

2018

Non-Nursing Courses' Impact on NCLEX-RN Pass-Rates in Associate Degree Nursing Programs

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Nicole A. Garner

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Walden University
2018

Abstract

Non-Nursing Courses' Impact on NCLEX-RN Pass-Rates in Associate Degree

Nursing Programs

by

Nicole A. Garner

MSN, Eastern Michigan University, 2009

BSN, Bowling Green State University, 2004

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

Doctor of Philosophy

Nursing – Interdisciplinary Specialization

Walden University

August 2018

Abstract

Nurse educators make decisions regarding the inclusion or exclusion of non-nursing courses in a curriculum. The current literature lacks research regarding which courses have the most impact on first-time nursing licensing examination pass-rates. The purpose of this quasi-experimental study was to investigate if there is a specific combination of courses that enhance first-time licensing examination pass-rates, using 161 randomly selected accredited associate degree nursing programs. General systems theory applied to nursing education was the framework for the study. ANOVA and independent *t*-tests were used to address the questions of non-nursing courses or discipline-specific set of non-nursing courses' impact on first-time licensure pass-rates. The ANOVA and independent *t*-tests analyses did not yield any significant non-nursing courses or discipline-specific sets of non-nursing courses. The findings indicate that non-nursing courses are not a significant subsystem in nursing education when the sole outcome used is NCLEX-RN pass-rates. Nursing faculty can use the results of this study as evidence that the inclusion or exclusion of one non-nursing course over another will likely not be detrimental to their program. This study can lead to positive social change through increasing the evidence-based knowledge from which faculty can base their curriculum.

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Acknowledgments

I would like to thank my faculty and family for assisting me in making my personal goal a reality. I have desired to earn a doctoral degree since I first decided to become a nurse in high school. Without the guidance of Dr. Long and Dr. Garner, I could not have achieved my degree. Additionally, without the patience, support, and understanding of my family, especially my husband, Jacob, and daughter, Lilly, I could not have taken the time and effort necessary to finish my Ph.D.

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Chapter 1: Introduction to the Study

Introduction

Contemporary nursing curricula that are evidence-based and provide a foundation for the changing demographics in nursing programs has been discussed widely for bachelor of science in nursing (BSN) programs but not for associate degree nursing (ADN) programs (Elder, Jacobs, & Fast, 2015; Future of Nursing, 2015). Nursing faculty responsible for developing programs of study for ADN programs require evidence-based educational literature to guide decisions of courses to include or exclude. One area of study that has not had attention is which non-nursing courses or electives might promote higher licensure or NCLEX pass rates in ADN programs (Close, Gorski, Sroczynski, Farmer, and Wortock, 2015; Giddens & Meyer, 2016; Schooley & Kuhn, 2013). Evidence is needed to determine the most appropriate non-nursing courses in a nursing program. The lack of current research creates a gap in the development of contemporary nursing curriculum that requires a comprehensive, scientific approach. Almost all of the available studies investigated the impact of non-nursing course grades in a single nursing program with NCLEX-RN success (e.g. Beeman & Waterhouse, 2001; Beeson & Kissling, 2001; Chen & Bennet, 2016; Daley Kirkpatrick, Frazier, Misook, & Moser, 2003; Elder, Jacobs, & Fast, 2015; Gilmore, 2008; Higgins, 2005; Jeffreys, 2007; Lockie, Van Lanen, & McGannon, 2013; Penprase & Harris, 2013; Schooley & Kuhn, 2013; Seldomridge & DiBartolo, 2004; Shaffer & McCabe, 2013; Simon, McGinnis, & Krauss, 2013; Trofino, 2013; Wambuguh, Eckfield, & Van Hofwegen, 2016; Waterhouse & Beeman, 2003; Yin & Burger, 2003) or based the conclusion of the article on current

practice, not research (e.g. Future of Nursing, 2015). In this study, I evaluated whether non-nursing courses were beneficial to NCLEX-RN outcomes in ADN programs through the study of multiple programs.

This quasi-experimental predictive study compared National Council Licensure Examination for Registered Nursing (NCLEX-RN) first-time pass rates of Accreditation Commission for Education in Nursing (ACEN) accredited ADN programs to the course listing of non-nursing courses within the curricula to determine if one or more non-nursing course impacts the success of students on the NCLEX-RN. I planned to include a model-testing design to determine if a combination of courses enhanced NCLEX-RN first-time pass-rates in ADN programs. The findings may provide social change assisting nursing faculty to improve nursing curriculum, thus resulting in nursing graduates better prepared for the profession. The general systems theory framework outlines the importance of examining often overlooked non-nursing components of nursing programs and determining their impact on nursing program outcomes.

Background

In this study, I addressed which, if any, non-nursing courses impact NCLEX-RN pass-rates. No studies have examined the relationship between non-nursing courses and NCLEX-RN first-time pass-rates in multiple nursing programs. Simon et al. (2013) examined general education courses, transfer credit, and GPA to predict scores on an NCLEX predictor exam in BSN students. Higgins (2005) studied general education in ADN nursing programs and their prediction of success on NCLEX-RN pass-rates. The only significant predictor of success that Simon et al. (2013) found on the NLN exam was

transferred credit, while Higgins (2005) found a correlation between anatomy and physiology I and NCLEX-RN pass-rates. Unfortunately, both studies are outdated, with data from 1999-2000 and 2001-2004 respectively, and both conducted in only one nursing program (Higgins, 2005; Simon et al., 2013). Schooley and Kuhn (2013) more recently examined NCLEX-RN pass-rates and corroborated the findings by Higgins (2005) that anatomy and physiology grades correlate with nursing school success and likely NCLEX-RN pass-rates. The association of high first-time NCLEX-RN pass-rates and science courses has also been found by Alameida et al. (2010), Koestler (2015), Serembus, (2016) and Simon et al. (2013). The results of other studies on non-nursing course grades and NCLEX-RN success are mixed. Additional studies in ADN programs from across the United States may help predict NCLEX-RN first-time pass-rates and refine a model that can increase the effectiveness of nursing program curricula.

Several studies identified the need for research on correlations between NCLEX-RN first-time pass and program design, and for current, well-designed research that looks at non-nursing courses (Giddens & Meyer, 2016; Higgins, 2005; Jayasekara, Schultz, & McCutcheon, 2006; Penprase & Harris, 2013; Rogers, 2009). Research that can predict success on NCLEX-RN may increase consistency among nursing programs and allow nurse educators to make evidence-based decisions when deciding which courses to include in nursing curricula. Increased consistency and evidence may significantly impact the effectiveness and efficiency of nursing program development (Penprase & Harris, 2013). Several authors also suggested future research address comparisons of nursing curricula among programs with high and low NCLEX pass-rates to help develop more

information to help the nursing faculty determine the best construction for nursing programs (Higgins, 2005; Penprase & Harris, 2013).

Problem Statement

ADN programs have a strong nursing core, but they also have a pervasive inconsistency and lack of an evidence-based foundation for the choice of non-nursing courses included in the programs (Future of Nursing, 2015; Giddens & Meyer, 2016; Schwarz & Leibold, 2014). Nurse educators make decisions about prerequisite and corequisite courses that their students must take to complete their nursing program. Nursing faculty in accredited programs are under pressure to ensure that students are achieving their ADN degree within five semesters for ACEN accreditation requirements (Tanner, 2013), so each course that a student takes should assist the student to become a better nurse and provide a pathway to passing the NCLEX-RN on the first attempt. Although nursing faculty may not have full control over the types of the courses that are required for the degree such as math, humanities, social science, and natural science courses because degree requirements determined the need for these courses (Fagette, Chen, Baran, Samuci, & Mohammad, 2013; Giddens & Meyer, 2016; LeBlanc, 2015; Robertson, 2013), nursing faculty often have some influence on the courses that can be utilized to meet general education and degree requirements.

There is minimal research published about which non-nursing courses increase favorable first-time NCLEX-RN pass-rates. NCLEX-RN first-time pass-rates are a valuable indicator of the ability of the nursing program to create competent graduates and are one measurement of the effectiveness of a nursing program (Benner, Sutphen,

Leonard, & Day, 2010; Davenport, 2007; De Lima, London, & Manieri, 2011; Hackney, 2017; Harding, 2010; Homard, 2013; Libner & Kubala, 2017; Lockie, Van Lanen, & McGannon, 2013; McDowell, 2008; Pennington & Spurlock, 2010; Schooley & Kuhn, 2013; Serembus, 2016; Simon et al., 2013; Trofino, 2013; Yeom, 2013). Although some studies have examined grades in specific courses to see if they correlate with an NCLEX predictor exam (Chem & Bennett, 2016; Daley, Kirkpatrick, Frazier, Misook, & Moser, 2003; Elder, Jacobs, & Fast, 2015; Higgins, 2005; Jeffreys, 2007; Lockie et al., 2013; Penprase & Harris, 2013; Schooley & Kuhn, 2013; Shaffer & McCabe, 2013; Simon et al., 2013; Trofino, 2013; Wambuguh, Eckfield, & Van Hofwegen, 2016), no studies have looked at multiple programs to see if specific courses are determinate of NCLEX first-time pass-rates.

In the past few years, the Future of Nursing: Campaign for Action has created a think tank to determine which courses should be considered foundational for BSN programs (2015). The think tank is necessary because little research is available to make evidence-based decisions regarding foundational coursework for nursing students. However, the think tank has identified the most frequently included courses in current nursing programs, categorized the courses into disciplines, and recommended sets of courses for general education in BSN programs (Future of Nursing, 2015). Research on the most effective general education courses to include in nursing programs was not included in the report, likely because it does not currently exist.

The lack of research on this topic is further exemplified by one study that cited the importance of non-nursing courses as “essential” to meeting the program outcomes

(Davis, 2011). The only rationale that the non-nursing courses included in the program were essential was that the courses were similar to the courses included in other nursing programs in the state (Davis, 2011). Studying general education in nursing ADN programs can help to guide nurse educators when updating and making important decisions about curricula that affect students' time and money.

Purpose of the Study

The purpose of this quantitative study was to determine if there is a combination of courses that will enhance NCLEX-RN first-time pass-rates in accredited ADN programs. The examination of the impact of individual courses or a combination of non-nursing courses on first-time NCLEX-RN pass-rates answered this question. I conducted the study on accredited ADN programs across the United States to provide a broad sample.

Research Questions and Hypotheses

Research Question 1 (RQ1): What impact do non-nursing courses in an ADN curriculum have with first-time NCLEX-RN pass rate?

Null Hypothesis (H_0): Individual non-nursing courses in an ADN curriculum do not have a statistically significant impact with first-time NCLEX-RN pass-rates.

Alternative Hypothesis (H_a): Individual non-nursing courses in an ADN curriculum have a statistically significant impact on first-time NCLEX-RN pass-rates.

Research Question 2 (RQ2): What is the impact of a discipline-specific set of non-nursing courses and first-time NCLEX-RN pass rate?

Null Hypothesis (H_02): There is no statistically significant impact between discipline-specific non-nursing courses in an ADN curriculum and first-time NCLEX-RN pass-rates.

Alternative Hypothesis (H_a2): There is a statistically significant impact between discipline-specific non-nursing courses in an ADN curriculum and first-time NCLEX-RN pass-rates.

Research Question 3 (RQ3): Does an overall set of non-nursing courses in an ADN program impact higher NCLEX-RN pass-rates versus low NCLEX-RN pass-rates?

Null Hypothesis (H_03): No difference in non-nursing courses will be found between ADN programs with high first-time NCLEX-RN pass-rates and low NCLEX-RN pass-rates.

Alternative Hypothesis (H_a3): A difference in non-nursing courses will be found between ADN programs with high first-time NCLEX-RN pass-rates and low NCLEX-RN pass-rates.

Theoretical and Conceptual Framework

The general systems theory was originally described by Von Bertalanffy (1969) and applied to various systems, including nursing (Putt, 1978). The theory has also been used in nursing education research (Carrick, 2011; Simon et al., 2013). The general systems theory has input, throughput, and output, which lead to feedback, all of which take place in an environment. I used the general systems theory (Putt, 1978; Von

Bertalanffy, 1969) as it was used in the Simon et al. (2013) as the basis of this study.

Nurses have been using general systems theory in nursing education and research for many years (Putt, 1978). Carrick (2011) and Simon et al. (2013) recently used the theory in nursing education.

The use of systems theory and the description of systems theory in Carrick (2011) and Simon et al. (2013) helped to explain why nurse educators should examine all aspects of nursing education. One research study may not be able to look at all the different systems simultaneously but isolating an only previously cursorily researched part of the nested system can help to understand the broader nursing education system as a whole. This approach of isolating and studying a potential subsystem of a more extensive system was consistent with the descriptions of the use of general systems theory in research (Putt, 1978; Von Bertalanffy, 1969). General systems theory allows the understanding that although multiple variables impact NCLEX-RN success, examining a part a subset of the larger system can increase the understanding of the system as a whole. The potential to discover an important subsystem, non-nursing course's impact on NCLEX-RN success, does exist and should be determined.

The theories that I considered for this study included continuous quality improvement (CQI), systems thinking and complexity science (STCS), and Popoola's holistic praxis model (2012). I eliminated Popoola's holistic praxis model as a fit for the dissertation because although it discusses a use for a nursing curriculum framework, the model only addresses nursing courses (2012). The holistic praxis model did not include non-nursing courses (Popoola, 2012).

The second framework I eliminated for use in the dissertation was CQI because the phases of Plan, Do, Study, and Act represent a continuous feedback loop (Brown & Marshall, 2008; Serembus, 2016). This study did not include a feedback loop, so CQI was not a good fit. The model appeared to be very useful in assisting nursing program changes (Brown & Marshall, 2008; Serembus, 2016). The CQI model could be used for individual nursing program review if the information in the dissertation causes a nursing program to change, but the model was not a good fit because I was not changing current nursing program curricula in the dissertation.

Systems theory and complexity science (STCS) was the final theory I considered for the dissertation. STCS is described by Gates (2016) as having six components that may or may not be sequential: (a) supporting social program solving, (b) framing an intervention and its context, (c) selecting and using methods, (d) engaging in valuing, (e) producing and justifying knowledge, and (f) facilitating use. James (2010) also described the use of complexity science in nursing education as an important theory to drive nursing education curricula. However, this study did not include an intervention, which would have resulted in utilization of only a few phases and tenets of this framework. If I had determined the inclusion of appropriate non-nursing courses in nursing programs for optimal NCLEX-RN pass-rates, then STCS could be used to study the outcomes of the program change.

This study did not include input, or the personal system of the student, or the throughput of the student's interpersonal system. In the study, I analyzed the throughput of the non-nursing courses taken as part of the associate degree in nursing curriculum and

the output of first-time NCLEX pass-rates. The environment was an Accreditation Commission for Education in Nursing (ACEN) accredited ADN nursing program. The feedback was information provided through the study and output can then be utilized to influence future input, such as prerequisite work before entering the nursing program, as well as throughput, such as the courses to include in the ADN program to increase the output of favorable first-time NCLEX pass-rates. Chapter 2 consists of a more thorough description of general systems theory in nursing and its use in this study. (Figure 1).

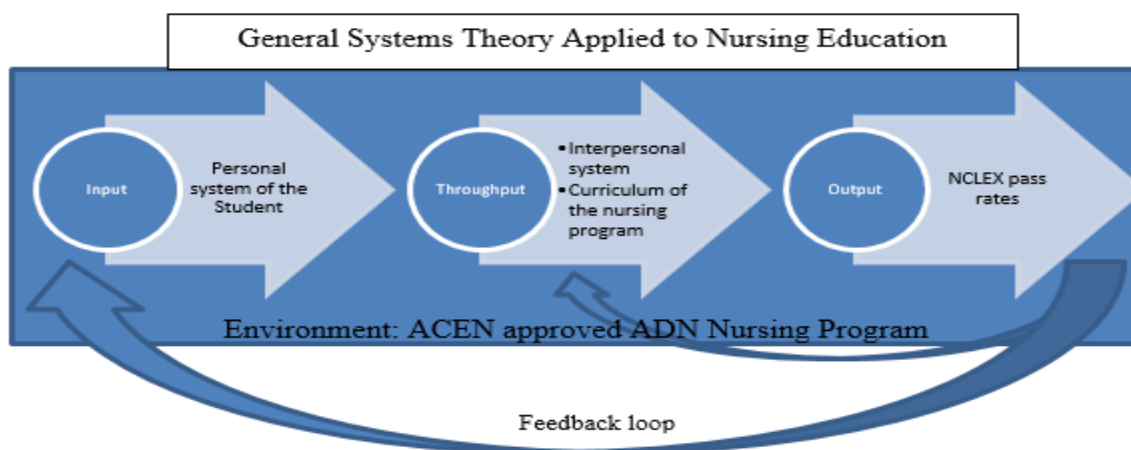


Figure 1. General Systems Theory in Nursing Education.

Input defined as student characteristics, throughput defined as the student's interpersonal system and the entire nursing curriculum, and output defined as first-time NCLEX-RN pass-rates. The environment is ACEN accredited ADN programs.

Nature of the Study

I used a quantitative approach in this predictive quasi-experimental study and used ANOVA to determine if any non-nursing courses or combinations of non-nursing courses NCLEX-RN pass-rates. ANOVA analysis was appropriate because the dependent variable was NCLEX-RN pass-rates, which was scale and the independent variables are

the inclusion of a particular class in the nursing program, which is nominal. Each ANOVA included several different independent variables, depending on the data that was collected and cleaned. For example, if data revealed that some nursing programs had a combined anatomy and physiology course for 5 credit hours, some nursing programs had a combined anatomy and physiology course for 4 credit hours, others required separated anatomy and physiology I and II courses for a total of 8 credit hours, and additional programs required an anatomy course and a physiology course for a combination of 8 hours, resulting in was four independent variables in the ANOVA. Completion of the tests occurred several times to compare the programs that included a particular course to those who did not include a particular course (or a specific combination of courses in a discipline, such as science).

I used comparative analysis to answer the research questions related to outcomes of programs that either included or did not include specific courses. I reviewed course catalogs for consistency among course descriptions when determining equivalencies among courses. If ADN programs with a specific course, such as microbiology, are more likely to have first-time NCLEX-RN pass-rates higher than programs without microbiology, then a significant correlation might exist between microbiology and NCLEX-RN success. The same analysis was valid for a disciplinary set of courses, such as general biology and microbiology. The course's discipline remained consistent with the Future of Nursing: Campaign for Action recommendations, which included basic science, social science, human science, communications, English, humanities, fine arts, mathematics, history, and statistics/logic (2015). The programs with a specific

combination of courses in a discipline were compared to those that do not have the combination.

I planned to use the results of the initial ANOVA analyses in a factorial logistic regression analysis to determine if a specific curriculum, excluding core nursing courses, can predict NCLEX-RN first-time success. Other studies have utilized regression analysis to look at predictors of NCLEX-RN success, but no other studies have looked at multiple programs and their inclusion or exclusion of specific courses and sets of courses. However, the ANOVA analyses did not provide any significant courses or sets of courses, so the factorial logistic regression analysis was not completed.

Definitions

NCLEX-RN first-time pass-rates and non-nursing courses were the variables for the dissertation.

NCLEX-RN First-Time Pass-rates: The first-time pass-rates for nursing programs is a percentage that includes the number of students who pass the licensure exam on their first attempt divided by the number of students who are eligible to take the licensure exam after graduating the nursing program. The study only included nursing programs in the United States. Therefore, the “First-time, US Educated, Associate Degree” pass-rate is the national average NCLEX-RN pass-rate for comparison is the dissertation. The percentage must be publicly available as of July 2016, per accreditation standards (Accreditation, n.d.).

Non-nursing Course: The definition of non-nursing course was any course that was not a core nursing course and was required by the program plan of study. This

definition included any course that does not have a NURS or equivalent prefix associated with the course. One exception was pathophysiology, which sometimes has a biology prefix and other times had a NURS prefix.

Assumptions

My assumptions in this study included that the accredited nursing programs are similar due to having met the curriculum standards required for ACEN accreditation and that the differences among the ADN programs will not substantially affect the outcomes of the research. The need to compare different nursing programs across the nation and the endless number of variables necessitated this assumption. In this dissertation, I only looked at the programs as a whole and did not include any student variables nor any variables of the location of the program. Randomization, large sample size, and statistical analysis helped to control for these variables.

Scope and Delimitations

The delimitations were the inclusion of only ACEN-accredited nursing programs to ensure some consistency in the rigor of the programs and enhance internal validity. The focus of the study was limited to non-nursing courses in ADN programs. Excluding other types of registered nursing programs, such as bachelor of science in nursing and diploma programs helped to decrease the inconsistencies among programs and the resulting confounding variables. Additionally, the statistical analyses chosen were correct for some unknown variables.

I utilized a simple random sample using the random digits appendix in Frankfort-Nachmias, Nachmias, and DeWaard (2015). This sampling method removed any

systematic sampling bias the selection procedure and allowed the results to be more representative of the entire population. The generalizability of the study results was high. A probability sampling design was appropriate for this study because a complete list of the Accreditation Commission for Education in Nursing (ACEN) accredited ADN nursing programs was on the ACEN website (2013).

The data that I collected included the non-nursing courses listed in the ADN program's curriculum as well as the program's NCLEX-RN first-time pass-rates for the 2016 exam version. The time-frame for collection included information from 2017 pass-rates for each program and the catalog requirements for the previous 2–3 years, which would show the required courses for the students graduating and taking NCLEX-RN in 2017.

Limitations

The limitation of the study was that it was not possible to control for all the different variables among nursing programs, which can compromise internal validity. The scope of the study only addressed program-level information and excluded individual student variation. Attempts to address these limitations were described previously and included limiting the study to just ACEN accredited ADN programs, only using one form of the NCLEX-RN by limited the data to one year, statistical analysis on a large sample size, and randomization of the sample.

The sample was of programs, not human subjects, avoiding most bias types. However, my bias, specifically when identifying similar non-nursing courses, could have caused an error in analysis. Therefore, any courses that were not traditionally named,

such an English composition, required reading the course description to clarify the content of the course.

Significance

The results of this study have the potential for positive social change through increasing the evidence-based knowledge from which faculty can base their curriculum decisions. The ability to know which, if any, non-nursing courses increase NCLEX-RN pass-rates will allow faculty to make thoughtful, data-driven decisions (Laureate, 2015). Nursing faculty can be empowered to decide what courses to include and have credible information to present to their peers to persuade changes to required courses outside of the nursing faculty's control when revising a nursing curriculum.

The potential to know which non-nursing courses increase NCLEX-RN pass-rates will allow faculty to make evidence-based curricular decisions. The results of the study may increase the likelihood of more uniform coursework in ADN programs, which will help to streamline the transition from ADN to BSN education. An increase in consistency of courses required in ADN programs is necessary to increase the number of BSN prepared registered nurses (Close, Gorski, Sroczyński, Farmer, & Wortock, 2015; Farmer et al, 2017; Giddens & Meyer, 2016; Gorski, Farmer, Sroczyński, Close, & Wortock, 2015; Green, Beal, Flemming, & Cater, 2011; Koestler, 2015). More students can enter BSN completion programs with a similar educational background.

NCLEX-RN first-time pass-rates are vital to the status of nursing programs. Compliance with state boards of nursing and accreditation standards depends on

NCLEX-RN first-time pass-rates. Also, NCLEX-RN pass-rates strongly influence nursing programs' reputations and recruitment (DiBartolo & Sledonridge, 2005; Haas et al., 2003; Hackney, 2017; Harding, 2010; Langford & Young, 2013; Trofino, 2013; Yeom, 2013).

Additionally, any decrease in NCLEX-RN first-time pass-rates can have a significant influence on former nursing students and employers. The graduate that fails on the first attempt can have financial and personal losses. The graduate can lose months of registered nursing wages and have to begin to repay student loans as well as pay to retest (Roa, Shipman, Hooten, & Carter, 2011). The graduate may also experience a sense of failure, embarrassment, and lack of self-esteem and confidence when the licensure exam is not passed on the first attempt (Roa et al., 2011). Many employers hire nursing graduates expecting the new employee to pass the NCLEX-RN on the first attempt. When this does not happen, the employer will need to replace the RN care that the new-hire was meant to fulfill, often with a more expensive employee because of overtime or seniority (Roa et al., 2011).

During the data collection process, I had to contact particular college representatives to clarify information about their nursing program courses and pass-rates. Building rapport and relationships through these communications will allow dissemination of the data generated from the study and potentially increase the information's use (Callahan et al., 2012). Therefore, the findings from this study may contribute to positive social change by providing evidence for nursing faculty to

determine which courses to choose to optimize the nursing student's outcomes to benefit students, colleges, and employers.

Summary

The dissertation was a predictive quasi-experimental study to determine if there was a best-fit model of non-nursing courses that enhance NCLEX-RN outcomes can give nursing faculty the evidence that they require to make informed decisions to provide efficient and effective education to their ADN students. General systems theory was the framework that explicitly illustrated the need for data-driven feedback to enhance the output of ACEN accredited ADN programs. Despite the limitations of the study which included uncontrollable variables, the large sample size, boundaries, and methodology of the study assist in ensuring the validity of the research. The need for a multi-program examination of non-nursing courses in ADN programs and their impact on NCLEX-RN pass-rates is evident as a gap in the literature. All studies on non-nursing courses' effect on NCLEX-RN pass-rates included only one program and data gathered before or during 2014 (Beeman & Waterhouse, 2001; Beeson & Kissling, 2001; Chen & Bennett, 2016; Daley et al., 2003; Elder et al., 2015; Higgins, 2005; Jeffreys, 2007; Lockie et al., 2013; Penprase & Harris, 2013; Schooley & Kuhn, 2013; Seldomridge & DiBartolo, 2004; Shaffer & McCabe, 2013; Simon et al., 2013; Trofino, 2013; Wambuguh, Eckfield, & Van Hofwegen, 2016; Yin & Burger, 2003). Additionally, only a small portion of the studies identifying predictors of NCLEX-RN success have been completed in ADN nursing programs, although these programs provide a more significant proportion of graduates sitting for licensure exam each year (Chen & Bennett, 2016; Higgins, 2005;

Jeffreys, 2007; Schooley & Kuhn, 2013; Shaffer & McCabe, 2013; Trofino, 2013; Yin & Burger, 2003). Chapter 2 includes more information on the literature existing related to enhancing NCLEX-RN pass-rates and the use of general systems theory in nursing.

Chapter 2: Literature Review

Introduction

The purpose of this quantitative study was to determine if there is a combination of courses that will enhance NCLEX-RN first-time pass-rates in accredited ADN programs. I answered this question by examining the impact of individual courses or a combination of courses, excluding core nursing courses, on first-time NCLEX-RN pass-rates. I planned to utilize any significant results to determine if the establishment of a predictive model for increased NCLEX-RN pass-rates was possible. I conducted this study on accredited ADN programs from across the United States to provide an examination of many programs. I compared the NCLEX-RN pass-rates between programs containing a specific non-nursing course and those not containing the specific non-nursing course.

The need for research and evidence-based decision making regarding the courses to include in ADN programs and the need to better understand predictors of NCLEX-RN success has been cited (Giddens & Meyer, 2016; Pennington & Spurlock, 2010; Romeo, 2013). Schwarz and Leibold (2014) and Giddens and Meyer (2016) provided a strong argument for an increase in consistency among ADN curricula to promote progression to BSN completion programs. Koestler also discussed the need for a seamless transition from RN to BSN to improve nursing education (2015). Enhancement of the transition from an associate degree to a bachelor degree necessitates research dedicated to determining the best courses to be included in nursing curricula at the ADN level. The need for uniformity and research to determine appropriate courses outside of the core

nursing courses echoes the recommendations from Close, Gorski, Sroczyński, Farmer, and Wortock (2015), Higgins (2005), and Schooley and Kuhn (2013). Additionally, the need to study the number of science courses was discussed by Wolkowitz and Kelley (2010) because of the positive correlation between science and NCLEX-RN pass-rates.

Information gathered from other types of nursing programs and predictors of success are also significant to consider when developing a research study on non-nursing courses and NCLEX-RN pass-rates. Recent literature included discussion about the need for more research on predictors of first-time NCLEX-RN success (e.g. Chen & Bennett, 2016; Giddens & Meyer, 2016; Hackney, 2017; Johnson, Sanderson, Wang, & Parker, 2017; McCarthy, Harris, & Tracz, 2014; Penprase & Harris, 2013; Robert, 2018; Romeo, 2013; Trofino, 2013; Yeom, 2013). Several studies completed on predictors of NCLEX-RN success have included different types of nursing programs such as accelerated second-degree programs (Penprase & Harris, 2013), BSN programs (Beeman & Waterhouse, 2001; Beeman & Waterhouse, 2003; Beeson & Kissling, 2001; Carr, 2010; Daley, Kirkpatrick, Frazier, Misook, & Moser, 2003; Elder, Jacobs, & Fast, 2015; Homard, 2013; Johnson et al., 2017; Kaddoura, Flint, Van Dyke, Yang, & Chiang, 2017; Lockie, Van Lanen, & McGannon, 2013; McCarthy et al., 2014; Penprase & Harris, 2013; Seldomridge & DiBartolo, 2004; Shaffer & McCabe, 2013; Simon, McGinnis, & Krauss, 2013; Ukpabi, 2008; Uyehara, Magnussen, Itano, & Zhang, 2007; Wambuguh et al., 2016; Yeom, 2013), and ADN programs (Beeson & Kissling, 2001; Chen & Bennett, 2016; De Lima, London, & Manieri, 2011; Higgins, 2005; Jeffreys, 2007; Penprase & Harris, 2013; Pullen, 2017; Robert, 2018; Romeo, 2013; Schooley & Kuhn, 2013; Shaffer

& McCabe, 2013; Simon et al., 2013; Trofino, 2013; Yin & Burger, 2003). Only two studies examined multiple programs, with one investigating the Health Education Systems Incorporates (HESI) Exit Exam as a predictor of NCLEX-RN success in diploma, ADN, and BSN programs (Langford & Young, 2013) and the other examining the ATI TEAS test on all types of nursing programs (Wolkowitz & Kelley, 2010). Both studies found positive correlations between standardized testing and NCLEX-RN pass-rates.

In addition to non-nursing courses, the predictors of NCLEX-RN success investigated in the literature included different grade point averages (GPAs), standardized tests, individual student factors, and nursing course grades. Several researchers examined pre-nursing GPA (Jeffreys, 2007; McCarthy et al., 2014; Seldomridge & DiBartolo, 2004; Uyehara et al., 2007; Wambuguh et al., 2016), nursing GPA (Beeman & Waterhouse, 2001; Haas, Nugent, & Rule, 2003; Jeffreys, 2007; Romeo, 2013), and cumulative program GPA (Beeson & Kissling, 2001; Chen & Bennett, 2016; Daley et al., 2003; De Lima, 2011; Haas et al., 2003; Homard, 2013; Kaddoura et al., 2017 Ukpabi, 2008). The majority of studies found a positive correlation between pre-nursing course GPA and NCLEX-RN success (Beeson & Kissling, 2001; Jeffreys, 2007; McCarthy et al., 2014; Seldomridge & DiBartolo, 2004; Wambuguh et al., 2016). However, Wambuguh et al. (2016) only examined preadmittance science GPA and not overall pre-nursing GPA when researching GPA impact on NCLEX-RN pass-rates. Only Uyehara et al. (2007) found no correlation between pre-nursing GPA and NCLEX-RN pass-rates in a BSN program. Beeman and Waterhouse (2001) and Jeffreys (2007) both determined that

a lower GPA in nursing theory was a predictor of NCLEX-RN failure. Gilmore (2008), Haas et al. (2003), and Romeo (2013) found that a higher nursing GPA predicted a higher rate of NCLEX-RN first attempt success. Cumulative GPA was found to be a predictor of success by Daley et al. (2003), Chen and Bennett (2016), and Beeson and Kissling (2001). These findings balanced the almost equal number of studies finding no correlation between NCLEX-RN pass-rates and cumulative GPA (De Lima, 2011; Gilmore, 2008; Haas et al., 2003; Ukpabi, 2008). Additionally, Kaddoura et al. (2017) found that a decrease in cumulative GPA negatively correlated with NCLEX-RN pass-rates. The impact that GPA has on NCLEX-RN pass-rates indicates a potential for non-nursing courses to be a significant predictor of success.

Standardized testing is an extensively studied predictor of success. The most commonly cited standardized tests are the HESI exit exam (De Lima et al., 2011; Harding, 2010; Higgins, 2005; Johnson et al., 2017; Kaddoura et al., 2017; Langford & Young, 2013; Schooley & Kuhn, 2013), National League of Nursing (NLN) tests (Ukpabi, 2008), Assessment Technologies Institute (ATI) tests (Chen & Bennett, 2016), and program entrance exams (Chen & Bennett, 2016; Higgins, 2005; McCarthy et al., 2014; Robert, 2018; Trofino, 2013; Ukpabi, 2008; Wambuguh et al., 2016). All researchers who examined the HESI exit exam (De Lima et al., 2011; Higgins, 2005; Johnson et al., 2017; Kaddoura et al., 2017; Langford & Young, 2013; Schooley & Kuhn, 2013) and the ATI comprehensive exam (Chen & Bennett, 2016) found that the exams positively correlated with NCLEX-RN first-time pass-rates. Johnson et al. (2017) found that several HESI course exams were predictors of NCLEX-RN success. Robert (2018)

discovered that the HESI entrance exam was also a predictor of NCLEX-RN success. Additionally, Homard (2013) discussed the positive correlation between an increase in standardized testing throughout the program and NCLEX-RN pass-rates. Ukpabi (2008) also found positive associations with specific NLN and ATI tests and NCLEX-RN pass-rates. All but one study conducted by Chen and Bennett (2016) found a positive correlation between either the whole entrance exam, primarily ATI Test of Essential Academic Skills, or subscores of the entrance exam and NCLEX-RN pass-rates (Higgins, 2005; McCarthy et al., 2014; Trofino, 2013; Ukpabi, 2008; Wambuguh et al., 2016; Wolkowitz & Kelley, 2010). Although all the standardized tests are potential predictors of NCLEX-RN success, the ATI TEAS is of interest because non-nursing courses are related to the subject areas included in the test.

Student grades in nursing courses were also examined for correlation with NCLEX-RN first-time pass-rates (Daley et al., 2003; De Lima et al., 2011; Trofino, 2013). Medical-surgical nursing course grades were found to be a predictor of NCLEX-RN success by Daley et al. (2003) and Trofino (2013). De Lima et al. (2011) identified a negative correlation between failing nursing courses with clinical components and NCLEX-RN success. Furthermore, Robert (2018) found that completing the ADN program within the prescribed two years was a predictor of NCLEX-RN success on the first attempt. While this information is helpful to nurse educators, it did not have a direct impact on this study because all programs included information covered in medical-surgical nursing courses, a core nursing course, not a non-nursing course.

Additionally, Beeman and Waterhouse (2003), Hackney (2017), and Wambuguh et al. (2016) studied numerous individual student factors for their impact on NCLEX-RN success. Beeman and Waterhouse (2003) looked at post-graduate factors predicting licensure exam success and found that the number of hours the graduate worked between graduating and taking the licensure exam negatively correlated with passing the NCLEX-RN. Hackney (2017) did not find any correlation between intrinsic and extrinsic motivation and NCLEX-RN success. Wambuguh et al. (2016) did not find any relationships between healthcare experience or a previous degree and NCLEX-RN success. I did not take any individual student factors into account because the population was entire programs. The data that some individual student variables did not impact NCLEX-RN first-time pass-rates decreases the number of interfering variables expected in the dissertation.

Literature Search Strategy

For this literature review, I used multiple strategies. I utilized several search terms for each major topic in the dissertation (see Tables 1 & Table 2). After collection of the initial articles, I read each of the article's references lists, selected additional articles, and repeated the process until I achieved of saturation. I only included articles after the year 2000 unless the older article was deemed essential. The NCLEX-RN has changed significantly over the past 17 years, so articles written before 2000 were not applicable to the dissertation content regarding pass-rates. I did include older articles in the research of general systems theory.

Table 1

Databases and Search Terms for Curriculum and NCLEX Pass-Rates

	Curriculum and NCLEX pass*	Curricul* and NCLEX pass*	Nursing education and NCLEX pass*
Academic Search Complete	✓	✓	✓
Business Source Complete			✓
CINAHL Plus with Full Text	✓	✓	✓
Cochrane Central Register of Controlled Trials	✓	✓	✓
Cochrane Database of Systematic Reviews	✓	✓	✓
Education Source	✓	✓	✓
ERIC	✓	✓	✓
Library, Information Science, and Technology Abstracts	✓	✓	✓
MEDLINE with Full Text	✓	✓	✓
Ovid Nursing Journals Full Text	✓	✓	✓
ProQuest Health & Medical Collection	✓	✓	✓
ProQuest Nursing & Allied Health Source	✓	✓	✓
Primary Search	✓	✓	✓
PsychARTICLES	✓	✓	✓
PsychEXTRA	✓	✓	✓
PsycINFO	✓	✓	✓
PubMed	✓	✓	✓
Research Starters-Education	✓	✓	✓
Teacher Reference Center	✓	✓	✓

Theoretical Foundation and Conceptual Framework

I used general systems theory to describe the need to look at all parts of a system as represented in the dissertation by looking at non-nursing courses. Non-nursing courses and NCLEX-RN pass-rates have never been isolated and studied across multiple nursing programs to see if an important subsystem exists inside of the more substantial nursing

education system. As reiterated by Rousseau (2015), concrete things are either a system or part of a system. Therefore, the non-nursing courses and NCLEX-RN first-time pass-rates are part of a system and could be a subsystem if a relationship between them exists (Caws, 2015).

Table 2

Databases and Search Terms for Nursing and Systems Theory

	Nursing and System*	Nursing and Systems Theory	Nur* Education and System* Theory
Academic Search Complete	✓	✓	✓
Business Source Complete	✓	✓	✓
CINAHL Plus with Full Text	✓	✓	✓
Cochrane Central Register of Controlled Trials	✓	✓	✓
Cochrane Database of Systematic Reviews	✓	✓	✓
Education Source	✓	✓	✓
ERIC	✓	✓	✓
Library, Information Science, and Technology Abstracts	✓	✓	✓
MEDLINE with Full Text	✓	✓	✓
Ovid Nursing Journals Full Text	✓	✓	✓
ProQuest Health & Medical Collection	✓	✓	✓
ProQuest Nursing & Allied Health Source	✓	✓	✓
Primary Search	✓	✓	✓
PsychARTICLES	✓	✓	✓
PsychEXTRA	✓	✓	✓
PsycINFO	✓	✓	✓
PubMed	✓	✓	✓
Research Starters-Education	✓	✓	✓
Teacher Reference Center	✓	✓	✓

Nursing education research has included general systems theory. Carrick (2011) examined nursing programs in the context of general systems theory. However, the article was a literature review and not primary research, so the cited research sources were outdated from 2001-2009 and examined only core nursing courses. Carrick (2011) did not include any support classes, which are part of the learning system. Simon et al. (2013) described nursing education as a system of input, throughput, and output, all in an environment. Input was the students upon admission, which I did not individually consider, throughput was the curriculum, which in this dissertation, represented non-nursing courses, and output was NCLEX-RN first-pass-rates of the nursing program (Simon, 2009; Simon et al., 2013). The environment was an ACEN accredited ADN nursing program (Simon, 2009; Simon et al., 2013).

Isolating a potential subsystem of a larger system was consistent with the research application of general systems theory (Caws, 2015; Putt, 1972; Simon, 2009; Von Bertalanffy, 1969 & 1972). The entire nursing education system would be extremely difficult to study because of the individual variations in input and throughput as evidenced by the variations in individual students or admission requirements as well as teaching techniques and nursing coursework. However, I used whole programs, not individual students and the rigorous requirements of ACEN accreditation increased control in the throughput and environment. Examination of the throughput of non-nursing courses and output of NCLEX-RN first-time pass-rates assisted in determining if these variables were a significant subsystem of the nursing education system.

Literature Review Related to Key Variables and Concepts

In this study, I addressed which, if any, non-nursing courses impact NCLEX-RN pass-rates. No studies have included an examination of the relationship between non-nursing course inclusion in a program and NCLEX-RN first-time pass-rates. However, several researchers have examined non-nursing course grades and NCLEX-RN success in one program.

Non-nursing Courses

Non-nursing courses included all classes that a nursing program requires that were not core nursing courses. Non-nursing courses are often general education courses, which are essential to the foundation and overall education of college students (Guertin, 2015; Pullen, 2017; Robertson, 2013). However, determining which non-nursing courses are helping nursing students be successful in their licensure examination would be helpful in creating effective and efficient ADN programs (Close et al., 2015; Higgins, 2005; Robertson, 2013; Schooley & Kuhn, 2013; Wolkowitz & Kelley, 2010). The most researched courses are science courses, including Biology, anatomy and physiology, Chemistry, Microbiology, and Pathophysiology.

Biology. Beeman and Waterhouse (2001), Simon et al. (2013), and Wambuguh et al. (2016) all found a positive correlation between general biology grades and NCLEX-RN success. However, one study stated that the nursing curriculum overrode the positive correlation (Simon et al., 2013).

Anatomy and physiology. Most of the studies did result in the identification of a relationship between at least one anatomy and physiology course grade and NCLEX-RN

success. Elder et al. (2015), Higgins (2005), Jeffreys (2007), Wambuguh et al. (2016), and Yin and Burger (2003) all found a positive correlation between anatomy and physiology I and NCLEX pass-rates. Beeman and Waterhouse found physiology to positively correlated with NCLEX-RN success (2001). Both anatomy and physiology I and II were found to have a predictive relationship with NCLEX-RN by Schooley and Kuhn (2013), and Shaffer and McCabe (2013). All of these positive findings were contradicted by the research findings of Higgins (2005) who did not find a correlation between anatomy and physiology II and NCLEX-RN pass-rates and Beeson and Kissling (2001), Daley et al. (2003), Gilmore (2008), and Trofino (2013), who found no correlation between anatomy and physiology I and II and NCLEX-RN success.

Chemistry. The research regarding chemistry course grades has been mixed, with an equal number of researchers finding chemistry as a predictor (Elder et al., 2015; Lockie et al., 2013; Wambuguh et al., 2016; Yin & Burger, 2003) and not a predictor (Daley et al., 2003; Higgins, 2005; Schooley & Kuhn, 2013; Seldomridge & DiBartolo, 2004) of NCLEX-RN success. Simon et al. (2013) did find that chemistry was a predictor of success, but that the nursing courses overrode the importance of the science courses, which could account for the mixed findings.

Microbiology. The researchers assessing the impact of microbiology grades on NCLEX-RN pass-rates also had mixed results but weighted toward a positive impact. Elder et al. (2015), Higgins (2005), Shaffer and McCabe (2013), Wambuguh et al. (2016), and Yin and Burger (2003) found microbiology grades to predict NCLEX-RN

success, while Beeson and Kissling (2001), Schooley and Kuhn (2013) and Trofino (2013), did not find a correlation.

Pathophysiology. Only four studies included an assessment of the impact of pathophysiology grades on NCLEX-RN success. Three of the researchers found a positive correlation (Beeman & Waterhouse, 2001; Elder et al., 2015; Seldomridge & DiBartolo, 2004), with one of the studies including pathophysiology in an ineffective predictive model for NCLEX-RN success that otherwise included nursing courses (Waterhouse & Beeman, 2003).

Other Non-Nursing Courses. The literature included other non-nursing course grades and NCLEX-RN first-time pass-rates. These courses included psychology, English, humanities, sociology, philosophy, nutrition, human growth and development, and math. The research results regarding these course grades primarily indicated no impact on NCLEX-RN, with a few exceptions.

Psychology. Two studies conducted by Penprase and Harris (2013) and Yin and Burger (2003), each found a positive correlation between general psychology grades and NCLEX-RN success. However, Beeson and Kissling (2001), Higgins (2005), Schooley and Kuhn (2013), Shaffer and McCabe (2013), and Trofino (2013) found no correlation. Only two of the studies, which happen to contradict each other, were performed on BSN program students (Beeson & Kissling, 2001; Penprase & Harris, 2013)

English. All researchers that investigated the impact of English grades on NCLEX-RN pass-rates found no correlation. Most of the studies were completed in ADN programs (Chen & Bennett, 2016; Higgins, 2005; Schooley & Kuhn, 2013; Shaffer &

McCabe, 2013; Yin & Burger, 2003), while only one was completed in a BSN program (Elder et al., 2015).

Humanities. One study, in a BSN program, also included humanities course grades in general and did not find a relationship between these grades and NCLEX-RN pass-rates (Elder et al., 2015).

Sociology. All of the studies including sociology course grades and NCLEX-RN pass-rates found no correlation (Beeson & Kissling, 2001; Daley et al., 2003; Schooley & Kuhn, 2013; Shaffer & McCabe, 2013). BSN programs (Beeson & Kissling, 2001; Daley et al., 2003) and ADN programs (Schooley & Kuhn, 2013; Shaffer & McCabe, 2013) were each the setting for two of the studies examining sociology.

Philosophy. Only one study, completed in a BSN program, included the examination of correlation between licensure exam pass-rates and philosophy grades, which was positive (Elder et al., 2015).

Nutrition. The two studies that included research on nutrition grades and NCLEX-RN success were both completed in ADN programs and did not find any correlation (Schooley & Kuhn, 2013; Shaffer & McCabe, 2013).

Human growth and development. One study found a correlation between lifespan psychology grades and NCLEX-RN pass-rates (Shaffer & McCabe, 2013) while two studies found no association (Beeson & Kissling, 2001; Trofino, 2013). Two studies were completed in ADN programs (Shaffer & McCabe, 2013; Trofino, 2013) and contradicted each other and the third study population was a BSN program (Beeson & Kissling, 2001).

Math. Only Seldomridge and DiBartolo examined statistics grades in a BSN program, and their results indicated no correlation between grades and NCLEX-RN first-time pass-rates (2004). Two other studies included an examination of math grades, one in a BSN program (Elder et al., 2015) and one in an ADN program (Robert, 2018), neither finding a significant correlation between math grades and NCLEX-RN first-time pass-rates.

NCLEX-RN First-Time Pass-rates

NCLEX-RN first-time pass-rates are a valuable indicator of the ability of the nursing program can create competent graduates and are one measurement of the effectiveness of a nursing program (Benner, Sutphen, Leonard, & Day, 2010; Davenport, 2007; De Lima et al., 2011; DiBartolo & Seldomridge, 2005; Haas et al., 2003; Hackney, 2017; Harding, 2010; Homard, 2013; Libner & Kubala, 2017; Lockie et al., 2013; McDowell, 2008; Pennington & Spurlock, 2010; Schooley & Kuhn, 2013; Serembus, 2016; Simon, McGinnis, & Krauss, 2013; Trofino, 2013; Yeom, 2013). Although a few authors have called for utilizing more than NCLEX first-time pass-rates for evaluating the effectiveness of a nursing program, all have also recognized that this change has not taken place yet, leaving pass-rates as the most cited measure of effectiveness (Giddens, 2009; O'Lynn, 2017; Taylor, Loftin, & Reyes, 2014). When NCLEX-RN first-time pass-rates decline, the nursing program can face a loss of accreditation and state board approval, as well as a decrease in enrollment and reputation (DiBartolo & Seldomridge, 2005; Haas et al., 2003; Hackney, 2017; Harding, 2010; Langford & Young, 2013; Trofino, 2013; Yeom, 2013). Additionally, the individual graduate who fails the licensure

exam can experience many adverse financial and emotional effects including a delay in earning a registered nurse's salary, needing to pay for the test again, and losing self-esteem and confidence (Langford & Young, 2013; Yeom, 2013). Chapter 3 contains specific research on the NCLEX-RN exam, as well as a discussion of validity and reliability.

Summary and Conclusions

The need for research predicting the NCLEX-RN first-time pass-rates and the impact of program design and non-nursing courses was evident in the literature (Giddens & Meyer, 2016; Higgins, 2005; Jayasekara, Schultz, & McCutcheon, 2006; Penprase & Harris, 2013; Rogers, 2009). Research that can be used to help predict success on NCLEX-RN to increase consistency among nursing programs and allow nurse educators to make evidence-based decisions when deciding which courses to include in nursing curricula can significantly impact the effectiveness and efficiency of nursing program development (Penprase & Harris, 2013). Several authors also suggested that future research address comparisons of nursing curricula among programs with high and low NCLEX pass-rates to develop more information to help the nursing faculty determine the best construction for nursing programs (Higgins, 2005; Penprase & Harris, 2013). This study is needed to fill the gap of current research on the impact of non-nursing courses on NCLEX-RN first-time pass-rates to provide an increase in evidence for determining nursing program curricula. Chapter 3 includes more research on the NCLEX-RN examination and a description of the methodology for the dissertation.

Chapter 3: Research Method

Introduction

In this study, I used a quantitative, predictive, quasi-experimental design with model-testing to determine if there was a combination of courses that enhance first-time NCLEX-RN pass-rates in ADN programs. Information gathered through this study may assist nursing faculty in making nursing program curricular decisions.

The primary analyses were independent *t*-tests and ANOVAs to determine if any general education courses or combinations of general education courses correlate with higher NCLEX-RN pass-rates. The independent *t*-tests and ANOVA were used to answer RQ1 and RQ2. The use of independent *t*-tests was appropriate because the test is valid when the independent variable has only two levels, while the ANOVAs were appropriate because the test is valid when the independent variables have more than levels and are included in multiple groups, such as the inclusion or exclusion of a particular course or set of courses (Green & Salkind, 2014). Additionally, I planned to use a factorial logistic regression analysis to answer RQ3 to determine how courses fit together in relationship to first-time NCLEX-RN pass-rates. However, no significant data resulted from the independent *t*-tests and ANOVA analyses, so the third research question could not be addressed with the data from this study. Other recent studies have utilized ANOVA (i.e. Homard, 2013; Landry, Davis, Alameida, Prive & Renwanz-Boyle, 2010; Schooley & Kuhn, 2013), multiple regression (i.e. Lockie, Van Lanen, & McGannon, 2013; Penprase & Harris, 2013; Simon, McGinniss, & Krauss, 2013), or logistic regression analysis (i.e. Kaddoura, Flint, Van Dyke, Yang, & Chiang, 2017; McCarthy, Harris, & Tracz, 2014;

Romeo, 2013; Trofino, 2013; Wambuguh, Eckfield, & Van Hofwegen, 2016; Yeom, 2013) to look at predictors of NCLEX-RN success, but no other studies have looked at multiple programs and their inclusion or exclusion of specific courses and sets of courses.

Research Design and Rationale

The quasi-experimental design using independent *t*-test and ANOVA was appropriate because the independent variables—non-nursing courses—are categorical and the dependent variable was scale.

N	O		
N	O		
N	O		
N	O		
N	O		
N	O	N	O
N	O		
N	O		
N	O		
N	O		

Figure 2. Research Design Notation.

The programs were split into two comparison groups, with one group of programs containing a particular non-nursing course and the other group of programs not containing the particular non-nursing course. The two groups' NCLEX-RN pass-rates were compared, and repetition of the process took place until examination of all non-nursing courses was complete. After I completed analyses of all courses and sets of courses, I planned to put the significant results into a factorial logistic regression to determine if one complete set of non-nursing courses is the best fit for predicting

NCLEX-RN success. However, I was not able to complete the factorial logistic regression analysis because the ANOVA results were not significant.

Additionally, I was not able to manipulate the independent variables, but the independent variables were the reason for dividing the groups into control (programs without the examined course) and comparison (programs with the examined course), and sometimes an additional comparison group (programs with a similar variation of the examined course). After the individual and discipline-specific sets of courses were analyzed to see if any are predictors of NCLEX-RN success, I planned to use an overall factorial logistic regression to determine if one curriculum correlated with NCLEX-RN success. However, I was not able to complete the factorial logistic regression analysis because the ANOVA results were not significant. No time constraints or resources are inherent in this study.

Methodology

Population

The population sample was all ACEN-accredited ADN programs in the United States, which was 714, with 161 programs randomly selected. The sample number was calculated using G*Power analysis for the first two research questions using ANOVA (Faul, Erdfelder, Lang, & Buchner, 2007). The information was secondary data via unobtrusive measures gathered from the colleges' websites. The websites contained the college catalogs, the plans of study for the nursing programs, as well as the published first-time NCLEX-RN pass-rates. ACEN accredited programs were required to publish NCLEX-RN pass-rates as of July 1, 2016, (Accreditation, n.d.).

Sampling and Sampling Procedures

I used a simple random probability sampling technique. I used the random digits appendix in Frankfort-Nachmias, Nachmias, and DeWaard (2015) for randomization of the sample selection. Frankfort-Nachmias et al. (2015) state that a random probability sampling method removes any systematic sampling bias from the selection procedure and allows the results to be more representative of the entire population. Therefore, I used a random probability sampling technique in my dissertation. A probability sampling design was appropriate for this study because the ACEN website includes a complete list of the ACEN accredited ADN nursing programs (ACEN, 2013). The population of ACEN accredited ADN programs as of January of 2018 was 714 (ACEN, 2013)

Trochim (2006) recommended a medium effect size, alpha level .05, and power .80 to determine the sample size for the ANOVAs. Therefore, I used these recommendations in the determination of sample size for the ANOVAs in this dissertation. I imputed these measures, as well as the likelihood of having three groups for most of the ANOVAs, in G*power analysis for the calculation of sample size. The alpha level, α , was the significance level, or the odds that the results of the analysis were due to chance and defined by the confidence level. The α level could have been 0.01, 0.05, or 0.1, but as the α increases so does the likelihood of identifying a false relationship, which is a Type I error and decreases the rigor of the analysis (Field, 2013). The 0.05 was selected to decrease the likelihood of a Type I error and keep rigor in the study. The power or odds of finding a relationship when there is an effect is often .80 in social science research (Field, 2013; Trochim, 2006). I used the power of .80 to decrease

the chance of a Type II error. The sample size estimate was 159, so the sample was 161. After reaching sample size and finalization of groups, recalculation of the number of groups and measurements determined the new sample size. Therefore, additional sample identification during random assignment was necessary for the contingency that a larger sample was determined.

I used G*power analysis to calculate the sample size for the logistic regression analysis to answer research question three. The α error probability was .05, the power was .80, and the odds ratio was 2.33. The estimated R^2 other X was .15. The result of the *a priori* analysis concluded that the total sample size must be at least 61. The sample size of 161 for RQ1 and RQ2 exceeded the required sample size for question three. The α of .05 and power of .80 respectively decreased the likelihood of identifying an effect when there was none, a Type I error, and not detected an effect when there was one, a Type II error.

The data included the courses listed in the ADN program's curriculum outside of the core nursing courses as well as the program's NCLEX-RN first-time pass-rates for the 2016 exam version. The time-frame for collection includes information from 2017 pass-rates for each program and the catalog requirements for the previous two years, which would show the required courses for the students graduating and taking NCLEX-RN in 2017.

Procedure for Data Collection

The collected data included the courses listed in the associate degree of nursing program's curriculum outside of the core nursing courses as well as the program's

NCLEX-RN first-time pass-rates for the 2017 year. The process of sampling consisted of identifying ACEN-accredited ADN programs randomly selected from across the country until identification of 161 with all necessary information available utilizing the ACEN and individual college websites (ACEN, 2013). The college catalogs, located on the individual college website, included the plans of study for the nursing programs as well as the websites had the published first-time NCLEX-RN pass-rates.

Instrumentation and Operationalization of Constructs

NCLEX-RN. The reliability of the NCLEX-RN examination was a decision consistency statistic in which multiple estimates including the ability of the candidate, standard error, and cumulative standard normal distribution, and the pass/fail cut score are determined (National, n.d.). The average of this probability over all candidates was the estimated decision consistency, which is between .87 and .92 (National, n.d.). The examination included validity measured through content, sampling, face, construct, scoring, and pass/fail decision validity. Volunteers from across the country representing various backgrounds, specialties, and practice settings ensure content validity as well as the sampling validity (National, n.d.). Job analysis was completed every three years to assess the content categories included on the exam, which determined sampling validity (National, n.d.). The face validity was determined through real and simulated testing to ensure that questions were balanced and the juxtaposition of content is representative of the domain of nursing. The construct validity utilized the Rasch measurement theory (Wright and Stone, 1977, as cited in National, n.d.) to determine construct validity through the examination scale. The scoring validity was measured through 15 “tryout

questions” that each examinee received to determine the exact difficulty of each item (National, n.d.). The pass/fail validity was the minimum level of competency that is thoroughly investigated on a triennial basis and referred to as the passing standard (National, n.d.). A panel of nursing experts reviewed the validity to ensure a current and valid test.

Operationalization. The NCLEX-RN first-time pass-rate is a percentage. This percentage interpretation was at or above the national NCLEX-RN pass rate or below the national NCLEX-RN pass rate. The definition of high pass-rates was at or above the national level, and low pass-rates as below the national level. The national pass-rate for United States education graduates of ADN programs in 2017 was 81.68% (National Council, 2017).

Non-nursing Courses. Non-nursing courses, often general education courses, were defined as any course that was required by the nursing program and not a core nursing course. This definition included any course that did not have a NURS or equivalent prefix associated with the course.

Operationalization. Operationalization included the categorization of courses outside of the core nursing courses into the discipline, such as social science, natural science, humanities, math, English, etc. There were different sets because some programs had only anatomy and physiology I & II and some had general biology as well as the anatomy and physiology sequence; others also had microbiology or chemistry, etc.

Data analysis plan. The data for each randomly selected ADN program were gathered and inputted into SPSS 23 as collected as well as recorded in a preorganized

codebook. Morrow (n.d.) recommended using Winsorizing to clean the data to decrease the risk of a Type I and Type II errors and check the data for violation of assumptions. Therefore, after data collection, the data were then cleaned using a Winsorizing technique to eliminate outliers to decrease the risk of Type I and Type II errors. The data were then checked for normality, missing data, multicollinearity, and homogeneity of variance. I used a histogram determined the normality. Any sample with missing data not obtained through contacting the college was eliminated and replaced with the next randomly selected college.

Independent t-tests and ANOVA. I used independent *t*-tests and ANOVA to address RQ1 and RQ2. The reports included the main effects and contrasts for each comparison of programs conducted as well as the *f* values, *p* values, and *r* values. RQ1: What impact do non-nursing courses in an ADN curriculum have with first-time NCLEX-RN pass rate?

Null Hypothesis (H_0): Individual non-nursing courses in an ADN curriculum do not have a statistically significant impact with first-time NCLEX-RN pass-rates.

Alternative Hypothesis (H_a): Individual non-nursing courses in an ADN curriculum have a statistically significant impact on first-time NCLEX-RN pass-rates.

RQ2: What is the impact of a discipline-specific set of non-nursing courses and first-time NCLEX-RN pass rate?

Null Hypothesis (H_0): There is no statistically significant impact between discipline-specific non-nursing courses in an ADN curriculum and first-time NCLEX-RN pass-rates.

Alternative Hypothesis (H_a): There is a statistically significant impact between discipline-specific non-nursing courses in an ADN curriculum and first-time NCLEX-RN pass-rates.

I compared the average pass-rate for the programs containing a specific course or a set of courses to those without the course or set of courses to determine if there was a difference.

I used a Pearson bivariate correlation to assess for multicollinearity. If any multicollinearity existed, then the courses would be combined into one item. Data were analyzed both with individual courses and combining discipline-specific courses into one item. Although the determination of homogeneity of variance through a Levene's test is important, if found, the sample is large enough that a slight variation should not impact the results of the test (Field, 2013). Welch's F statistic was used when Levene's test was significant.

Logistic regression. Question three was not able to be answered because the answers to questions one and two did not yield significant results.

RQ3: Does an overall set of non-nursing courses in an ADN program impact higher NCLEX-RN pass-rates versus low NCLEX-RN pass-rates?

Null Hypothesis (H_03): No difference in non-nursing courses will be found between ADN programs with high first-time NCLEX-RN pass-rates and low NCLEX-RN pass-rates.

Alternative Hypothesis (H_a3): A difference in non-nursing courses will be found between ADN programs with high first-time NCLEX-RN pass-rates and low NCLEX-RN pass-rates.

I planned to utilize the courses with the highest impact on increased NCLEX-RN pass-rates in a factorial logistic regression to determine if a model could be used to identify the best non-nursing course curriculum for predicting NCLEX-RN success. This model would have been used to answer RQ3. Field (2013) recommends examination of the likelihood ratio while entering each predictor into the model hierarchically to decrease the probability of a Type II error. I would have followed this procedure in the analysis. A Type II error can take place when the regression coefficient (b) is large, inflating the standard deviation, resulting in underestimating the z -statistic and inappropriate rejection of the predictor (Field, 2013). I would have diligently examined the results of the factorial logistic regression to minimize the likelihood of Type I or Type II errors. Additionally, examination of residuals of the model would have taken place, with parsimony as the goal for the model. However, I was unable to complete this step because the results of the independent t -test and ANOVA analyses were not significant.

Threats to Validity

The primary threat to validity in this study was the number of variables inherent to a diverse population of nursing students and nursing programs that could affect the

results of NCLEX-RN pass-rates, which was a threat to internal validity. However, the population being nursing programs minimized the impact of student variation. The statistical techniques also helped to control for variables. The nursing programs had some similarities in their internal assessment and practices because all programs used in the dissertation were ADN programs and ACEN accredited. The selection of the sample for the study was a significant random sample from across the country, which increased external validity and decreased systematic sampling bias. The use of general system theories increased construct validity through identification of non-nursing courses as part of the throughput of a nursing program and NCLEX-RN first-time pass-rates as the primary, measurable output of nursing programs.

Ethical Procedures

All collected information was considered public and gathered using internet research (Ahern, 2005). Therefore, only an expedited internal review board approval was required, and consents from the schools are unnecessary. None of the data collected was considered confidential.

Summary

I utilized a quantitative, predictive, quasi-experimental study design to initially determine if any specific courses or sets of discipline-specific courses correlated with higher levels of NCLEX-RN first-time pass-rates. The plan was for the initial results to be inputted into a factorial logistic regression to determine if one curriculum, excluding core nursing courses, correlates with first-time NCLEX-RN success in ADN programs through model-testing. A large, random sample of ACEN accredited ADN programs

from across the United States was utilized for the study, which increased the generalizability of the results. Although control of all variables was not possible, a large random sample and the statistical analysis assisted in making the results meaningful.

Chapter 4: Results

Introduction

In this study, I examined the impact of individual courses and sets of discipline-specific sets of courses on first-time NCLEX-RN pass-rates. If multiple courses were found, then I would have continued the study by determining if a combination of courses enhanced NCLEX-RN first-time pass-rates in accredited ADN programs. The three research questions with hypotheses that I used to achieve the purpose of this study were as follows:

RQ1: What impact do non-nursing courses in an ADN curriculum have with first-time NCLEX-RN pass rate?

Null Hypothesis (H_01): Individual non-nursing courses in an ADN curriculum do not have a statistically significant impact with first-time NCLEX-RN pass-rates.

Alternative Hypothesis (H_{a1}): Individual non-nursing courses in an ADN curriculum have a statistically significant impact on first-time NCLEX-RN pass-rates.

RQ2: What is the impact of a discipline-specific set of non-nursing courses and first-time NCLEX-RN pass rate?

Null Hypothesis (H_02): There is no statistically significant impact between discipline-specific non-nursing courses in an ADN curriculum and first-time NCLEX-RN pass-rates.

Alternative Hypothesis (H_{a2}): There is a statistically significant impact between discipline-specific non-nursing courses in an ADN curriculum and first-time NCLEX-RN pass-rates.

RQ3: Does an overall set of non-nursing courses in an ADN program impact higher NCLEX-RN pass-rates versus low NCLEX-RN pass-rates?

Null Hypothesis (H_03): No difference in non-nursing courses will be found between ADN programs with high first-time NCLEX-RN pass-rates and low NCLEX-RN pass-rates.

Alternative Hypothesis (H_{a3}): A difference in non-nursing courses will be found between ADN programs with high first-time NCLEX-RN pass-rates and low NCLEX-RN pass-rates.

Chapter 4 includes the data collection techniques, summarize and explain the results, and answer the applicable research questions.

Data Collection

The sample included one-hundred and ninety nursing programs, with 161 programs having complete information regarding both their 2017 NCLEX-RN pass-rates and their fall of 2015 curriculum. The timing of the data collection, between February and May of 2018, allowed the inclusion of newer NCLEX-RN first-time pass-rates than the previously anticipated 2016 pass-rates. The number of alternates increased from 10 to 30, due to the lack of information provided on websites as well as the lack of response from nursing programs when contacted for additional information. I solicited additional

information via email instead of phone to increase the ability of nursing program representatives to respond with documents or links including the requested information.

I confirmed the sample size to require at least 159 nursing programs using G*power analysis. The number of groups of courses, such as different credit hours of microbiology, were most often three or less with only a few having a very small fourth group. The sample of 161 was appropriate for the data analyses.

The sample included 161 randomly chosen associate degree nursing programs from 43 states. The states with nursing programs not randomly selected for this study each had between one and six ACEN accredited nursing programs. The states not included were Hawaii, Idaho, Indiana, North Dakota, Oregon, Rhode Island, and Vermont. Of these seven states, four had nursing programs initially selected for inclusion into the study as either the primary sample or alternates but were disqualified for a variety of reasons. The reasons for exclusion included the program being solely LPN to RN completion, having only one student test for the NCLEX-RN in 2017, and lack of data after initiating contact with the program representative and receiving no response. The sample included the states with higher numbers of accredited ADN programs. The NCLEX-RN first-time pass-rates for 2017 ranged from 56%-100%, with a mean of 87.88%. The national NCLEX-RN first-time pass-rate for all associate degree nursing programs was 84.24% (National Council, 2018). The NCLEX-RN pass-rate for the sample is higher than the national NCLEX-RN pass-rate, which was consistent with a sample of only accredited ADN programs while the national pass-rate was for all ADN

programs. See Table 3 for descriptive statistics about courses and Table 4 for descriptive statistics for sets of courses included in the study.

Table 3

Descriptive Statistics for Included Courses

Course Name	Contact Hours	Frequency
Algebra	3	45
	4	7
Anatomy and Physiology I	4	19
	3	2*
Anatomy and Physiology II	4	132
	5	2*
	3	2*
	4	131
	5	2*
Biology, General	3	1*
	4	18
Chemistry	3	1*
	4	35
	5	1*
Combination Anatomy and Physiology I & II	4	1*
	5	2*
Communication	3	65
Computer	1	2*
English Composition	3	15
	3	158
English Research	3	67
Fine Art	3	7
General Psychology	3	131
	4	3
Growth and Development Psychology	3	114
Microbiology	2	2*
	3	6
	4	127*
	5	3
Nursing Assistant	Varies	7
Nutrition	1	1*
	2	5
	3	25
Pathophysiology	3	8
	4	8
	6	2*
Philosophy	3	15
Physiology	4	20
Sociology	3	56
Statistics	3	17

*Data removed with Winsorizing

Table 4

Descriptive Statistics for Discipline-Specific Sets of Courses

Discipline Set of Courses Name	Data Included	Frequency
Algebra, Any	No Algebra	109
	Any number of Algebra credits	52
Anatomy and Physiology, Any	No Anatomy and Physiology	3
	Any Anatomy and Physiology I & II	136
	Separate Anatomy and Physiology	19
	Combination Anatomy Physiology I & II	3
Biology, General, Any	No General Biology	141
	Any number of General Biology credits	20
Chemistry, Any	No Chemistry	124
	Any number of Chemistry credits	37
Computer, Any	No Computer	144
	Any number of credits of Computer	17
General Psychology, Any	No General Psychology	27
	Any number of General Psychology credits	134
Humanities, Any	No Humanities	76
	Any number of Humanities credits	85
Humanities Courses, Number of	No Humanities course	76
	1 Humanities course	78
	2 Humanities courses	5
Math Course, Any	No Math course	65
	Any number of Math credits	96
Math Credits, Number of	No Math credits	65
	1 Math credit	2*
	3 Math credits	78
	4 Math credits	12
	6 Math credits	4
Microbiology, Any	No Microbiology	22
	Any number of Microbiology credits	139
Nutrition, Any	No Nutrition	130
	Any number of Nutrition credits	31
Pathophysiology, Any	No Pathophysiology	143
	Any number of Pathophysiology credits	18
Social Sciences, Any	No Social Science credits	4
	Any number of Social Science credits	157
Social Science Courses, Number of	No Social Science Course	4
	1 Social Science Course	38
	2 Social Science Courses	85
	3 Social Science Courses	34

*Data removed with Winsorizing

Results

The sample consisted of 161 randomly selected ACEN accredited ADN programs from 43 states across the nation. The nursing programs had NCLEX-RN first-time pass-

rates that ranged from 56-100%, with a mean of 87.88%. No data were missing from the study.

I conducted multiple statistical analyses to evaluate the impact of non-nursing courses and discipline-specific sets of courses on NCLEX-RN first-time pass rates. The independent variables, courses, and sets of courses had between two and four levels, which included the number of credits or the number of courses in a specific discipline. The dependent variable was NCLEX-RN first-time pass-rates for 2017. Pearson correlation coefficients, r , were calculated to assess for multicollinearity. No medium or high multicollinearity was found.

The assumptions of the ANOVA include normal distribution, variances of the dependent variable are the same for each sample, and the cases represent random samples from the population, and the scores are independent of each other (Green & Salkind, 2014). A histogram determined the normality for each group after winsorizing. The Combination anatomy and physiology courses were completely left out of the individual course analyses due to winsorizing because there was only one course at four credits and two courses at five credits, but the courses were combined and included in the discipline-specific sets of courses analysis.

An unexpected result of winsorizing was that most of the courses and sets of courses only had two groups, one group with the course or set of courses, and one group without the course or set of courses. Therefore, I used an independent t -test for most of the analyses (See Tables 5 & 8). The independent t -test also assumes normality, which was either met for most of the sample groups. However, the confidence intervals were

included because a few of the sample groups were not normally distributed. Additionally, Cohen's d for all independent t -tests was calculated. Although some of the effect sizes were medium or large, none of the higher effect sizes were present in any analyses containing a similar number in the groups being compared, which makes these data inconclusive.

The statistics for all courses and sets of courses containing more than two levels was ANOVA. All individual courses or sets that grossly violated the normality assumption used a Kruskal-Wallis test (see Tabled 6 & 9). The Levene's test analyzed homogeneity of variance, and any violation of this assumption was addressed through the post hoc test, the Welch's F . The sample consisted of randomly selected cases from the population of ACEN accredited nursing programs. Therefore, the groups were of different sizes, which can cause bias in the results. The *Bonferroni*, *Hochberg's GT2*, and *Games-Howell* post hoc procedures were used in the statistical analysis because the group sizes were different. All of these post hoc procedures yielded nonsignificant results.

The first research question was what impact do non-nursing courses in an ADN curriculum have with first-time NCLEX-RN pass rate? The independent t -tests and ANOVAs were insignificant for all courses (See Tables 5, 6, & 7). Therefore, the null hypothesis was retained for all courses.

The second research question was what is the impact of a discipline-specific set of non-nursing courses and first-time NCLEX-RN pass rate? No discipline-specific set of non-nursing courses significantly impacted NCLEX-RN first-time pass-rates (see Tables

8, 9, & 10). Therefore, the null hypothesis was retained for all discipline-specific sets of non-nursing courses.

Table 5

Independent t-tests for Individual Courses with One Comparison

Course	Independent Samples Test	Bootstrap Difference
Anatomy	$t(41.54) = -.82, p = .16, d = -.19$	-1.68, BCa 95% CI [-3.80, .65]
Anatomy & Physiology I	$t(155) = .79, p = .43, d = .26$	1.43, BCa 95% CI [-1.28, 3.99]
Anatomy & Physiology II	$t(155) = .21, p = .84, d = .06$.35, BCa 95% CI [-2.54, 2.98]
Biology	$t(159) = -1.41, p = .16, d = -.33^*$	-2.77, BCa 95% CI [-5.68, .99]
Chemistry	$t(159) = -.08, p = .94, d = -.02^*$	-.13, BCa 95% CI [-2.99, 2.95]
Communication	$t(159) = -.88, p = .38, d = -.13$	-1.16, BCa 95% CI [-3.98, 1.65]
Computer	$t(158) = -.29, p = .77, d = -.08^*$	-.61, BCa 95% CI [-5.36, 4.08]
English Comp	$t(159) = 1.23, p = .22, d = .78$	5.90, BCa 95% CI [-3.18, 11.60]
English Research	$t(159) = .32, p = .75, d = .05$.43, BCa 95% CI [-2.11, .286]
Fine Arts	$t(159) = 1.61, p = .11, d = .62$	5.10, BCa 95% CI [-.20, 11.94]
General Psychology	$t(154) = .84, p = .40, d = .20$	1.41, BCa 95% CI [-1.74, 4.57]
Growth and Development	$t(159) = .73, p = .47, d = .13$	1.05, BCa 95% CI [-1.96, 3.65]
Nursing Assistant	$t(159) = -1.08, p = .28, d = -.49$	-4.05, BCa 95% CI [-9.39, .52]
Philosophy	$t(15.06) = 1.24, p = .23, d = .54$	4.13, BCa 95% CI [-1.96, 10.86]
Physiology	$t(158) = -1.81, p = .08, d = -.26$	-2.26, BCa 95% CI [-4.86, .47]
Sociology	$t(159) = -.29, p = .78, d = -.04$	-.38, BCa 95% CI [-2.73, 1.91]
Statistics	$t(157) = -.32, p = .75, d = -.08$	-.67, BCa 95% CI [-4.71, 3.27]

*Winsorizing of data

Table 6

Statistics for Individual Courses Not Normally Distributed

Course	Kruskal-Wallis Test
Algebra	$H(2) = .44, p = .804$
Microbiology	$H(4) = 5.92, p = .205^*$
Pathophysiology	$H(3) = 7.70, p = .053^*$

*Winsorizing of data

Table 7

Statistics for Individual Courses Normally Distributed

Course	Levene's Test	ANOVA (F)	Welch's F
Nutrition	$(2, 156) = .92, p = .40$	$(2, 156) = .120, p = .30^*$	NA

*Winsorizing of data

Table 8

Independent t-tests for Discipline-Specific Sets of Courses with One Comparison

Set of Courses	Independent Samples Test	Bootstrap Difference
Algebra, Any	$t(159) = .24, p = .81, d = .04$.33, BCa 95% CI [-2.05, 2.60]
Biology, Any	$t(159) = -1.41, p = .16, d = -.33$	-2.77, BCa 95% CI [-5.64, .61]
Chemistry, Any	$t(159) = -.08, p = .94, d = -.01$	-.13, BCa 95% CI [-3.02, 3.15]
Computer, Any	$t(159) = .62, p = .54, d = .17$	1.31, BCa 95% CI [-4.19, 7.59]
General Psychology, Any	$t(159) = .96, p = .34, d = .23$	1.66, BCa 95% CI [-1.41, 4.94]
Humanities Course, Any	$t(156.17) = 1.27, p = .21, d = .04$	1.56, BCa 95% CI [-.70, 3.94]
Math, Any	$t(159) = -.58, p = .56, d = -0.09$	-.77, BCa 95% CI [-3.63, 1.88]
Microbiology, Any	$t(158) = -.02, p = .99, d = -.002$	-.03, BCa 95% CI [-4.77, 4.77]
Nutrition, Any	$t(158) = -.10, p = .92, d = -.02$	-.15, BCa 95% CI [-2.77, 2.39]
Pathophysiology, Any	$t(159) = 1.67, p = .10, d = .44$	3.43, BCa 95% CI [-1.32, 8.29]
Social Science Course, Any	$t(159) = -.92, p = .36, d = -.57$	-3.67, BCa 95% CI [-8.32, 5.61]

Table 9

Statistics for Discipline-Specific Sets of Courses Not Normally Distributed

Set of Courses	Kruskal-Wallis Test
Anatomy & Physiology, Any	$H(3) = 4.23, p = .238$
Math Credits, Number of	$H(3) = .95, p = .814^*$
Social Science Courses, Number of	$H(3) = 3.69, p = .298$

*Winsorizing of data

Table 10

Statistics for Discipline-Specific Sets of Courses Normally Distributed

Set of Courses	Levene's Test	ANOVA (F)	Welch's F
Humanities Courses, Number of	$(1, 158) = 4.13, p = .04$	NA	$(1, 156.17) = 1.61, p = .21$

*Winsorizing of data

The third question was does an overall set of non-nursing courses in an ADN program impact higher NCLEX-RN pass-rates versus low NCLEX-RN pass-rates? No courses or discipline-specific sets of courses significantly impacted NCLEX-RN pass rates. Therefore, answering RQ3 through logistic regression was not feasible.

Summary

The data did not yield any significant results. The answers to the research questions are that this study did not find any individual non-nursing courses or discipline-specific sets of non-nursing courses that impact NCLEX-RN first-time pass rates in ACEN accredited ADN programs. The third research question was not addressed, which was if there was a combination of non-nursing courses that increase NCLEX-RN first-time pass-rates in ADN programs because the first two research questions did not provide courses to include in a logistic regression model. Chapter 5 will discuss what the results of this study mean for future research and social change.

Chapter 5: Discussion, Conclusions, and Recommendations

Introduction

My goal for this quantitative study was to ascertain if one combination of non-nursing courses could increase NCLEX-RN first-time pass-rates in ADN programs. I began by determining if certain individual non-nursing courses or discipline-specific sets of non-nursing courses impacted NCLEX-RN first-time pass-rates. Then, I planned to continue the study by taking the significant non-nursing courses or sets of courses and determining if a model could be built to show a specific combination of non-nursing courses that enhance NCLEX-RN pass-rates. Only the first step was completed in the study because the investigation of individual non-nursing courses and discipline-specific sets of non-nursing courses' impact on NCLEX-RN first-time pass-rates did not produce any significant data. In this study of 161 ADN programs from across the United States, I concluded that no non-nursing courses or discipline-specific set of courses were more important for students to take to pass the NCLEX-RN the first time. There were limitations to the study and several recommendations for future research emerged.

Interpretation of the Findings

This study is the first of its kind because it did not assess individual student grades and NCLEX-RN first-time pass-rates but instead looked at the inclusion of non-nursing courses or sets of discipline-specific non-nursing courses to determine if one combination of courses would have a positive or negative impact NCLEX-RN first-time pass-rates. The study showed that, as part of general systems theory, the throughput of non-nursing courses might not impact the output of NCLEX-RN pass-rates as much as

the throughput of nursing courses. The idea that the nursing courses have more impact on NCLEX-RN pass rates corroborates the findings of Simon et al. (2013), that biology and chemistry grades positively impacted NCLEX-RN pass-rates, but that the core nursing courses overrode the effect. Additionally, this study substantiates previous research that indicated non-nursing course grades in anatomy and physiology (e.g. Gilmore, 2008; Higgins, 2005; Trofino, 2013), chemistry (e.g. Higgins, 2005; Schooley & Kuhn, 2013;), microbiology (e.g. Schooley & Kuhn, 2013; Trofino, 2013), pathophysiology (e.g. Waterhouse & Beeman, 2003), psychology (e.g. Higgins, 2005; Schooley & Kuhn, 2013; Schafer & McCabe, 2013; Trofino, 2013), English (e.g. Chen & Bennett, 2016; Elder et al., 2015; Higgins, 2005; Schooley & Kuhn, 2013; Shaffer & McCabe, 2013), humanities (e.g. Elder et al., 2015), sociology (e.g. Schooley & Kuhn, 2013; Shaffer & McCabe, 2013), nutrition (e.g. Schooley & Kuhn, 2013; Shaffer & McCabe, 2013), human growth and development (e.g. Trofino, 2013), and math (e.g. Elder et al., 2015) did not influence NCLEX-RN pass-rates. The non-nursing courses may not be an important subsystem inside the nursing education system when examined with the outcome of NCLEX-RN first-time pass-rates because no relationship between the two seems to exist (Caws, 2015). However, this is the first study that isolated non-nursing courses across multiple ACEN accredited nursing programs, so more research should be completed to corroborate this finding.

Limitations of the Study

I identified several limitations and delimitations regarding validity and generalizability of this study.

Validity

I analyzed the validity of this dissertation, or whether this dissertation actually included the effects of non-nursing courses' on NCLEX-RN pass-rates as planned, from multiple perspectives. The primary limitation of the study was the impossibility of controlling all the extraneous variables among nursing programs, which compromised internal validity. Although I took measures to enhance internal validity through utilization of only ACEN accredited ADN programs, only using one form of the NCLEX-RN, and the use of a large randomized sample, the limitation could still have decreased the validity of the study. Additionally, the statistical analyses chosen were correct for when some variables are unknown.

The groups in the study were not equal, although this was partially controlled through bootstrapping, the control group being the largest group whenever possible, and use of the *Bonferroni*, *Hochberg's GT2*, and *Games-Howell* post hoc procedures (Field, 2013). Controlling the number of samples in each group was not possible because the sample was completely random.

The external validity of the study was high because of the use of a random sample from across the country. Random sampling minimized systematic sample bias. The use of general system theories increased construct validity through identification of non-nursing courses as part of the throughput of a nursing program and NCLEX-RN first-time pass-rates as the primary, measurable output of nursing programs.

Generalizability

The generalizability, or how representative this dissertation's sample analysis is to the population, is high. The random selection of the sample allows for high generalizability to ACEN accredited ADN programs across the United States. This sampling method removed any systematic sampling bias the selection procedure and allowed the results to be more representative of the entire population.

Recommendations

My recommendations for further research include examining other predictors of NCLEX-RN first-time pass-rate success. Additional research on non-nursing courses, with the utilization of grades in the courses across multiple ADN programs has the potential to enhance curricular knowledge for nursing faculty across the country. Multiple nursing programs are rarely researched to determine predictors of NCLEX-RN success, so more robust research on nursing program curricula is also warranted.

Implications

Positive Social Change

Although this study did not yield any statistically significant results, the knowledge that one non-nursing course may not be any more important than another non-nursing course regarding NCLEX-RN success can still be helpful to nursing faculty and allow for evidence-based decisions. When planning curriculum changes, nursing faculty can choose or provide input on the courses that they believe are most helpful for their students or can include courses that best articulate to the BSN programs their students most often attend. The faculty can choose those courses without the burden that one or

two non-nursing courses included or excluded from the program will make significant changes in their program's NCLEX-RN pass-rates. The results of this study do not negate the necessity of increasing the consistency of ADN programs' non-nursing courses to streamline the process of BSN completion that Close, Gorski, Sroczyński, Farmer, and Wortock(2015), Farmer et al. (2017), Giddens and Meyer (2016), Gorski, Farmer, Sroczyński, Close, and Wortock(2015), Green, Beal, Flemming, and Cater (2011), and Koestler (2015) emphasized.

The results of this dissertation can impact positive social change for individual nursing students as well as nursing programs by providing more evidence for curriculum decisions. Additionally, the knowledge that specific non-nursing courses are not likely an important subsystem of throughput when NCLEX-RN first-time pass-rates are the primary output is an important contribution to general systems theory applied to nursing education. However, the impact of grades in some non-nursing courses on pass-rates is still needs to be determined in the literature.

Conclusion

Nursing faculty consistently make curricular decisions to enhance the NCLEX-RN first-time pass-rates for their students and programs. I examined one potential subsystem of nursing education, the non-nursing courses. I researched a large sample from across the United States was researched to see if any non-nursing courses or set of discipline-specific non-nursing courses impact NCLEX-RN pass-rates to determine if one combination of courses could enhance pass-rates. This study did not yield any significant results, leading me to conclude that specific non-nursing courses are likely not a

significant subsystem of the nursing education system that impacts NCLEX-RN pass-rates. Nursing faculty can use this information when making curricular decisions.

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