation for Carroll's (1963) model is as follows:

$$\text{Degree of Learning} = \frac{\text{Time Spent}}{\text{Time Needed}}$$

In an accelerated program of nursing, the facet of time is greatly restricted as the student progresses through the curriculum at a rapid pace. If the student or an educator can ascertain how much time a student needs for mastery of a topic to occur, it can be more readily determined if an accelerated program is appropriate for the individual. By using the TEAS exam, admission committee members typically aim to admit students who have the aptitude to succeed in a nursing program with a fast-paced curriculum on a challenging timeline.

Hymel (1974) applied Carroll's model of school learning to test 17 null hypotheses regarding 169 Algebra 1 students. Hymel determined that a high quality of instruction followed by feedback and proper remediation techniques resulted in a statistically significant increase in the degree of learning. According to Hymel, a student with a low ability to understand instruction can offset this disadvantage by investing more time in being successful, which in Carroll's (1963) model is referred to as perseverance. A high quality of instruction, accompanied by frequent feedback, whether positive or negative in nature, assists the student in being

successful. In a nursing program of an accelerated nature, the lack of extra time available for a student to invest, or persevere, may negatively affect the ability of a student to succeed.

There may be more for researchers to examine than simply variables that affect a student's ability to be successful. In addition to identifying the five variables that affect student success, Yates and Sandiford (2013) stated the dimension of time as an important variable. The achievement of school learning directly relates to the amount of time a student has to complete his/her studies. The factor of time may be of significance when examining an accelerated second-degree baccalaureate-nursing program as these programs progress rapidly and greatly reduce the amount of time a student experiences in the program of study.

As a second theoretical framework, and as stated in Bess and Dee (2012), institutional theory "suggests that organizations by accident and choice mirror the norms, values, and ideologies of the general environment in which they are embedded" (p. 141). An organization should respond to norms set by external factors. These factors are likely to apply to other institutions similar to the organization itself. A major impetus for organizations to conform to expected norms is "organizations that conform to external expectations tend to be deemed legitimate by society and viewed as worthy of support" (Bess & Dee, 2012, p. 141). Achieving a satisfactory NCLEX-RN passing rate is certainly an external expectation nursing program administrator's focus on achieving. This expectation is characteristic of potential students, other institutions of higher education, accrediting agencies such as the Commission on Collegiate Nursing Education (CCNE), and governing bodies such as state boards of nursing. A college or university, which fails to achieve an acceptable passing rate, is likely to experience scrutiny, questioning, and validation concerns from each of these external forces.

Deephouse (1999) contended that organizations must ask what is the value of being different compared to the value of being the same as other organizations. An organization that makes a concentrated effort to be different from other institutions may benefit in that the organization faces less competition (Deephouse, 1999). By deciding to be different, thereby creating a niche in the market, an organization may soon discover the market advantage of being competitive (Guo, Tang, & Su, 2014). For an accelerated second-degree baccalaureate-nursing program, the fast-track approach to completing a degree is the factor that primarily establishes the institution as being different. Students are able to complete the entire nursing curriculum in a relatively short 12 months and become eligible to sit for the NCLEX-RN. It is the factor of a student being able to achieve a baccalaureate degree quickly in nursing that has given accelerated nursing programs a competitive edge (Meyer et al., 2006).

There are also benefits to being the same. The benefit most readily apparent is legitimacy. By being the same, an organization establishes legitimacy and acceptance (Deephouse, 1999). For a new college, for example, being the same as other institutions of higher education can garner improved legitimacy as well as improve access to available resources (DiMaggio & Powell, 1983; Suchman, 1995). When a nursing college seeks to establish legitimacy and acceptance, having NCLEX-RN pass rates that are of a competitive nature will help the nursing college establish legitimacy and will assist the college with conforming to standards set by governmental agencies as well as accrediting bodies.

Achieving an acceptable NCLEX-RN pass rate is more likely to result in a nursing program gaining more notoriety and approval. Bess and Dee (2012) stated that recognition of legitimacy is more likely for organizations able to meet these external expectations. An institution of higher learning able to maintain this recognition finds rewards with more “public

support, larger numbers of applicants to academic programs, and more highly qualified faculty and staff who want to work at these institutions" (Bess & Dee, 2012, p. 142).

If a nursing school has a low pass rate on the NCLEX-RN, the institution is less likely to receive a large number of quality applicants. Additionally, the nursing program may experience a greater challenge in gaining public support. Faculty and staff may also consider working for other organizations deemed more legitimate partly due to higher pass rates. According to Ferguson, Deephouse, and Ferguson (2000), the reputation of an organization is paramount to its success. An organization with a poor reputation is likely to struggle with being seen as legitimate and is often seen as having ulterior motives (Deephouse, Newburry, & Soleimani, 2016; Shim & Yang, 2016). In order to establish a positive reputation, a higher education institution that offers a nursing program will want to achieve a high level of performance by its graduates on the NCLEX-RN. Institutional theory certainly applies well to a nursing program with growing concerns regarding falling NCLEX-RN pass rates for its graduates.

A nursing program with low NCLEX-RN pass rates may choose to increase pass rates as an attempt to maintain, or obtain, legitimacy. Organizations may work through a process to reestablish or create legitimacy, therefore bringing stability to the institution (Bitektine & Haack, 2015). One method that may be used is to concentrate on admitting those students who are most likely to complete the nursing program successfully and then go on to pass the NCLEX-RN on the first attempt.

Higher education institutions can benefit from being ready to change when necessary, or to incorporate change when change is optimal for the success of the institution. Dacin, Goodstein, and Scott (2002) concluded that institutions change over time as they attempt to adapt to a changing environment or changing needs of society. Administrators of accelerated second-

degree baccalaureate nursing programs may benefit from closely examining admission criteria. If the TEAS exam, for example, is a significant component of the admissions process, it may be helpful to know how reliable an indicator the TEAS exam truly is. If it is discovered that there is evidence indicating the TEAS is not a reliable indicator of success, a decision to change admission criteria may be entertained.

One important aspect of institutional theory is the concept of coercive conformity. According to Bess and Dee (2012), coercive conformity occurs when an institution must adhere to standards set by certain agencies. Higher educational nursing programs are certainly included in this category, as they are required to adhere to certain standards imposed by various agencies. These agencies include accrediting bodies which require certain standards which a college or university must uphold (Bess & Dee, 2012). In the context of the NCLEX-RN, nursing programs are held to standards set by both accrediting agencies and governing bodies. A nursing program with a substandard NCLEX-RN pass rate is in danger of losing accreditation and perhaps ultimately facing termination by the state board of nursing. Administrators and admission committee members may choose to consider if the TEAS exam is predictive of student success. By doing so, colleges and universities that offer nursing programs may be able to better identify those prospective students that are more likely to pass the NCLEX-RN on the first attempt.

The current researcher incorporated institutional theory as a lens for examining the TEAS and student success. Nursing programs strive to achieve an acceptable NCLEX-RN pass rate as a means of complying with coercive conformity. Using institutional theory, colleges and universities that offer programs in nursing can best position themselves to be competitive and remain legitimate within the realm of higher education.

CHAPTER 3

METHODS AND OVERALL RESEARCH APPROACH

When looking at the relationship of nursing student success, researchers have conducted multiple quantitative studies using regression analysis; in the current study, the researcher followed a similar structure (Crow et al., 2004; Cunningham et al., 2014; Gilmore, 2008; Hinderer et al., 2004; Kowitlawakul, Brenkus, & Dugan, 2013; Manieri et al., 2015; McGahee et al., 2010; Newton et al., 2007a; Penprase & Harris, 2013; Trofino, 2013; Uyehara et al., 2007; Wolkowitz & Kelley, 2010). The researcher's rationale for using a quantitative design was based on it being the best method to answer the research question. The researcher attempted to determine the relationship between the TEAS examination and student success. Evaluation of the data the researcher had available provided the best, most accurate answer to the research question.

Main Research Question and Potential Subquestions

For this study, the researcher defined student success in two ways. The first way the researcher defined success was in successful completion of the nursing curriculum and achievement of GN status. The second way the researcher defined success was in successfully passing the NCLEX-RN on the first attempt. The researcher examined the relationship between the TEAS exam and each of these measures of success.

The researcher was able to demonstrate a certain amount of robustness of research variables and the analytical approach. The researcher utilized archival data using previously validated instruments, such as statistical analysis with SPSS version 24, to examine the research

questions and hypotheses. Admission committee members may examine the overall composite TEAS score, as well as the individualized category scores of reading, mathematics, science, and English and language usage. In this study, the researcher examined the relationship between the composite and categorical scores on the TEAS exam and student success. In doing so, the researcher investigated 10 research questions. The questions were as follows:

Research Question 1: What is the relationship between the TEAS science score and student successful completion of the accelerated second-degree baccalaureate-nursing program?

Research Question 2: What is the relationship between the TEAS mathematics score and student successful completion of the accelerated second-degree baccalaureate-nursing program?

Research Question 3: What is the relationship between the TEAS English and language usage score and student successful completion of the accelerated second-degree baccalaureate-nursing program?

Research Question 4: What is the relationship between the TEAS reading score and student successful completion of the accelerated second-degree baccalaureate-nursing program?

Research Question 5: What is the relationship between the TEAS composite score and student successful completion of the accelerated second-degree baccalaureate-nursing program?

Research Question 6: What is the relationship between the TEAS science score and student successful completion of the NCLEX-RN on the first attempt?

Research Question 7: What is the relationship between the TEAS mathematics score and student successful completion of the NCLEX-RN on the first attempt?

Research Question 8: What is the relationship between the TEAS English and language usage score and student successful completion of the NCLEX-RN on the first attempt?

Research Question 9: What is the relationship between the TEAS reading score and student successful completion of the NCLEX-RN on the first attempt?

Research Question 10: What is the relationship between the TEAS composite score and student successful completion of the NCLEX-RN on the first attempt?

Design or Framework

The researcher completed this study in alignment with a correlational design. According to Creswell (2015), researchers use the correlational statistical test "to describe and measure the degree of association (or relationship) between two or more variables or sets of scores" (p. 339). In this study, the researcher examined the relationship between multiple variables and student success. The multiple variables included TEAS examination scores (the four separate categories and the composite score), age at time of enrollment, subject of prior baccalaureate degree earned, gender, degree grade point average for prior baccalaureate degree, and sciences grade point average from prior baccalaureate degree. The researcher examined the relationship between these variables and student success, defined as completion of the nursing curriculum and separately as passing the NCLEX-RN on the first attempt.

In the current study, the researcher focused on the predictive value of the TEAS exam in the admission practices of an accelerated second-degree nursing program located in the United States. The institution for this study had been admitting ASDN students since it first opened in 2009. The institution has been utilizing the TEAS score since its fourth cohort. The institution used the TEAS IV until ATI produced a version V, after which the newer version V became part of the admission process.

The admission, progression, and graduation (APG) committee, made up of the dean and faculty members, examined the overall composite TEAS score as well as the individualized

category scores of reading, mathematics, science, and English and language usage. The committee expressed concern over whether utilizing TEAS scores as an admission assessment tool is truly predictive of student success.

Site Selection and Rationale

The researcher gathered data from a specific institution. The institution used in this study was a small, private, nursing college in the United States. The State Board of Nursing approved this program, which also received accreditation by the Accrediting Commission of Career Schools and Colleges (ACCSC) and the Commission on Collegiate Nursing Education (CCNE). The program was a second-degree accelerated-baccalaureate nursing program where students could obtain a baccalaureate degree in nursing in a 12-month period. The curriculum of the program covers the typical 2 years of nursing core content from generic baccalaureate programs and condenses the content into 12 months. Students are required to attend classes, labs, and participate in clinicals routinely 5 days a week. Clinicals occur on days, evenings, nights, and weekends. The program is particularly intense in that students must demonstrate learning, applying, and reviewing the material at a rapid pace.

Other researchers performing similar studies have considered only one specific population (Alwan et al., 2012; Crouch, 2015; Cunningham et al., 2014; Kowitlawakul et al., 2013; Manieri et al., 2015; McGahee et al., 2010; Penprase & Harris, 2013; Trofino, 2013). The current researcher also used a single population. The researcher aimed to help complete the missing research with this specific group of students, accelerated second-degree baccalaureate nursing students, and fill the gap in the literature that currently exists.

Subject Selection and Rationale

The subjects used in this research were all students admitted to the institution that attended at least two full weeks of instruction. Students at this institution could drop during the first two weeks of the program without any financial penalty. As students began their studies, some decided to withdraw for a variety of reasons. Students were encouraged to consider withdrawing from the institution before the end of the second week of instruction, thereby avoiding unnecessary financial costs associated with enrollment. Omitting students from the study who dropped during the first 2 weeks eliminated those students that may have chosen not to fully engage in graduating from the program.

The institution admitted a cohort of students every 6 months, beginning classes in January and July of each calendar year. The first group of students admitted to the program began their studies in February of 2009. For the first cohort of students, classes started 1 week late due to unforeseeable circumstances, which resulted in moving their start date from the last week of January to the first week of February. For all subsequent cohorts scheduled to begin classes in January, the coursework started as scheduled and classes began each January.

The researcher chose to study students beginning with those that started in July of 2010 (Cohort 4) and ending with the group of students who started in July of 2014 (Cohort 12). As the program took 12 months to complete, students from Cohort 4 graduated in July of 2011 and students from Cohort 12 graduated in July of 2015. The researcher chose to begin with the fourth cohort of students, as these were the first group of students that were required to submit TEAS scores as part of the admission process. Utilizing these cohorts resulted in a population size of 415 students. All 415 students were included and evaluated in the study. All participants were able to complete the program and take the NCLEX-RN under the same institution. Due to an

acquisition, students in Cohort 13 could potentially graduate from a different institution, as were all subsequent cohorts. For this reason, the researcher chose to end the sample selection with the completion of Cohort 12.

In order to obtain a larger sample size, the researcher chose to combine these cohorts rather than looking at each cohort independently. According to Nayak (2010), the importance of sample size cannot be overemphasized. A researcher using a smaller sample size may obtain results which may not be supported with sufficiency to detect a difference between groups being studied, resulting in false negatives (George, Osinga, Lavie, & Scott, 2016; Nayak, 2010; Tonidandel, King, & Cortina, 2016). Other researchers have agreed that using small samples may be unwise. Houts, Edwards, Wirth, and Deal (2016) stated that using sample sizes of less than 75 participants will often not be sufficient for accurate analysis. Since no single cohort in the current study had more than 60 participants, a risk for inaccuracy due to incomplete analysis may have existed with studying each cohort individually rather than collectively. With relative consistency throughout the curriculum of study, students in any particular cohort received a comparable nursing education when compared to students in any other cohort. The researcher therefore decided to examine these cohorts of students collectively, rather than looking at smaller groups of students in a specific cohort.

An additional benefit to using a larger sample size is the ability to conduct further research. Larger samples allows researchers to investigate new samples previously not analyzed. With larger data sets, such as those obtained from entire populations, scholars can develop new research questions that may pertain to a specific subset of the original population (Tonidandel et al., 2016). Having a larger data set readily available may be enough to illicit further research. The researcher hopes to be able to conduct future research in the event other questions resonate.

Data Collection Procedures and Rationale

All data were available from existing nursing school records. The researcher used admission applicant spreadsheets to identify prior baccalaureate degree majors, gender, and composite TEAS scores available from the institution. The researcher used individual student files and pre-existing spreadsheets for collecting the four categories of the TEAS exam (science, mathematics, English and language usage, and reading) and the overall composite scores. The researcher verified successful completion of the program with the college registrar. The institution's registrar collected NCLEX-RN results from the boards of nursing associated with the state where the individual student completed the exam.

Data Analysis Techniques

For this study, the researcher chose to use the two definitions of success as dependent variables. The first dependent variable was student success determined as successful completion of the nursing program. The second dependent variable was successful passage of the NCLEX-RN on the first attempt. For independent variables, the researcher used the separate TEAS categorical scores as well as the composite scores, age at time of enrollment, subject of prior baccalaureate degree earned, gender, degree grade point average for prior baccalaureate degree, and sciences grade point average from prior baccalaureate degree.

The researcher looked at covariance to identify if the TEAS score, individual subjects, or composite score correlated significantly with completion of the nursing program or with passage of the NCLEX-RN on the first attempt. As variance increases, one can "better predict scores from the independent variable to the dependent variable" (Creswell, 2015, p. 339). By identifying the amount of variance that exists, the researcher aimed to explain student success.

As the researcher examined multiple variables in this study, the researcher also used binary logistic regression analysis. Agresti (2007) defined logistic regression as a statistical model for examining the association of multiple independent variables with a single binomial and multinomial response variable. The researcher ran a logistic regression analysis comparing the independent variables of TEAS examination scores (the four separate categories and the composite score), age at time of enrollment, subject of prior baccalaureate degree earned, gender, degree grade point average for prior baccalaureate degree, and sciences grade point average from prior baccalaureate degree, with the dependent variable of student success defined as completion of the nursing program. The researcher then ran a second logistic regression analysis comparing these same independent variables, with the dependent variable of student success defined as passage of the NCLEX-RN on the first attempt. These analyses assisted in answering the specific research questions proposed in this study.

The researcher conducted descriptive statistical summaries using the admission information from 393 accepted students. The students included in the study were those accepted into the program from July of 2010 through July of 2015. The researcher evaluated data regarding the composite TEAS score, as well as the four specific categories, for each of these students. Additionally, the researcher also evaluated the variables of age at time of enrollment, subject of prior baccalaureate degree earned, gender, degree grade point average for prior baccalaureate degree, and sciences grade point average from prior baccalaureate degree to determine if there are any additional correlations that influenced student success. Descriptive statistics allowed the researcher to organize and describe the independent and dependent variables by examining the frequencies, range, mean, standard deviation, as well as the skewness and other normality assumptions statistics.

The researcher chose to use a causal comparative analysis as a means to determine the strength of any relationships between independent and dependent variables. The researcher conducted two logistic regression analyses using the two dependent variables of the study. The researcher used this type of regression analysis to explore the research hypotheses that performance on the individual TEAS categorical sections, as well as one's TEAS composite score performance, correlated with success on completion of the accelerated second-degree nursing program and on successful passage of the NCLEX-RN on the first attempt. Using logistic regression analysis, the researcher aimed to determine the power of predictive validity of the two dependent variables and the independent variables. The independent/predictor variables were the TEAS scores. For all of the regression models, the researcher used SPSS Version 24. Table 2 below identifies the research questions, variables, and statistical tests designed to arrive at the answer to each research question.

Table 2

Research Question, Variables, and Statistical Tests

Research Question	Variables	Statistical Test
1. What is the relationship between the TEAS science score and student successful completion of the accelerated second-degree baccalaureate-nursing program?	DV: Completion IV: TEAS science	Logistic regression analysis
2. What is the relationship between the TEAS mathematics score and student successful completion of the accelerated second-degree baccalaureate-nursing program?	DV: Completion IV: TEAS mathematics	Logistic regression analysis
3. What is the relationship between the TEAS English and language usage score and student successful completion of the accelerated second degree baccalaureate-nursing program?	DV: Completion IV: TEAS English	Logistic regression analysis

4. What is the relationship between the TEAS reading score and student successful completion of the accelerated second-degree baccalaureate-nursing program?	DV: Completion IV: TEAS reading	Logistic regression analysis
5. What is the relationship between the TEAS composite score and student successful completion of the accelerated second-degree baccalaureate-nursing program?	DV: Completion IV: TEAS composite	Logistic regression analysis
6. What is the relationship between the TEAS science score and student successful completion of the NCLEX-RN on the first attempt?	DV: NCLEX RN IV: TEAS science	Logistic regression analysis
7. What is the relationship between the TEAS mathematics score and student successful completion of the NCLEX-RN on the first attempt?	DV: NCLEX RN IV: TEAS mathematics	Logistic regression analysis
8. What is the relationship between the TEAS English and language usage score and student successful completion of the NCLEX-RN on the first attempt?	DV: NCLEX RN IV: TEAS English	Logistic regression analysis
9. What is the relationship between the TEAS reading score and student successful completion of the NCLEX-RN on the first attempt?	DV: NCLEX RN IV: TEAS reading	Logistic regression analysis
10. What is the relationship between the TEAS composite score and student successful completion of the NCLEX-RN on the first attempt?	DV: NCLEX RN IV: TEAS composite	Logistic regression analysis

Ethical Considerations

The researcher notified the Institutional Review Board (IRB) of this proposed research, and submitted all required documentation for approval. The researcher anticipated this process to be exempt or expedited. Since the researcher only examined readily available and pre-existing data, there was no need for interaction with any human subjects during the research process. The IRB at The University of Alabama approved the study. The institution that supplied data did not

have an IRB and therefore, there was no need to submit for approval from the institution prior to beginning the collection of data or the research process.

The researcher did not identify participants of the study in any way. The researcher eliminated all identifying information such as names and the student ID of the participants prior to the analysis stage. To protect the anonymity of all participants, the researcher replaced the participants' names with numerical codes.

Quality Assurance

The researcher maintained security and confidentiality of data throughout the collection of data and the research process. The researcher replaced students' names with identification numbers to assure anonymity and confidentiality. According to Brown (2006), validity is defined as the ability for an instrument to measure what the researcher intends to measure. Brown also described reliability as the instrument's ability to consistently and accurately measure the concept addressed by the study. Using descriptive statistics and regression analysis, the reliability and validity were assured, as these methods are widely considered both reliable and valid. Due to the use of SPSS Version 24 to analyze the data, the researcher remained confident in the reliability and validity of the data interpretation utilized in the study.

Summary

The purpose of this study was to examine the relationship between TEAS test scores and the completion of the accelerated as well as the NCLEX RN programs. The researcher obtained data from a school archive, and anonymized the obtained data before beginning the research. The researcher utilized a logistic regression approach in this study. For regression models with high likelihood of multicollinearity issues, the researcher also conducted individual regression

models. In Chapter 4, the researcher will present the details of the analyses, results, and the interpretation of results found in this study.

CHAPTER 4

RESULTS

Introduction

The purpose of this quantitative study was to determine if there is a positive correlation between the TEAS examination and nursing student success in a second-degree accelerated baccalaureate of nursing program. The researcher aimed to examine the relationships between the TEAS exam and student success. For this study, the first dependent variable was student success, which the researcher defined as successful completion of the nursing program. The second dependent variable was successful passage of the NCLEX-RN on the first attempt. For independent variables, the researcher used the separate TEAS categorical scores as well as the composite scores, age at time of enrollment, subject of prior baccalaureate degree earned, gender, degree grade point average for prior baccalaureate degree, and sciences grade point average from prior baccalaureate degree.

In Chapter 4, the researcher presents the results of the data analysis methods following the collection and organization of the data, including details on the research questions and hypotheses, a description of the sample used for statistical analysis, and an exploration of the statistical tests used to observe the research questions and hypotheses. Chapter 4 concludes with a summary section.

Research Question and Hypothesis

In this section, the researcher will address the research questions and hypotheses, determining if there is a positive correlation between the TEAS examination and nursing student success in a second-degree accelerated baccalaureate of nursing program.

Research Question 1: What is the relationship between the TEAS science score and student successful completion of the accelerated second-degree baccalaureate-nursing program?

Research Question 2: What is the relationship between the TEAS mathematics score and student successful completion of the accelerated second-degree baccalaureate-nursing program?

Research Question 3: What is the relationship between the TEAS English and language usage score and student successful completion of the accelerated second-degree baccalaureate nursing program?

Research Question 4: What is the relationship between the TEAS reading score and student successful completion of the accelerated second-degree baccalaureate-nursing program?

Research Question 5: What is the relationship between the TEAS composite score and student successful completion of the accelerated second-degree baccalaureate-nursing program?

Research Question 6: What is the relationship between the TEAS science score and student successful completion of the NCLEX-RN on the first attempt?

Research Question 7: What is the relationship between the TEAS mathematics score and student successful completion of the NCLEX-RN on the first attempt?

Research Question 8: What is the relationship between the TEAS English and language usage score and student successful completion of the NCLEX-RN on the first attempt?

Research Question 9: What is the relationship between the TEAS reading score and student successful completion of the NCLEX-RN on the first attempt?

Research Question 10: What is the relationship between the TEAS composite score and student successful completion of the NCLEX-RN on the first attempt?

Demographics

The sample in this study consisted of 393 students admitted to the institution that attended at least two full weeks of instruction. Table 3 illustrates a summary of demographics for the study participants, where ages ranged from 20 to 56 years old, with an average age of 28.5 years old (*SD* = 6.9). Of the sample, 17.1% (*n* = 67) were males, and 82.9% (*n* = 326) were females. When observing Bachelor's major, most majors were in Science (39.4%, *n* = 154), followed by 20.5% (*n* = 80) in Health/Education, 17.4% (*n* = 68) in Liberal Arts, 13.0% (*n* = 51) in Psychology/Social Science, and 9.7% (*n* = 38) in Business. Bachelor major information was missing for two students. Of the students, Bachelor's GPA ranged from 2.5 to 4.0, with an average GPA of 3.1 (*SD* = 0.30). Science GPA ranged from 2.7 to 4.0, with an average GPA of 3.3 (*SD* = 0.38).

Table 3

Summary of Demographics

	N	Percent
Gender		
Male	67	17.05
Female	326	82.95
Bachelor Major		
Business	38	9.72
Health/Education	80	20.46
Liberal Arts	68	17.39
Psychology/Social Science	51	13.04
Science	154	39.39
	Mean	SD
Age	28.5	6.90
Bachelor's GPA	3.10	0.30
Science GPA	3.23	0.38

Study Variables

For this study, the first dependent variable was student success, define as successful completion of the nursing program; the second dependent variable was successful passage of the NCLEX-RN on the first attempt. Table 4 shows a summary of each dependent variable, where most students successfully completed the nursing program (94.7%, *n* = 372), and most successfully passed the NCLEX-RN on their first attempt (90.6%, *n* = 337).

For independent variables, the researcher used the separate TEAS categorical scores as well as the composite scores, age at time of enrollment, subject of prior baccalaureate degree earned, gender, degree grade point average for prior baccalaureate degree, and sciences grade point average from prior baccalaureate degree. Table 4 also shows a summary of the separate TEAS categorical scores as well as the composite scores. TEAS Science scores ranged from 48 to 100, with an average score of 74.4 (*SD* = 10.3). TEAS Mathematics scores ranged from 44 to 100, with an average score of 83.9 (*SD* = 11.0). TEAS English and language usage scores ranged from 53 to 100, with an average score of 77.8 (*SD* = 9.97). TEAS Reading scores ranged from 52 to 100, with an average score of 84.6 (*SD* = 8.79). TEAS Composite scores ranged from 67 to 97, with an average score of 80.0 (*SD* = 6.39).

The demographic variables that the researcher used as independent variables (age at time of enrollment, subject of prior baccalaureate degree earned, gender, degree grade point average for prior baccalaureate degree, and sciences grade point average from prior baccalaureate degree), are located in the summary of demographics in Table 3.

Table 4

Summary of Study Variables

	N	Percent
Dependent Variables		
Successful Completion of the Nursing Program		
No	21	5.34
Yes	372	94.66
Successful Passage of the NCLEX-RN on 1st Attempt		
No	35	9.41
Yes	337	90.59
	Mean	SD
Independent Variables		
TEAS Science	74.35	10.33
TEAS Mathematics	83.88	11.00
TEAS English	77.85	9.97
TEAS Reading	84.58	8.79
TEAS Composite	80.04	6.37

Statistical Model Assumptions

The researcher used Multivariable Logistic Regression models to determine the association of each dependent variable (successful completion of the nursing program, and successful passage of the NCLEX-RN on the first attempt), with each independent variable (TEAS categorical scores, composite scores, and demographic variables). According to Montgomery, Peck, and Vining (2012), one of the major assumptions of logistic regression requires the dependent variable to be binary, which is true for this study (0 = *no success*, 1 = *success*). Further, logistic regression requires each observation to be independent, which is true for the observations in this study (Montgomery et al., 2012). Lastly, implementing logistic regression requires large sample sizes. If the sample size is not sufficient, proper parameter estimates may not be possible, which will become evident in the statistical results (Van Smeden et al., 2016).

Results

Research question 1 asked, "What is the relationship between the TEAS science score and student successful completion of the accelerated second-degree baccalaureate-nursing program?" The researcher observed a multivariable logistic regression model with successful completion of the accelerated second-degree baccalaureate-nursing program as the dependent variable, TEAS science score as the main independent variable, while controlling for student age, gender, major degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS science score was significantly associated with successful completion of the accelerated second-degree baccalaureate-nursing program (Table 5). Specifically, for every one unit increase in TEAS Science score, the odds of successful completion of the program increase by about 8% (*OR & 95% CI* = 1.08 (1.02 – 1.14), $p = 0.006$). Additionally, when controlling for all other factors in the model, females had higher odds of successful completion of the program versus males (*OR & 95% CI* = 5.77 (2.05 – 16.25), $p = 0.001$). As age increases, the odds of successful completion decrease (*OR & 95% CI* = 0.94 (0.89 – 0.99), $p = 0.030$), and as science GPA increases, the odds of successful completion increase (*OR & 95% CI* = 4.24 (1.03 – 17.39), $p = 0.045$). The overall odds model for the successful completion of the accelerated second-degree baccalaureate-nursing program was: 0.08*TEAS Science Score + 1.75*Females + 1.89*Health/Education + -0.04*Liberal Arts + -0.71*Psych/Social Science + 0.01*Science + -0.06*Age + 0.24*Bachelor's GPA + 1.44*Science GPA (model $df = 5$, $R^2 = 0.17$). Given these results, the researcher rejected the null hypothesis, concluding that there is a significant relationship between TEAS science score and student successful completion of the accelerated second-degree baccalaureate-nursing program.

Table 5

Logistic Regression Model for Research Question 1

	β	SE	Wald Test	OR (95% CI)
TEAS Science Score	0.08*	0.03	7.54	1.08 (1.02 – 1.14)
Gender				
Male	1.00	--	--	--
Female	1.75*	0.53	11.01	5.77 (2.05 – 16.25)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	1.89	1.25	2.26	6.59 (0.56 – 77.07)
Liberal Arts	-0.04	0.89	0.002	0.96 (0.17 – 5.45)
Psych/Social			0.70	0.49 (0.10 – 2.58)
Science	-0.71	0.84		
Science	0.01	0.82	0.00	1.01 (0.20 – 5.03)
Age	-0.06*	0.03	4.69	0.94 (0.89 – 0.99)
Bachelor's GPA	0.24	0.85	0.08	1.27 (0.24 – 6.67)
Science GPA	1.44*	0.72	4.01	4.24 (1.03 – 17.39)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Research question 2 asked, "What is the relationship between the TEAS mathematics score and student successful completion of the accelerated second-degree baccalaureate-nursing program?" The researcher observed a multivariable logistic regression model with successful completion of the accelerated second-degree baccalaureate-nursing program as the dependent variable, TEAS mathematics score as the main independent variable, while controlling for student age, gender, major, degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS mathematics score was significantly associated with successful completion of the accelerated second-degree baccalaureate-nursing program (Table 6). Specifically, for every one unit increase in TEAS mathematics score, the odds of successful completion of the program increase by about 5% (*OR & 95% CI* = 1.05 (1.01 – 1.09), $p = 0.017$). Additionally, when controlling for all other factors in the model, females had higher odds of

successful completion of the program versus males (*OR & 95% CI* = 5.93 (2.08 – 16.96), p = 0.001), and as science GPA increases, the odds of successful completion increase (*OR & 95% CI* = 4.57 (1.16 – 18.09), p = 0.030). The overall odds model for the successful completion of the accelerated second-degree baccalaureate-nursing program was: 0.05*TEAS Math Score + 1.78*Females + 2.47*Health/Education + 0.25*Liberal Arts + -0.37*Psych/Social Science + 0.39*Science + -0.05*Age + 0.18*Bachelor's GPA + 1.52*Science GPA (model df = 5, R^2 = 0.14). Given these results, the researcher rejected the null hypothesis, concluding that there is a significant relationship between TEAS mathematics score and student successful completion of the accelerated second-degree baccalaureate-nursing program.

Table 6

Logistic Regression Model for Research Question 2

	B	SE	Wald Test	OR (95% CI)
TEAS Mathematics Score	0.05*	0.02	5.75	1.05 (1.01 – 1.09)
Gender				
Male	1.00	--	--	--
Female	1.78*	0.54	11.05	5.93 (2.08 – 16.96)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	2.47	1.28	3.73	11.86 (0.96 – 145.85)
Liberal Arts	0.25	0.87	0.08	1.28 (0.24 – 7.02)
Psych/Social Science	-0.37	0.82	0.20	0.69 (0.14 – 3.45)
Science	0.39	0.80	0.24	1.47 (0.31 – 7.03)
Age	-0.05	0.03	3.05	0.95 (0.90 – 1.00)
Bachelor's GPA	0.18	0.87	0.04	1.20 (0.22 – 6.53)
Science GPA	1.52*	0.70	4.69	4.57 (1.15 – 18.09)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Research question 3 asked, "What is the relationship between the TEAS English and language usage score and student successful completion of the accelerated second-degree baccalaureate-nursing program?" The researcher observed a multivariable logistic regression

model with successful completion of the accelerated second-degree baccalaureate-nursing program as the dependent variable, TEAS English score as the main independent variable, while controlling for student age, gender, major, degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS English score was not significantly associated with successful completion of the accelerated second-degree baccalaureate-nursing program (p = 0.144; Table 7). When controlling for all other factors in the model, females had higher odds of successful completion of the program versus males (*OR & 95% CI* = 3.35 (1.30 – 8.64), p = 0.013). As age increases, the odds of successful completion decrease (*OR & 95% CI* = 0.94 (0.89 – 0.99), p = 0.021), and as science GPA increases, the odds of successful completion increase (*OR & 95% CI* = 4.13 (1.04 – 16.41), p = 0.044). The overall odds model for the successful completion of the accelerated second-degree baccalaureate-nursing program was: 0.03*TEAS English Score + 1.38*Females + 1.96*Health/Education + -0.01*Liberal Arts + -0.58*Psych/Social Science + 0.29*Science + -0.06*Age + 0.25*Bachelor's GPA + 1.42*Science GPA (model df = 5, R^2 = 0.13). Given these results, the researcher accepted the null hypothesis, concluding that there is not a significant relationship between TEAS English and language usage score and student successful completion of the accelerated second-degree baccalaureate-nursing program.

Table 7

Logistic Regression Model for Research Question 3

	β	SE	Wald Test	OR (95% CI)
TEAS English Score	0.03	0.02	2.14	1.04 (0.99 – 1.08)
Gender				
Male	1.00	--	--	--
Female	1.38*	0.49	7.82	3.97 (1.51 – 10.45)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	1.96	1.26	2.42	7.12 (0.60 – 84.44)
Liberal Arts	-0.01	0.89	0.00	0.99 (0.17 – 5.63)
Psych/Social			0.47	0.56 (0.11 – 2.93)
Science	-0.58	0.84		
Science	0.29	0.81	0.12	1.33 (0.27 – 6.57)
Age	-0.06*	0.03	4.35	0.94 (0.89 – 0.99)
Bachelor's GPA	0.25	0.84	0.09	1.28 (0.25 – 6.59)
Science GPA	1.42*	0.70	1.43	4.13 (0.69 – 9.57)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Research question 4 asked, "What is the relationship between the TEAS reading score and student successful completion of the accelerated second-degree baccalaureate-nursing program?" The researcher observed a multivariable logistic regression model with successful completion of the accelerated second-degree baccalaureate-nursing program as the dependent variable, TEAS reading score as the main independent variable, while controlling for student age, gender, major, degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS reading score was significantly associated with successful completion of the accelerated second-degree baccalaureate-nursing program (Table 8). Specifically, for every one unit increase in TEAS reading score, the odds of successful completion of the program increase by about 5% (*OR & 95% CI* = 1.05 (1.01 – 1.10), $p = 0.044$). Additionally, when controlling for all other factors in the model, females had higher odds of successful completion

of the program versus males (*OR & 95% CI* = 3.97 (1.49 – 10.59), $p = 0.006$), and as science GPA increases, the odds of successful completion increase (*OR & 95% CI* = 4.31 (1.09 – 17.08), $p = 0.038$). The overall odds model for the successful completion of the accelerated second-degree baccalaureate-nursing program was: 0.05*TEAS Reading Score + 1.38*Females + 2.22*Health/Education + 0.04*Liberal Arts + -0.45*Psych/Social Science + 0.56*Science + -0.06*Age + 0.34*Bachelor's GPA + 1.46*Science GPA (model $df = 5$, $R^2 = 0.13$). Given these results, the researcher rejected the null hypothesis, concluding that there is a significant relationship between TEAS reading score and student successful completion of the accelerated second-degree baccalaureate-nursing program.

Table 8

Logistic Regression Model for Research Question 4

	β	SE	Wald Test	OR (95% CI)
TEAS Reading Score	0.05*	0.02	4.07	1.05 (1.00 – 1.10)
Gender				
Male	1.00	--	--	--
Female	1.38*	0.50	7.59	3.97 (1.49 – 10.59)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	2.22	1.24	3.23	9.22 (0.82 – 104.03)
Liberal Arts	0.04	0.86	0.002	1.04 (0.19 – 5.65)
Psych/Social			0.30	0.64 (0.13 – 3.19)
Science	-0.45	0.82		
Science	0.56	0.79	0.51	1.76 (0.37 – 8.25)
Age	-0.06	0.03	3.57	0.95 (0.89 – 1.00)
Bachelor's GPA	0.34	0.85	0.16	1.40 (0.26 – 7.47)
Science GPA	1.46*	0.70	4.32	4.31 (1.09 – 17.08)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Research question 5 asked, "What is the relationship between the TEAS composite score and student successful completion of the accelerated second-degree baccalaureate-nursing

program?" The researcher observed a multivariable logistic regression model with successful completion of the accelerated second-degree baccalaureate-nursing program as the dependent variable, TEAS composite score as the main independent variable, while controlling for student age, gender, major, degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS composite score was significantly associated with successful completion of the accelerated second-degree baccalaureate-nursing program (Table 9). Specifically, for every one unit increase in TEAS composite score, the odds of successful completion of the program increase by about 14% (*OR & 95% CI* = 1.14 (1.04 – 1.24), $p = 0.004$). Additionally, when controlling for all other factors in the model, females had higher odds of successful completion of the program versus males (*OR & 95% CI* = 5.47 (1.98 – 15.13), $p = 0.001$). The overall odds model for the successful completion of the accelerated second-degree baccalaureate-nursing program was: 0.13*TEAS Composite Score + 1.70*Females + 2.08*Health/Education + 0.08*Liberal Arts + -0.55*Psych/Social Science + 0.27*Science + -0.05*Age + 0.36*Bachelor's GPA + 1.35*Science GPA (model $df = 5$, $R^2 = 0.18$). Given these results, the researcher rejected the null hypothesis, concluding that there is a significant relationship between TEAS composite score and student successful completion of the accelerated second-degree baccalaureate-nursing program.

Table 9

Logistic Regression Model for Research Question 5

	B	SE	Wald Test	OR (95% CI)
TEAS Composite Score	0.13*	0.05	8.30	1.14 (1.04 – 1.24)
Gender				
Male	1.00	--	--	--
Female	1.70*	0.52	10.73	5.47 (1.98 – 15.13)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	2.08	1.27	2.69	7.98 (0.67 – 95.77)

	B	SE	Wald Test	OR (95% CI)
Liberal Arts	0.08	0.89	0.10	1.08 (0.19 – 6.23)
Psych/Social Science	-0.55	0.84	0.42	0.58 (0.11 – 3.02)
Science	0.27	0.82	0.11	1.31 (0.26 – 6.53)
Age	-0.05	0.03	3.01	0.95 (0.90 – 1.01)
Bachelor's GPA	0.36	0.86	0.17	1.43 (0.26 – 7.74)
Science GPA	1.35	0.73	3.44	3.87 (0.93 – 16.13)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Research question 6 asked, "What is the relationship between the TEAS science score and student successful completion of the NCLEX-RN on the first attempt?" The researcher observed a multivariable logistic regression model with successful completion of the NCLEX-RN on the first attempt as the dependent variable, TEAS science score as the main independent variable, while controlling for student age, gender, major, degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS science score was significantly associated with successful completion of the NCLEX-RN on the first attempt (Table 10). Specifically, for every one unit increase in TEAS science score, the odds of successful completion of the NCLEX-RN increase by about 5% (*OR & 95% CI* = 1.05 (1.01 – 1.09), p = 0.033). Additionally, when controlling for all other factors in the model, females had higher odds of successful passage of the NCLEX-RN on the first attempt versus males (*OR & 95% CI* = 3.95 (1.61 – 9.71), p = 0.003), and higher science GPA was associated with successful completion of the NCLEX-RN (*OR & 95% CI* = 4.51 (1.29 – 15.76), p = 0.018). The overall odds model for the student successful completion of the NCLEX-RN on the first attempt was: 0.04*TEAS Science Score + 1.37*Females + -0.91*Health/Education + -1.34*Liberal Arts + -1.36*Psych/Social Science + -0.79*Science + 0.02*Age + 1.42*Bachelor's GPA + 1.51*Science GPA(model df = 5, R^2 = 0.15). Given these results, the researcher rejected the null hypothesis,

concluding that there is a significant relationship between TEAS science score and student successful completion of the NCLEX-RN on the first attempt.

Table 10

Logistic Regression Model for Research Question 6

	β	SE	Wald Test	OR (95% CI)
TEAS Science Score	0.04*	0.02	4.56	1.05 (1.01 – 1.09)
Gender				
Male	1.00	--	--	--
Female	1.37*	0.46	8.96	3.95 (1.61 – 9.71)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	-0.91	1.12	0.65	0.40 (0.05 – 3.64)
Liberal Arts	-1.34	1.12	1.43	0.26 (0.03 – 2.35)
Psych/Social			1.42	0.26 (0.03 – 2.41)
Science	-1.36	1.14		
Science	-0.79	1.10	0.52	0.45 (0.05 – 3.87)
Age	0.02	0.04	0.36	1.02 (0.95 – 1.09)
Bachelor's GPA	1.42	0.75	3.63	4.15 (0.96 – 17.95)
Science GPA	1.51*	0.64	5.58	4.51 (1.29 – 15.76)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Research question 7 asked, "What is the relationship between the TEAS mathematics score and student successful completion of the NCLEX-RN on the first attempt?" The researcher observed a multivariable logistic regression model with successful completion of the NCLEX-RN on the first attempt as the dependent variable, TEAS mathematics score as the main independent variable, while controlling for student age, gender, major, degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS mathematics score was not significantly associated with successful completion of the NCLEX-RN on the first attempt (p = 0.768; Table 11). When controlling for all other factors in the model, females had higher odds of successful passage of the NCLEX-RN on the first attempt versus males (*OR & 95% CI* = 3.06

(1.28 – 7.31), $p = 0.012$), and higher science GPA was associated with successful completion of the NCLEX-RN (*OR & 95% CI* = 4.77 (1.41 – 16.11), $p = 0.012$). The overall odds model for the student successful completion of the NCLEX-RN on the first attempt was: -0.01*TEAS Math Score + 1.12*Females + -0.76*Health/Education + -1.22*Liberal Arts + -1.18*Psych/Social Science + -0.55*Science + 0.02*Age + 1.43*Bachelor's GPA + 1.56*Science GPA (model $df = 5$, $R^2 = 0.12$). Given these results, the researcher accepted the null hypothesis, concluding that there is not a significant relationship between TEAS mathematics score and student successful completion of the NCLEX-RN on the first attempt.

Table 11

Logistic Regression Model for Research Question 7

	B	SE	Wald Test	OR (95% CI)
TEAS Mathematics Score	-0.01	0.02	0.09	0.99 (0.96 – 1.03)
Gender				
Male	1.00	--	--	--
Female	1.12*	0.45	6.32	3.06 (1.28 – 7.31)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	-0.76	1.12	0.47	0.47 (0.05 – 4.18)
Liberal Arts	-1.22	1.11	1.20	0.30 (0.03 – 2.61)
Psych/Social Science	-1.18	1.13	1.09	0.31 (0.03 – 2.83)
Science	-0.55	1.09	0.25	0.58 (0.07 – 4.85)
Age	0.02	0.03	0.25	1.02 (0.95 – 1.09)
Bachelor's GPA	1.43	0.74	3.80	4.20 (0.99 – 17.75)
Science GPA	1.56*	0.62	6.31	4.77 (1.41 – 16.11)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Research question 8 asked, "What is the relationship between the TEAS English and language usage score and student successful completion of the NCLEX-RN on the first attempt?" The researcher observed a multivariable logistic regression model with successful completion of the NCLEX-RN on the first attempt as the dependent variable, TEAS English

score as the main independent variable, while controlling for student age, gender, major, degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS English score was not significantly associated with successful completion of the NCLEX-RN on the first attempt ($p = 0.088$; Table 12). When controlling for all other factors in the model, females had higher odds of successful passage of the NCLEX-RN on the first attempt versus males (*OR & 95% CI* = 3.08 (1.29 – 7.32), $p = 0.011$), and higher science GPA was associated with successful completion of the NCLEX-RN (*OR & 95% CI* = 4.62 (1.34 – 15.96), $p = 0.015$). The overall odds model for the student successful completion of the NCLEX-RN on the first attempt was: 0.03*TEAS English Score + 1.13*Females + -0.78*Health/Education + -1.20*Liberal Arts + -1.18*Psych/Social Science + -0.56*Science + 0.02*Age + 1.39*Bachelor's GPA + 1.53*Science GPA (model $df = 5$, $R^2 = 0.14$). Given these results, the researcher accepted the null hypothesis, concluding that there is not a significant relationship between TEAS English and language usage score and student successful completion of the NCLEX-RN on the first attempt.

Table 12

Logistic Regression Model for Research Question 8

	β	SE	Wald Test	OR (95% CI)
TEAS English Score	0.03	0.02	2.91	1.03 (0.99 – 1.07)
Gender				
Male	1.00	--	--	--
Female	1.13*	0.44	6.49	3.08 (1.30 – 7.32)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	-0.78	1.12	0.48	0.46 (0.05 – 4.12)
Liberal Arts	-1.20	1.12	1.15	0.30 (0.03 – 2.70)
Psych/Social			1.06	0.30 (0.03 – 2.89)
Science	-1.18	1.14		
Science	-0.56	1.09	0.26	0.57 (0.07 – 4.85)
Age	0.02	0.03	0.33	1.02 (0.95 – 1.09)
Bachelor's GPA	1.39	0.74	3.50	4.00 (0.94 – 17.16)
Science GPA	1.53*	0.63	5.87	4.62 (1.34 – 15.96)

	β	SE	Wald Test	OR (95% CI)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Research question 9 asked, "What is the relationship between the TEAS reading score and student successful completion of the NCLEX-RN on the first attempt?" The researcher observed a multivariable logistic regression model with successful completion of the NCLEX-RN on the first attempt as the dependent variable, TEAS reading score as the main independent variable, while controlling for student age, gender, major, degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS reading score was not significantly associated with successful completion of the NCLEX-RN on the first attempt (p = 0.551; Table 13). When controlling for all other factors in the model, females had higher odds of successful passage of the NCLEX-RN on the first attempt versus males (*OR & 95% CI* = 3.13 (1.32 – 7.40), p = 0.009), and higher science GPA was associated with successful completion of the NCLEX-RN science (*OR & 95% CI* = 4.61 (1.36 – 15.62), p = 0.014). The overall odds model for the student successful completion of the NCLEX-RN on the first attempt was: 0.01*TEAS Reading Score + 1.14*Females + -0.74*Health/Education + -0.12*Liberal Arts + -1.19*Psych/Social Science + -0.53*Science + 0.02*Age + 1.43*Bachelor's GPA + 1.53*Science GPA (model df = 5, R^2 = 0.12). Given these results, the researcher accepted the null hypothesis, concluding that there is not a significant relationship between TEAS reading score and student successful completion of the NCLEX-RN on the first attempt.

Table 13

Logistic Regression Model for Research Question 9

	β	SE	Wald Test	OR (95% CI)
TEAS Reading Score	0.01	0.02	0.36	1.01 (0.97 – 1.05)
Gender				
Male	1.00	--	--	--
Female	1.14*	0.44	6.76	3.13 (1.32 – 7.40)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	-0.74	1.12	0.43	0.48 (0.05 – 4.30)
Liberal Arts	-0.12	1.11	1.21	0.29 (0.03 – 2.59)
Psych/Social			1.10	0.30 (0.03 – 2.81)
Science	-1.19	1.14		
Science	-0.53	1.09	0.24	0.59 (0.07 – 4.94)
Age	0.02	0.03	0.37	1.02 (0.96 – 1.09)
Bachelor's GPA	1.43	0.74	3.76	4.18 (0.99 – 17.73)
Science GPA	1.53*	0.62	6.03	4.61 (1.36 – 15.62)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Research question 10 asked, "What is the relationship between the TEAS composite score and student successful completion of the NCLEX-RN on the first attempt?" The researcher observed a multivariable logistic regression model with successful completion of the NCLEX-RN on the first attempt as the dependent variable, TEAS composite score as the main independent variable, while controlling for student age, gender, major, degree GPA, and sciences GPA. Results showed that when controlling for demographics, TEAS composite score was significantly associated with successful completion of the NCLEX-RN on the first attempt (Table 14). Specifically, for every one unit increase in TEAS composite score, the odds of successful completion of the NCLEX-RN increase by about 7% (*OR & 95% CI* = 1.07 (1.01 – 1.14), $p = 0.040$). Additionally, when controlling for all other factors in the model, females had higher odds of successful passage of the NCLEX-RN on the first attempt versus males (*OR &*

95% CI = 3.68 (1.53 – 8.88), $p = 0.004$), and higher science GPA was associated with successful completion of the NCLEX-RN (*OR & 95% CI* = 4.31 (1.24 – 15.05), $p = 0.022$). The overall odds model for the student successful completion of the NCLEX-RN on the first attempt was: 0.07*TEAS Composite Score + 1.30*Females + -0.76*Health/Education + -1.23*Liberal Arts + -1.25*Psych/Social Science + -0.62*Science + 0.03*Age + 1.40*Bachelor's GPA + 1.46*Science GPA (model $df = 5$, $R^2 = 0.15$). Given these results, the researcher rejected the null hypothesis, concluding that there is a significant relationship between TEAS composite score and student successful completion of the NCLEX-RN on the first attempt.

Table 14

Logistic Regression Model for Research Question 10

	β	SE	Wald Test	OR (95% CI)
TEAS Composite Score	0.07*	0.03	4.22	1.07 (1.01 – 1.14)
Gender				
Male	1.00	--	--	--
Female	1.30*	0.45	8.43	3.68 (1.53 – 8.88)
Bachelor Major				
Business	1.00	--	--	--
Health/Education	-0.76	1.12	0.45	0.47 (0.05 – 4.25)
Liberal Arts	-1.23	1.12	1.20	0.29 (0.03 – 2.63)
Psych/Social Science	-1.25	1.14	1.20	0.29 (0.03 – 2.69)
Science	-0.62	1.09	0.32	0.54 (0.06 – 4.59)
Age	0.03	0.04	0.70	1.03 (0.96 – 1.10)
Bachelor's GPA	1.40	0.75	3.47	4.04 (0.93 – 17.55)
Science GPA	1.46*	0.64	5.26	4.31 (1.24 – 15.05)

Note. β values are estimated unstandardized regression coefficients; OR indicates likelihood of Success; * $p < 0.05$

Summary

The main purpose of this quantitative study was to determine if there is a positive correlation between the TEAS examination and nursing student success in a second-degree accelerated-baccalaureate of nursing program. To explore this question, the researcher aimed to

examine the relationships between the TEAS exam and student success. Results of the statistical analyses showed that higher TEAS Science, Mathematics, Reading, and Composite scores were all significantly associated with successful completion of the accelerated second-degree baccalaureate-nursing program. In addition, higher TEAS Science and Composite scores were significantly associated with successful completion of the NCLEX-RN on the first attempt. Beyond observing the separate TEAS categorical scores as well as the composite scores, and their relationships with success, the researcher also found that females had higher odds of success versus males, higher science GPAs were associated with success in most models, and decreasing age was associated with success in some models. Table 15 shows a summary of the results obtained when examining the relationship between each TEAS exam and student success.

Table 15

Summary of Testing Each Hypothesis

Dependent Variable	Independent Variable	Reject Null?	Model Odds Ratio*
Completion of Program	TEAS Science	Yes	1.08 (1.02 – 1.14)
Completion of Program	TEAS Mathematics	Yes	1.05 (1.01 – 1.09)
Completion of Program	TEAS English	No	1.04 (0.99 – 1.08)
Completion of Program	TEAS Reading	Yes	1.05 (1.00 – 1.10)
Completion of Program	TEAS Composite	Yes	1.14 (1.04 – 1.24)
Completion of NCLEX-RN	TEAS Science	Yes	1.05 (1.01 – 1.09)
Completion of NCLEX-RN	TEAS Mathematics	No	0.99 (0.96 – 1.03)
Completion of NCLEX-RN	TEAS English	No	1.03 (0.99 – 1.07)
Completion of NCLEX-RN	TEAS Reading	No	1.01 (0.97 – 1.05)
Completion of NCLEX-RN	TEAS Composite	Yes	1.07 (1.01 – 1.14)

**Model Odds Ratio and 95% Confidence Interval*

CHAPTER 5

DISCUSSION

Introduction

With the increased attention on student success, administrators of nursing programs have sought admissions exams that can predict success (Newton et al., 2007b). The Test of Essential Academic Skills is used by most colleges and universities offering nursing programs within the United States (Cunningham et al., 2014; Hinderer et al., 2014). The TEAS is used as a method to identify students who are most likely to be successful in a nursing program. The TEAS assesses basic knowledge in reading, mathematics, science and English and language usage (Assessment Technologies Institute, 2011). It is often required from potential students to take the TEAS exam and submit their scores as part of the application process. Admission committees utilize the results of this exam to enhance the decision-making process of whether to admit a particular student or not. As colleges and universities that offer degrees in nursing rely on TEAS exam scores, it was important to research the correlation of TEAS to nursing school success.

There are different ways in which to describe or define success. One way to define success is to see it as completion of the nursing school curriculum, commonly referred to as meeting the requirements to graduate from the program (Newton et al., 2007a). Another way would be to see it as the successful passage of the National Council Licensure Exam for Registered Nurses (NCLEX-RN) on a student's first attempt (Yeom, 2013). Both of these definitions were included in this study and examined separately.

The purpose of this quantitative study was to determine if the TEAS examination correlates with nursing student success in a second-degree accelerated baccalaureate of nursing program. Accelerated baccalaureate nursing programs continue to rise in popularity within the United States (American Association of Colleges of Nursing, 2012). One factor that may contribute to the increase in the number of accelerated baccalaureate programs is the recommendation for the baccalaureate in nursing education level to be the basic level of education for the nursing profession. The researcher aimed to examine the relationships between the TEAS exam and student success. The results of this study examined all components of the TEAS, including the four subject areas (science, mathematics, English and language usage, and reading) along with the composite TEAS score obtained from scoring all four categories.

The first research question investigated the relationship between the TEAS science score and student successful completion of the second-degree accelerated-baccalaureate nursing program. The second research question investigated the relationship between the TEAS mathematics score and student successful completion of the second-degree accelerated-baccalaureate nursing program. The third research question investigated the relationship between the TEAS English and language usage score and student successful completion of the second-degree accelerated-baccalaureate nursing program. The fourth research question investigated the relationship between the TEAS reading score and student successful completion of the second-degree accelerated-baccalaureate nursing program. The fifth research question investigated the relationship between the TEAS composite score and student successful completion of the second-degree accelerated-baccalaureate nursing program. The sixth research question investigated the relationship between the TEAS science score and student successful completion of the NCLEX-RN on the first attempt. The seventh research question investigated the

relationship between the TEAS mathematics score and student successful completion of the NCLEX-RN on the first attempt. The eighth research question investigated the relationship between the TEAS English and language usage score and student successful completion of the NCLEX-RN on the first attempt. The ninth research question investigated the relationship between the TEAS reading score and student successful completion of the NCLEX-RN on the first attempt. The tenth and final research question investigated the relationship between the TEAS composite score and student successful completion of the NCLEX-RN on the first attempt.

The sample of this study consisted of 393 students admitted to the institution who attended at least 2 full weeks of instruction. Ages ranged from 20 to 56 years old, 17.1% were males, and 82.9% were females. When observing Bachelor's major, most majors were in Science (39.4%), followed by 20.5% in Health/Education, 17.4% in Liberal Arts, 13.0% in Psychology/Social Science, and 9.7% in Business.

Results of Regression Analysis

The researcher used Multivariable Logistic Regression models to determine the association of the successful completion of the nursing program and successful passage of the NCLEX-RN on the first attempt with the TEAS categorical scores, composite scores, as well as demographic variables.

Research Question 1

The researcher investigated the association between successful completion of the second-degree accelerated-baccalaureate nursing program and the TEAS science score, while controlling for age, gender, major degree GPA, and sciences GPA. The results showed that when controlling for demographic variables, the TEAS science score was significantly associated with successful

completion of the program. Females have higher odds of successful completion of the program. An increase in age was negatively associated with success. An increase in science GPA was positively associated with successful completion.

Research Question 2

The researcher investigated the association between the successful completion of the second-degree accelerated-baccalaureate nursing program and TEAS mathematics score, while controlling for demographical variables. The results showed that when controlling for demographics, TEAS mathematics score was significantly associated with successful completion of the program. Again, females were more likely to complete the program successfully. An increase in science GPA was positively associated with successful completion.

Research Question 3

The researcher investigated the association between the successful completion of the second-degree accelerated-baccalaureate nursing program and TEAS English and language usage score, while controlling for demographical variables. The results showed that when controlling for demographics, TEAS English and language usage score was not significantly associated with successful completion of the program. When controlling for all other factors in the model, females were more likely to complete the program successfully. Increased age had a negative association with successful completion. An increase in science GPA was positively correlated with successful completion.

Research Question 4

The researcher investigated the association between the successful completion of the second-degree accelerated-baccalaureate-nursing program and TEAS reading score, while controlling for demographical variables. The results showed that when controlling for

demographics, TEAS reading score was significantly associated with successful completion of the program. Again, females had higher odds of successful completion of the program. Increased science GPA was positively associated with successful completion.

Research Question 5

The researcher investigated the association between the successful completion of the second-degree accelerated-baccalaureate-nursing program and the TEAS composite score, while controlling for demographical variables. The results showed that when controlling for demographics, TEAS composite score was significantly associated with successful completion of the program. Females were more likely to complete the program successfully.

Research Question 6

The researcher investigated the association between the successful completion of the NCLEX-RN on the first attempt and the TEAS science score, while controlling demographical variables. The results showed that when controlling for demographics, TEAS science score was significantly associated with successful completion of the NCLEX-RN on the first attempt. Females were more likely to complete the program successfully. A higher science GPA was positively associated with successful completion of the NCLEX-RN.

Research Question 7

The researcher investigated the association between the successful completion of the NCLEX-RN on the first attempt and the TEAS mathematics score, while controlling for demographical variables. The results showed that when controlling for demographics, TEAS mathematics score was not significantly associated with successful completion of the NCLEX-RN on the first attempt. Females had higher odds of successful completion of the program, and

higher science GPA was positively associated with successful completion of the NCLEX-RN GPAs.

Research Question 8

The researcher investigated the association between the successful completion of the NCLEX-RN on the first attempt and the TEAS English and language usage score, while controlling for demographical variables. The results showed that when controlling for demographics, TEAS English and language usage score was not significantly associated with successful completion of the NCLEX-RN on the first attempt. Females had higher odds of successful completion of the program, and higher science GPA was associated with successful completion of the NCLEX-RN.

Research Question 9

The researcher investigated the association between the successful completion of the NCLEX-RN on the first attempt and TEAS reading score, while controlling for demographical variables. The results showed that when controlling for demographics, TEAS reading score was not significantly associated with successful completion of the NCLEX-RN on the first attempt. Females had higher odds of successful completion of the program, and higher science GPA was associated with successful completion of the NCLEX-RN science.

Research Question 10

The researcher investigated the association between the successful completion of the NCLEX-RN on the first attempt and the TEAS composite score, while controlling for demographical variables. The results showed that when controlling for demographics, TEAS composite score was significantly associated with successful completion of the NCLEX-RN on the first attempt. Females had higher odds of successful completion of the program, and higher

science GPA was associated with successful completion of the NCLEX-RN. In the rest of this chapter, the researcher discusses the results in light of the literature, its implications, the limitations of the study, and the recommendations for future research.

Interpretation of the Findings

Results of the statistical analyses showed that higher TEAS Science, Mathematics, Reading, and Composite scores were all significantly associated with the successful completion of the accelerated second-degree baccalaureate-nursing program. Also, higher TEAS Science and Composite scores were significantly associated with successful completion of the NCLEX-RN on the first attempt. Beyond observing the separate TEAS categorical scores as well as the composite scores, and their relationships with success, it was also found that females had higher odds of success versus males, higher science GPA's were associated with success in most models, and decreasing age was associated with success in some models. The results of the study were significant and facilitated interesting interpretation and implications.

The TEAS exam serves as a method to assess an applicant's readiness, and predicted success, in nursing school (Assessment Technologies Institute, 2011). This statement is in agreement with the current results, when taking the first criteria for success into account. The first success criterion encompassed the successful completion of the accelerated second-degree baccalaureate-nursing program. For this criterion, the researcher found the TEAS scores to be a significant predictor of success. Should the second criterion, the successful completion of the NCLEX-RN on the first attempt be taken into account, the TEAS scores for science and the composite score would be the only predictors of success. However, this would mean that the predictive power of TEAS scores may be subjective, as it depends on the definition of success implied.

Cantwell et al. (2015) found the TEAS exam to be a statistically proven predictor of student success in a nursing program, although their study used the TEAS exam's composite score to examine the relationship between minority students and non-minority students when evaluating student success. Yet, the way in which the researchers examined success is unknown. Although they utilized the TEAS exam in their study, they did not specifically examine the relationship between TEAS scores and student success. Cornelius (2012) indicated both grade point average and preadmission examination results as key factors to examine when predicting success in an associate degree-nursing program. These results are in agreement with the results of the current study, yet more so should the measurement of success be that participants successfully completed the accelerated second-degree baccalaureate-nursing program. In addition, Davenport (2007) noted the importance of successfully passing the NCLEX-RN on the first attempt as passing the licensure exam on the first attempt is considered a visible measure of program quality. Wolkowitz and Kelley (2010) also defined success as successful passing of the NCLEX-RN. A visible measure of program quality may be considered vital for success, and may thus mean that only the composite and science score for the TEAS may be accurate predictors. Alternatively, Manieri et al. (2015) identified success as successful completion of a nursing program.

Furthermore, Diaz et al. (2012) studied Hispanic students enrolled in their first Bachelor of Science academic course, Nursing Fundamentals, at a state-supported university in Texas. The researchers found that the TEAS examination was the single significant predictor of student success with passing the Nursing Fundamentals course (Diaz et al, 2012). Penprase and Harris (2013) found that the TEAS assessment test, along with a pre-nursing developmental psychology course, a health assessment course, and an NCLEX-RN predictor examination, all showed

significant moderate relationships with NCLEX-RN success, although they only examined the mathematics and reading portions of the TEAS. Ukpabi (2008) determined that the composite TEAS score was a significant predictor of success on the NCLEX-RN. The results of this study is in contradiction with the results of Penprase and Harris (2013) and Ukpabi (2008), as these researchers found that only the TEAS Science and Composite scores were significantly associated with successful completion of the NCLEX-RN on the first attempt.

Interestingly, the results of the study showed that females, younger candidates as well as candidates with higher science GPAs were more likely to succeed in the nursing program. Furthermore, having a Bachelor's major did not make a significant difference in the successful completion of the nursing program. Haas et al. (2004) and Seago and Spetz (2005) also determined that gender was a factor, and found that females were more likely to pass the NCLEX-RN than their male colleagues. Regarding age, the research was contradictory. Trofino (2013) found that students who were 22 years or older were significantly more likely to pass the NCLEX-RN on the first attempt. Beeson and Kissling (2001) found that individuals over 35 years of age were more likely to be successful in passing the NCLEX-RN, which contradicts the results of the current study. While Haas et al. (2004) were in agreement with the current study and found that students below the age of 24 years were more likely to pass the NCLEX-RN on the first attempt. Several other researchers also found age not to be an influencing factor (Giddens & Gloeckner, 2005; Sayles et al., 2003; Sears et al., 2015). Further research on age as a success factor might thus be needed to clarify the existing contradictions in the literature.

The first theoretical framework that was applied for this study was Carroll's (1963) model of school learning with institutional theory as a lens for examining the TEAS and student success. According to Carroll, school learning is a function of five variables: (a) aptitude, (b)

opportunity to learn, (c) ability to understand instruction, (d) quality of instruction, and (e) motivation or perseverance. The fact that students differ in the time it takes to learn is an assumption made by this model (Carroll, 1989). Bess and Dee (2012) stated that institutional theory "suggests that organizations by accident and choice mirror the norms, values, and ideologies of the general environment in which they are embedded" (p. 141). Nursing programs strive to achieve an acceptable NCLEX-RN pass rate and by using institutional theory, colleges and universities that offer programs in nursing can best position themselves to be competitive and remain legitimate. These theoretical frameworks were an appropriate fit for the current study, as the researcher took all the variables into account within their capacity.

The results of this study were mainly in agreement with the available literature, although further investigation on the definition of academic success will be helpful in the future. The definition of success has an influence on the predictive value of the TEAS scores with regards to the success of students. The results of this study added to the body of literature, and may have clarified some of the questions regarding the predictive value of TEAS scores.

Implication of the Findings

The results of this study are significant, and thus yield several implications for the involved parties. Administrators of the TEAS exam may find the results of this study helpful, and may be able to use it as a guide to improve their exam. As only TEAS Science and Composite scores were significantly associated with successful completion of the NCLEX-RN on the first attempt, it might be necessary to re-evaluate the other sections of the exam in order for it to result in more significant predictive value. It may be helpful to assign a larger part of the exam to science, evaluating scientific skill in greater depth. An improvement of the exam will also lead to further studies regarding its association with success.

Students may be able to utilize the results in this study as an aptitude test. The administrators of the TEAS exam might benefit from contacting high schools, providing their exam to them, and sourcing their possible candidates from the pool of students who completed the test, whilst providing feedback to them regarding other possible career choices besides nursing. Another option is to promote the test at the career days of high schools, and providing it to students who would like to join the nursing field. Students might be able to make life-changing decisions regarding the career they will pursue. The results of this study showed a correlation between academic success and the TEAS scores for nursing students, and may thus assist students to choose a different career path before they may fail. This would save students and/or their parents a lot of money, as well as save time in order for them to join the workforce as soon as possible. Should students join the workforce timeously, it may have positive effects on the economy as well.

Universities and policymakers may find the results of this study helpful, as they could use it to streamline their definition of success. They may even conduct further studies for success pertaining to nursing specifically, as mentioned in the recommendations section. Deciding on a definite description of success would assist them when allowing students to join their nursing program, as they would have insight on how to interpret the results of the TEAS scores accurately, helping to ensure the success of the selected participants. Should they use this to their advantage, they would be able to increase their graduation rates as the students who join the nursing program would be more likely to succeed, aside from personal influencing variables.

The results of this study may also affect curriculum. It may be helpful to provide high school students with more specified education earlier in school, or to provide more options with regard to subjects. High school students often have no idea of what career they would like to

follow, or even which careers are available. Students showing interest in nursing may benefit from more intense science lessons. Additionally, high school programs that curtail to students with an expressed interest in nursing, or healthcare in general, may assist students in identifying if a career in nursing may be a good option. Therefore, the results of this study may provide insight to high schools regarding career preparation.

The results of this study also indicated that males, older candidates, and a lower science GPA were negatively associated with the successful completion of the second-degree accelerated-baccalaureate nursing program. This knowledge could assist universities to narrow down their participant pool, or it could encourage them to provide assistance to males, older candidates and candidates with a lower science GPA in order to ensure a more diverse work force. The candidates who were less likely to succeed may be provided with an extra course, as well as more assistance throughout the program to make sure they stay on track. Assigning these students mentors and smaller classes may also be able to increase their likeliness of success.

Furthermore, the personnel in control of admissions for universities may utilize the results of this study in their selection process. When screening potential candidates for nursing programs, universities and other educational institutions could administer the TEAS test and specifically focus on the results of applicants' science and composite scores in order to make their decisions. Implementing such a process may result in higher graduation rates, and overall success of the university or educational institute and their students.

Reflections on the Study

The first reflection of this study would be that success was only measured for nursing student success in a second-degree accelerated baccalaureate of nursing program, thus limiting the generalizability of the results. The significant associations found between the TEAS and the

success of students may be limited to success of students completing this specific type of nursing program. Applying the components of this study to different types of nursing programs may yield different results.

The second reflection would be the use of secondary sources regarding the results of the TEAS scores. All data were available from existing nursing school records. The researcher used admission applicant spreadsheets to identify prior baccalaureate degree majors, gender, and composite TEAS scores available from the institution. As such, the researcher assume the accuracy of the data.

The third reflection may be the inclusion of two definitions of success. The first dependent variable was student success determined as successful completion of the nursing program. The second dependent variable was successful passage of the NCLEX-RN on the first attempt. Should other definitions of success have been included, the predictive value of the TEAS scores may have been different.

Recommendations for Future Research

The first recommendation for future research would be to conduct a qualitative study exploring the different criteria for success by interviewing the policymakers of different universities and colleges. Finding a general accurate definition and measurement for academic success would be helpful for future studies conducting similar research on the predictive value of TEAS scores. Setting a definite standard for academic success at the tertiary level would be a significant contribution to the literature, as up to now, success has had diverse definitions.

The second recommendation would be to investigate further the success of these students who were stated to be successful according to the criteria for success included in this research in a correlational study. It would be of great value to observe the further successes of these students

later on in their lives, and may shed light on the true definition of academic success. Such a study would also provide further evidence of the true predictive value of TEAS scores. Investigating the lives these successful students have led through their studies and after graduation could provide information on a possible ideal environment for success.

The third recommendation would be to apply a similar study design on other nursing programs. Rafferty and Lindell (2010) found the clinical skills of graduates from an accelerated nursing program were equal to those that graduated from programs that are more traditional. In contrast, Oermann et al. (2010) indicated that graduates from accelerated programs did not have equal clinical competency when compared to graduates from traditional programs. Testing the correlation of TEAS scores and academic success on other types of nursing programs would be valuable to extend the evidence on the predictive value of TEAS scores. Further evidence may also lead to more refinement of the TEAS exam. More research on this subject would be of great significance to universities and colleges to assist them with their selection processes.

The fourth recommendation would be to conduct a longitudinal correlation study of a few participants with significantly different TEAS enrolled in the same nursing program, or even students with similar TEAS scored enrolled in different programs. This study could include qualitative and quantitative analysis. Including qualitative analysis will assist in revealing other influential factors besides TEAS scores regarding academic success. Millett et al. (2015) identified nonacademic factors that may affect the success of accelerated nursing students. Such a study might yield interesting results and give more insight on the general academic success of students in tertiary education.

Last, the results of this study showed that not all of the TEAS test scores had predictive value for the success of nursing students. In further research, such as a similar quantitative study

for a larger sample, the focus could be directed at the science and composite TEAS scores of nursing students, or research should be conducted to determine why the other TEAS scores were not significantly predictive. Determining why certain TEAS scores correlate less than others may help administrators to streamline the test, which will in turn result in the entire test to have more predictive value.

Conclusion

The purpose of this quantitative study was to determine if the TEAS examination correlates with nursing student success in a second-degree accelerated baccalaureate of nursing program. The researcher aimed to examine the relationships between the TEAS exam and student success, while evaluating success according to two sets of criteria. The researchers in the body of literature suggested that the TEAS exam serves as a method to assess an applicant's readiness, and predicted success, in nursing school (Assessment Technologies Institute, Inc., 2011). Davenport (2007) noted the importance of successfully passing the NCLEX-RN on the first attempt as passing the licensure exam on the first attempt is considered a visible measure of program quality. The results showed that higher TEAS Science, Mathematics, Reading, and Composite scores were all significantly associated with the successful completion of the accelerated second-degree baccalaureate-nursing program and higher TEAS Science and Composite scores were significantly associated with successful completion of the NCLEX-RN on the first attempt.

The implications of the results included that universities and policymakers may find the results of this study helpful, as they could use it to streamline their definition of success. The recommendations for future research included conducting a qualitative study exploring the different criteria for success by interviewing the policymakers of different universities and

colleges and conducting a longitudinal correlation study of a few participants with significantly different TEAS enrolled in the same nursing program, or even students with similar TEAS scored enrolled in different programs. This discussion in Chapter 5 concludes the study.

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APPENDIX A

IRB APPROVAL

THE UNIVERSITY OF ALABAMA | Office of the Vice President for Research & Economic Development
Office for Research Compliance

January 17, 2017

Anthony Pennington
Higher Ed. Admin.
College of Education
Box 870302

Re: IRB#: 17-OR-026 "The Relationship of the Test of Essential Academic Skills (TEAS) Exam Scores on Student Success in an Accelerated Second-Degree Baccalaureate of Nursing Program"

Dear Mr. Pennington:

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

Your application has been given expedited approval according to 45 CFR part 46. You have also been granted the requested waiver of informed consent. Approval has been given under expedited review category 7 as outlined below:

(7) Research on individual or group characteristics or behavior (including, but not limited to, research on perception, cognition, motivation, identity, language, communication, cultural beliefs or practices, and social behavior) or research employing survey, interview, oral history, focus group, program evaluation, human factors evaluation, or quality assurance methodologies

Your application will expire on January 16, 2018. If your research will continue beyond this date, complete the relevant portions of the IRB Renewal Application. If you wish to modify the application, complete the Modification of an Approved Protocol Form. Changes in this study cannot be initiated without IRB approval, except when necessary to eliminate apparent immediate hazards to participants. When the study closes, complete the appropriate portions of the IRB Request for Study Closure Form.

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

Good luck with your research.

Sincerely,

[redacted]

Carpantato T. Myles, MSM, CIM, CIP
Director & Research Compliance Officer

358 Rose Administration Building | Box 870127 | Tuscaloosa, AL 35487-0127
205-348-8461 | Fax 205-348-7189 | Toll-free 1-877-820-3066

IRB Project #: 17-OR-026

UNIVERSITY OF ALABAMA
INSTITUTIONAL REVIEW BOARD FOR THE PROTECTION OF HUMAN SUBJECTS
REQUEST FOR APPROVAL OF RESEARCH INVOLVING HUMAN SUBJECTS

I. Identifying Information

	Principal Investigator	Second Investigator	Third Investigator
Names:	Anthony Pennington	Dr. Claire Major	N/A
Department:	Ed.D. Studies in Higher Education Administration	Educational Leadership, Technology, and Policy Studies	N/A
College:	Education	Education	N/A
University:	UA Tuscaloosa campus	UA Tuscaloosa campus	N/A
Address:	124 South Julia Avenue DeLand, FL 32720	301C Graves Box 870302 Tuscaloosa, AL 35401	N/A
Telephone:	386-848-1192	205-348-1152	N/A
FAX:	N/A	N/A	N/A
E-mail:	[redacted]	cmajor@ua.edu	N/A

Title of Research Project: The relationship of the Test of Essential Academic Skills (TEAS) exam scores on student success in an accelerated second-degree baccalaureate of nursing program.

Date Submitted: 11/28/16
Funding Source: Self

Type of Proposal: ☒ New ☐ Revision ☐ Renewal Please attach a renewal application ☐ Completed ☐ Exempt
Please attach a continuing review of studies form
Please refer the original IRB # on the top of the page

UA faculty or staff member signature: [redacted]

II. NOTIFICATION OF IRB ACTION (to be completed by IRB)
Type of Review: _____ Full board _X_ Expedited

IRB Action:
___ Rejected Date: _____
___ Tabled Pending Revisions Date: _____
___ Approved Pending Revisions Date: _____
X Approved-this proposal complies with University and federal regulations for the protection of human subjects.
Approval is effective until the following date: 1/16/2018
Items approved: X Research protocol (Dated _____)
___ Informed consent (Dated _____)
___ Recruitment materials (Dated _____)

Approval signature: [redacted] Date 1/17/2017