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Accelerated Online and Hybrid RN-to-BSN Programs: A Predictive Retention Algorithm

Melissa Knight
Walden University

Walden University

College of Health Sciences

This is to certify that the doctoral dissertation by

Melissa Knight

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Review Committee
Dr. Leslie Hussey, Committee Chairperson, Nursing Faculty
Dr. Mary Martin, Committee Member, Nursing Faculty
Dr. George Zangaro, University Reviewer, Nursing Faculty

Chief Academic Officer
Eric Riedel, Ph.D.

Walden University
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Abstract

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MSN, Walden University, 2012

BS, [University of South Carolina], 2000

Dissertation Submitted in Partial Fulfillment

of the Requirements for the Degree of

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Abstract

Predicting retention and time to graduation within accelerated online and a hybrid RN-to-BSN programs are significant elements in leveraging the pipeline of qualified RNs with BSN degrees, but the literature lacks significant accounts of retention and time to graduation outcomes within these programs and predictive algorithm developments to offset high attrition rates. The purpose of this study was to quantitatively examine the relationships between pre-entry attributes, academic integration, and institutional characteristics on retention and time to graduation within accelerated online RN-to-BSN programs in order to begin developing a global predictive retention algorithm. This study was guided by Tinto's theories of integration and student departure (1975, 1984, 1993) and Rovai's composite persistence model. Retrospective datasets from 390 student academic records were obtained. Findings of this study revealed pre-entry GPA, number of education credits, enrollment status, 1st and 2nd course grades and GPA index scores, failed course type, size and geographic region, admission GPA standards, prerequisite criteria, academic support and retention methods were statistically significant predictors of retention and timely graduation ($p \leq .05$). A decision tree model was performed in SPSS modeler to compare multiple regression and binary logistic regression results, yielding a 96% accuracy rate on retention predictions and a 46 % on timely graduation predictions. Recommendations for future research are to examine other variables that may be associated with retention and time to graduation for results can be used to redevelop accurate predictive retention models. Having accurate predictive retention models will affect positive social change because RN-to-BSN students that successfully complete a BSN degree will impact the quality and safety of patient care.

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Dedication

I would like to dedicate this accomplishment to my beautiful twins as they are the primary reason I strive to be the best that I can be every day. I hope to be a positive force within their lives and serve as a positive example of success encompassed with love, faith, consistency, dedication, passion, resilience and perseverance. To my parents, my friends and family for their undeniable love, support and encouragement while I completed this milestone.

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Chapter 1

Introduction to the Study

As of 2017, approximately three million registered nurses (RNs) were employed in the United States (BLS, 2017). According to the American Association of Colleges of Nursing (AACN), approximately 55% of these RNs hold a baccalaureate of science degree in nursing (BSN), a 25% deficit of the Institute of Medicine's (IOM) recommendations (HRSA, 2013; AACN, 2017). In 2010, the IOM urged that 80% of RNs be baccalaureate prepared by 2020. Health care leaders and educators have acknowledged the essential demand for nurses with a BSN degree as research shows that nurses with BSN degrees provide care that is associated with significant decreases in client mortality and morbidity (Aiken, Clarke, Cheung, Sloane & Silber, 2003; Blegen, Goode & Park, 2013; Kutney-Lee, Sloane & Aiken, 2013). Because of the 2010 IOM recommendations, the AARP, the Robert Wood Johnson Foundation (RWJF,) and AACN have collaboratively promoted "seamless academic progression" toward securing the pipeline of BSN, master's and doctorate-prepared nurses (Heglund, Simmons, Wink & Leuner, 2017; Hall, Causey, Johnson & Hayes, 2012; Murray, Palmer, Wunderlich, Giancola & Shaw, 2014). Subsequently, these efforts have induced a sizable influx of essential BSN accelerated learning frameworks inclusive of shared curriculum models, community college conferred RN-to-BSN models, accelerated BSN non-nursing degree models, and accelerated online and hybrid RN-to-BSN term models (Gorski, Farmer, Sroxyznski, Close & Wortock, 2015; AACN, 2016; Jones-Schnek, 2014; Rodriquez, McNeish, Goyal & Apen, 2013). Previous research has limitedly examined predictive outcomes within accelerated paradigms and the way these programs provide a purposeful fit considering RN attributes and institutional characteristics.

The purpose of this quantitative predictive correlative study was to retrospectively analyze pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades), and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on future predictions of retention and time to graduation within accelerated RN-to-BSN programs. I created a predictive analytic model and algorithm by utilizing predictive statistical tools inclusive of logistic regression and decision tree algorithms. Positive social change implications entail the benefits of developing predictive analytic models and algorithms that are capable of preventively identifying at-risk students during pre and post enrollment periods and centering the student within suitable learning and interventional methods that most likely will lead to retention and timely graduation (Tinto, 1975, 1987, 1994; McEwen, Pullis, White & Krawtz, 2013; Okagbare, 2017).

Chapter 1 includes information regarding legislation and state regulations, the paradigm of accelerated learning, the history of attrition and retention and the role of predictive analytics to reduce attrition. The chapter also includes the relevant research problem, purpose, research questions, theoretical and conceptual frameworks, nature of the study, definitions, assumptions, scope of delimitations, limitations, and significance.

Background

Legislation and State Regulations

In 1965, the American Nurses Association (ANA) and the National League of Nursing (NLN) advocated for the BSN degree to be minimum entry into RN practice. In 2000, AACN advocated for the baccalaureate degree as the minimum requirement for professional nursing practice (AACN, 2000). In 2010, the IOM strongly recommended that 80% of RNs attain a BSN degree by 2020. Historically, ADN prepared nurses were less likely to pursue a degree one level higher than their basic education with less than 18% pursuing a BSN degree (Allen, & Armstrong, 2013; Aiken et al., 2003; IOM, 2011). Various state legislations and regulations have since reversed this trend, mandating nurses to obtain a BSN or higher or be subject to non-employment and/or the loss of licensure within certain states.

The American Nurses Credentialing Center's (ANCC) Magnet status compliance and state policies such as the "BSN in Ten" have been principle grounds for RNs pursuing a BSN degree (Murray, Palmer, Wunderlich, Giancola & Shaw, 2014). The ANCC Magnet programs recognize excellence in nursing across various healthcare facilities that require 100% of its' nursing leaders possess a BSN or higher degree as of January 1, 2013 (AACN, 2016). Many states are considering or have already recently mandated the "BSN in 10" legislation, resulted from findings that showed BSN prepared nurses exhibited lower patient mortality rates, principle nursing diagnosis and interventions, and lower failure to rescue rates (AACN, 2016).

After 14 years of lobbying, New York became the first state to pass the "BSN in 10" law on December 19, 2017; mandating nurses to attain a BSN degree within ten years of their initial RN licensure (University of Buffalo, 2018). These motions stemmed from considerable evidence that identified that for every 10% increase in hospital percentages of BSN degrees there was an average reduction of 7.47 deaths per 1,000 patients that had complications (Kutney-Lee, Sloane & Aiken, 2013). It is evident that dynamics of technology and complexities within the healthcare system, secondary to expanded access to care, an aging population, nursing shortages, increased acuity of patients and diversity are shaping nursing competencies (Gubrud, Spencer & Wagner, 2017).

After many years of debate, BSN attainment is now official in professional nursing practice as evident in New York's "BSN in 10" law. Positive consequences of attaining a BSN degree necessitates enhanced patient safety and quality of care subjected through advanced critical thinking and confidence skills, higher RN job satisfaction, improved leadership skills, career advancement, job security and securement of qualified nurses who may transition to nursing academia; addressing the nursing faculty shortage (Phillips & Titzner Evans, 2017).

Accelerated Pathways

Various seamless education pathways are accessible for RNs to obtain a BSN degree within shorter and more cost-effective means. According to the AACN, enrollments in both generic (entry-level) BSN programs and RN-to-baccalaureate (RN-to-BSN) programs increased by 3.6% and 1 % respectively between 2015 and 2016. The AACN (2017) reported that as of 2016 over 740 RN-to-BSN programs existed across the

United States with most of these students enrolled part-time (90,337) compared to full-time (46,948). Due to the benefits of shortened time to BSN completion, RNs have flooded accelerated online and hybrid programs with an average increase of 7,479 RN-to-BSN student enrollments per year from 2012 to 2016 with many turned away due to faculty shortages or lack of clinical sites (AACN, 2017).

Within the last 5 years, an assortment of accelerated RN-to-BSN curriculum frameworks have been developed offering flexible-open enrollment terms/quarters ranging between 5 and 12 weeks with continuous start dates (AACN, 2016). Subsequently, expected program completion lengths within these frameworks have been modified considerably, with some programs potentially completed less than 12 months and others ranging between 12 months to 24 months, contingent upon the student enrolling full or part-time (AACN, 2016).

The AACN (2017) reported an average increase of 6,370 in RN-to-BSN graduation rates between 2012 and 2016. However, certain programs consistently yield suboptimal completion rates (<40%), dissimilar to traditional BSN programs and RN-to-BSN hybrid curricula (Dacanay, Vaughn, Orr, Andre & Mort, 2015; Davidson, Metzger & Lindren, 2011; Davidson, Metzger & Finley, 2014; Mancini, Ashwill & Cipher, 2015). According to the AACN, 51.4 % of RN-to-BSN programs now offer 100% distance education whereas 21.5% have 51%–99% distance education. Other programs account for the remainder 27.1% offering anywhere between 0%–50% distance education (AACN, 2017).

Curriculum frameworks within online RN-to-BSN programs have been expanded, transformed, and enhanced to foster student-centered accelerated teaching and learning frameworks, which are not to be confused with accelerated non-nursing degree BSN programs (AACN, 2016). A growing demand for accelerated programs is notable in the United States (Serdyukov, 2008). Accelerated learning has been conceptually defined as an expedited timeframe approach to learning that underlines a holistic experience within andragogy and pedagogy (Radler & Bocianu, 2017; Kasworm, 2003). Accelerated models have been the catalyst for deeper independent learning that consequently, yet purposely, uncovers inferior learning behaviors that necessitates concept remediation (Radler & Bocianu, 2017). Accelerated frameworks are not merely based on accelerated speeds of learning but furthermore shapes principles of adaptability, independence and cognitive performance (Serdyukov, 2008; Radler & Bocianu, 2017; Kasworm, 2003). The pragmatic assumption of accelerated models signifies the need to predictively assess for motivational and remedial tendencies (Radler & Bocianu, 2017).

An advantage of accelerated learning is that the self-directed adult learner has the capacity to earn a BSN degree in substantially less time compared to traditional semester-based courses (Radler & Bocianu, 2017; Serdyukov, 2008). Large amounts of course content must be absorbed in a very short time period, increasing attrition risks in students who are academically weak or students engaged in employment and academics (Kasworm, 2003). Accelerated and flexible frameworks may potentiate variable retention and graduation rates eluding excessive drop outs, stop outs, or failures within unmotivated nursing students (Radler & Bocianu, 2017; Kasworm, 2003; Jeffreys, 2007).

Consistent full-time progression from course to course with fewer dropped or failed courses have been reported as significant predictors of retention and likely graduation. (Cipher, Mancini & Shrestha,2017). Within accelerated courses, best outcomes are ensured when learners have personalized plans that are aligned with course objectives and furthermore where the student can track their progress in collaboration with a mentor (Radler & Boicanu, 2015). There is a gap in the literature that examines predictive variables relative to retention and time to graduation outcomes within online accelerated RN-to-BSN programs.

History of Attrition and Retention

Student retention and timely graduation in higher education have been issues since the 20th and into the 21st century with attrition rates as high as 50% in the United States (Okagbare, 2017, Tinto, 1975; Tinto, 1993; Astin, 2005; Bean & Metzner, 1985; Brown & Marshall, 2008). Substandard attrition rates and lengthy graduations within online programs have historically been excessive compared to traditional degree programs (Choi & Park 2016; Rovai, 2003). Differences exist within course completion and academic performance amidst a myriad of institutions that have very diverse student populations and substandard comparisons across different programs (Grosskurth, 2016; Atchley, Wingenback & Akers, 2013; Rovai, 2003; Allen & Seaman, 2016; Choi & Park, 2018). Some researchers have even speculated that healthcare disciplines are not well suited for online settings, however Atchley et al. (2013) found this to be untrue (Carnevale, 2003; Atchley, Wingenback & Akers, 2014).

Over the last 50 years, political and economic influences have shaped institutional strategic plans toward improving retention and success of students in higher education including online education (Tinto, 2012; Seidman, 2012). A greater research emphasis has been placed on defining student attributes to meet the contextual nature of the institution as attrition rates change over time and place (Tinto, 2012; Seidman, 2012). Various theories and conceptual models have heuristically explained personal, academic, psychological, environmental, and social variables and their effect on student retention in both the traditional and nontraditional students. Substandard retention rates remain a major concern across discipline borders, including nursing academia. (Tinto, 2007; Jeffreys, 2012; Astin, 2005; Bean & Metzner, 1985).

Vincent Tinto, in his 2012 book titled, *Completing College Rethinking Institutional Action*, wrote about the history of political and economic influences of retention analyzation and measurements. Tinto reported various historical differences of attrition outcomes particularly in first year students, stating that of the 50% of students who obtained bachelor's degrees from their original institution, only about 33% of them graduated within standard benchmark times (Tinto, 2012). Tinto noted that women earned more bachelor's degrees more frequently than men (21.9% versus 19.6%) and white students (22.6%), Asians or Pacific Islanders (33.1%) have shown higher graduations than blacks (14.0%), Hispanics (13.7%) and American Indians (8.8%; Tinto, 2011). In addition, Tinto noted that low income students (19.0%) had lower rates of bachelor's degree attainment compared to higher income students (42%). Students with higher GPAs (>3.25) were more likely to graduate compared to those who had less than a 2.25 GPA (Tinto, 2012).

Since Tinto's initial research, many developments within social constructs, healthcare systems, program structures, and the dynamics of nontraditional student attributes have evolved. Many recent studies have found mixed elements of student retention where some claim that demographics are inferior in predicting future attrition risks and that institutional characteristics such as faculty and institutional support are presently more likely to be the root of attrition in higher education (Choi & Park, 2016; Bergman, Gross, Berry & Shuck, 2014). Across nursing academia, attrition rates have been as high as 50% in the majority student population and as high as 85% in minority populations (Newton & Moore, 2009; Gilchrist & Rector, 2007). Previous research within accelerated RN-to-BSN frameworks has presented variable graduation and attrition rates among those with poor self-efficacy, inferior GPAs, minorities, and low socioeconomic status. (Bryer, Peterson-Graziose & Nikolaidou, 2015; Tinto, 2007; Jeffreys, 2007). Others have found no relationship between student demographics and GPA and timely graduation in nursing programs (Jackson, 2010). High faculty to student ratios and the shortage of BSN nursing faculty add to the complexity of adult learner satisfaction and success within RN-to- BSN programs leading to high attrition (Hall, Causey, Johnson & Hayes, 2012; Altmann, 2011).

RN-to-BSN student characteristics are changing as studies report RN students are now less experienced, younger, and more ethnically diverse (McEwen, Pullis, White & Krawtz, 2013). The wide variations between retention outcomes from institution to institution are highly reflective of differences between the student's pre-entry attributes, degree of social integration, the institutions' characteristics and environmental influences (Tinto, 1987, Jeffrey's, 2007). Retention experts have strongly correlated these variables predictive of retention within a culmination of research over the last fifty plus years (Tinto, 1987; Bean & Metzner,1985; Jeffreys, 2007).

Problem Statement

Nursing student attrition is a complex and multifaceted problem with no single remedy (Jeffreys, 2007, 2012, 2015). Delayed persistence in online adult learners, as featured in Rovai's composite persistence model (CPM), has been attributed to multivariate roots including concurrent academic, work and family responsibilities, life events, financial obligations, demographics, academic performance, computer literacy, program fit, etc. (Levy, 2007; Stanford-Bowers, 2008. Angelino, 2007; Carr, 2000; Moody, 2004; Rovai, 2003). Considering the route of accelerated term models within RN-to-BSN programs and multiple personal, academic, and environmental variables, integrating predictive analytics is imperative (Harris & Burman, 2016; Chai & Gibson, 2015). In most cases, student retention interventions are reactive and not proactive in nature which often leads to a case of attrition. With the insurmountable amount of research examining characteristics of students who are likely to persist, empirical evidence explaining these interactions is lacking in the literature (Okagbare, 2017).

In order to meet IOM recommendations, an increase of 20% of BSN degree obtainment is needed by 2020. Changes within nurse and patient demographics are impacting the nursing workforce. According to the Bureau of Labor and Statistics (BLS), job openings in the United States will reach 1.09 million by 2024 secondary to growth and replacement needs (BLS, 2015). The baby boomer population, which has diverse backgrounds and co-morbidities will tax the healthcare system. RNs who successfully obtain a BSN degree will significantly decrease client mortality and morbidity and will potentially add to the workforce pipeline of master and doctoral prepared nurses (Statler, Keister, Ulrich & Smith, 2014).

There is a gap between knowledge and usage of high-tech predictive analytic models and algorithms in nursing academia to supplement student retention strategies during the critical first term/quarter of enrollment. Predictive analytic technologies have not been implemented into accelerated RN-to-BSN programs in order to proactively examine pre-entry attributes, academic integration, and institutional characteristics on the future likelihoods of retention and time to graduation (Chai & Gibson, 2015; Kai, Andres, Paqueette, Baker, Molnar, Watkins & Moore, 2016).

The discord between predictive analytic technology and institutional implementation include cost, inadequate data quality, complex usage, institutional culture, concerns of ethical biases within predictive models, risk of violating student confidentiality, and the potential over-reliance on products offered by private companies (Bari et al., 2017). When strategically integrated and adopted, predictive analysis tools can be simple enough to use by anyone in the institution and can further assist nursing leaders, nursing education coaches, faculty advisors, and educators by predicting risky variables prior to admission and furthermore during pre-enrollment and post-enrollment periods, with further suggestions of appropriate educational interventions (Fonti, 2005).

Predictive analytics is the art and science of refining “obtained information from large sets of data in order to determine patterns and produce probabilities that certain outcomes and trends will occur in the future” (Bari, Chaouchi & Jung, 2017; Ganas, 2015; Keim, Ku & Ma, 2013). Predictive software technologies enable users to uncover hidden patterns and relationships within structured and unstructured institutional data that can further proactively direct instruction, curriculum and student retention interventions before attrition is unrecoverable (West, Heath & Juijser, 2016, Radu, 2017). Institutional benefits of embedding predictive analytics is precision decision making with saved costs and time by predicting risky variables sooner that lend high institutional and student attrition reactively (Bari, Chaouchi & Jung, 2017). Predictive algorithms, as studies have shown, may enhance student retention as a result of tailored advising services and personalized learning during the critical first year of enrollment (Radu, 2017; Chai & Gibson, 2015; West, et al., 2016; Gandomi & Haider, 2015; Tinto, 2012).

The technology processes entail first collecting various retrospective data sets through data mining processes or by combining data sets from multiple institutional systems. Second, a predictive statistical software tool involves refining and cleaning data while looking at various attributes relevant to the analysis for accuracy. The software tool enables running of algorithms in which are mathematical instructions that train machines to problem solve under various what-if scenarios further building a predictive model outside of basic logistic regression models (Bari et al., 2017). Once a validated predictive model is developed, new datasets with similar contexts (demographics, retention measures, independent and dependent variables) can be added to build and redevelop the model over time (Bari et al., 2017). The crucial application step of creating predictive retention algorithms, however, is to first identify what variables are essential for analyzation.

Purpose of the Study

The purpose of this quantitative correlative study was to determine if there was a relationship among pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation based on retrospective data.

My specific aim for this study was to use retrospective datasets collected from academic records, institutional data and public records to build a sample predictive retention algorithm using IBM SPSS and IBM Predictive Modeler software. The sample predictive algorithm adds to the literature by its' capabilities of achieving proactive academic planning and retention strategy implementation that can further promote retention and timely graduation across accelerated online and hybrid RN-to-BSN programs based on previous trends. The sample predictive model created can be applied to new databases like the contextual nature of this study and recalibrated over time.

Research Question(s) and Hypotheses

The study purpose was to examine relationships between pre-entry student attributes, academic integration and institutional characteristics on retention and timely graduation. The following research questions aligned with the research purpose:

Research Question 1 (RQ1): What is the relationship among pre-entry (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation in accelerated online and hybrid RN-BSN programs?

Null Hypothesis ($H_0$1): There is no statistically significant relationship exist among pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation in accelerated online and hybrid RN-BSN programs.

Alternative Hypothesis (H_a1): There is a statistically significant relationship exists among pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation in accelerated online and hybrid RN-BSN programs.

Research Question 2 (RQ2): What is the relationship among retention of accelerated online or hybrid RN-to-BSN student and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods)?

Null Hypothesis ($H_0$2): There is no relationship among retention of accelerated online or hybrid RN-to-BSN and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Alternative Hypothesis (H_a2): There is a relationship among retention of an accelerated online or hybrid RN-to-BSN student and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Research Question 3 (RQ3): What is the relationship among time to graduation of accelerated online or hybrid RN-to-BSN student and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods)?

Null Hypothesis ($H_0 3$): There is no relationship among time to graduation of accelerated online or hybrid RN-to-BSN and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Alternative Hypothesis ($H_a 3$): There is a relationship among time to graduation of an accelerated online or hybrid RN-to-BSN student and pre-entry (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Theoretical Foundation and Conceptual Framework

Both Tinto’s theory of integration and student departure (1975, 1984 and 1993) and Rovai’s composite persistence model (CPM) (2003) guided my study as theoretical and conceptual frameworks respectively. Vincent Tinto’s redeveloped theories of integration and student departure have been foundational in model construction and 21st century research relative to higher education student retention and the first critical year of academic pursuits. Tinto’s theories have been redefined over the past 50 years to consider nontraditional and online students with further research implications directed by Bean and Metzner (1985), and Rovai (2003).

Inspired by Durkheim's theory of suicide (1897) and Spady’s model of college dropout (1971), Tinto’s theories of integration and student departure (1975, 1984, 1993) postulates that when students are academically and socially integrated into the academic institution the greater the likelihood of retention considering pre-entry attributes, goals and commitments, informal, and formal institutional experiences. Social integration defined as satisfaction with peer support relations and informal relations with faculty and staff. Academic integration contextually defined as the 1st semester and 2nd semester or term GPA and course grades (Pascarella & Terenzini, 1979; Tinto, 1987). Tinto’s Interactionalist Theory of Departure (1993) has been cited in over 775 academic studies and served as a framework to examine the variables within my study context (Buxton, Hirschy & McClendon, 2004). Tinto posited that student pre-entry attributes and the institutional characteristics culminates a platform that can promote or end the relationship between the student and the academic institution. This ultimately affects persistence, retention, and timely graduation with the first academic year being the most risky. Varying degrees of social and academic integration, holding external factors constant, leads to withdrawal or persistence decisions (Tinto, 1993). Subsequently, the higher the degree of satisfaction of social and academic integration the less likely the student will withdraw from a program of study or course (Tinto, 1993, 2012). Pre-entry attributes, the degree of academic integration and institutional characteristics during the pre-enrollment period and 1st and 2nd terms of enrollment may potentially predict future outcomes of retention and time to graduation in accelerated online and hybrid RN-to-BSN programs.

Rovai's Conceptual Framework

Critics have claimed that Tinto's retention models had limited application for the examination of nontraditional students who are typically older and/or those enrolled in online programs (Bean & Metzner, 1985; Astin, 2005). Nontraditional students have different social integration desires compared to traditional students who mostly live on campus and value full academic integration (Jeffreys, 2007). Several models have attempted to explain student persistence at the community and university level by looking at nontraditional variables. Influenced by Tinto's and Bean and Metzner's model (1986), Rovai (2003), developed the CPM specific to online nontraditional students. The CPM considers student pre-attributes "prior to admission" and internal and external factors, "after admission" influencing the degree of student persistence. Student characteristics and skills prior to admission, external and internal factors affecting students after admission are presumptions in Rovai's model. Rovai's model has been instrumental in empirically explaining significant predictors of online student dropouts versus completers considering pre and post admission attributes (Lee, Choi & Kim 2013). A greater explanation of Rovai's and Tinto's models will be provided in Chapter 2.

Nature of the Study

The method of inquiry for this research was a quantitative predictive correlation study that examined relationships between student pre-entry attributes, academic integration (GPA and course grades) and institutional characteristics on future retention and time to graduation in accelerated RN-to-BSN programs with continuous enrollment terms or quarters. The study design was appropriate to develop and examine retrospective datasets within 390 subjects. A multiple regression data analysis was performed in SPSS to determine significant relationships among the study variables. Second, the study produced a predictive model and algorithm using decision trees analysis within SPSS Modeler and further compared to logistic regression in SPSS. The predictive algorithm highlights the key variation findings from this study on likelihoods of retention and timely graduation. A more in-depth explanation of the research design and methodologies is provided in Chapter 3. The following are types and sources of data used: Institutional public records and website data, accrediting agency public graduation, demographic reports and student academic records and transcripts.

Definitions

Accelerated Baccalaureate for Non-nursing Program: Admits students with baccalaureate degrees in other disciplines and no previous nursing education and awards a baccalaureate nursing degree. Curriculum is designed to be completed in less time than the generic baccalaureate program usually through a combination of "bridge"/transition course (AACN, 2017). Operational definition- A BSN student who is not an RN and not enrolled in an accelerated RN-to-BSN program.

Accelerated RN-to-BSN Course Terms/Quarters: A RN-to-BSN course term or quarter designed to be completed in less time than the generic semester to semester typical of generic baccalaureate programs. Operational definition- Terms or quarters typically range between 5 weeks to 9 week courses and can be completed in 12 months or less. Courses are typically taken one at a time in a continuous enrollment structure.

Academic integration: A measurement of the student's grade performance and his intellectual development after enrollment and throughout college (Tinto, 1975). Operational definition- Cumulative GPA and course grades after the 1st and 2nd term and/or quarter or semester and number of withdrawn classes or failures within the 1st and 2nd terms or quarter.

Associate Degree in Nursing (ADN) program: The ADN nursing program awards an Associate Degree in Nursing following at least two academic years of college nursing courses. Graduates can sit for the NCLEX registered nursing exam (Fang, Hu, & Bednash, 2011).

Attrition: Refers to a student "dropping out" or the rate in which the student terminates without completing a degree (Jeffreys, 2007; Tinto, 2012). Difference between the enrollment number and the completion number (at course level and graduation level).

Generic Baccalaureate of Science in Nursing (BSN): Admits students with no previous nursing education. A BSN program requires four to five years of college study and leads to a baccalaureate nursing degree. Graduates can sit for the NCLEX registered nursing exam (Fang, Hu, & Bednash, 2011). Operational definition- A traditional BSN student who is not a RN by licensure.

Full-time student- Undergraduate: A student enrolled for 12 or more semester credits, or 12 or more quarter credits, or 24 or more contact hours a week with each term or quarter as designated by the program structure (IPEDS).

Graduation rates: Number of students entering the institution as full-time or part-time in a particular year (cohort), by demographics. The number completing their program within 150 percent of normal time to completion (IPEDS). Operational definition- Percentage of RN-to-BSN students who enrolled either full-time or part-time and graduated within 150% of normal time to completion (2 years for an accelerated online RN to BSN program).

Hybrid Program: Has between 30% and 80% of course content delivered online. A term used to describe courses that include both synchronous and asynchronous elements in order to deliver instructional content (e.g., real-time class meetings with on-campus and distance students through web conferencing, in addition to independent assignments completed on the course LMS) (IPEDS; Allen & Seaman, 2016).

Institutional Characteristics: Specific data elements currently collected for each institution include: institution name, address, telephone number, control or affiliation, calendar system, levels of degrees and awards offered, types of programs, application information, student services, and accreditation. (IPEDS). Operational definition- Size and location of the institution and program, program type (online versus hybrid), curriculum terms (5, 6,7, 8 or 9 week), number and type of prerequisite course requirements, GPA admission requirement, student support services (academic, social, technical, financial), profit status (for profit or nonprofit), retention methods (mentorship, tutoring, remediation, orientations, advisement predictive analytics).

Normal Time to Completion (Timely Graduation): The amount of time necessary for a student to complete all requirements for a degree or certificate according to the institution's catalog or accreditation benchmark (IPEDS). For the purpose of this study, time periods will be based on individual program standards of 150% of time to completion metric (Tinto, 2012) as no widely standardized measure of timely graduation was found in the literature relative to online and hybrid RN-to-BSN programs (part-time and full-time). Operational definition- Cohort graduation completions within 150% of benchmark standards (2 years for an accelerated online RN to BSN program).

Online program: At least 80% of the course content is delivered online (Allen & Seaman, 2016, IPEDS). RN-to-BSN enrollment of at least 80% course delivery.

Part-time student- Undergraduate: A student enrolled for either less than 12 semester or quarter credits, or less than 24 contact hours a week each term. Graduate: A student enrolled for less than 9 semester or quarter credits. (IPEDS). Contact term hours or semester credits of enrollment.

Pre-entry Attributes: A student quality, character, or characteristic ascribed to someone or something before admission into an academic institution (Tinto).

Demographics, prior work and academic experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits.

Predictive analytics (PA): Obtaining information from sets of data in order to determine patterns and produce probabilities that certain outcomes and trends will occur in the future (Siemens & Gašević, 2012).

Retention/persistence: The percentage measure in which a student (part-time or full-time) persists from one course to the next, from one semester or term to the next, and re-enrolls each subsequent semester or term. For four-year institutions, this is the percentage of first-time bachelor's degree-seeking undergraduates who did not "fail", "withdrawal", "dropout" or "stop out" and persisted through to graduation as the end goal (IPEDS, Jeffreys, 2007). Operational definition- RN-to-BSN (Part-time or full-time) course completion, term by term enrollment to graduation.

RN-to-BSN- Registered Nurse to Baccalaureate of Science in Nursing: The "RN to BSN" student, defined in this context as a licensed associate degree in nursing (ADN) RN or diploma nurse RN seeking to obtain a bachelor's of science degree in nursing (BSN) (Mancini et al., 2016; Phillips & Titzner-Evans, 2017). Operational definition- An adult RN enrolled in either an online or hybrid program to obtain a BSN degree.

Assumptions

The assumptions for my study are: RN students select and enroll in online or hybrid RN-to-BSN programs and desire to graduate in a timely manner. Nontraditional online students choose to take classes asynchronously and/or synchronously so that they can maintain full-time employment and family responsibilities while pursuing a higher degree as indicated. RNs who decide to enroll in a BSN program have the desire to persist and the persistence to complete their degree will be multifactorial considering diverse student backgrounds and institutional characteristics.

Scope and Delimitations

The scope of this retrospective study was limited to accredited U.S. online, hybrid accelerated RN-to-BSN programs with continuous enrollment. The study excluded traditional BSN programs, complete face-to-face RN-to-BSNs; community college RN-to BSN programs and accelerated second degree BSN programs. Although many of these partnership pathways are aimed at increasing BSN attainment for IOM purposes the student and curriculum dynamics vary widely. Previous research regarding BSN face-to-face programs is numerous in the literature and is well informing of differences between online RN-to-BSN programs and BSN traditional programs. Collaborative models between community colleges and universities that promote educational progression of RNs with shortened pathways from ADN to BSN attainment differ in program structures (Farmer et al., 2017). Accelerated ADN to BSN students concurrently take ADN and BSN courses in a community college structure dissimilar to that of working RNs pursing a BSN through online or hybrid accelerated terms. Accelerated second degree BSN students are a unique population as these students do not hold an ADN or a diploma in nursing and are not licensed to practice as an RN (AACN, 2016). A qualitative study was considered for this study, however after searching the literature a wealth of studies was found relative to online RN-to-BSN students and their perceptions of factors that added to their satisfaction, success or failures within an online BSN programs. Considering theoretical and conceptual frameworks, other conceptual theories are unspecific to this study purpose and research questions. Bean and Metzner's attrition model (1985) broadly addressed factors such as compensatory interaction effects between social environmental variables and academic variables, suggesting that environmental variables are presumed to be superior for nontraditional students in comparison to academic variables (Bean & Metzner, 1985). Jeffrey's (1984) Nursing Universal Retention and success (NURS) model presented a globally-applicable framework for examining academic outcome interactions within psychosocial contexts of nursing students. Jeffreys assumed multivariable factors related to positive nursing student retention outcomes are accompanied by positive psychosocial outcomes (Jeffreys, 1984). The NURS model provides a conceptual lens to understand nursing retention dynamics. However, the model does not analyze the contextual nature of online learning respective of the student's pre-entry attributes, level of academic integration, the institutional characteristics and persistence within distant education platforms.

Limitations

The limitations of this study regard the threat of external validity where generalization of findings does not represent the entire population. Further recommendations for randomized studies with larger sample sizes are warranted. The distribution of the sample geographically represented a small population and findings may not be applicable to other programs in other regions with varying student representations. I suggest that future studies extend outside of the sample population to further add to the validity of my findings. The datasets I obtained were secondary in nature with risks of face validity or inaccurate or faulty documentation within the original data source. Ambiguity within the calculations of attrition, retention and graduation may lead to erroneous findings as different institutions had varying ways of calculating these measures retention and time to graduation outcomes and ambiguous retention measurements. Internal validity threats surround causation of retention and timely graduation that cannot be achieved as the use of correlational study designs provides only a mere understanding of relationships. Retention and graduation outcomes have many variables that impact its outcome thus many variables were untested with skewed results directed toward only those variables examined but with future recommendations to empirically examine other variables.

Significance of the Study

Few studies have examined predictive variables for the purpose of developing predictive models in accelerated online and hybrid RN-BSN programs with continuous enrollment periods. Furthermore, there is a lack of research that has examined the influence of RN-BSN accelerated models on retention and time to graduation. Student retention and degree completion in RN-BSN programs will have positive implications for the student, academic institutions, healthcare organizations and patient safety (Mancini et al., 2016). Although a large portion of online RN-BSN students pursue accelerated terms, these programs traditionally have lower retention rates compared to face-to-face RN-BSN routes (Mancini et al., 2016). Feelings of detachment and isolation from the institution are factors shown to increase failure risks for the online accelerated student with hybrid options revealing better outcomes (Simpson, 2004). RN-to-BSN students are mostly of older age, white, have full-time jobs with family obligations, struggle with financial costs of returning to school, endure time restraints and live in rural areas compared to face-to-face BSN students (Mancini et al., 2016).

Online RN-BSN students face many barriers to success while attempting to meet program requirements and study time within expedited and continuous course terms (Yorke, 2004). Mancini et al., (2016) found students in face-to-face RN-BSN programs completed degree requirements in less time compared to online-RN-BSN students. Contrarily, online RN-BSN students bring forth unique challenges and strengths relative to traditional BSN students (Sarver, Cichra & Kline, 2016). Hewitt (2016) suggests that at the BSN level, RNs are expected to have greater theoretical and leadership qualities and to be skilled in both writing and professional communication. These skills are not likely obtained in their technical associate degree preparation. Acute-care settings, have concurrent issues of nursing shortages, lack of diversity, and a deficit of nurses with BSN degrees; creating a need to retain more students with diverse backgrounds (AACN, 2016). Reports indicate that a large percentage of soon-to-be retired nurses working in acute care settings have BSN degrees, which leaves a large gap of nurses who will not be BSN prepared (AACN, 2016). Patient quality and safety of care is enhanced when nurses have a minimal of a BSN or higher degree in nursing (AACN, 2016).

As many acute care organizations are requiring a BSN for minimal job entry, a considerable rise of online RN-BSN programs is predicted to continue (Hewitt, 2016). Many RN-BSN students attempt to concurrently manage academics, professional and personal commitments while transitioning from nurse to student placing them at higher risk of attrition (Gilmore & Lyons, 2012; Pitt, Powis, Levett-Jones & Hunter, 2012; Sarver et al., 2015). Students with nontraditional backgrounds such as minorities, males, and older adults have shown higher risk of attrition compared to traditional nursing students (Pitt, Powis, Levett-Jones & Hunter, 2012; Smith, 2006). Cauble (2015), however, found no relationship between demographic variables and outcomes of persistence and retention in RN-to-BSN programs. Previous studies have found environmental variables such as family, financial, and faculty support to be more predictive of retention in online programs, however demographic variables continue to be a consideration in evaluating institutional program quality and graduation outcomes. Individuals involved in recruitment efforts, research, policy and curriculum development must consider the pre-enrollment and immediate post-enrollment periods of potential RN-to-BSN students as student pre-attribute variables and levels of academic integration may predict future retention and persistence behaviors toward graduation (Tinto, 1993). Intervening institutional characteristic variables may better explain the relationship between an “academic fit” (Tinto, 1993; Rovai, 2003).

Positive social change implications of my study will lend to a transformation of proactive strategic advisement and academic retention plans to address adult student needs and institutional level characteristics. Identifying predictive retention variables and developing a sample predictive analytic model for accelerated online RN-to-BSN programs will align with the trend of implementing technological advancements in higher education and will enhance future retention outcomes and time to program completion; leading to positive social change (Chai & Gibson, 2015; Kari et al., 2016; Hart, 2014).

Summary

Nursing student attrition has systemic and long-term consequences for students, institutions, communities, and clients. Evaluation of retention and time to graduation are of the essence to assist RNs in preserving their nursing license and employment within ANCC Magnet status facilities and specific states mandating the “BSN” in 10 law (AACN, 2017; HRSA, 2013). Accelerated RN-to-BSN programs are expected to continue to grow based on current trends (AACN,2016). Accelerated education is popular among RNs of all backgrounds who balance work, family, and school responsibilities. The problem of sub-optimal attrition and graduation times however, continues to be a major concern considering the IOMs recommendations. Previous research has not examined various predictive variables in depth for the purpose of developing predictive analytics in RN-BSN programs. In order to meet program benchmarks and IOM recommendations, program leaders must invest and implement innovative predictive analytic tools that can be used to examine an extensive amount of multivariate retention factors associated with diverse backgrounds and causative factors. Considering the capabilities and advancement of technology, a re-evaluation of complexities within today’s RN college student and institutional influences is necessitated using predictive analysis (West et al., 2016). Chapter 2 discusses literature review findings regarding factors related to retention and time to graduation.

Chapter 2

Literature Review

The overall purpose of this quantitative study was to examine correlations between student pre-entry attributes, academic integration, and institutional characteristics and retention and time to graduation. I created a sample predictive algorithm for accelerated RN-to-BSN programs using retrospective student records and institutional data. The purpose of the literature review was to highlight a critical review of previous research findings on student retention outcomes in higher education.

Very few studies have examined relationships between student attributes and institutional characteristics in accelerated online and hybrid RN-to-BSN programs with continuous enrollment. This chapter includes information regarding literature search strategies and an explanation of theoretical and conceptual frameworks of Tinto and Rovia. This chapter begins with the methodology of the literature search, proceeding to an in-depth explanation of the theoretical propositions aligned with defined variables associated with this study, and will follow with an insightful review of the literature associated with retention and timely graduation in accelerated online RN-to-BSN programs.

Literature Search Strategy

In an attempt to locate pertinent studies and findings of persistence, retention and timely graduation in the various accelerated online and accelerated RN-BSN programs, I used a combination of key terms and searched between the years of 2010-2018 using CINAHL, CINAHL PLUS, Education Source, ERIC, Sage and EBSCO. The rationale for the search beginning in 2010 reflects the time period of the IOM recommendations in which an influx of RN-to-BSN programs were created, and concerns of program quality and graduation outcomes began to surface.

Many studies exist between the years of 2010 and 2015 that compare traditional RN-to-BSN programs and the various online RN-to-BSN degree options. After searching several databases, I located thousands of studies related to retention. I excluded, most of these studies as they were either inaccessible, had issues of validity and reliability, or were irrelevant to my study. I selected approximately 156 studies that were inclusive in my literature review discussion. In addition, I utilized peer-reviewed articles, dissertations and three books related to retention in higher education. Search terms included *retention, attrition, timely graduation, nursing retention, RN-BSN retention*, *RN to BSN retention*, *RN-BSN attrition*, *RN to BSN attrition*, *RN to BSN graduation*, *RN-BSN graduation*, *RN-BSN persistence*, *RN to BSN persistence* and *RN to BSN success,* and *RN-BSN success*. Other key search terms included spelling out *registered nurses to baccalaureate of science in nursing*, *RN-BSN online retention*, *RN-BSN accelerated*, *RN-BSN hybrid*. Theoretical frameworks were searched by the authors names (Vincent Tinto, and Rovai).

Theoretical Foundation

Vincent Tinto and Alfred Rovai are reputable retention theorists who similarly conceptualized retention and persistence within traditional and nontraditional education systems (See Figure 1). Both theorists postulated that personal attributes of the student, integrated within an institution that fosters academic and social integration, most likely will lead to student retention and persistence. The distinction between their assumptions centers on the delivery mode of education. Tinto's theories of student integration and departure (1975, 1983, 1993) provided a foundation to understand the academic transition experience within general college students. Rovai combined the works of Tinto and Bean and Metzner (1985) and assumed distant education platforms influence the rate of persistence, considering integration between pre-entry and post-entry factors. Both models provided a framework to better understand the dynamics of RN-to-BSN online and hybrid learning and the relationships between institutional and student attributes as predictors of retention and time to graduation.

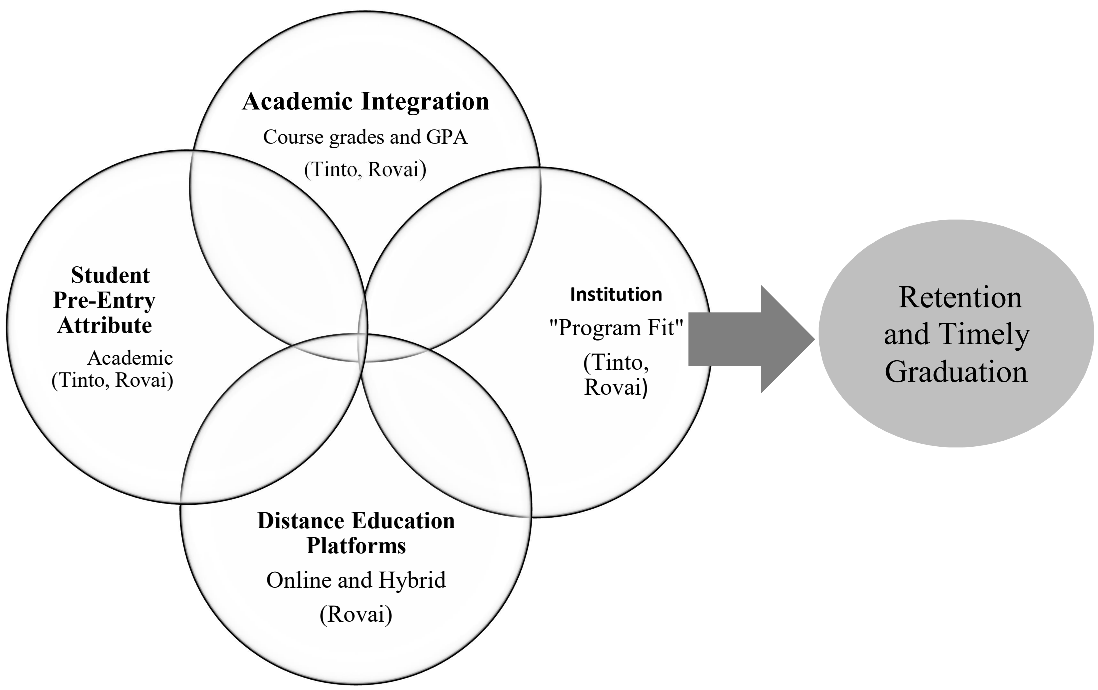

Figure 1: Concepts within Tinto's Theory of Retention and Rovai's CPM.

Vincent Tinto is a notably accredited sociological theorist in higher education with a large amount of research studies that have cited his sociological postulates relative to academic and social integration, retention, and student departure across various disciplines. Tinto's theories of integration and student departure are heuristic culminations of over 50 years of research , nestled closely with other psychosocial engagement theorist such as Bean and Eaton's psychological model of student retention (1999) and Astin's theory of student involvement and input, environment and output model (1977, 1984, 1993), Bean & Metzner's student attrition model (1985). Much of these theories were grounded in Tinto's work, as some proclaimed that his speculations were too passive and non-dynamic toward nontraditional students (Bean & Metzner, 1985). The definitions of nontraditional nursing students have been renormalized and extended to include students over the age of 24, commuter, enrolled part-time, male, member of an ethnic and/or racial minority group, English as a second language (ESL), has general equivalency diploma, requires remedial work (Jeffreys, 2005, 2012)

Nontraditional and traditional students share common factors; however, students 25 and older have added challenges of family, career and financial obligations and progress differently than traditional students (Okagbare, 2017; Jeffrey's, 2007). In a retrospective predictive analysis of 9,567 students, younger students who received financial aid and had previous baccalaureate degrees revealed that fewer failed, dropped, or withdrew from classes and were more likely to graduate (Cipher et al., 2017).

The experiences and integration process for nontraditional students are quite different compared to traditional students who live on campus and can ideally socially integrate with faculty, staff, and peers (Bean & Metzner, 1985; Jefferys, 2004). Many RN-BSN students attempt to concurrently manage academics and professional and personal commitments while transitioning from nurse to student (Gilmore & Lyons, 2012; Sarver et al., 2015; Gillespie & Langston, 2014). Nonacademic barriers associated with attrition and dropout include financial crisis, lack of family support, inadequate stress management, lack of self-esteem, poor self-efficacy, insufficient motivation, and lack of time (Megginson, 2008).

Tinto's student integration models remain influential in asserting that purposeful academic and social integration are highly influential in adult student retention holding external variables constant (Tinto, 1975, 1985, 1993). Tinto speculated that student departure is influenced by a transitional process that accounts for interactions between the student's personal attributes and experiences, formal and informal levels of academic integration and external environmental influences (Tinto, 1993). Outcomes of retention are reflective of both the students' and the academic institutions' level of commitment to student success (Tinto, 1993).

The outcome of "retention" however, according to Tinto, is merely a byproduct of the meshing between the student elements and the academic and social systems per individual institution that reflects the degree of "successful education" it imparts on its' unique student population (Tinto, 1987). The more robust the degree of academic and social integration and the more suitable fit between the student and the institution, the more likely the student will be retained and ultimately graduate (Tinto, 1993; Bean & Metzner, 1985; Rovai, 2003).

Unexpected links between institutional characteristics such as class size and student demographics have been found to influence educational outcomes (Bettie & Thiele, 2016). Integration can take the form of structural or normative processes considering external and internal rewards respectively (Okagbare, 2017). Some suggest that a student *habitus*, are formulated perceptions of human, cultural, social and financial gains where earning a degree or diploma, positioning oneself in a higher social class, establishing networks and relationships respectively are considerate factors in integration processes (Okagbare, 2017). Intrinsic and extrinsic motivators play a major role in a student responding to change in learning and/or one's work environment. Dissatisfaction within these motivating elements can lead to voluntary withdrawal (Hoeve, Castelein &Roodbol, 2017).

Many RN-to-BSN students are motivated to persist toward obtaining a BSN degree to maintain their employment under Magnet status and state regulations and for family recognition and personal achievements (Bryer et al., 2015). Hence, decisions to withdraw from online programs are multifactorial and no longer based solely on demographic variables (Sorenson & Donovan, 2017).

Previous research within the last 10 years has identified *dropout factors* as an interaction between the students' academic background, relevant work and academic experiences, personal skills and psychological attributes, course and institutional designs, instructional and faculty support, and environmental factors such as work commitments and supportive interactions and environments (Lee, Choi & Kim, 2013; Jeffreys, 2007). Bryer et al. (2015) found that high levels of self-esteem and self-efficacy are factors relative to student attrition in RN-to-BSN students.

Tinto's theory provides insight into a critical question of why many online students have higher attrition and dropout rates compared to traditional programs.

Perhaps much of the problem is due to less academic and social integration conducive to the academic delivery model and to multifactorial interactions between RN-to-BSN attributes and the institutions' unique characteristics (Tinto, 2012). Differences in the significance of social integration among nontraditional and traditional students have been found and the 1st year of enrollment chiefly predicted future outcomes for retention (Tinto, 1975, 1987). Social integration has found to be less significant to online RN-to-BSN students who are mostly older, with concurrent work, academic, and family responsibilities. Due to the nature of accelerated online programs and barriers to the student's time, less emphasis is placed on the formation of peer groups and involvement in campus learning activities, social events and organizations (Rovai, 1985).

Social integration varies according to institutional mission and goals. Notably to mention is that student academic factors only account for 20–30% of attrition, whereas 70–80% of attrition accounts for reasons such as environmental barriers, financial hardships, unexpected life events and the lack of academic and social support (Tinto, 2012). I excluded social integration variables in my study as much of the recent research in RN-to-BSN programs have qualitatively explored student perceptions of internal and external social support systems accrediting faculty and family support as most critical to their academic success. I used Tinto's theory of integration and departure (1993) as a guide to understand the relationship between student pre-entry attributes and academic integration. However, I also used a conceptual model to consider persistence in nontraditional online students and will be necessary to further evaluate correlations between variable predictors of retention and timely graduation in accelerated online structures.

Conceptual Model

Building upon Tinto's theories, Rovai (2003) combined Tinto's (1975) and Bean and Metzner's (1985) models suggesting a framework that included factors ''prior to admission'' including student characteristics and student skills, and external and internal factors affecting students ''after admission'' sensitive to online non-traditional students (Cochran, Campbell, Baker & Leeds, 2014). Rovai (2003), developed the Composite Persistent Model (CPM) that considers student pre-attributes "prior to admission" and internal and external factors, "after admission" influencing the degree of student persistence in distance education platforms. Student characteristics and skills prior to admission, external and internal factors post-admission are presumptions in Rovai's model. Rovai's model has been instrumental in empirically explaining significant predictors of online student dropouts versus completers taking into account considering pre and post admission attributes.

Choi and Park (2018) credited Rovai's conceptual framework in analyzing variables and found that indirect and direct physical constraints, interactions within course content, satisfaction, and GPA directly affected adult student decisions to persist or dropout of an online degree program. An ample amount of research has been provided to conclude that personal, external, and internal factors influence retention in online RN-to-BSN programs; therefore, certain constructs in Rovai's model were excluded in this study (family support, faculty and program satisfaction, self-efficacy and motivation, levels of stress, study time, computer literacy).

There is a lack of studies that have analyzed specific intervening variables of institutional characteristics, student pre-enrollment attributes and immediate post-enrollment integration as predictors of retention and timely graduation in accelerated online RN-to-BSN programs. Many studies, however, have presented contradicting findings with parts of Rovai's model most relevant to student characteristics such as age, ethnicity, gender, academic performance, and preparation before enrollment and the effect of each of these on student persistence and retention. Researchers have found demographics to have less value in predicting persistence and retention in online courses, however some have found pre-enrollment student attributes such as gender, age, race, GPA, previous work experience prior to college are notable predictors of student persistence and retention (Rovai, 2003; Bean & Metzner, 1985). Rovai's model was used to conceptually analyze pre-enrollment and post-enrollment attributes on the degree of persistence and furthermore retention and time to graduation in accelerated RN-to-BSN students.

Literature Review Related to Key Variables and/or Concepts

Pre-Entry Attributes (Personal)

The current degree of literature on retention and graduation in accelerated online RN-to-BSN population is limited, however a vast amount of previous studies have examined pre-entry attributes as significant risk factors prior to enrollment processes and throughout the critical first year of enrollment (Tinto, 1987; Jefferys, 2005). Common barriers, challenges, incentives and strategies in completing RN-to-BSN education include pressures to complete a BSN, challenges of work and employment, financial barriers, employer tuition assistance, financial aid and family and institutional support respectively (Duffy et al., 2014). In addition to individual characteristics, satisfaction between family and organizational frameworks are predictive of dropout and persistence in online students (Park & Choi, 2016). RN nursing students enter the academic arena with diverse social and demographic backgrounds which has created a challenge in assimilating strategies to retain them throughout degree completion (Merkley, 2016). It is well documented in the literature that demographic variables such as age, gender, race/ethnicity, academic and work experiences are predictors of retention across multiple heterogeneous degree programs (Astin, 2005; Tinto, 1975, 1985, 1993). Students with nontraditional backgrounds such as minorities, males and older adults are at a higher risk of attrition compared to traditional nursing students (Pitt, Powis, Levett-Jones & Hunter, 2012; Smith, 2006). Retention theorist such as Tinto, Astin and Bean, Bean and Metzner and Jefferys, postulated significant multifactorial correlations between personal, academic, environmental and psychosocial influences on student retention. Studies examining online RN-BSN retention outcomes have reported mixed findings. One study concluded that personal variables are the least likely cause of attrition in RN-to-BSN subjects, however the degree of academic integration, satisfaction or dissatisfaction of faculty and organizational support, financial assistance, and time constraints were most significant predictors of retention and attrition respectively (Jeffery's, 2007). In a 2015 retrospective correlative dissertation study of 197 graduate nursing students, Cauble found that pre-entry attributes (age, gender, race/ethnicity) were not predictors of persistence but that undergraduate GPA was most predictive. Lending to high attrition rates (15.9-44%) in baccalaureate nursing programs, retention strategies are often based on demographic differences (Urwin, Stanley, & Jones, 2010; Campbell & Dickson, 1996). Commonalties of pre-entry characteristics across the various heterogeneous disciplines have found significant relationships between retention, graduation and/or timely graduation. Considering multifactorial and interacting variables in the online RN to BSN population, exact causative factors for retention and graduation is unexplainable, however personal characteristics should not be totally discounted but understood as less predictive compared to academic and environmental influences (Park & Choi, 2016). Various elements of personal, academic, social, psychological and environmental influences must be holistically considered when attempting to grasp student retention issues across various educational pathways. Sparkman, Maulding and Roberts (2012), found students who live on campus, attend traditional course, are white females and who had parents with college education were more likely to graduate. Formulating accurate assumptions of attrition is the lack of consistency in defining retention terms and benchmarks used to measure progression, retention and graduation rates (Robertson, Canary, Orr, Herberg & Rutledge, 2010). Numerous qualitative studies have been performed that have examined diverse experiences among RNS who withdrew or failed out of an academic program providing rich insight behind the reasons and consequences of attrition. Exacerbations of attrition reflect the push and pull manifestations of family and work responsibilities primarily, predicating a fine-line between retention and withdrawal decisions (Hart, 2012). Many RN-to-BSN students academically succumb to the pressures forgone, with many evaluating closely the worth of the emotional and financial costs versus the benefits and value of obtaining a BSN degree (Girard, Hoeksel, Vandermause & Eddy, 2016). Consequently, many RN-to-BSN nurses bear the emotions of a failed attempt, even considering oneself place bound and unable to move forward with political, professional and social expectations of becoming a baccalaureate prepared RN (Girard et al., 2016). Compensating factors within a personal or academic crisis that enables the student to maintain persistence include high levels of psychological empowerment, resilience and spiritual well-being (Beauvais, Steward, DeNisco & Beauvais, 2014). It is imperative for academic educators and advisors to understand that attrition outcomes can have long-term ramifications for the unsuccessful RN student including ill- effects on ones' dignity and fear of reattempting an academic program (Girard et al., 2016). Predicting and identifying common roadblocks of students early on may potentially offset the later manifestations of refractory attrition (Borghese & Lacey, 2014). Predictive college persistence questionnaires have been implemented to assess factors influencing retention and attrition in certain international nursing populations with high validity index (Pugh, Cramer, Slatyer, Twigg & Robinson, 2018).

Age

Most of the descriptive correlative studies found related to retention in online RN-BSN samples claim that most of these students are 30 years of age or older (Cipher et al., 2017; Duffy et al., 2014; Gilmore, 2017). Previous research has claimed that as a student's age rises above the traditional age, along with heightened levels of personal and family responsibilities, the more likely that student will not be retained (Horn, 1998; Murtaugh, 1999). In addition, previous research suggests that students who have children less than 6 years of age have lower completion rates (Wladis, Conway & Hachey, 2016). Interestingly, the human capital model posits that the later age in which the student starts college, perceived benefits of financial and nonfinancial gains dwindles down (Stratton et al., 2007). This finding has implications for academic programs that enroll larger numbers of older RN students who potentially may not be as persistent or motivated as their younger RN peers pursing the same degree. Typically, traditional students are less than 24 years old, assume the traditional 4-6 years to complete college, and are more likely to be retained and graduate compared to nontraditional students (Bean & Metzner, 1985). Notably, students who are considered “nontraditional” have presented with higher attrition rates in various studies. Cipher et al. (2017) found that pre-entry attributes of younger age (<24) predicted both graduation and earlier graduation with defined interacting variables of financial aid assistance and the presence of a previous baccalaureate degree outside of nursing. It is found however, that motivators in older nontraditional students reflect goals of personal and professional growth despite time constraints and employer discouragement (Harris & Burman, 2015; Schwarz & Leibold, 2014). Encouragement and articulation friendliness are reported facilitators to pursue and persist towards obtaining a BSNs, where family and job commitments, financial barriers and indifferent treatment between associate prepared RNs and baccalaureate-prepared RNs were perceived barriers (Schwarz & Leibold, 2014).

Online RN-to-BSN students are typically older Caucasian women who are married and have families, live in rural areas, have financial and time commitments, are employed, and attend school part-time (Mancini et al., 2016; Dacanay et al., 2015; Robertson et al., 2010). It is for these reasons, along with the lack of salary incentives that many RNs decide not to voluntarily pursue a BSN degree; because personal challenges outweigh the benefit of pursing a higher degree (Hidle, 2014). Now that many proposed mandates such as the "BSN in 10" and Magnet status regulations are in place, many RNs must involuntarily pursue a BSN or face the consequence of being unable to practice in a state. RN-to-BSN program leaders should consider dynamic influences of student persistence during pre-planning phases prior to academic enrollment, considering intrinsic and external motivators, barriers and incentives for returning to school (Dacanay et al., 2015; Robertson et al., 2010). Many of the initial reasons' students decided to become ADN nurses may intrinsically motivate one to pursue a higher degree characterized by caring behaviors, personal healthcare experiences, role modeling in one's current work environment and potential clinical leadership positions (Hoeve, Casteline, Jansen & Roodbol, 2017). The lived experience of previous RN-to-BSN students can be retrospectively examined in order to predict motivational tendencies, barriers to enrollment, and political influences of BSN attainment (Hidle, 2014). Evaluating levels of intrinsic motivators can assist in predicting early attrition (Hoeve et al., 2017). During the pre-enrollment period, academic coaches and advisors are in prime positions to assess student barriers and using "motivational interviewing" to identify barriers to baccalaureate matriculation and completion (Baur, Moore & Wendler, 2017, p.

172). In a qualitative study of 10 senior RN-to-BSN students, Hidle found commonalities between RN-to-BSN student experiences including (1) the idea that nursing education was the right path, (2) shared motivations to enhance knowledge and higher degree attainment, (3) ideas of improved patient care, (4) perceptions of job security and financial security, (5) degrees of perseverance and gratification (6) perception s of lack of job opportunities with ADN degree, (7) common financial, time, age, visa status and guilt barriers (8) shared acceptance of RN-to-BSN educational pathways. Compensatory mechanisms within various stages of attrition may offset poor academic performance when a student has a higher level of emotional intelligence and social responsibility (Hidle, 2014). Emotional intelligence scores have been found to increase with age and education attainment, suggesting personal, professional and academic experiences of older RN-to-BSN students may soften the effects of attrition when hardships arise compared to younger BSN students (Jones-Schenck & Harper, 2014). Understandably, the greater the degree of motivation toward degree attainment and educational aspirations the greater likelihood of persistence (Bergman, Gross, Berry & Shuck, 2014).

Gender

Nursing students with nontraditional backgrounds such as older adults, males and minorities have traditionally had higher attrition rates compared to traditional nursing students with less risk factors (Pitt, Powis, Levett-Jones & Hunter, 2012; Smith, 2006; McLaughlin, Muldoon & Moutray, 2010). Females have historically represented the highest percentage of the total enrolled nursing students including RN-BSN programs (National League of Nursing, 2009). According to the Bureau of Labor Statistics (BLS), approximately 91% of working RNs are female. Research revealed that females are more likely to be retained and graduate in a reasonable time frame compared to males (Smith, 2006; McLaugh, Muldoon & Moutray, 2009; Mulholland, Anionwu, Atkins, Tappern & Franks, 2008). Some studies, however, have found no relation between gender and retention (Ajai & Imoko, 2015). Further research is needed to evaluate gender effects on retention in accelerated RN-to-BSN programs. Examining gender differences in personal and academic capabilities alone is of little value in understanding retention. However, analyzing the negative effects of gender inequality in nursing academic programs has been the focus of recent research. Stott (2007) found that males, in a qualitative study, had primarily female peers, felt isolated or excluded, and feared “appearing silly or less academically able in a female dominated context” (p. 328). Kirk, Chad and Ponton, (2013) examined 49 men in a predominately female online RN-BSN program and found that men rated higher levels of acceptance by their female peers compared to traditional on-campus programs. Out of the 49 men surveyed, 98% of the male subjects were motived to complete the BSN degree for career advancement and professional growth. However common barriers included (1) gender-biased language and imagery, (2) lack of role models, (3) isolation, (4) devaluing of men's perspectives and contributions, (5) sexist stereotypes, and (6) open hostility and discrimination (Kirk, Chad & Ponton, 2013). Being in a hostile environment can persistently produce dissatisfaction and lead to higher attrition rates in male nursing students (McLaughlin, Muldoon, & Moutray, 2010; Mulholland et al., 2008; Pryjmachuk et al., 2008; Stott, 2007; Wilson, 2005). Suggestive interventions for male nursing students in RN-BSN programs would be equal treatment and incorporation of independent, self-directed, minimal competitive online activities with assignments as the leader or one in charge in team-based assignments (Anthony, 2006; Brady & Sherrod, 2003; Dyck et al., 2009; Ellis, Meeker, & Hyde, 2006; O'Lynn, 2004; Stott, 2007).

Ethnicity and Race

Changing demographic elements have shifted perceptions of race as determinants of persistence and risks. Recent studies have assessed that RNs from minority backgrounds are more likely to pursue baccalaureate and higher degrees in nursing compared to whites (HRSA, 2008). Native born students have been found to have a higher risk of dropping out of an online course than foreign-born students (Wladis, Conway & Hachey, 2016). Academic abilities, socioeconomic status, prior experience with academic systems, first generation degree obtainments, and negative impacts of inequality of racism have been correlative elements of retention. A lack of diversity in the nursing profession and academia warrants interventional measures to attract and retain various students of ethnic backgrounds. According to the BLS, 10.4% of RNs are Black, 7.3% are Asian, and 5.1% are Hispanic (2011). A sense of belonging is a significant factor linked to retention found in various studies for students of all races (O'Keefe, 2013; Simpson, 2004). Feelings of detachment and isolation from the institution are factors shown to increase failure risks for the online and accelerated student (Simpson, 2004). Minorities often report disconnection and isolation relative to both the online environment and indifferences to their dominant peers. When solely considering race and ethnicity, blacks, Hispanics, American Indians and English as second language (ESL) students have the highest risk of attrition (French, Immekus & Oakes, 2005). Williams et al., (2018) performed a longitudinal study of 2250 predominately female non-white nursing students enrolled in an accelerated BSN program, approximately 43% of the subjects were African American and 62% categorized themselves economically disadvantaged. Multilevel modeling, propensity score matching, and a Karlson, Holm, and Breen KHB decomposition method (2010) were used in one study and found that native-born students were at greater risk of attrition in online structures compared to foreign-born students comparing face-to-face structures (Wladis, Conway & Hatchey, 2016). National and international evaluation of contextual regards to attrition and retention among diverse groups is needed as students experience higher education very differently depending upon one's eclectic circumstances (Mulholland et al., 2008).

Socioeconomic status/geographic region

Social capital plays a major role in RN-to-BSN degree completion (Romp et al., 2014; Okagbare, 2017). Geographic zip codes and geographic regions have been a measure in many retention studies to predict the degree of impact of social capital and student retention. Financial barriers are one of the primary culprits for RNs not obtaining a BSN and furthermore are primary reasons for academic withdrawal (Romp et al., 2014). Many RNs concurrently manage financial, academic and work commitments and reduce their work hours significantly to attend school fulltime. Others, however, due to less financial capital, maintain full-time employment and attend school part-time which may a negative impact on timely degree completion. Many healthcare employers with high BSN demand currently offer generous tuition assistance packages as incentives for RNs to go back to school.

Interestingly, academically strong students may prove superior in abilities to compensate during the time of a financial crisis compared to weaker academic students who would be at a higher risk of attrition under the same circumstances (Mosely & Mead, 2008). Students with financial limitations should be identified prior to enrollment and referred to the proper funding resources to reduce later attrition and/or withdrawal risks. Surprisingly many nurse educators are uninformed of available financial assistance in which the student could benefit. This requires institutional action to ensure all faculty are educated on financial resources, manifestations of student financial hardships and its' varied consequence on student attrition (Astin, 1993, 1995). Studies referencing financial aid, both loan and grants, have reported contradictory correlations between student retention and aid support. Stratton (2007) found no relationship between financial aid and full-time student retention, however other similar studies found positive statistically significant correlations between merit-based aid and retention compared to a nonsignificant relationship between need-based aid and retention (Singell 2004). State-funded scholarship and loan attainment has shown significant correlations with withdrawal decisions as maintaining a minimum GPA is often a criteria and proves to be a positive motivator for an online student to maintain course enrollment (Cochran, Campbell & Leeds, 2014). Enrollment decisions from course to course are heavily dependent on presence of financial abilities, thus attrition can significantly rise in students prone to financial hardships (Cochran et al., 2014). Students in the study who were financially stable were 40% more likely to persist than those who did not have money to pay for college, controlling for other personal and environmental factors.

Prior Education Experience

RN-to-BSN students bring forth unique strengths and compensatory mechanisms to the academic arena compared to traditional BSN students. Along with these experiences comes an association with both positive and negative academic encounters (Megginson, 2007). During the pre-enrollment period, it is imperative to examine the time frame between the RNs associate degree obtainment and entrance into a BSN program. Historic studies reported a wide range of enrollment periods ranging between 7.5 to 10.5 years from initial licensure. However, it is understood that this time period gap is rapidly closing as more inexperienced RNs are pursuing their BSN degree directly after licensure (McEwen et al., 2013; Krov, 2010).

RNs that hold a previous bachelor's degree outside of nursing has shown reduced risks associated with attrition (Cipher et al., 2017; Sarver et al., 2016). These students potentially have stronger liberal and writing skills compared to non-baccalaureate students and have substantial academic preparation, relevant experiences, and learning skills (Hewitt, 2016, Choi & Park, 2018). Choi (2016) found that these elements are predictive of student dropout as scholastic aptitude is a direct indictor of the students learning skills and the practical contact academic experiences one has encountered. Students at the BSN level are expected to achieve advanced leadership, communication and writing competencies; which are skills that are not presumed at the technical associate degree level (Hewitt, 2016). Writing courses have been perceived by many RN-to-BSN students to be intimidating and may potentially lead to a case of withdrawal or failure in the presence of simultaneous risk factors such as poor academic performance and the lack of writing support for example (Tyndall & Scott, 2016). It is imperative that academic leaders and BSN educators make better efforts to collaborate with ADN level faculty and implement writing structures early on that will best prepare potential BSN students for writing achievements. Furthermore, providing pre-enrollment writing support and remediation workshops could offset future attrition risks in online RN-to-BSN populations. In a qualitative study exploring perceptions of quality writing development in RN-to-BSN, found differentiated competencies between ADN and BSN prepared nurses including: being a scholarly writer, assessing writing abilities, and connecting to practice. Implications from this study suggests that the learned experience of writing may assist in the shaping of professional intricacies and furthermore potentiating persistence toward attaining a BSN degree (Tyndall & Scott, 2016).

Retrospective studies performed on online RN-to-BSN subjects have provided predictive insights into what year of program progression most likely will have the highest rate of withdrawal and failure. Studies have shown that senior students who are further along in the academic program have shown less attrition risks compared to non-seniors (Tinto, 2012; Bean & Metzner, 1985). As Tinto and Bean and Metzner articulated in their research, the freshman year of college is a "transitional" stage and is most susceptible to dropout and/or failure. Their findings have been concurred with many other retention studies that have found trends toward a steady decrease in attrition risks during sophomore, junior and senior years (Cochran, Cambell & Baker, 2014; Sorensen

& Donavon, 2017). Although not specific to RN-to-BSN programs, these assumptions may assist in appreciating that seniors (1) have culminated personal and academic experiences with demonstration of persistent behaviors (2) perceive upper level courses more relevant to direct practice and (3) have less time to repeat courses (Cochran et al., 2014). RN-to-BSN students are professional adults with years of diverse practice experiences where learning activities should link the student's previous experience with newly formed knowledge in baccalaureate education (Lee & Fawcett, 2013). Academic reasons are not the sole predictors of attrition. Lack of support, misjudged ability to balance priorities, time constraints and procrastination are other variables. Notably, these variables are reasons for later attrition compared to earlier attrition related to academic difficulties (Sorensen & Donavon, 2017). Unfortunately, many students may harbor negative feelings toward traumatizing academic experiences from the past. In a phenomenological study of RN-to-BSN students, Megginson (2008), found that negative academic experiences can increase attrition risks and in addition can lead to long-term consequences on a student's decision to pursue a BSN.

Prior RN Work Experience

Girard et al. (2017) descriptively analyzed the degree of work experience in a RN-to-BSN program. Many of the subjects had between 6 to 40 years of nursing experience, with an average of 17.5 years (Girard, 2017). RNs work in a myriad of healthcare settings including acute care, ambulatory care, long-term care, home health, community health, specialized units, and primary care areas (Girdard, 2017). RNs may assume various roles including management and leadership positions, direct care provisions, patient navigators. It is not thoroughly investigated in the literature how the number of years of RN work experiences, the respective work setting and the assumed RN role impact future RN-to-BSN educational outcomes. It can only be assumed that the level of critical thinking and discipline, assumed from professional clinical practice, can readily equip the RN with the essential skills to be successful in an online program (Rovai, 1985). A 2015 retrospective study examining the relationship between prior RN clinical experience and educational outcomes in an online master's of nursing (MSN) program found that RN clinical experience had a negative effect on timely graduation (El-Banna et al., 2015). Surprisingly this suggests that those with least RN work experience may be more likely to graduate timely in comparison to RNs with more experience. Of the 106 clinical nurse practitioner students examined in this study, no relationship was found between the RNs clinical experiences and cumulative GPA, clinical course GPA and having any failed courses or being placed on probation (El-Banna et al., 2015). Limited findings on this variable insinuates the justification that further research is needed to examine if RN work experiences are significant predictors of retention and graduation in online RN-to-BSN cohorts. Nevertheless, it is apparent from adult pedagogy frameworks that nurse faculty should design learning activities that link a students' previous work experience with a new metaparadigm of knowledge obtainment and a professional BSN role identity (Lee & Fawcett, 2012; Bryer et al., 2015).

Enrollment Status

Online BSN education has enabled many nurses to return to school in a convenient and flexible manner that may not have otherwise been possible due to covariates (Parker & Wassef, 2010). When choices are provided in degree structure (online or hybrid), progression (part-time or full time) and course choices (prerequisites or electives) students create schedules and select course delivery methods that best meet their needs (Parker & Wassef, 2010). Retaining the online student has been an historic concern for many academic disciplines. Studies have shown that online part-time students are more likely to dropout or fail compared to full-time students (Bean & Metzner, 1985; Rovia, 2003; Tinto, 2012). Many speculations relevant to retention and the part-time student suggests that a greater disconnect between the parent academic institution and the student; the greater the likelihood of attrition (Tinto, 2012). Part-time students in online RN-to-BSN programs, in particular, are more likely to feel disconnected from their academic institution as many are employed full-time and manage families concurrently (O'Keefe, 2013). A common basis for failure in online programs is the inability to maintain academic commitments independently compared to traditional programs and the caliber of students enrolled them (Herbert, 2006). For-profit academic programs have capitalized on this very issue in that "nontraditional" students assume that flexibility, convenience and part-time structures coincidently position them in achieving their academic goals. (Jaggars, 2014). For those students who do not have the academic qualifications, resources or time to commit to a full-time traditional RN-BSN program and or even a hybrid option, "nontraditional" online RN-to-BSN nursing programs provide an attractive option. Understandably, most RNs have concerns of committing to both full-time study and full-time employment (Curtis, Kist, Van Aman & Riley, 2017).

Timeliness is of the essence in reaching the IOM goals by 2020 for 80% of RNs to be BSN prepared. Although some studies have reported equality and comparability in quality retention outcomes between online and traditional BSN degree programs, it's commonly appraised that ongoing course to course persistence accompanied with full-time study is most predictive of retention and timely graduation (Davidson, 2014). The options of taking a break between course terms have resulted in longer time to program completion for some online RN-to-BSN students adding an additional 1.7 years compared to on-campus RN-BSN programs reported by (Mancini et al., 2017). In a 2014 retrospective study, Davidson examined first-time, full-time baccalaureate students and found that continuous enrollment was the most predictive of retention. Students who had earned more credits by the second year and took a summer course were more likely to be retained compared to students who earned less credits and did not take a summer course (Davidson, 2014). Full or part-time persistence has various significant interactive variates such as the student's level of aspiration to obtain a higher degree, the level of satisfaction within faculty, advisory, family and academic support systems, prior learning experiences, receipt of financial assistance and the perceptions of course relevancy to BSN practice (Jeffreys, 2007). Ongoing persistence in either case has found to be lower in students' who find dissatisfaction within their personal, financial and academic experiences (Bergman, Gross, Berry & Shuck, 2014). Students who transfer to another institution, who have a major life crisis, who made wrong career choices and who live busy lives affect attrition percentages tremendously (Kukkonen, Suhonen & Salminen, 2015)

Previous College Credits

Online RN-to-BSN programs have various prerequisite requirements and elective options. What is not clear in the literature is the relationship between elective course selections and the number of prerequisites completed before upper-division BSN enrollment or thereafter and the impact on retention and timely graduation. One study found a significant predictor between online lower-level course elective selections with subsequent higher attrition rates in certain elective courses (Wladis, Wladis & Hachey, 2014). This finding suggests that students may have unsettling expectations of elective courses possibly assuming less efforts and motivation are needed to excel in these courses or that they can be repeated or substituted if necessary. If this is the case, students who fail, repeat or withdrawal repeatedly from elective courses may display signs and symptoms of attrition and should be on the radar for timely graduation. Completing general education requirements or prerequisites after or before entering into a BSN program can predict retention and time to graduation (Gregory, Krupp & Williams, 2013). Gregory et al., (2013), examined a cohort of 240 RN-to-BSN students enrolled in either a five or six semester course and found that most students (80.4%) electively entered into upper division courses before completing all general education courses. Out of the 194 students that completed some of the general education courses, the 3 year graduation rate was 20% less compared to the 47 students who completed all general requirements before entering the program (Gregory et al., 2013). Concurrent enrollment in both major core requirements and general course requirements leads to higher risks of attrition and withdrawal due to heavy course work loads. The number of enrolled credit hours can have positive or negative implications on both retention and timely graduation. More research is needed to examine elective, credit hours and general education course completion times in online BSN programs on retention outcomes. More relevant in this instance is the ambiguity in calculating attrition outcomes to include elective and prerequisite courses. In many cases these variables are not included in evaluating program retention outcomes specifically for online RN-to-BSN programs. Most institutional or program attrition measures are calculated from the time of upper division enrollment and included in traditional BSN degree outcomes.

Cumulative nursing GPA and Course Grades

An immeasurable amount of previous research concludes that an association exists between a student's grade point average (GPA) and attrition (Patzer et al., 2017; Astin, 2005). GPA standings have been an historic measure of a student's potential for success with some institutions having high selectivity based on high school grades, GPA and standardized testing scores (Astin, 2005). Many online RN-to-BSN programs accept lower cumulative GPAs compared to traditional BSN programs. A ten-year comparison of outcomes in face-to-face and online programs found significant differences between course GPAs in online versus face-to-face programs; favoring face-to-face students with a 0.15 higher average GPA (Tanyel & Griffen, 2014). Notably however, students with higher GPAs in early semesters have found to be more likely to persist and subsequently enroll from term to term compared to academically weak students who are more likely to fail or withdrawal before BSN completion (Zuspan, 2017). Likewise, Cochran, Campbell, Baker & Leeds, (2014) found that students with higher GPAs (>3.0) were less likely to withdrawal from term to term. On-time and any-time graduations have been predicted by higher GPA's in pre-nursing and science courses (Seago, Keane, Chen, Spetz & Grumbach, 2012). Standardized tests have been traditionally administered in various nursing programs in addition to evaluating GPA as early retention variances (Newton, Smith, Moore & Magnan, 2007). Ideally, these measures provide insight into academic preparedness and should not only aid in admission processes and curriculum improvements but assist in establishing mandatory mentoring, remediation, online self-tests and tutoring interventions in academically weak students (Newton, et al., 2007; Thomas, et al., 2017). Where feasible and predictive, these interventions can be implemented before the student formally enrolls into the academic program; decreasing the like hood of future attrition. Suhayda, Hicks and Fogg, (2008) examined cumulative GPA, undergraduate nursing GPA and Graduate Record Examination (GRE) scores across 738 Master nursing students. The combination of cumulative (3.25) and undergraduate nursing GPA (3.0) were 99% predictive of student success, however GRE scores added no additional value so the measure was dropped from the admission criterion. In a mixed-method study, Sorenson and Donovan (2017) found a similar significance between student GPA and last course grades. This finding implies that a students' current GPA can be a predictor of student performance in a future course. Specific pre-course interventions (advisement, remediation, course study sessions, tutoring) could be implemented for weaker academic students prior to entering a new course in which they have greater odds of failing. Likewise, Borghese and Lacey (2014), created a predictive model that found retention in a physics class was significantly predictive of scores on the Measures of the Ability to Form Spatial Mental Imagery (MASMI) test and the Scholastic Level Exam (SLE). Patzer et al. (2017), found 80% variance accounting for admission, nursing and undergraduate science GPA and academic completion in nursing graduate programs Greater research is needed to evaluate predictive interactions between academic and course GPA in online and hybrid RN-to-BSN programs.

Science, mathematics, reading, and English courses are subjects of interest in predicting early nursing school success, however science has been found to be the strongest predictor in various studies (Wolkowitz & Kelley, 2010). Other researchers however, found that passing grades in other non-sciences courses, such as psychology can predict success (Abele et al., 2013). Fewer dropped or failed courses have been found as significant predictors of graduation and retention (Abele, et al., 2013; Cipher, et al., 2017). RN-to-BSN students who fail or withdrawal from a course are less likely to complete the program with findings that suggest that with each course failure a student has a 36% less chance of completing a BSN program (Abele, et al., 2013).

Institutional Characteristics

As students become less successful in persisting in college, it is necessary to examine the institutional characteristics that influence student success (Okagbare, 2017; Sembiring, 2014). Individual and institutional variables affect nursing attrition, however many studies have focused primarily on personal and academic attributes of the student (Sontam & Gabriel, 2012; Bowden & Wood, 2011; Okagbare, 2017; Shelton, 2012). RN-to-BSN programs with intense curriculum demands, unrelated concepts toward actual practice, and limited use of adult learning principles were found to affect retention negatively (Bryer et al., 2015). Sembiring (2014), in a quantitative study of 44,4042 baccalaureate students examined the influence of student expectation and university reputation on student retention. Student satisfaction within institutional academic support (registration and course materials) were the most significant attributes (Sembiring, 2014). Basic underlying assumptions of Jeffreys' Nursing Undergraduate Retention and Success (NURS) model, predicated that regardless of the students' academic background, all students benefit from academic support and academic enrichment (Jeffreys, 2007). Previous research on institutional factors that affect online RN-to-BSN students is intensely limited. Based on Okagbare's (2017) conclusions from various qualitative and literature findings the conceptual structure of the following institutional and program characteristics will be analyzed in this study: (1)size and geographic region of institution and program, (2) program type (online versus hybrid), (3) curriculum, prerequisite and GPA requirements (4) academic student support services, (5) profit status, (6), course and program retention methods, (7) use of predictive analytics.

Institution and Program Size and Geographic Region

Larger academic institutions have favorable retention outcomes in some cases, hence the larger size of the institution the greater the retention and level of student engagement (Lin, Yu & Chen, 2012; Okagbare's, 2017). This finding may be relative as larger institutions are more likely to have academic support measures in place to assist struggling students (Okagbare, 2017). Institutional, program and class sizes are generally associated with a certain proportion of students to faculty (Okagbare, 2017). Larger class sizes have posed weightier academic risks as instructors attempt to facilitate learning across various learning styles and diverse student needs compared to smaller class sizes. McEwen et al. (2012), in a systematic review of online RN-to-BSN programs found that almost half of the programs were small with most reporting fewer than 25 graduates per year, however the sample size in this study was limited. RNs have different learning styles compared to traditional BSN students. Nurses with 0-20 years of nursing experience have found to be accommodative learners whereas nurses with 20 or more years of nursing experience have been found more likely to be assimilators (Smith, 2010). This finding has implications for nurse educators to implement relevant teaching activities and remediation plans to promote course retention in online RN-to-BSN programs. Establishing and maintaining positive learning environments, giving consistent timely feedback, and utilizing facilitative technology enhances engagement in adult online learners (Chakraborty & Nafukho, 2014).

Due to enhanced technology in online courses, learning environments are more effective when students are engaged and critical thinking skills are strengthened (Merkley, 2016). Online faculty have influence on the long-term success of students. The growing nursing faculty shortage adds to the complexity of timely graduation and nursing student attrition as some programs have high faculty to student ratios impacting student success (AACN, 2016). According to AACN, 64,067 qualified applicants were turned away from baccalaureate and graduate nursing programs in 2016 due to insufficient faculty, budget restraints, physical resources and clinical sites. White (2018) found associations between faculty-supportive behaviors and caring behaviors in an online RN-to-BSN and further master's degree attainment. Other studies reported that class sizes smaller than 25, interactions with faculty, a sense of belongingness, student engagement, social integration, and academic integration were more likely to promote retention in online students (Lee, Choi & Kim, 2013; Gravel, 2012). Feelings of detachment and isolation from the institution and faculty are factors shown to increase failure risks for both online and accelerated students (Simpson, 2004; McMahon, 2013). Dell Antonio (2017) concluded that instructor immediacy influences both academic success and retention in RN-to-BSN online students. Social presence and caring interpersonal interactions are crucial factors that offset student isolation in online education. Glazier (2016) implemented rapport-building teaching strategies in a cohort of 143 students and found significantly lower attrition rates and higher graduations in rapport-building courses compared to the control group. These rapport-building interventions included videos, personal email communication with the student and electronic comments on assignments (Glazier, 2016). Relationships between faculty participation in online and RN-to-BSN online courses, student satisfaction and perceived learning have found significant measures (Claywell, Wallace, Price, Reneau, & Carlson, 2016; Cobb, 2011). Faculty buy-in is a critical component in developing a program culture that is sensitive to student success and retention (Lees, 2016). Fick (2017) added that RN-to-BSN programs can benefit from implementing Culture of Excellence models, defining academic pathways, creating opportune times for students to pursue a BSN, creating the preferred methods of academic delivery, creating detailed and informative orientations, and building quality curriculums while improving retention outcomes.

Program Type

Online education is a growing academic sector with more than 5.8 million higher education students enrolled in some type of distance education course (Allen & Seaman, 2016). As of 2013, there were 118,176 nurses enrolled in RN-to-BSN programs (AACN, 2014). Currently over 700 online or hybrid RN-to-BSN programs are available across the country (AACN, 2017). Most RN-to-BSN programs offer online and hybrid formats with rare instances of face-to-face delivery (McEwen et. al., 2015). Significant differences exist between course completion and academic performance in online versus traditional courses (Atchley et al., 2013). Students in face-to-face RN-BSN programs have shown less time in completing degree requirements compared to online-RN-BSN students (Mancini et al., 2016; Tanyel & Griffen, 2014; Atchley et al., 2013). Davidson et al. (2014) reported graduation rates in an online program exceeded national averages (90%) with hybrid programs having a 4 % higher graduation rate compared to 100% online programs. There was a 10% difference in retention in a specific course favoring the hybrid course as having higher graduation rates (Davidson, et al., 2014). In another study, Davidson, et al. (2011) found that a hybrid RN-to-BSN format promoted a 100% completion rate within a structured, sequential format in which the RNs were admitted yearly and progressed continuously within cohort groups. This study has further research implications for evaluating cohort progression within accelerated terms and integrated courses within RN-to-BSN curriculum (Curtis et al., 2017; Pike & Graunke, 2015). Mancini et al. (2017), in a comparative analysis of 3,802 RN-to-BSN students (332 on campus and 3,470 on-line) found that on-campus students took significantly less time to graduate compared to the online students. Program discontinuation was similar in both groups. Although the consensus of online education may suggest inferior completion rates compared to traditional routes, Atchey et al., (2013) contrarily found that students in an online course had more “As” compared to traditional courses and that Health and Reading disciplines had the highest percent of online retention compared to other disciplines such as computer information systems, general business, management, psychology, English). Learning analytics within online environments has shown positive outcomes in examining students within learning management systems and predicting retention outcomes (Rientes & Toetenel, 2016). Socially, students who spend greater time on communication activities such as learning modules have found to be more likely to persist in the course (Rientes & Toetenel, 2016).

Curriculum, Prerequisite and GPA Requirements

The many unique program terms and flexible start dates now offered by online RN-to-BSN necessitates the examination between subsequent term completions and rates of degree progression. It is not clear rather these accelerated structures foster quality education and furthermore retention and timely graduation in online RN-to-BSN programs. Most of the programs surveyed by McEwen et al. (2012) found RN-to-BSN programs required 30 to 40 credit hours within upper level divisions with lengths of program completion between 12 to 18 months (44%). Most programs surveyed required common courses including: Leadership and Management, Community Health Nursing, Research, Health Assessment, Statistics and Pathophysiology (McEwen, 2012). Most programs required students to complete at least one clinical course in Community and

Public Health Nursing (McEwen, 2012). GPA requirements were reported as 2.5 on average and 26% of programs required that students had all prerequisites completed prior to admission (McEwen et al., 2012). Time to degree completion may be impacted by the number of non-nursing courses taken prior to enrollment or concurrently with upper-level nursing courses. Traditional BSN programs are less directive than online RN-to-BSN programs. As such, many students decide to take general education courses after enrollment into upper-level courses, prolonging graduation in many cases. Courses generally start every 5, 6 or 7 weeks, allowing the RN-to-BSN students to take small breaks in between terms. Most BSN programs measure "completion" between the start of upper-level nursing courses and the last BSN course. Time to degree completion may be prolonged greater than 1.7 years compared to traditional on-campus RN-BSN programs (Mancini, et al., 2017). Grosskurth (2016) qualitatively explored reasons behind lengthy graduations in RN-to-BSN programs. Twelve RNs were noted to take greater than 16 semesters to graduate from an RN-to-BSN program in which was designed to be completed in an 8 semester program. The results indicated that (1) stopping and restarting classes, (2) lack of available classes and (3) difficulties and frustrations with technology and the online learning management system (LMS) (Grosskurth, 2016). RN students who enroll in online programs with flexible degree terms may be at higher risk of withdrawal or prolonged graduation; which can negatively impact program accreditation benchmarks and jeopardize employment within Magnet status healthcare facilities or states that mandate the BSN degree to legally practice as an RN (Grosskurth, 2016). Issues within nursing program progression policies and non-uniform grading policies are other factors associated with student retention (Merkley, 2016). Various curriculum structures are perceived by RN-to-BSN students as strong attainments in relationship-centered care, clinical judgment and intentional learning. Whereas, competencies in leadership, application of evidenced-based practice and broader health-care system practice are perceived as low attainment. This warrants greater in-depth curriculum evaluation and development to promote student success within RN-to-BSN programs (Northrup-Snyder, Menkens & Dean, 2017). Competency-based and outcomes-based curriculums are widely being used in RN-to-BSN programs that entail the student reaching a certain level of competence or performance standards before awarded progression (Gorski, Farmer, Srocynski, Close & Wortock, 2015). Using various teaching strategies with active hands-on learning is strongly correlated with increased motivation and course satisfaction in online programs. (Tsai, Cheng, Change & Liou, 2014). Further research is needed to evaluate curriculum structure influences on retention and time to graduation.

Academic Student Support Services

Adequate academic support services are highly predictive of student persistence in online traditional and online nursing programs (Hart, 2012; Shelton, 2012). Various qualitative studies have explored life experiences of RN-to-BSN students highlighting the most significant factors leading to their success or demise. Previous research suggests that support from family and friends outweigh environmental influences being most supportive of RN-to-BSN student retention (Kern, 2014). Nevertheless, online programs benefit from effective academic advising and registration processes, technological and financial support, faculty and instructional effectiveness (Boylston & Jackson, 2008;

Hart, 2012). Instructional effectiveness and academic advising often outweigh other factors, however financial aid loss or family crisis are often unpreventable causes of withdrawal in BSN program. (Boylston & Jackson, 2008). Faculty and academic support are relevant to academic retention in online programs with increased levels of withdrawal when students lack a sense of belonging, peer support, communication with the instructor and satisfaction within the online environment (Hart, 2012). Quality online curriculum structures that have focused content delivery, reflective opportunities, social presence and technical support are essential in student retention (Gazza & Hunker, 2014). Tinto speculated that 70–80% of retention issues are based on positive institutional and environmental influences within social and academic integration and external support. This assumption is essential to student success as 20% of reasons for attrition are academically related (Tinto, 2012). RN-to-BSN students who report satisfaction with faculty feedback, library orientations, peer support, flexibility of courses, writing assistance, and availability of hybrid courses are more likely to persist in nursing distance education programs (Dacanay, Vaughn, Orr & Mort, 2015; Jaggars, 2014). Peer and faculty mentorship with frequent student contact is associated with lower retention subsequent to feelings of belongingness and healthy communication in online and traditional programs (Boylston & Jackson, 2008; Park, Perry & Edwards, 2011; Raymond & Sheppard (2017); Swearingen, Clarke, Gatua & Sumner, 2013). Research regarding the effectiveness of mentorship programs in online RN-to-BSN programs are limited. Cheek, Dotson and Ogilvie (2016), identified that time constraints and personality differences were barriers to sustaining a mentorship program designed to enhance graduation rates in a public RN-to-BSN program thus longitudinal retention outcome measures were limited. Rebar (2010) found, in qualitative study of 5 RN-to-BSN students, that perceptions of community are not reflective of interpersonal relationships, but perceived more by the instructor's demonstration of feedback, timeliness and professionalism. Class introductions, discussion boards, peer support, group assignments, and opportunities for engagement and learner-content interaction within online platforms enhances satisfaction and furthermore influences retention (Chaffin & Jacobson, 2017; Choi & Park, 2016; Zimmerman, 2012; Conner & Thielemann, 2013). Technological, library and academic support for computer skill enhancement and reading and writing skills have shown positive outcomes of retention in nontraditional online programs. (Park, Perry & Edwards, 2011).

Profit Status

For-profit universities have capitalized on the needs of nontraditional students by offering convenient and flexible online programs in which the student can concurrently work and take classes. More than 2 million students currently attend for-profit institutions online, however higher attrition rates have been attributed to these structures compared to non-profit universities (Wilcox, Cotter & Joy, 2011; Boston, Ice & Gibson, 2011). All academic programs are not created equal in terms of student success, necessitating a further evaluation into institutional and program missions and structures, and formalized retention strategies. Significant differences exist among institutional characteristics and the retention of college students (Okakbare, 2017). Recent research studies have found that private universities have higher retention rates compared to public universities

(NCES, 2017). In addition, non-profit institutions have been found to have higher retention rates compared to for-profit programs that cater to nontraditional working adults (NCES, 2017). Institutions that have more selective criteria (less accepted) compared to open admissions policies had greater baccalaureate graduations rates (88% to 32% respectively (NCES 2017).

Course and Program Retention Methods

Few studies have examined retention strategies within accelerated online RN-to-BSN programs. However, it is well documented that faculty presence in online programs, effective communication between the student, peers and faculty, opportunities for socialization within online platforms, and engaging activities relevant to RN experiences can significantly enhance academic and social integration (O'Keefe, 2013; Gilmore & Lyons, 2012; Clayell et al., 2016). Face-to-face orientation sessions have shown promising improvements in online proficiencies and furthermore retention outcomes in distant RN-BSN programs. Gilmore and Lyons (2012) reported a substantial 20 percent decrease in student attrition rates with the implementation of face to face pre-course orientation sessions designed for an online RN- BSN program. The orientation sessions included information on the learning management system, computer software requirements and computer skills, and simulated online course work (Gilmore & Lyons, 2012). Correlations between mentoring and retention in the online RN-BSN programs are limited however, writing flipped classrooms, tutors, library orientation, computer and technology "boot camps", alternate study plans (full-time and part-time), offering a hybrid course format (on campus and on-line class), and peer support have shown positive influences on attrition in online RN-to-BSN programs (Dacanay et al., 2015; Buxton, Buxton & Jackson, 2016). Preston-Safarz and Bolick (2015), found content mastery in an RN-to-BSN hybrid program using objective instruction clinical examinations. Robertson et al., (2010), reported various retention strategies within a systematic survey among various RN-to-BSN programs. Nursing orientation sessions, mentorships with intense class terms, one-day per week courses, program flexibility with stop and start options, part-time study, writing and reading tutoring, cohort structured progressions, and faculty support were retention strategies most correlated with student retention (Robertson et al., 2010). Student surveys provide useful input into student's satisfaction with psychological, social and cultural barriers in BSN programs and the student's intent to pursue further education. Using student satisfaction feedback in online RN-BSN programs at entry, mid-entry, and exit has been found to promote student retention (Gazza & Matthias, 2016; Williams, Bourgault, Valenti, Howie & Mathur, 2018). Virtual advisement within RN-to-BSN programs has been suggested in the literature as a retention method however, this intervention needs greater empirical research (Chai, 2013).

Summary

Tinto and Rovai's retention models guided understandings of complex factors affecting student retention within traditional and nontraditional degree programs. Student retention is a multifactorial problem that extends into personal, academic and environmental circumstances. When there is a high level of academic and social integration between the student and the academic institution, the student is more likely to persist and be retained as posited by Tinto. Nursing student attrition across various degree levels has been attributed to differences among student demographics, GPA standings, previous work and academic experiences, the number of prerequisite courses and course enrollment status. Institutional characteristics such as profit status, size, geographic region, program type, entry requirements, academic and retention support systems are highly diverse signifying the complexities of a proper “fit” between the student and the institution. What is not clear in the literature is the predictability of retention and time to graduation within accelerated RN-to-BSN paradigms and the relationships between student attributes and diverse nursing program characteristics. Retrospective datasets collected for this study purpose provided valuable information regarding trends within accelerated RN-to-BSN structures. Insights into the probability of student retention and time to graduation, considering the student’s and the institution’s characteristics, will be made possible using predictive analysis and algorithm development. Chapter 3 describes the methodology of this research study.

Chapter 3: Research Method

Introduction

The purpose of this predictive correlative quantitative study was to investigate if relationships exist between pre-entry student attributes, academic integration, and institutional characteristics and retention and time to graduation in accelerated online and hybrid RN-to-BSN programs. I created a predictive model drawing from retrospective data sets obtained from institutional academic records. I used Tinto's model of integration and student departure and Rovia's composite persistence model (CPM) as frameworks to draw hypothetical assumptions applicable to my study. Both models provided a better understanding of interactions between the online RN-to-BSN student's, the institution's attributes and the effects of academic integration on student retention in order to meet IOM recommendations.

The first section will describe the research design for my study with rationales for why I used secondary datasets. I will discuss proper methodological alignment within the research purpose and research questions, time, and resource constraints of collecting secondary data. In the second section of chapter 3, I will describe the methodology including the setting, the sample size and the procedure used to collect my archived data sets. In the third section, I will describe threats to validity and ethical considerations I took to collect data from each institution and academic educational records.

Research Design and Rationale

The purpose of this study was to determine if there was a relationship among pre-entry (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation. I conducted a quantitative predictive correlational study that modeled retention and timely graduation in online and hybrid RN-to-BSN programs. I denoted retention and time to graduation index, as the dependent variables. Furthermore, I denoted the dependent variables as continuous for multiple regression analysis and fitted them as dichotomous categorical variables for the logistic regression and decision tree analysis. Quantitative descriptive correlative designs using secondary data sets are plentiful in the literature in examining predictors of nursing student retention and persistence. Cauble (2015) used secondary data analysis to perform a predictive analysis between associations of student characteristics and academic performance of persistence.

Results from this study revealed that undergraduate GPA was a significant predictor of persistence in graduate nursing students. Likewise, Mancini et al. (2015) used secondary data to examine differences between online RN-to-BSN versus campus RN-to-BSN students. Comparing 5 years of data, the study findings revealed that on-campus students took less time to graduate and had higher graduation rates compared to the online group (Mancini, et al., 2015).

Advantages of using secondary data for my study was that data was already in existence, inexpensive and took less time compared to collecting primary data (Wienclaw, 2013). Secondary data records provided a broader scope of research collection in both time and space contexts with records that were collected from 2012 to 2018. The disadvantage of using secondary data was that I did not have control over the original data collected and data could contain levels of error or bias in which was accounted for in the limitations section (Wienclaw 2013).

Methodology

Population

I used a subset of students who were enrolled in either an accelerated online or a hybrid RN-to-BSN program accredited by Commission on Collegiate Nursing Education (CCNE) between 2012 and 2018. Currently, the CCNE accredits over 700 RN-to-BSN programs across the United States. I distributed permission letters to various institutions within the CCNE network with approval received from the Institutional Review Board at Walden University and the respective academic partner institutions within Northeastern and Southeastern regions of the United States. The target population contained approximately 75,000 students who were enrolled in an online RN to BSN program between 2012 to 2018.

Descriptive statistical analysis described demographic data within the study sample of 390 records to include pre-entry attributes of the student enrolled. I created datasets from retrospective academic records and transcripts relevant to examine if pre-entry attributes, academic integration and institutional characteristics were related to retention and time to graduation. I performed a multiple regression analysis to examine the main effects of pre-entry attributes, academic integration, and institutional characteristics on retention and time to graduation. In addition, I performed a logistic regression and decision tree analyses using IBM SPSS and IBM Modeler to determine predictive percentage odds and reliability within outcomes of retention and time to graduation with respect to pre-entry attributes, academic integration and institutional characteristics.

Sampling and Sampling Procedures

The sample size of the study was 390 accelerated RN-to-BSN students who were enrolled in either an online or hybrid RN-to-BSN program as part-time or full-time between 2012 and 2018. This estimate was based on G*Power analysis with inputs of multiple regression (rule of 10) with medium effect size (0.15), alpha of (0.05) and a power of (0.80) considering 14 predictor independent variables, a minimum of 140 cases were required for multiple regression a and 15 cases per variable for logistic regression (210). I used a total of 390 student records that were randomly selected. Statistical analysis within multiple regression commonly use alphas of .05 and powers of .80 to generate assumptions that there will be a 5% chance that the null hypotheses are true and a 80% chance of finding differences or relationships among the variables if relevant (Warner, 2013). I chose a medium effect size as other predictive studies using multiple regression have used these criteria (Warner, 2013). I, considered that a smaller effect size and a power greater than .80 would necessitate a substantially larger sample size and considerably more time and cost spent collecting data.

Inclusion criteria for this study was online and hybrid RN-to-BSN students and respective programs accredited by the CCNE. The CCNE accredits over 800 baccalaureate, master's and doctorate of nursing degree programs nationwide with diverse student populations (AACN, 2017). RN-to-BSN programs accredited by the CCNE are mandated to report its' program graduation outcomes and student demographic data. CCNE accessible reports with be collected from a sample of programs that meet institutional inclusion criteria. A random sample of institutional and student data was collected from university settings within the Northern and Southern parts of the United States that met inclusion criteria. Random records were selected until the adequate sample size was met, correcting for missing data. Exclusion criteria were as follows: RN students who are enrolled in 100% on campus, traditional four –year BSN students, community college acquired RN-BSN students and accelerated non-nursing degree BSN students. I excluded online or hybrid RN-to-BSN programs that were not accredited by the AACN/CCNE.

I collected archived datasets to answer the research questions and to build a predictive algorithm. It was necessary to access various retrospective institutional and academic records to predict retention and time to graduation outcomes within accelerated RN-to-BSN student datasets. IRB approval from both Walden University and the respective academic institutions was required as student confidentiality is ethically sensitive. De-identified datasets were received as requested to protect student confidentiality. Due to the predictive nature of this study, obtaining archived data from both institutional and student data records best analyzed the predictive retention outcomes. (See Figure 2 for an illustration of datasets that were used for the study). Each variable category examined are described and grouped below Figure 2.

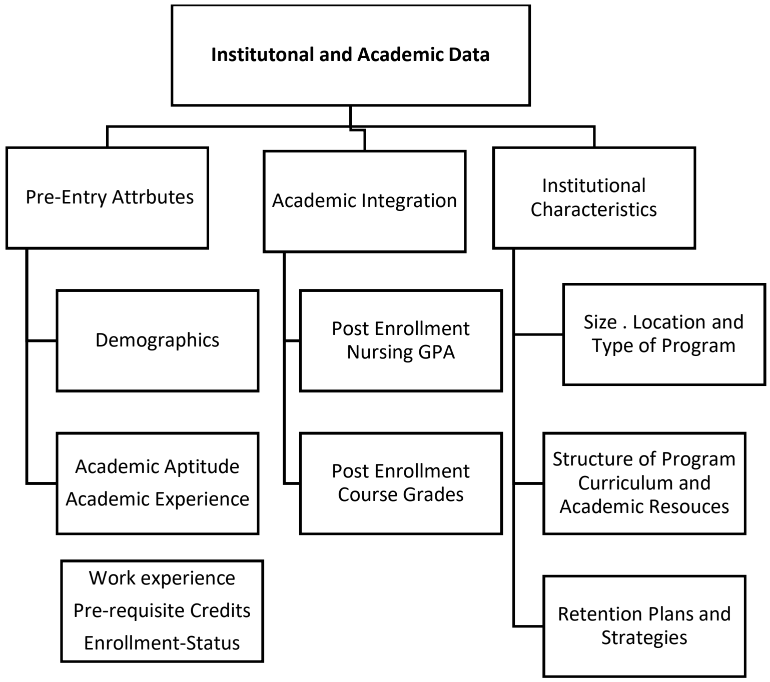

Figure 2. Relationship of datasets used for this study.

Student pre-entry attributes

- Demographics
    - Age (grouped by age ranges)
    - Gender (male or female)
    - Race (grouped by race)
- Registered Nurse (RN) Academic Experiences
    - Length of time from RN licensure to BSN enrollment (group of year ranges)
    - Previous degree outside of nursing (yes or no)
    - Pre-enrollment cumulative grade point average (GPA) (group of ranges)
    - Amount of education course credits earned prior to admission

- Number of credits enrolled during 1st and 2nd term (Part-time or Full-time status)

Academic Integration

1. Nursing Grade point average (GPA)(post-entry to upper level divisions)
    a. Post 1st quarter, term or semester nursing GPA (grouped ranges)
    b. Post 2nd quarter, term or semester nursing GPA (grouped ranges)
2. Course grades (post-entry to upper level divisions)
    a. Post 1st quarter, term or semester course grades (elective, general or core)
    b. Post 2nd quarter, term or semester course grades (elective, general or core)
    c. Type and number of failed or withdrawn courses (general, electives and core nursing courses during 1st and 2nd term)

Institutional Characteristics

1. Institution and Program size and location
    a. Number of students enrolled in the online or hybrid RN-to-BSN program
    b. Number of faculty teaching within the online or hybrid RN-to-BSN program
    c. Geographic region (grouped)
2. Program Type and Institution Profit status
    a. Presence of a 100% online option or hybrid option

   b. Profit or non-profit
   c. Private or Public
3. Curriculum Structure
   a. Length of courses (5, 6, 7, 8- or 9-week terms; semester based or quarter based)
   b. Presence of continuous enrollment periods (yes or no)
   c. Pre-enrollment GPA requirements (group of ranges)
   d. Pre-enrollment prerequisite course credit requirements (None or Required)
   e. Curriculum framework (Competency based, outcome based, concept based)
4. Academic Support Services
   a. Library (Campus or online)
   b. Writing Support (Campus or online)
   c. Technological Support (computer training-yes or no)
5. Retention Plans
   a. Mentorship (yes or no)
   b. Tutoring (online or campus)
   c. Remediation (structured or unstructured)
   d. Advisement (mandatory or non-mandatory)
   e. Face-to-face or virtual orientations (yes or no)

f. Use of data analytics (learning and/or predictive; yes, no, or in process)

Procedures for Obtaining Archival Data

I distributed permission letters to institutions that met inclusion criteria across the United States to access student admission and transcript records. The permission letters extended the request for program chairs and directors to provide specific program information that could not be directly collected such as specific academic support measures, student retention methods and the use of learning analytics.

Additional institutional data such as profit status and program types were obtained from regional accreditors such as the Southern Association of Colleges and Schools (SACS). Representatives from each academic partner extracted data from a university software that housed student admission files. The academic partner then provided encrypted and deidentified datasets that I then transferred directly to SPSS statistics and SPSS modeler. The data that I received was specific to RN-to-BSN online or hybrid formats with part-time or full-time status.

The term *RN-to-BSN* is conceptually defined as any licensed associate degree in nursing (ADN) or diploma degree registered nurse (RN) seeking to obtain a bachelor of science degree in nursing (BSN) (Mancini et al., 2016; Phillips & Evans, 2017). An *online* program is contextually defined as a program where at least 80% of the course content is delivered online (IPEDS). A *hybrid* program is contextually defined as a program that has between 30% and 80% of course content delivered synchronously or asynchronously online (IPEDS). A *part-time student-*

undergraduate is defined as a student enrolled for either less than 12 semester or quarter credits, or less than 24 contact hours a week each term. A *full-time student-undergraduate* is defined as a student enrolled for 12 or more semester credits, or 12 or more quarter credits, 24 or more contact hours a week each term or as designated by the institution term model (IPEDS).

Data Analysis Plan

In order to test the hypothetical assumptions in this study, I used multiple statistical analysis tests. I used the IBM SPSS Statistics 25 software to perform descriptive analysis, multiple regression and binary logistic regression. I then used the IBM SPSS Modeler to create a decision tree predictive algorithm and I compared the results to the SPSS binary logistic regression for best reliability of retention and time to graduation. I used descriptive statistics analysis to describe the basic premise of the study. I grouped the independent variables pre-entry attributes, academic integration and institutional characteristics by operationally defined terms. Graphical representations of the data findings are provided in chapter 4 along with detailed steps of the retention algorithms that I created using logistic regression and decision tree analysis.

I performed a multiple regression to examine relationships between pre-entry attributes, academic integration, and institutional characteristics as independent categorical variables and retention and time to graduation as dependent continuous index variables with confidence interval of 95% ($p \leq 0.5$). Considering the rationale for me using both multiple regression and binary logistic regression, multiple regression analyzed the statistical effects of a given covariate (predictor or dependent variable), whereas logistic regression provided dichotomous assumptions of rather an event will likely occur or not (Long, Griffith, Selker, & D'agostino, 1993). I reported the odds ratio and stated the result as the percentage odds of being retained or not retained, and the percentage odds of timely graduation or untimely graduation. In order to create a predictive model and to analyze likelihoods of retention or non-retention and timely graduation or untimely graduation, I performed a binary logistic regression model and further compared the results to the IBM SPSS Modeler decision tree predictive model for best accuracy. Both logistic regression and decision trees showed statistical accuracy in predicting associated factors for retention but not timely graduation. Park (2016), in his dissertation titled *Developing a Predictive Model for Hospital-Acquired Catheter-Associated Urinary Infections Using Electronic Health Records and Nurse Staffing Data,* examined accuracy differences between predictive models and found decision tree models had better performance in reduction in FN, higher accuracy and sensitivity compared to logistic regression. Decision tree models create rules considering various variables and furthermore interpreting relationships between dependent and independent variables (Long, Griffith, Selker, & D'agostino, 1993). As Park suggested, ensuring accuracy can be timely but necessary in order to clean, preprocess, transform and consolidate data accurately (Park, 2016,). I adjusted data that were missing or inconsistent and further corrected items within the cleaning process. I analyzed the research questions and hypothesis with multiple regression analyses for research question1(RQ1) and logistic regression/decision tree analysis used for research questions 2 (RQ2) and 3 (RQ3).

Research Question 1 (RQ1): What is the relationship among pre-entry (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation in accelerated online and hybrid RN-BSN programs?

Null Hypothesis ($H_0$1): There is no statistically significant relationship exist among pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation in accelerated online and hybrid RN-BSN programs.

Alternative Hypothesis (H_a1)There is a statistically significant relationship exists among pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation in accelerated online and hybrid RN-BSN programs.

Research Question 2 (RQ2): What is the relationship among retention of accelerated online or hybrid RN-to-BSN student and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods)?

Null Hypothesis ($H_0 2$): There is no relationship among retention of accelerated online or hybrid RN-to-BSN and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Alternative Hypothesis ($H_a 2$): There is a relationship among retention of an accelerated online or hybrid RN-to-BSN student and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Research Question 3 (RQ3): What is the relationship among time to graduation of accelerated online or hybrid RN-to-BSN student and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods)?

Null Hypothesis ($H_0 3$): There is no relationship among time to graduation of accelerated online or hybrid RN-to-BSN and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Alternative Hypothesis ($H_a 3$): There is a relationship among time to graduation of an accelerated online or hybrid RN-to-BSN student and pre-entry (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Threats to Validity

External and Internal Validity

Findings of this study did not represent the entire population or that of all variables that may be associated with retention and timely graduation. The random samples I received from the datasets did not geographically represent populations within certain institutions and only represented a small segment within the northern and southern parts of the United States. Demographic differences may influence results therefore demographic data was obtained in order to identify influences without the assumption of generalizability across all geographic regions. The datasets that I received were already in existence therefore inaccuracy within the original data source could be prone to error. Ambiguity within the calculations of attrition, retention and time to graduation may potentially lead to erroneous findings as the different institutions had differing way of calculating student outcomes. Internal validity threats surround causation of variables and the predicted outcomes as the use of correlational study designs is limited to understanding relationships and not causation. Threats to statistical conclusion validity are sensitive toward drawing erroneous conclusions about relationships when there is not one (García-Pérez, (2012). Using a statistical power of 80 justified that there was an 80% chance that a relationship exists. Likewise, potential for overlooking a relationship when there is missed data or unreliable statistical procedures can lead to threats of statistical conclusion validity (García-Pérez, 2012). Violated assumptions of statistical tests potentially occur in quantitative research when data is not assumed as distributed normally leading to errors within the data analyses process, however this study met appropriate assumptions for both multiple regression and binary logistic regression models (García-Pérez, 2012).

Ethical Procedures

I sought IRB approval from each institution in which a random sampling of student transcripts and archived records were accessed to collect data on student personal attributes, academic integration status, institutional characteristics and retention and timely graduation. I had no direct student contact for the study purpose and I did not collect data until I received IRB approval from both Walden University and each respective institution. Collected archived data was only accessible by me and locked within password protected data files with only de-identified student information. Ethical considerations for confidentiality of student data included doing no harm and protecting the right to privacy and data security (FERPA). The study adhered to FERPA guidelines. Honesty and integrity were ensured by presenting data findings completely and truthfully. No conflict of interest or bias existed in this study relative to the selected institutions as the researcher was not affiliated in any respects. I had no relationship with program directors that influenced or altered the collected data.

Summary

I employed a secondary data collection process to obtain academic and institutional data sets relative to analyzing predictive variables associated with retention and time to graduation within accelerated online and hybrid RN-to-BSN programs with continuous enrollment. Assumptions, limitations, delimitations, and ethical assurances associated with the study were followed. The study results defined which variables were found to be predictive of retention and time to graduation. It is imperative that academic advisors and nurse educators develop predictive models for their own unique student populations (Bari et al., 2017). Deciphering between insurmountable interactions between predictive factors is impossible to do by hand and requires algorithm analysis using predictive machine tools that have the ability to combine massive student records and files. During recruitment and enrollment periods academic promotors and advisors can more effectively identify a proper "fit" between the student's attributes and the academic program structure by using previously developed predictive analytic models. Predictive tools can significantly reduce attrition risks and untimely timely graduation by analyzing student and institutional data (Bari et al., 2017). Chapter 4 will discuss the multiple and binary logistic regression models used and organized by the 3 research questions analyzed.

Chapter 4: Results

Introduction

Chapter 4 discusses results of the multiple regression, logistic regression and decision tree analysis. Tinto's theory of retention and Rovai's CPM model were theoretical and conceptual frameworks. he study examined relationships among pre-entry student attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) as predictor variables and retention and time to graduation as outcome variables. I collected retrospective datasets from 390 academic records and used results of the decision tree model to build a sample predictive algorithm using. In Table 1, I present demographic characteristics of the sampled population and program retention and time to graduation outcomes. I present results of the multiple regression and binary logistic regression for each research question, indicating if each hypothesis was assumed or not assumed.

Data Collection

The sample population was composed of 390 students enrolled in an online RN-to-BSN accelerated degree program between the years of 2012 to 2018. A non-probability sample of records was based on G*Power analysis with inputs of multiple regression (rule of 10 cases per variable) with medium effect size (0.15), alpha of (0.05) and a power of (0.80). Considering 14 predictor independent variables, a minimum of

140 cases were required for multiple regression and 15 cases per variable for logistic regression (N=210). I examined a total of 390 records randomly for analysis. I used a power of .80, and an alpha of 0.05 to yield a small to medium effect size for significance. Using both SPSS statistics and SPSS modeler, I used multiple regression, binary logistic regression and decision tree analysis to answer the 3 research questions. I created a predictive retention algorithm with datasets analyzed in the decision tree model. I accounted for missing data as all variables were available for analyzation (demographics, prior work and academic experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credit, post-1st and 2nd term GPA and course grades, size and geographic region, program type, admission GPA and prerequisite criteria, academic support and retention methods). Under the prior work and academic experience variable group, “RN-time” was missing 114 records and I subsequently omitted this group from both the multiple and logistic regression models when analyzing total variable relationships. I analyzed RN-time separately under binary logistic regression and omitted it within the multiple regression model. Due to the large number of variables in this study and since “RN-time” was considered a category and not a sole variable, all 390 records were permissible analysis. For “time to graduation” variation analysis, 275 records were inclusive due to the case that all students were not successful in completing the program.

The gender makeup of my study sample was consistent with the representation of the institution and schools of nursing. One institution had 1% more men than women within the total student body but had more females to males within the school of nursing. The study sample group was predominately Caucasian (*N*=302, 77.4%); which is consistent with each respective institutional demographic makeup and national averages. Most of the sample fell within a (40 to 49) age range which is less than the national RN average age of 50 years old according to the 2017 National Nursing Workforce Study but was consistent with the average age of each institution total student body (>35 or older).

Results

Table 1 below presents the pre-entry descriptive outcome results within the total 390 sample group. Of the 390 records obtained, 275 students were retained (70.1%) and certified for graduation, equivalent to a 29.9% attrition rate. This finding is noted above the national average of 50% attrition within baccalaureate nursing programs (50%) (Abele, Penrase & Ternes (2011; Harris, Rosenberg & Rourke, 2014). The number of program completions within 150% of the time to graduation (2 years) was 186 (67.6%). Table 1 shows most of the sample were females (*N*=370, 94.9%), compared to males (*N*=20, 5.1%). This finding is consistent with national averages where women account for 90% of the nursing workforce (U.S Census Bureau, 2017).

The sample group was predominately Caucasian (*N*=302, 77.4%), which was consistent with each respective institutional demographic makeup and national averages. Most of the sample fell within a (40 to 49) age range (35.9%), which was younger than the national RN average age of 50 years old according to the 2017 National Nursing Workforce Study.

Most of the sample had “0” to “2” years of RN licensure exposure prior to BSN program entry after deleting 114 cases with missing “RN-time” data. This finding aligns with the trend that many RNs educated at the associate degree level are pursuing BSNs directly after initial licensure. Students who had previous degrees outside of nursing accounted for a small percentage of the sample group (16.2%).

Students had a wide range of GPA outcomes with most students falling in a (2.5--2.99) GPA range. Most of the sample had previously been credited with 71 to 100 college credits prior to entry into the accelerated RN-to-BSN program. However, data were unattainable to examine specific prerequisite and general education courses taken prior to program entry as initially planned for this study. Most students held a full-time status during enrollment (89.7%); which contrasts with the national average that most students are enrolled part-time in RN-to-BSN programs (AACN, 2017).

Table 1

Frequencies and Percentages for Demographics and Pre-Entry Attributes

Student Pre-Entry Attributes	*N*	Percent of Sample
Age		
20 to 24	8	2.1%
25 to 29	41	10.5%
30 to 34	35	9.0%
35 to 39	61	15.6%
40 to 49	140	35.9%
50 to 64	103	26.4%
65 and older	1	.3%
unknown	1	.3%
Gender		
Female	370	94.9%
Male	20	5.1%
Race		
White	302	77.4%
Black	57	14.6%
Asian	2	.5%
Hispanic	9	2.3%
Two or More Races	5	1.3%
Undeclared	15	3.8%
Length of time to RN to BSN		
0-2	76	19%
2.1-5	57	15%
6-10	50	13%
11-15	37	9%
16-20	24	6%
21>	32	8%
unknown	114	29%
Previous Degree Non-Nursing		
Yes	63	16.2%
No	327	83.8%
Pre-enrollment GPA		
<1.99	3	.8%
2.0 to 2.49	33	8.5%
2.5 to 2.99	134	34.4%
3.0 to 3.24	88	22.6%
3.25 to 3.5	32	8.2%
3.6 to 3.75	73	18.6%
3.75 and higher	27	6.9%
#Course credits prior to **admission**		
0-30	119	31%
31-70	29	7%
71-100	141	36%
101-130	54	14%
>131	47	12%
Enrollment Status		
Full-Time	350	89.7%
Part-time	40	10.3%
Student Outcomes		
Retention	275	70.1%
Timely Graduation	186	67.6%

Academic Integration

Academic integration characteristics are displayed in Table 2. Students in the sample generally took one course per term/quarter. Most students after Term/Quarter 1 had GPA standings >3.75 on a 4.0 scale (*N*=220, 56.4%). Students who separated/failed or withdrew during Quarter 1 accounted for 7.9% of the sample (*N*=31). Comparable to the GPA standings, most of the students received an "A" in their 1st term course (*N*=202, 52%).

During Quarter 2, course grades and GPA standings followed a similar trend with 212 students having a 3.75 or higher GPA (54.4%) and the majority receiving an "A" in a 2nd term course (*N*=202, 52%). Students who separated/failed or withdrew during quarter 2 accounted for 16.9% of the sample (*N*=66). Most of the students scored a" none" for number of failed courses (82.3%), whereas most courses that were failed occurred within the 1st or 2nd term and were nursing courses compared to non-nursing courses.

Table 2

Frequencies and Percentages of Academic Integration

Academic Integration	N	Percent of Sample
Nursing Course GPA 1st Quarter		
3.75 and Higher	220	56.4%
3.5 to 3.74	14	3.6%
3.25 to 3.49	5	1.3%
3.0 to 3.24	88	22.6%
2.5 to 2.99	2	.5%
2.0 to 2.49	16	4.1%
Below 1.99	12	3.1%
Separated	33	8.4%
Nursing Course GPA 2nd Quarter		
3.75 and Higher	212	54.4%
3.5 to 3.74	17	4.4%
3.25 to 3.49	13	3.3%
3.0 to 3.24	67	17.2%
2.5 to 2.99	0	0%
2.0 to 2.49	8	2.1%
Below 1.99	5	1.3%
Separated	68	17.3%
Nursing Course Grade Index 1st Quarter		
A	202	51.8%
B	110	28.2%
C	13	3.3%
Fail/Withdraw	65	16.7%
Nursing Course Grade Index 2nd Quarter		
A	202	51.8%
B	105	27%
C	6	1.5%
Fail/Withdraw	77	19.7%
Failed Course Type		
Nursing	85	21.8%
Other	27	6.9%
None	278	71.3%
Failed Courses		
1	58	14.9%
2	7	1.8%
3	3	.7%
4	1	.2%
None	321	82.3%

Institutional Characteristics

A chart outlining institutional characteristics is displayed in Table 4. Students either attended a Northern or Southern U.S school of nursing. Most students were enrolled in a school of nursing with greater than 500 student enrollments and greater than 50 teaching faculty (71%). Most of the student population were enrolled in 5-week course length terms and had a GPA entry requirement of 2.4 or less (71%). All students (100%) were enrolled in an institution that offered both a hybrid and a 100% online option; denoted as public, non-private sectors. All students (100%) were enrolled in a program with continuous enrollment and an outcome-based curriculum structure.

Library, writing, and tutoring were offered to 100% of the students; however, none of the students had options for mentorship or remediation (0%). Online technical support was available for most of the students (71%), whereas virtual advisement was nonmandatory for most (71%). Virtual and in-person orientations were offered to (71%) of the student sample. Although data analytic retention methods were not completely being used to predict student retention, it was currently in process for full implementation for (71%) of the students. Pre-entry credit requirements were in place for most of the student population (71%). Table 3 presents the ranges, means, and standard deviations for continuous variables used for research question 1.

Table 3

Descriptive Statistics for Continuous Variables

Variable	Min.	Max.	*M*	*SD*
Time to Graduation Index	423	10000	3470	4219
Retention Index	1.0	2.0	1.70	.45
General Education Prior	.10	252.00	71.5	54
Course Grade Index 1	.10	4.0	3.0	1.4
Course Grade Index 2	.10	4.0	3.0	1.5
GPA Term 1	.10	5.0	1.67	1.7
GPA Term 2	.10	5.0	3.5	1.9
RN-Time	.25	36.00	8.8	8.2

Table 4

Frequencies and Percentages of Students within Institutional Characteristics

Institutional Characteristics	*N*	Percent of Sample
Number of Students Enrolled		
0-500	114	29.0%
500-10000	276	71.0%
Number of Faculty Teaching		29.0%
0-50	114	71.0%
51-100	276	
Course Length (Terms)		
1-4	114	29%
5	276	71.0%
GPA requirement		
2.5>	114	29%
2.4 or less	276	71.0%
Region		
South	114	29%
North	276	71.0%
Hybrid-Online Options		
Yes	390	100%
No	0	0%
Profit Status		
Nonprofit	390	100%
For-profit	0	0%
Sector Status		
Public	390	100%
Private	0	0%
Continuous Enrollment		
Yes	390	100%
No	0	0%
Curriculum Framework		
Outcome	390	100%
Concept	0	0%
Library Option		
Yes	390	100%
No	0	0%
Writing/Tutoring		
Yes	390	100%
No	0	0%
Online Tech Support		
Yes	276	71%
No	114	29%
Mentorship/Remediation		
Yes	0	0%
No	390	100%
Tutoring		
Yes	390	100%

(table continues)

Table 4

No	0	0%
Virtual Advisement		
Mandatory	114	29%
Nonmandatory	276	71%
Orientation		
Virtual	114	29%
Online and In-person	276	71%
Data Analytics		
No	114	29%
In process	276	71%
Credit Requirement		
None	114	29%
Required	276	71%

I will report my data analysis by research question.

Research Question 1 (RQ1)

Null Hypothesis ($H_0$1): There is no statistically significant relationship exist among pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation in accelerated online and hybrid RN-BSN programs.

Alternative Hypothesis (H_a1)There is a statistically significant relationship exists among pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation in accelerated online and hybrid RN-BSN programs.

Retention and Time to Graduation Index

To assess research question 1, I performed a multiple regression analysis to predict "retention index" and "time to graduation" from variations among pre-entry attributes, academic integration and institutional characteristics with respect to demographics, prior work, and academic experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits, post-1st and 2nd term GPA and course grades, size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods respectively. Eight multiple regression assumptions must be met; deeming the model appropriate for analyzation. The dependent variables (retention index and time to graduation index) were measured at the continuous level and each independent variable was measured at the continuous or nominal level. Subjects were assigned a retention and time to graduation index score based on program completion with higher retention index scores representing completion of the entire program; resulting in graduation and time to graduation was measured in months with a higher index score representing a longer time to graduation. Lower retention index scores represented a non-completer subsequent to either a withdraw or failure of a course or program and a lower time to graduation index score represented less time to graduate. Not all students within the sample completed the program, therefore the "time to graduation" analysis was based on 275 students that completed the BSN program successfully. The independence of residuals was assumed for the dependent variables, as assessed by a Durbin-Watson statistic of 1.85. A linear relationship was present between the predictor variables and the dependent variables of retention index and time to graduation.

Homoscedasticity was assessed by the visual representation of a plot of standardized residuals versus unstandardized predicted values for both dependent variables (Figure 3 and Figure 4). The absence of multicollinearity was as evidenced by VIFs values greater than 0.1 within all the independent variables. No significant outliers were found as all variables had residuals less than 3 standard deviations. Leverage values for 385 cases were less than 0.2 and deemed as safe whereas 5 of the leverage values fell between 0.2 to less than 0.5 deeming them risky but were left in the analysis. The Cook's distance was analyzed to examine if there were any influential cases and no values were above 1 (Cook and Weisberg, 1982). Residuals were analyzed and normally distributed via a histogram revealing normal distribution.

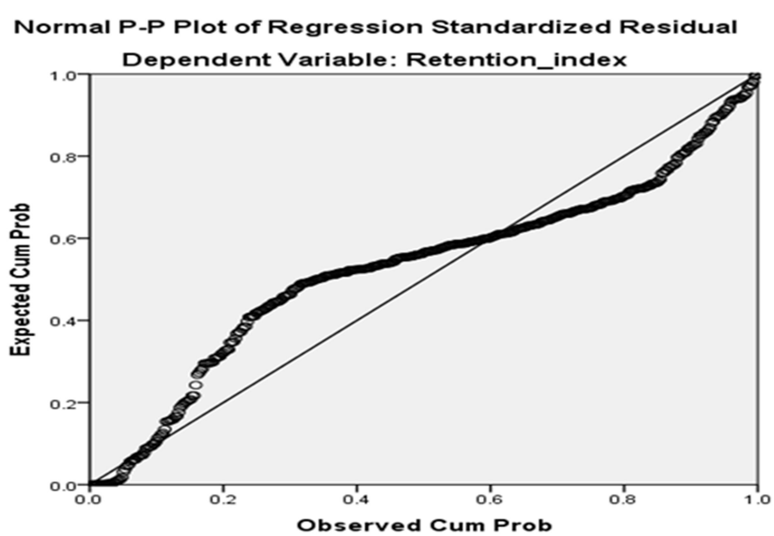

Figure 3: P-P Plot of standardized residuals from regression of retention index

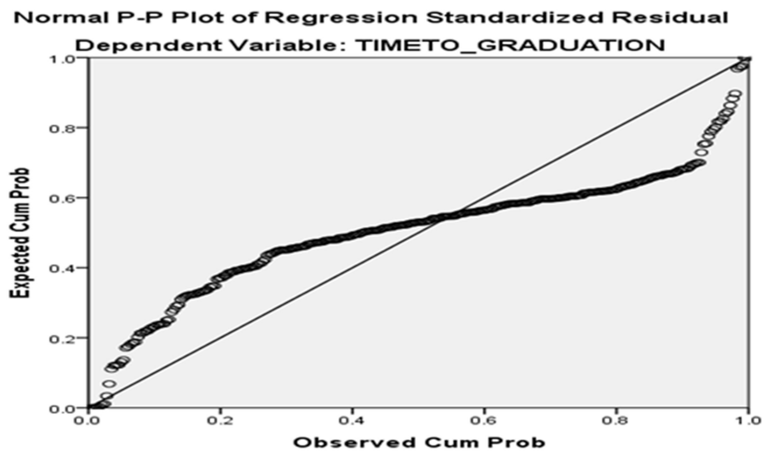

Figure 4: P-P Plot of standardized residuals from regression of time to graduation index

The variation R^2 for the overall multiple regression model was 69.5% with an adjusted R^2 of 67.4% for retention and 54.7% with an adjusted R^2 of 50.3% for time to graduation. Characteristics of pre-entry attributes, academic integration and institutional characteristics significantly predicted retention and time to graduation, F (25,362) = 33.017, $p \leq .0005$ and F (25, 250) =12.578, $p \leq .0005$ respectively. Pre-entry attributes (pre-entry GPA, enrollment status), academic integration (course grade index in term 1 and 2, GPA index in terms 1) and institutional characteristics (size and geographic region, admission GPA and prerequisite criteria, academic support, retention methods) were statistically significant predictors of retention ($p \leq .05$). Pre-entry attributes of age, gender, race/ethnicity, number of pre-enrollment credits, previous degree and institutional characteristics of "program type" were not statistically significant for retention ($p \leq .05$) (See Table 5). Pre-entry attributes (enrollment status) and academic integration (course grade index term 1 and 2, GPA terms 1, failed course type) were statistically significant as predictors of time to graduation ($p \leq .05$) (See Table 6). Demographics, previous degree, RN time, number of pre-entry courses, GPA term 2 and institutional characteristics were not statistically significant findings for time to graduation. For every unit increase of a pre-entry GPA range from 2.0 to 2.49 to 3.0 to 3.24, there was an increase in retention index scores suggesting that higher pre-entry GPAs are associated with higher program retention. Students enrolled part-time had a -2.31 retention index compared to full-time students so full-time students were associated with higher retention index scores. Students enrolled part-time had a 1051.929 increase in time to graduation index scores compared to full-time students. Further explained as full-time students were associated with less time to graduate compared to part-time students who took more time to graduate. Increases in one unit of course grades scores in terms 1 and 2 were associated with an increase of .095 and .128 retention index scores respectively. Students who had higher grades in terms 1 and 2, had higher retention scores. For every one unit increase in course grades scores in terms 1 (-116.228) and 2 (-842.402) there was a decrease in time to graduation index scores. Students who had higher grades in terms 1 and 2 took less time to graduate. Similarly, an increase in one unit of GPA status in term 1 was associated with an increase of .128 in retention index scores. Students who had higher GPAs in term 1 had higher retention outcomes. Increases in one unit of GPA status in term 1(-76.557) and term 2 (-59.495) was associated with a decrease in time to graduation index scores. Students who had higher GPAs in term 1 and 2 completed the program in less time. Students who had no failed courses in term 1 or term 2 had a (-

120.948) decrease in time to graduation index scores compared to others who failed either a “nursing” course or “other course”. Students who did not fail a course in terms 1 and terms 2 completed the program in less time.

Students within a school of nursing that had <50 faculty and <500 student enrollments had a predicted retention index of -.231 which is less than predicted retention index scores for students within institutions with >50 faculty and >500 students enrolled. Students enrolled in a smaller program of nursing with less faculty had lower retention scores. Students enrolled in a southern U.S institution had a predicted retention index score of -.214 retention index score which was less than students enrolled in a northern U.S institution. Students enrolled in a southern institution had less favorable retention outcome scores. Students enrolled in an institution with an admission GPA requirement of 2.0 had a predicted retention index score of -.214 which was less than that of institutions that had a GPA requirement of 2.5, implying that a higher admission GPA requirement had a lower retention index. Students enrolled in an institution that did not have certain academic and retention support (online technical support, data analytics in process) had a predicted retention index score of -.214 less than that of institutions that had online technical support and data analytics in process. Regression coefficients and standard errors for hypothesis 1 can be found in Table 5 and Table 6 (Multiple Regression-Retention Index and Time to Graduation Index). The null hypothesis that there is no relationship among pre-entry student attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term

GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation was rejected.

Table 5

Multiple Regression-Retention Index

Variable	*B*	*SE*	Beta	*t*	*p*
Age	-.004	.036	-.003	-.100	.920
Gender	.041	.064	.019	.639	.523
Race	-.009	.023	-.012	-.374	.709
Previous Degree	-.049	.048	-.039	-1.006	.315
Pre-entry GPA	.110	.055	.100	2.005	.046*
#Credits pre-entry	.001	.001	.078	1.170	.243
Course Grade Term 1	.095	.025	.291	3.771	.000*
Course Grade Term 2	.128	.035	.417	3.625	.000*
GPA Term 1	-.042	.016	-.155	-2.705	.007*
GPA Term 2	-.018	.024	-.074	-.747	.456
Type Failed Course	.240	.021	.434	11.580	.000*
Institution Size	-.214	.062	-2.14	-3.452	.001*
Region	-.214	.062	-2.14	-3.452	.001*
Admission GPA criteria	-.214	.062	-2.14	-3.452	.001*
Course credit Requirement	-.214	.062	-2.14	-3.452	.001*
Academic support	-.214	.062	-2.14	-3.452	.001*
Retention Methods	-.214	.062	-2.14	-3.452	.001*

*Note. * statistically significant*

Table 6

Multiple Regression-Time to Graduation Index

Variable	*B*	*SE*	Beta	*t*	*P*
Age	-379.477	179.253	-.102	-2.117	.054
Gender	-2.508	142.007	-.001	-.018	.986
Race	-97.417	50.141	-.092	-1.943	.053
Previous Degree	-32.311	94.605	-.021	-.342	.733
Pre-entry GPA	111.727	119.589	.070	.934	.351
#Credits pre-entry	-.574	1.108	-.051	-.518	.605
Enrollment Status	1501.929	205.591	.239	5.117	.000*
Course Grade Term 1	-1116.22	146.243	-1.115	-7.633	.000*
Course Grade Term 2	-842.40	138.94	-.778	-6.087	.000*
GPA Term 1	498.402	75.667	.951	6.587	.000*
GPA Term 2	317.402	75.602	.537	4.199	.000*
Number Failed	40.623	188.364	.010	.216	.829
Courses Type Failed	-120.948	56.938	-.133	-2.124	.035*
Size	-183.859	131.062	-.131	-1.403	.162
Region	-183.859	131.062	-.131	-1.403	.162
Course credit requirement	-183.859	131.062	-.131	-1.403	.162
	-183.859	131.062	-.131	-1.403	.162
Course Length					
	-183.859	131.062	-.131	-1.403	.162
Academic support	-189.049	126.807	-.135	-1.491	.137
Retention Methods	-189.049	126.807	-.135	-1.491	.137

*Note. * statistically significant*

Research Question 2 (RQ2)

Null Hypothesis ($H_0 2$): There is no relationship among retention of accelerated online or hybrid RN-to-BSN and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Alternative Hypothesis ($H_a 2$): There is a relationship among retention of an accelerated online or hybrid RN-to-BSN student and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Pre-entry Attributes

First, a binomial logistic regression was performed in IBM SPSS and compared to a decision tree analysis in SPSS modeler to determine accuracy of whether students were more or less likely to be retained. Second a sample predictive algorithm was created in SPSS modeler highlighting the major predictors of retention and timely graduation. A binomial logistic regression and decision tree analysis are commonly selected to predict probabilities if an event will likely or less likely to occur considering a dichotomous dependent variable. Each major variable (pre-entry attributes, academic integration and institutional characteristics) were analyzed separately in the logistic regression model unlike that of the multiple regression model used for research question 1 that assessed overall predictions with all variables added into the model. The dependent variable “retention” was denoted as the desired dichotomous outcome variable whereas “0” represented “yes” retention and “1” represented “no” retention. Assumptions of binary logistic regression were met. Linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the Box-Tidwell (1962) procedure. A Bonferroni correction was applied using all terms in the model resulting in statistical significance being accepted when $p < .00384615$ (Tabachnick & Fidell, 2014). Based on this assessment, all continuous independent variables were found to be linearly related to the logit of the dependent variable. There were two standardized residual cases with values of 2.622 and 3.408 standard deviations respectively, which were kept in the analysis. The logistic regression model for pre-entry attributes (demographics, RN-Time, prior academic experience, enrollment status, cumulative nursing GPA, number of prerequisite credits) were statistically significant, $\chi^2(18) = 101.851$, $p \leq .0005$. The model explained between 23% and 33.0% (Cox & Snell R Square and Nagelkerke R^2) of the variance in retention and classified 78.4% of cases. Sensitivity was 96.4%, specificity was 34.5%, positive predictive value was 78% and negative predictive value was 80%. Out of the 6 pre-entry attribute predictor variables, enrollment status and prior academic experience (general education credits prior to admission) were statistically significant

($p \leq .05$). For every unit increase in enrollment status (full-time) the student had 26.040 greater odds of being retained. Students who were enrolled full-time compared to part-time were more likely to be retained. For every unit increase in pre-entry course credits (GENED_PRIOR) students had 1.007 greater odds of being retained. The more college credits the student attained the more likely they would be retained. (See Table 7-Binary Logistic Regression-Pre-entry Attributes).

Table 7

Binomial Logistic Regression-Pre-entry Attributes-Retention

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
GENED_PRIOR	.007	.003	5.629	1	.018*	1.007	1.001	1.013
Gender	.693	.574	1.456	1	.228	2.000	.649	6.165
Age			3.377	5	.642			
20-29	1.904	1.380	1.904	1	.168	6.711	.449	100.250
30-34	-.037	.505	.005	1	.942	.964	.358	2.594
35-39	-.260	.504	.267	1	.606	.771	.287	2.070
40-49	-.397	.414	.919	1	.338	.672	.298	1.514
50 and over	-.056	.359	.024	1	.877	.946	.468	1.913
GPA_PRE-ENTRY			13.803	7	.055			
3.75 and Higher	1.353	1.371	.975	1	.324	3.870	.264	56.814
3.5 to 3.74	.822	1.338	.378	1	.539	2.275	.165	31.315
3.25 to 3.49	1.325	1.299	1.041	1	.308	3.764	.295	47.998
3.0 to 3.24	2.163	1.320	2.682	1	.101	8.694	.653	115.663
2.5 to 2.99	1.480	1.380	1.150	1	.284	4.393	.294	65.722
2.0 to 2.49	1.228	1.381	.791	1	.374	3.415	.228	51.145
Below 1.99	2.466	1.367	3.254	1	.071	11.772	.808	171.538
PREV_DEGREE1(1)	.284	.412	.476	1	.490	1.328	.593	2.977
ENROLL_STATUS1(1)	3.260	.596	29.890	1	.000*	26.040	8.094	83.780
RACE-WHITE			3.862	2	.145			
RACE-BLACK(1)	.810	.464	3.051	1	.081	2.247	.906	5.575
RACE-OTHER(2)	1.032	.547	3.562	1	.059	2.806	.961	8.195

*Note. * statistically significant*

Academic Integration

A binary logistic regression model was performed with "retention" denoted as a dichotomous outcome variable and academic integration (post-1st and 2nd term GPA and course grades, number and type of failed courses) as the independent variable group. The logistic regression model for academic integration was statistically significant, $\chi^2(7) = 322.930$, $p \leq .0005$. The model explained between 57% and 81% (Cox & Snell R Square and Nagelkerke R^2) of the variance in timely graduation and classified 93.8% of cases. Sensitivity was 96.4%, specificity was 87.6%, positive predictive value was 95% and negative predictive value was 91%. Of the six academic integration variables academic integration variables (course index term 1, course index term 2 and failed course type) were statistically significant. For every unit increase in "other" type failed there was an associated 4.2 greater odds of being retained compared to ones who failed a "nursing" course. For every unit increase in "none" failed course there was an associated 142 greater odds of retention. Students who had not failed any course were more likely to be retained. For every one unit increase in course grade index in term 1 there was a 3.566 greater odds of being retained. Students who had higher course grades in term 1 were more likely to be retained. For every one unit increase in course grade index 2 there was an associated 3.362 greater odds of being retained. Students who had higher course grades in term 2 were more likely to be retained. The binomial logistic regression findings can be found in Table 8-Binary Logistic Regression-Academic Integration.

Table 8

Binary Logistic Regression-Academic Integration-Retention

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
GPA_TERM 1	.345	.418	.682	1	.409	.708	.312	1.607
GPA_TERM 2	-.252	.279	.818	1	.366	.777	.450	1.342
TYPE			69.856	2	.000			
FAILED NURSING	-3.729	.524	50.580	1	.000*	.024	.009	.067
FAILED-OTHER(1)	-5.008	.696	51.812	1	.000*	.007	.002	.026
	.326	.441	.546	1	.460	1.385	.584	3.286
FAILED-NONE(2)	1.271	.445	8.147	1	.004*	3.566	1.489	8.536
	1.213	.589	4.235	1	.040*	3.362	1.059	10.672
# FAILED	-2.912	.939	9.630	1	.002	.054		

*Note. *statistically significant*

Institutional Characteristics

The logistic regression model for institutional characteristics was statistically significant, $\chi^2(1) = 18.99$, $p \leq .0005$ when each variable was input in the model separately. The model explained between 5% and 7.0% (Cox & Snell R Square and Nagelkerke R^2) of the variance in timely graduation and classified 71.0% of cases. The model ran for each of the nine variables (region, number of students enrolled, number of faculty teaching, course length, GPA-requirement, data analytics, advisement, technical support and number of pre-entry credit requirements) and each were independently statistically significant ($p \leq .0005$). Students enrolled in a program with < 500 students were 65% less likely to be retained compared to programs with > 500 students. Students enrolled in a program with > 50 teaching faculty had a 2.826 greater odds of retention compared to a program with <50 teaching faculty. Students enrolled in a program that had a GPA requirement of 2.5 were 65% less likely to be retained compared to those enrolled in a program with a GPA requirement of 2.0. Students enrolled in an institution without data analytics in process were 64% less likely to be retained compared to those students who did. Students who had non-mandatory virtual advisement of had 2.768 greater odds of retention compared to students who had mandatory advisement. Students enrolled in an institution with continuous enrollments with 1 to 10 week terms were 65% less likely to be retained compared to those who were enrolled in a continuous enrollment program with course terms/quarters of 5 weeks. Students who had online technical support options had 2.826 greater odds of retention compared to others who did not have this option (See Table 9). The null hypothesis that there is no relationship among retention of accelerated online or hybrid RN-to-BSN and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) was rejected.

Table 9

Binary Logistic Regression-Institutional Characteristics-Retention

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
NUMBERSTUDENTS_ENROLLED(1)	-1.039	.238	19.081	1	.000*	.354	.222	.564
Constant	1.234	.144	73.144	1	.000	3.435		
NUMBERFACULTY_TEACHING	1.039	.238	19.081	1	.000*	2.826	1.773	4.504
Constant	.195	.189	1.067	1	.302	1.216		
COURSE_LENGTH(1)	-1.039	.238	19.081	1	.000*	.354	.222	.564
GPA_REQUIREMENT(1)	-1.039	.238	19.081	1	.000*	.354	.222	.564
Constant	1.234	.144	73.144	1	.000	3.435		
region(1)	-1.039	.238	19.081	1	.000*	.354	.222	.564
ADVISEMENT_OPTION1(1)	1.018	.237	18.404	1	.000*	2.768	1.738	4.407
Constant	.211	.188	1.258	1	.262	1.235		
TECHSUPPORT_OPTION1(1)	1.039	.238	19.081	1	.000*	2.826	1.773	4.504
Constant	.195	.189	1.067	1	.302	1.216		
CREDIT_REQUIREMENT(1)	-1.039	.238	19.081	1	.000*	.354	.222	.564
Constant	1.234	.144	73.144	1	.000	3.435		
DATA_ANALYTICS1(1)	-1.018	.237	18.404	1	.000*	.361	.227	.575

Note. * *statistically significant*

Research Question 3 (RQ3)

Null Hypothesis ($H_0$3): There is no relationship among time to graduation of accelerated online or hybrid RN-to-BSN and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

Alternative Hypothesis (H_a3): There is a relationship among time to graduation of an accelerated online or hybrid RN-to-BSN student and pre-entry (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post 1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods).

A binomial logistic regression was performed to predict whether students will graduate timely or not graduate timely based upon pre-entry attributes, academic integration and institutional characteristics. Linearity of the continuous variables with respect to the logit of the dependent variable was assessed via the Box-Tidwell (1962) procedure. Based on this assessment, all continuous independent variables (RN time, general education credits prior to admission, course grade index at term 1 and course grade index at term 2, GPA term 1 and GPA term 2 index, failed course index) were found to be linearly related to the logit of the dependent variable, timely graduation. There were three standardized residuals with values of 2.945, 3.207 and 3.739 standard deviations respectively, which were all kept in the analysis. The logistic regression model for pre-entry attributes was statistically significant, $\chi^2(11) = 30$, $p \leq .0005$. The model explained between 10% and 14.0% (Cox & Snell R Square and Nagelkerke R^2) of the variance in timely graduation and classified 70.9% of cases. Sensitivity was 93%, specificity was 24.7%, positive predictive value was 72.1% and negative predictive value was 63%. Missing values were corrected for "timely graduation" as all students did not graduate the program. This left 275 records for analyzation for "timely graduation" Of the six pre-entry attribute variables the "GENED_PRIOR" was the only variable found to be statistically significant with time to graduation ($p \leq .05$). For every unit increase in the number of GENED_PRIOR (total college credits) there was an a 1.00 greater odds of time to graduation. The more college credits the student had the more likely they are to graduate timely. Table 10 presents the logistic regression results for pre-entry attributes on time to graduation.

Table 10

Binary Logistic Regression-Timely Graduation-Pre-Entry Attributes

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B)	
							Lower	Upper
Age			6.553	5	.256			
20-29	-.122	.855	.021	1	.886	.885	.166	4.724
30-34	-.892	.579	2.372	1	.124	.410	.132	1.275
35-39	.584	.503	1.345	1	.246	1.793	.668	4.810
40-49	-.341	.471	.525	1	.469	.711	.282	1.789
50 and over	.193	.351	.301	1	.583	1.213	.609	2.414
Gender(1)	-.519	.711	.532	1	.466	.595	.148	2.400
RACE-White			5.002	2	.082			
RACE-Black(1)	-.651	.575	1.280	1	.258	.522	.169	1.610
RACE-Other(2)	.127	.644	.039	1	.843	1.136	.322	4.011
GENED_PRIOR	-.008	.003	7.194	1	.007*	.992	.985	.998
PREV_DEGREE1(1)	.496	.460	1.166	1	.280	1.643	.667	4.045
ENROLLMENT_STATUS1(1)	-1.051	.962	1.192	1	.275	.350	.053	2.306
Constant	1.492	1.367	1.191	1	.275	4.446		

*Note. * statistically significant*

Academic Integration

The logistic regression model for academic integration was statistically significant, $\chi^2(20) = 41.11$, $p \leq .0005$. The model explained between 14% and 19.0% (Cox & Snell R Square and Nagelkerke R^2) of the variance in timely graduation and classified 72.8% of cases. Sensitivity was 95.7%, specificity was 24.7%, positive predictive value was 73% and negative predictive value was 73%. Of the six academic integration predictor variables "Failed Course Type" was statistically significant ($p \leq .05$). Students who failed “other” had 2.986 greater odds of timely graduation compared to others who had failed a nursing course. Table 11 presents the results.

Table 11

Binary Logistic Regression-Timely Graduation-Academic Integration

	B	S.E.	Wald	df	Sig.	Exp(B)	95% C.I.for EXP(B) Lower	Upper
COURSEGRADEINDEX _TERM1	-1.071	.972	1.215	1	.270	.343	.051	2.302
COURSEGRADEINDEX _TERM2	-.794	1.082	.538	1	.463	.452	.054	3.768
GPA_TERM1INDEX	.349	.461	.572	1	.450	1.418	.574	3.502
GPA_TERM2INDEX	.141	.487	.084	1	.772	1.151	.443	2.992
FAILED_COURSES	40.558	19288.816	.000	1	.998	411072611500000000.000	.000	.
FAILED_COURSETYPE-NURSING			4.303	2	.116			
FAILED_COURSETYPE(1)-OTHER	1.094	.527	4.303	1	.038*	2.986	1.062	8.393
FAILED_COURSETYPE(2)-NONE	-18.638	9644.408	.000	1	.998	.000	.000	.
Constant	-16.424	9644.409	.000	1	.999	.000		

*Note. * statistically significant*

Institutional Characteristics

The logistic regression model for institutional characteristics was performed separately due to large redundancies. The model ran for each of the nine variables (region, number of student enrolled, number of faculty teaching, course length, GPA-requirement, data analytics, advisement, technical support and number of pre-entry credit requirements) were each statistically significant ($\chi^2(1)$, $p \leq .0005$). The model explained between 5% and 7.0% (Cox & Snell R Square and Nagelkerke R^2) of the variance in timely graduation. Nine institutional characteristic predictor variables were statistically significant for timely graduation. Students within northern regions had 2.919 greater odds of time to graduation compared to students in the south. Similarly, students enrolled in programs with >500 students enrolled and >50 teaching faculty, had GPA requirements of 2.0 and had pre-credit requirements had 2.919 odds of time to graduation compared to students enrolled in programs with <500 students enrolled and <50 teaching faculty, had GPA requirements of 2.5 and did not have credit requirements upon entry other than an RN license. Students enrolled in an institution with data analytics in process, had 3.064 odds of time to graduation compared to those students who did not. Students who had mandatory virtual advisement were 76% less likely to graduate timely compared to students who had non-mandatory advisement. Students enrolled in an institution with continuous enrollments with 5-week terms had 2.919 greater odds of being retained compared to those who were enrolled in a continuous enrollment program with course terms/quarters ranging between 1 to 10 weeks. Students who did not have online technical support options were 66% less likely to graduate timely compared to others who had this option. See Table 12 for the results. The null hypothesis that there is no relationship among time to graduation of an accelerated online or hybrid RN-to-BSN student and pre-entry attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) was rejected.

Table 12

Binary Logistic Regression-Timely Graduation-Institutional Characteristics

	B	S.E.	Wald	*df*	Sig.	Exp(*B*)	95% C.I.for EXP(B) Lower	Upper
REGION(1)	1.071	.298	12.964	1	.000*	2.919	1.629	5.231
Constant	-1.007	.155	42.317	1	.000	.365		
#STUDENTS _ENROLLED (1)	1.071	.298	12.964	1	.000*	2.919	1.629	5.231
Constant	-1.007	.155	42.317	1	.000	.365		
# FACULTY TEACHING(1)	1.071	.298	12.964	1	.000*	2.919	1.629	5.231
Constant	-1.007	.155	42.317	1	.000	.365		
COURSE_LE NGTH(1)	1.071	.298	12.964	1	.000*	2.919	1.629	5.231
Constant	-1.007	.155	42.317	1	.000	.365		
GPA_REQ-UIREMEN-T(1)	1.071	.298	12.964	1	.000*	2.919	1.629	5.231
Constant	-1.007	.155	42.317	1	.000	.365		
DATA_ANA LYTICS1(1)	1.120	.296	14.265	1	.000*	3.064	1.714	5.479

(*table continues*)

Table 12

ADVISEMENT_OPTION1(1)	-1.120	.296	14.265	1	.000*	.326	.183	.583
Constant	.095	.252	.143	1	.706	1.100		
CREDIT_REQUIREMENT(1)	1.071	.298	12.964	1	.000	2.919	1.629	5.231
Constant	-1.007	.155	42.317	1	.000	.365		
TECHSUPPORT_OPTION1(1)	-1.071	.298	12.964	1	.000	.343	.191	.614
Constant	.065	.254	.064	1	.800	1.067		

*Note. *statistically significant*

IBM SPSS Modeler-Predictive Retention-Time to Graduation Algorithm

I uploaded structured datasets within the IBM SPSS Modeler using the IBM SPSS statistics file integration option. I had already manipulated, cleaned and processed the data accordingly within IBM SPSS before file integration. I analyzed the datasets for the predictive retention and time to graduation algorithms for pre-entry and academic integration variables. My sole intent of creating the sample algorithm was to begin adding statistically significant variables to train the model over time in future studies. I selected the Chaid decision tree model as the supervised model of interest. I denoted the dependent dichotomous outcome variables (retention and time to graduation) as targeted variables as “0” for retained and “1 for not retained” and “0” for timely graduation and “1” for non-timely graduation. Being that IBM SPSS Modeler follows all the same assumptions as IBM SPSS statistics it was not necessary to assess for violations. I added a partition node to split data randomly between training and testing sets to validate the model would perform well on unseen data. I implemented an executive model node and a model was displayed in an algorithm and graph form. I assessed confidence levels accordingly. The overall performance of the model for “retention” analysis was 95.74% on the training data and 95.05% on the unseen test data. This indicates the predictive model confidently predicted the variables associated with the odds for “retained” or not “retained”. The overall performance of the model for “time to graduation” however was 48.4% on the training data and 49.01% on the unseen test data. This indicates the predictive model did not confidently predict the variables associated with the odds for “timely graduation” or “non-timely graduation.” The Chaid decision tree model predicted that course grade index scores in terms 2 had the most predictive power of “retention,” followed by failed course type, course grade index in term 1, GPA index in term 2 and then numbers of general education courses (total college credits) on admission respectively. The model accurately predicted variables associated with retention similar to the logistic regression model in SPSS statistics except for enrollment status. The Chaid decision tree model predicted that the number of failed courses had the most predictive power on “timely graduation,” followed by race and previous degree. However, the logistic regression model in SPSS statistics predicted GEN ED prior (number of college credits and “failed course type”). This was expected as the model’s overall performance was poor at predicting time to graduation (48.4%). Predictive models presumably perform better when there are massive amounts of data trained overtime. I recommend that researchers empirically examine other variables suitable for this research study context so that predictive models, such as the one sampled in this study, can be trained overtime (Dissanayake, 2016). The sample retention and time to graduation algorithms are presented in Appendix A and Appendix B.

Summary

Chapter 4 discussed the results of the logistic regression and hierarchical multiple regression data analysis. The 3 research questions were addressed. For research question 1 (RQ1), a multiple regression model explained the degree of variation of retention and timely graduation with respects to each independent variable (pre-entry attributes, academic integration and institutional characteristics). Pre-entry GPA, enrollment status, course grade index scores in terms 1 and 2, GPA index in terms 1, size and geographic region, admission GPA standards, prerequisite criteria, academic support and retention methods were all statistically significant predictors of retention ($p \leq .05$). Demographics, number of prerequisite credits and previous degree were not statistically significant. Enrollment status, course grade index term 1 and 2, GPA in term 1 and failed course types were statistically significant as predictors of timely graduation. However, institutional characteristics were not significant predictors of timely graduation. Research question 2 (RQ2) addressed the odds of retention based on pre-entry attributes, academic integration and institutional characteristics. Enrollment status and number of general education credits prior to admission were statistically significant predictors of retention. Course index term1, course index term2 and failed course type were significant for likelihood of retention. Region, number of students enrolled, number of faculty teaching, course length, Pre-entry GPA requirements, data analytics, advisement, technical support and number of pre-entry credit requirements were statistically significant for likelihoods of retention. Research question 3 (RQ3) addressed the odds of timely graduation based on pre-entry attributes, academic integration and institutional characteristics. The number of general education credits prior to admission, failed course type, region, number of students enrolled, number of faculty teaching, course length, pre-entry GPA requirements, data analytics, advisement, technical support and number of pre-entry credit requirements were statistically significant for likelihoods of timely graduation. To compare logistic regression findings of pre-entry attributes and academic integration variations on retention and timely graduation, I performed a decision tree model created in IBM SPSS modeler. The Chaid decision tree model correctly predicted 95.05% of the analyzed data except for enrollment status. The Chaid decision tree model's overall performance for timely graduation was poor; predicting only 49.01% of predicted values. I created a sample predictive algorithm for retention and timely graduation and are presented in appendix 1 and appendix 2. Chapter 5 discusses the findings within this study, implications, and recommendations for further research.

Chapter 5: Discussions, Conclusions and Recommendation

Introduction

The literature lacks substantial evidence that predicts retention and time to graduation outcomes within accelerated online and hybrid RN-to-BSN programs with continuous enrollment. Considering the IOM's recommendations, it is necessary to evaluate academic structures considering a 25% deficit of RNs with BSN degrees. The purpose of this quantitative correlative study was to examine relationships between pre-entry student attributes (demographics, prior RN work experience, enrollment status, cumulative and nursing course GPA, number of prerequisite credits), academic integration (academic experience, post-1st and 2nd term GPA and course grades) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support, retention methods) on retention and time to graduation.

Similar to Tinto's theory of retention and Rovai's CPM model, pre-entry attributes (pre-entry GPA and enrollment status), academic integration (course grade index in Terms 1 and 2, GPA index in Terms 1 and 2, number of failed course types) and institutional characteristics (size and geographic region, program type, admission GPA and prerequisite criteria, academic support and retention methods) were statistically significant predictors of retention and time to graduation ($p \leq .05$). I found that academic integration and institutional characteristics had the greatest variation within multiple regression and logistic regression models. Chaids decision tree model in IBM SPSS modeler successfully predicted associations between pre-entry attributes and academic integration.

Interpretation of Findings

Age

Analysis of pre-entry attributes, (demographics, previous degree and RN work experience), were not significant predictors of retention and timely graduation. According to descriptive analytics, most students (35.9%) within this study were between the ages of 40 and 49. Other descriptive correlative studies examining retention in online RN-BSN samples claimed a majority of BSN students are 30 years of age or older (Cipher et al., 2017; Duffy et al., 2014; Gilmore, 2017). Although this study did not find age as a significant predictor of retention and time to graduation, Cipher et al. (2017) found BSN students of younger age (<24) predicted both graduation and earlier graduation with interacting variables of financial aid assistance and a previous baccalaureate degree outside of nursing. Previous research has shown that as a student's age rises, so does the likelihood of attrition because of higher levels of personal and family responsibilities (Horn, 1998; Murtaugh, 1999). However, these finding are inconsistent with my findings and other studies which found age, gender, and race/ethnicity were not statistically significant predictors of student retention and time to graduation (Jeffreys, 2007; Cauble, 2015).

Gender

I found no significant relationship among gender, retention, and time to graduation. Ajai and Imoko, (2015), also found no relationship between gender and retention outcomes. However, in other studies, women have been associated with higher retention rates and graduate in less time compared to men (Smith, 2006 McLaugh, Muldoon & Moutray, 2009; Mulholland, Anionwu, Atkins, Tappern & Franks, 2008). Non-traditional nursing students who are older, male, and/or a minority historically have lower retention rates compared to traditional nursing students (Pitt, Powis, Levett-Jones & Hunter, 2012; Smith, 2006; McLaughlin, Muldoon & Moutray, 2010). In my study, 94.9% of students enrolled were women, consistent with the (91%) national average (National League of Nursing, 2009, BLS, 2017).

Race/Ethnicity

French, Immekus and Oaks, (2005) suggested minority students and ESL students have the highest risk of attrition. However, I found no association between race/ethnicity, retention, and time to graduation. Consistent with the national average, most students within this study were white (77.4%). Wladis, Conway and Hachey (2016) found native born students had higher risks of not completing an online program compared to foreign-born students. Attrition rates have been reported as high as 85% in minority populations (Newton & Moore, 2009; Gilchrist & Rector, 2007). Previous research has presented variable graduation and attrition rates among minorities, low socioeconomic status and men (Bryer, Peterson-Graziose & Nikolaidou, 2015; Tinto, 2007; Jeffreys, 2007).

Cumulative Nursing GPA

GPA standing has historically been a measure of a student's academic abilities and associated with increased retention (Patzer et al., 2017; Astin, 2005; Zuspan, 2017). Most students within this study had cumulative pre-entry GPAs between 2.5 to 2.99

(34.4%). There was a statistically significant correlation between pre-entry GPA standings and retention ($p \leq .05$), but there was significance with time to graduation. Similarly, Cauble (2015), found a statistically significant association between persistence toward graduation and a higher undergraduate GPA. In addition, Cochran, Campbell, Baker and Leeds, (2014) found that students with higher GPAs (>3.0) were less likely to withdrawal from the program. In addition, higher GPAs in pre-nursing and science courses have been associated with timely graduation in BSN attainment (Seago, Keane, Chen, Spetz & Grumbach, 2012). Surprisingly, many online RN-to-BSN programs accept considerably lower cumulative GPAs compared to traditional BSN programs. The schools of nursing within this study required pre-entry GPAs between 2.0 to 2.5 but had an average overall retention rate above national averages (>70%).

RN Academic and Work Experience

Several studies have shown that RNs who hold a previous bachelor's degree outside of nursing have lower attrition rates than those who do not have a previous bachelor's degree (Cipher et al., 2017; Sarver et al., 2016). However, neither the multiple regression or logistic regression models in this study revealed a statistically significant prediction of retention and time to graduation based on a previous degree or RN-time. Most samples in this study had no previous degree outside of nursing (83.8%). Interestingly, most of the students (19%) had between 0–2 years of "RN-time". The highest percentage however accounted for "unknown" as 114 cases were missing "RN-time" data (29%). Other studies have reported an average of 7.5 to 10.5 years of RN–time, defined as the point of initial licensure to the point of enrollment in a BSN program.

(McEwen et al., 2013; Krov, 2010). Many RNs are now pursuing their BSN degree directly or near after their initial RN licensure.

Number of General Education Courses

Increased numbers of total college credits prior to admission was significantly associated with greater odds of retention. This finding was comparable to other studies that found completing more general education credits prior to admission was met with a 20% greater odd of retention and completing a degree program within the benchmarked timeframe. (Gregory et al., 2013). Most samples in this study had an average number of 71–100 college credits prior to program entry. The data collection process did not allow for specific credit analysis that would have revealed exact pre-requisite courses, general education courses and associate degree course work.

Enrollment Status

Most of the samples were enrolled full-time (89.7%). Greater emphasis has been placed on the degree of academic progression and institutional support factors relative to student success and retention (Okagbare, 2017). My findings of the multiple regression model were consistent with this trend. Samples enrolled full-time were correlated with having a higher retention and timely graduation index score compared to samples that had a lower retention index and a lower timely graduation index score. These findings are supported by Davidson (2014), who found consistent course to course progression and full-time enrollment within a BSN program were associated with higher retention and timely graduation.

Further explanations for this finding are assumed under Tinto's model of retention that explains the process of academic and social integration where the student who enrolls full-time and has greater opportunity to fully integrate within the institution has a greater chance of retention and graduation. Students enrolled part-time therefore, may be at a social disadvantage and often perceive a disconnect between themselves and the academic institution, leading to higher attrition risks (O'Keefe, 2013; Davidson, 2014). Full-time progression enables the student to accumulate a greater amount of credits in a shorter time frame compared to part-time progression, however most working RNs find this to be difficult. Although I did not measure the number of credits enrolled from term to term directly, students who earn more credits from term to term are more likely to be retained compared to students who earn less credits from one term or semester to the next (Davidson, 2014).

Academic Integration

I found that higher course grades in Terms 1 and 2, higher GPA index in Terms 1 and 2, and failed course types (none) were associated with a higher retention index. Course grade index in Term 1, course grade index in Term 2, GPA Term 1 and failed course type (none) were statistically significant predictors of timely graduation. This finding is consistent with previous studies that showed students with higher GPAs and course to course persistence were more likely to be retained from term to term leading to retention and on-time graduation compared to students who had lower course grades, lower course GPAs and higher numbers of failed courses (Zuspan, 2017; Cochran et al, 2014). Cipher et al. (2017) found that fewer failed or dropped courses predicted graduation and retention in BSN students. Comparably, Abele et al. (2013), found a 36% less chance of retention within a BSN program when subjects had higher numbers of course failures.

Institutional Characteristics

Institutional characteristics (geographic region, number of faculty, number of students, prerequisite credit requirements, technical support, advisement, writing support, and data analytics) predicted both retention and timely graduation ($p \leq .05$). All other institutional characteristics did not reveal a statistically significant difference.

Being enrolled in an online RN-to-BSN program within the Northern part of the United States, sufficient student to faculty ratios, access to online technical and writing support, and in-process data analytics predicted a higher retention and time to graduation index. Robertson et al, (2010) found correlations of student retention within academic programs that offer adequate academic support systems including writing, technical, and advisement support. Class size in particular, has shown to influence positive educational outcomes; suggesting an adequate faculty to student ratio leads to lower attrition risks (Bettie & Thiele, 2016).

Results of my study that showed that larger academic institutions have been associated with higher retention rates are supported in the literature (Lin, Yu & Chen, 2012; Okagbare’s, 2017). Although this study did not reveal a significant relationship between program type, non-profit public institutional sectors have generally held higher retention rates compared to for-profit public institutions (NCES, 2017). In addition, institutions that have higher GPA requirements generally have favorable graduations rates compared to less selective institutions (NCES 2017). Contrary to this finding, my results revealed that students enrolled in academic institutions with a lower admission GPA requirement (2.0) had a higher retention and time to graduation index compared to other institutions with an admission GPA requirement of (2.5). Students enrolled in academic institutions with course terms of 5 weeks, compared to institutions that offered alternating course lengths ranging between 2 weeks to 10 weeks, had higher retention index and timely graduation. Interestingly, studies suggest that RN students who enroll in online programs with flexible degree terms may be at higher risk of withdrawal or prolonged graduation (Grosskurth, 2016).

Tinto's theories of integration and student departure (1975, 1984, 1993) and Rovai's CPM model provided a theoretical and conceptual framework for my study. Tinto postulated that the degree of academic and social integration predicts whether a student will likely be retained or withdraw from an academic program. Interactions between the student's pre-entry attributes and the institutions characteristics likely leads to the student effectively integrating within the academic institution both socially and academically which furthers lead to retention and graduation (Tinto, 1993, 2012).

In my study, I found that pre-entry attributes, the degree of academic integration and institutional characteristics can predict future outcomes of retention and time to graduation as Tinto postulated. Rovai's CPM model considered nontraditional student pre-attributes "prior to admission" and internal and external factors, "after admission" is predictive of student persistence toward graduation in an online platform. My study found that pre-entry periods and 1st and 2nd terms of enrollments in an online RN-to-

BSN predicted both retention and time to graduation as postulated by Rovai's CPM model.

Limitations of the Study

Generalizability is limited as the distribution of samples came from a small number of online RN-to-BSN within the South and Northern regions of the United States and did not represent the entire population. I suggest that further studies extend outside of the southern and northern regions of the United States, analyze larger size datasets and academic records, and collect data from a larger number of academic institutions to reveal generalizations relevant varying student populations and institutional characteristics. In addition, my study was retrospective in nature with potential ambiguities within the collected datasets or the face validity of documentations within the original data source. Ambiguity within the calculations of attrition, retention and graduation may have led to erroneous findings as different institutions had varying ways of calculating retention and time to graduation. Retention and time to graduation outcomes have many variables that may potentially impact its' ultimate outcome.

Recommendations

Substandard retention rates remain a major concern across discipline borders, including nursing academia (Tinto, 2007; Jeffreys, 2012; Astin, 2005; Bean & Metzner, 1985). A lack of studies has examined variables which may predict risk of attrition and graduation times that exceed benchmarked time frames within accelerated RN-to-BSN programs with continuous enrollment. In my study, program completion of 2 years or less was benchmarked as "timely graduation". A gap exists between the benefits of using

predictive modeling within nursing academia and the necessary steps of implementation of predictive models and algorithms. Nurse directors, faculty and advisors could benefit from having an in-service regarding the specifics of various predictive model software and its' capabilities of predicting retention and timely graduation. I recommend that academic institutions evaluate the return of investment on implementing predictive analytic models to combat unfavorable attrition. Schools of nursing keep a large amount of student data which is often housed in various computer systems, so it becomes relevant to adopt predictive analytic systems that have the ability to combine data from multiple data points and to further analyze massive amounts of data relevant to an immense amount of student attributes, social behaviors and academic progression statuses during the critical first term/quarter of enrollment. Predictive retention algorithms can be used to examine students who are not likely to be retained or graduate timely and can further direct educators and advisors to intervene with appropriate interventions such as a student academic action plans, remediation, tutoring, mentorship or strict advisement.
Comparable to Tinto's theory of retention and Rovai's CPM model, this study similarly revealed that academic integration and institutional characteristics provided the most variation in retention and time to graduation. Further suggesting that 1st and 2nd terms/quarters outcomes can predict program retention and time to graduation. Further research is needed to evaluate gender effects on retention in accelerated RN-to-BSN programs with continuous enrollment. Gender differences may be of little value in understanding retention and time to graduation within current academic structures (Ajai & Imoko, 2015). A lack of diversity within the nursing profession warrants further

analysis into the differences among race/ethnicity within accelerated online RN-to-BSN programs of similar context. Further research is warranted regarding GPA requirements and its' predictive value on retention within accelerated RN-to-BSN programs with continuous enrollment. Although "RN-time" was not a significant predictor in this study, greater studies are needed to examine retention outcomes and time to graduation in relationship to the number of RN years of experience prior to BSN enrollment. Greater research is needed to evaluate these specific components and its' relationship to retention and timely graduation in accelerated online and hybrid RN-to-BSN programs.

My study provided a sample predictive retention algorithm created through decision tree modeling and predicted retention with a 96% accuracy rate. Although the decision tree model performed poorly for timely graduation analysis, predictive analysis can be of value when unseen data is trained over time. Of benefit would be for nursing leaders, nursing education coaches, faculty advisors and educators to continue to develop predictive models of similar context and furthermore use the technology to predict risky variables prior to admission and during the critical 1st and 2nd terms of program enrollment (Fonti, 2005). Predictive software technologies have the ability to uncover hidden patterns within massive institutional data that can further be used to direct instruction, curriculum and student retention interventions (West, Heath & Juijser, 2016, Radu, 2017). This study examined a limited geographic region of samples. I recommend researchers to further empirically and qualitatively examine other variables that may be associated with retention and timely graduation and furthermore commit these findings to predictive model developments.

Implications

Retention and time to graduation are critical elements in terms of RN employment within ANCC Magnet status facilities and states that have or will mandate the "BSN" in 10 law (AACN, 2017; HRSA, 2013). Accelerated online and hybrid RN-to-BSN programs with flexible terms and continuous enrollment periods are expected to have exponential growth for years to come (AACN,2016). This study provided insight into relevant predictive variables that have significant associations with retention and time to graduation. The predictive retention algorithm is a useful sample model for others to develop algorithms unique to the student population and institutional mission. Prior to this study, very few research studies examined various predictive variables for the purpose of developing predictive retention models. Providing a purposeful "fit" between the student's attributes and the academic institutions characteristics will lead to favorable student outcomes. Positive consequences of identifying attrition risks early within the 1^{st} and 2^{nd} academic terms and furthermore implementing timely interventions will lead to greater likelihoods of one attaining a BSN degree within benchmarked time frames.

Positive Social Change

Positive social change implications lend to a transformation of innovative strategic advisement and academic retention plans to address suboptimal attrition and untimely graduation with nursing academia. Identifying risky attrition variables early within predictive analytic models aligns with the trend of implementing technological advancements in higher education to improve retention outcomes (Chai & Gibson, 2015; Kari et al., 2016; Hart, 2014). Subsequently, by increasing the number of students who are successful in attaining a BSN degree, all stakeholders receive a return on their investment. In order to meet IOM recommendations, an increase of 20% to 25% of BSN prepared nurses are needed. My study provided a useful recommendation to improve attrition rates and timely graduation to move toward IOM goals using predictive models. Changes within nurse and patient demographics are impacting the patient experience, their safety and quality of care; necessitating a nursing workforce that is highly educated. U.S job openings will reach 1.09 million by 2024 according to the BLS (2017). RNs who successfully obtain a BSN degree will positively impact client mortality and morbidity and furthermore social change (Statler, Keister, Ulrich & Smith, 2014).

Conclusion

Ever since the educational reform, academic leaders have focused their attention on student retention in higher education (Tinto, 2007). Potential causes cited for students being unsuccessful within BSN programs are multifactorial but primarily include pre-entry attributes, degree of academic integration and institutional support. Studies have found that certain pre-entry attributes however, such as demographics are of less value in predicting retention and timely graduation as confirmed in this study. Prior to this study, a limited number of studies examined predictive retention variables within accelerated online and hybrid RN-BSN programs with continuous enrollment periods. A multiple regression model explained the degree of variation of retention and timely graduation with pre-entry GPA, enrollment status, course grade index scores in terms 1 and 2, GPA index in terms 1, size and geographic region, admission GPA standards, prerequisite criteria, academic support and retention methods were found to be statistically significant predictors of retention. Enrollment status, course grade index term 1 and 2, GPA in term 1 and failed course types were statistically significant as predictors of timely graduation. A binary logistic regression examined the odds of retention. Enrollment status, number of general education credits, course index term1, course index term2 and failed course type, region, number of students enrolled, number of faculty teaching, course length, pre-entry GPA requirements, data analytics, advisement, technical support and number of pre-entry credit requirements were statistically significant for likelihoods of retention. Similarly, the number of general education credits prior to admission, failed course type, region, number of students enrolled, number of faculty teaching, course length, pre-entry GPA requirements, data analytics, advisement, technical support and number of pre-entry credit requirements were statistically significant for likelihoods of timely graduation. A sample predictive algorithm was created and presented in Appendix 1 and Appendix 2. Nursing educators seeking innovative retention strategies may find implementing predictive retention algorithms and models can potentially identify students at risk of attrition and untimely graduation early on during the pre-enrollment and 1st and 2nd term periods; enabling the educator to implement timely retention strategies and/or remediation before retention becomes irrevocable. The effectiveness of predictive algorithms however, is the analyzation of sufficient and relevant data variables to train the models over a period of time. Managing these predictive models are now easy enough to use by anyone in the institution and do not require informational technology experience. I further recommend that researchers empirically and qualitatively examine other variables that can be added to a global predictive model in future research studies.

Through a social change lens, retaining and graduating RN-to-BSN students is a critical factor in the quality and safety of patient care and securing the recommendations of the IOM. Successfully attaining a BSN degree further adds potentiality of one pursing a higher degree in nursing (MSN, PHD/DNP).

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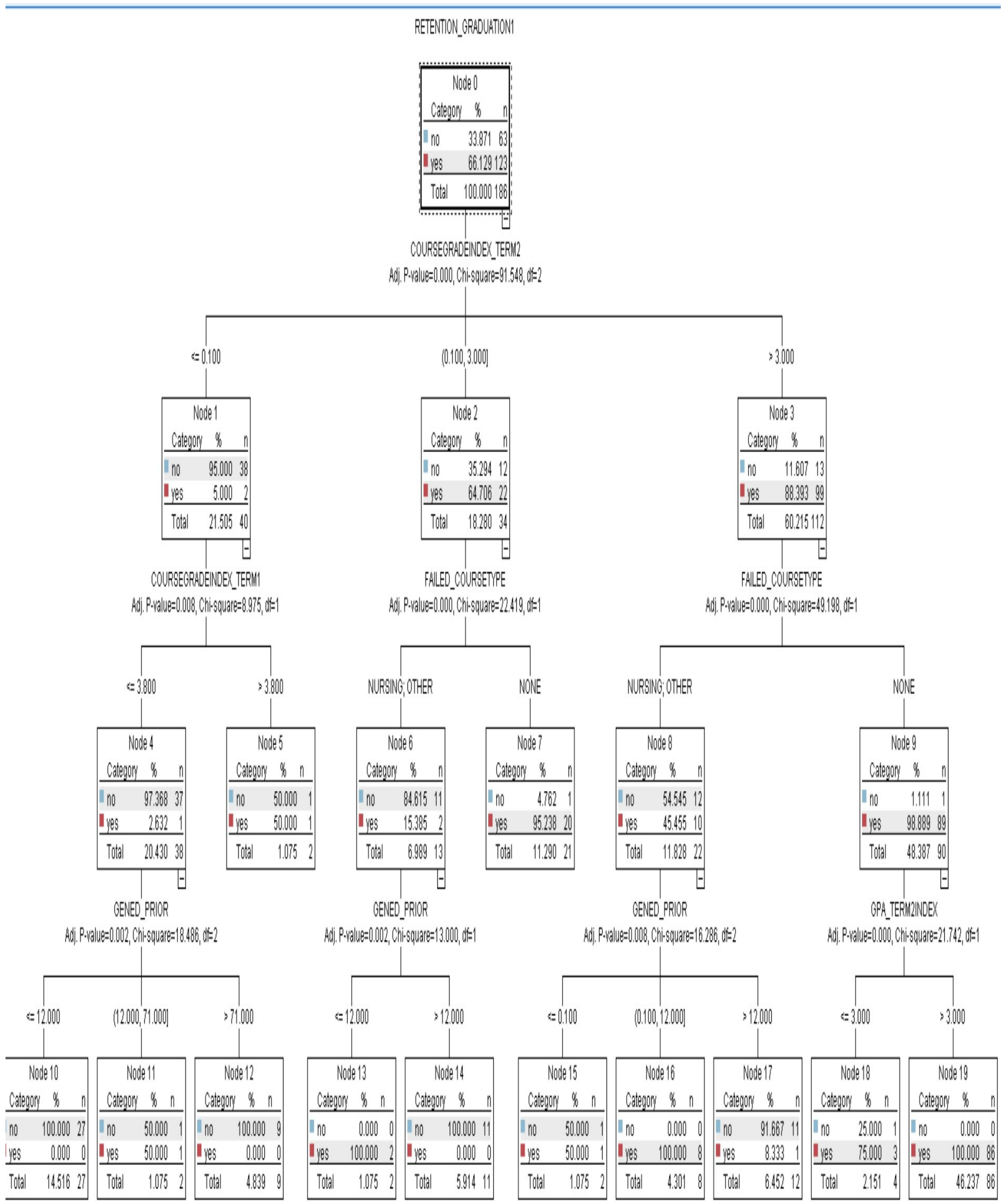
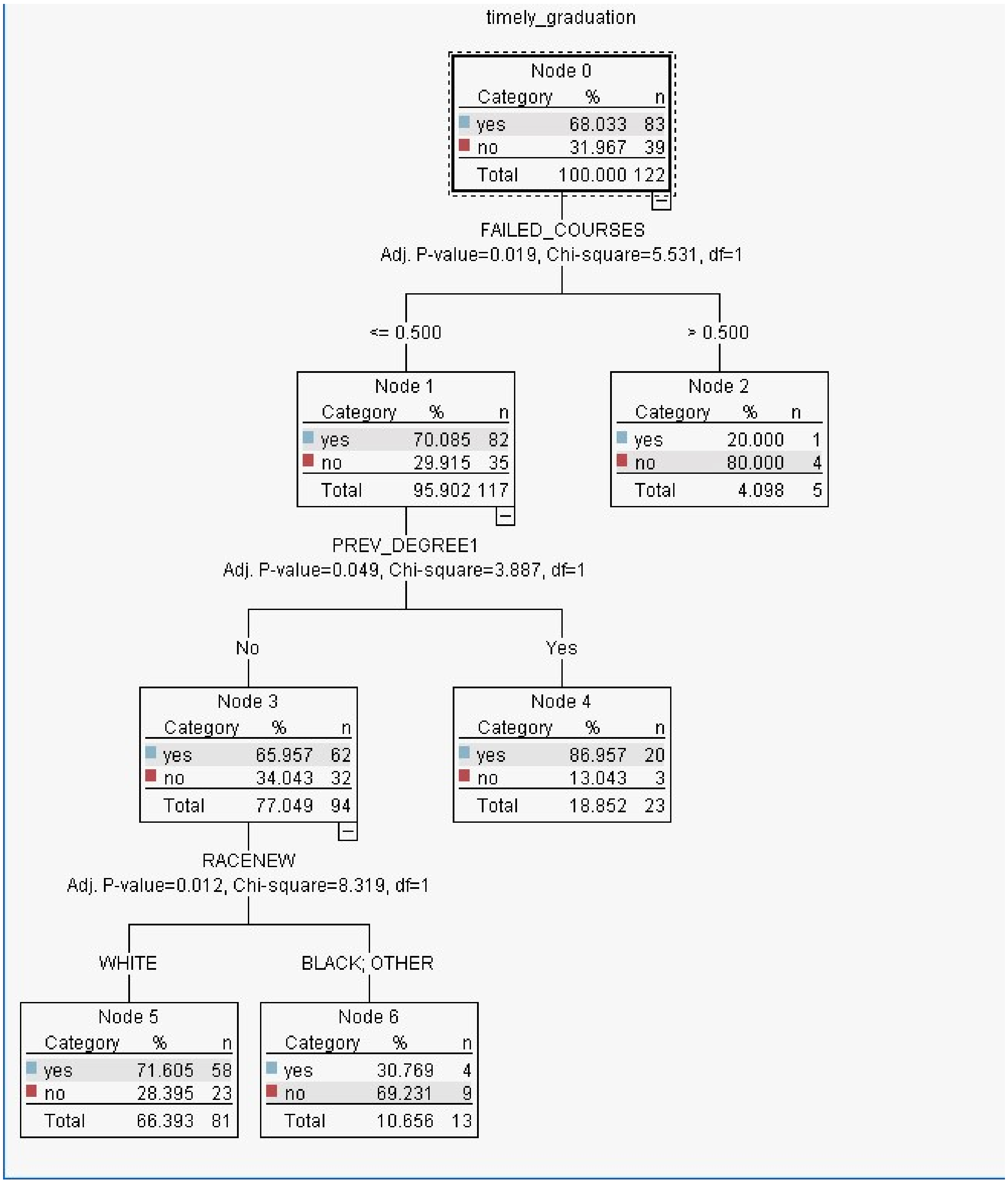
Appendix A


RETENTION_GRADUATION1
Node 0
Category % n
no 33.871 63
yes 66.129 123
Total 100.000 186
COURSEGRADEINDEX_TERM2
Adj. P-value=0.000, Chi-square=91.548, df=2
<= 0.100
(0.100, 3.000]
> 3.000
Node 1
Category % n
no 95.000 38
yes 5.000 2
Total 21.505 40
Node 2
Category % n
no 35.294 12
yes 64.706 22
Total 18.280 34
Node 3
Category % n
no 11.607 13
yes 88.393 99
Total 60.215 112
COURSEGRADEINDEX_TERM1
Adj. P-value=0.008, Chi-square=8.975, df=1
FAILED_COURSETYPE
Adj. P-value=0.000, Chi-square=22.419, df=1
FAILED_COURSETYPE
Adj. P-value=0.000, Chi-square=49.198, df=1
<= 3.800
> 3.800
NURSING; OTHER
NONE
NURSING; OTHER
NONE
Node 4
Category % n
no 97.368 37
yes 2.632 1
Total 20.430 38
Node 5
Category % n
no 50.000 1
yes 50.000 1
Total 1.075 2
Node 6
Category % n
no 84.615 11
yes 15.385 2
Total 6.989 13
Node 7
Category % n
no 4.762 1
yes 95.238 20
Total 11.290 21
Node 8
Category % n
no 54.545 12
yes 45.455 10
Total 11.828 22
Node 9
Category % n
no 1.111 1
yes 98.889 89
Total 48.387 90
GENED_PRIOR
Adj. P-value=0.002, Chi-square=18.486, df=2
GENED_PRIOR
Adj. P-value=0.002, Chi-square=13.000, df=1
GENED_PRIOR
Adj. P-value=0.008, Chi-square=16.286, df=2
GPA_TERM2INDEX
Adj. P-value=0.000, Chi-square=21.742, df=1
<= 12.000
(12.000, 71.000]
> 71.000
<= 12.000
> 12.000
<= 0.100
(0.100, 12.000]
> 12.000
<= 3.000
> 3.000
Node 10
Category % n
no 100.000 27
yes 0.000 0
Total 14.516 27
Node 11
Category % n
no 50.000 1
yes 50.000 1
Total 1.075 2
Node 12
Category % n
no 100.000 9
yes 0.000 0
Total 4.839 9
Node 13
Category % n
no 0.000 0
yes 100.000 2
Total 1.075 2
Node 14
Category % n
no 100.000 11
yes 0.000 0
Total 5.914 11
Node 15
Category % n
no 50.000 1
yes 50.000 1
Total 1.075 2
Node 16
Category % n
no 0.000 0
yes 100.000 8
Total 4.301 8
Node 17
Category % n
no 91.667 11
yes 8.333 1
Total 6.452 12
Node 18
Category % n
no 25.000 1
yes 75.000 3
Total 2.151 4
Node 19
Category % n
no 0.000 0
yes 100.000 86
Total 46.237 86

Appendix B



timely_graduation
Node 0
Category % n
yes 68.033 83
no 31.967 39
Total 100.000 122
FAILED_COURSES
Adj. P-value=0.019, Chi-square=5.531, df=1
<= 0.500
> 0.500
Node 1
Category % n
yes 70.085 82
no 29.915 35
Total 95.902 117
Node 2
Category % n
yes 20.000 1
no 80.000 4
Total 4.098 5
PREV_DEGREE1
Adj. P-value=0.049, Chi-square=3.887, df=1
No
Yes
Node 3
Category % n
yes 65.957 62
no 34.043 32
Total 77.049 94
Node 4
Category % n
yes 86.957 20
no 13.043 3
Total 18.852 23
RACENEW
Adj. P-value=0.012, Chi-square=8.319, df=1
WHITE
BLACK; OTHER
Node 5
Category % n
yes 71.605 58
no 28.395 23
Total 66.393 81
Node 6
Category % n
yes 30.769 4
no 69.231 9
Total 10.656 13