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VARIABLES THAT PREDICT SUCCESS WITH ASSOCIATE DEGREE NURSING
STUDENTS AT A COMMUNITY COLLEGE IN FLORIDA

by

LINDA SHEFFIELD MILES
M.S. University of Maryland at Baltimore, 1997

A dissertation submitted in partial fulfillment of the requirements
for the degree of Doctor of Education
in the Department of Educational Foundations
in the College of Education
at the University of Central Florida
Orlando, Florida

Fall Term
2006

Major Professor: Rosemarye Taylor

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ABSTRACT

The purpose of this exploratory, retrospective study was to determine if student demographics and academic variables predicted student persistence and success in an associate degree nursing program in Florida and to investigate the variables in Tinto's Longitudinal Model of Dropout (1975). The sample population (N=304) for this study was students enrolled in one of the initial courses of the associate degree nursing program at Daytona Beach Community College (DBCC) in Daytona Beach, FL from August 2002 through August 2003. Students were assigned to one of three groups (a) passing group, (b) failing group, or (c) withdrawing group. The convenience sample of (N=304) included: 242 students who successfully completed the nursing program, 32 students who failed a nursing course, and 38 students who withdrew from a course prior to successful completion.

Demographic variables, admission and college science course grade point averages, and Nurse Entrance Test (NET) scores were collected on the sample population. Descriptive statistics were used to identify any unique differences that may have existed between the three groups, and multinomial logistic regression was used to determine the variables that best predicted success in the associate degree nursing program.

Students in the passing group were found to be slightly older than students in the failing and withdrawing groups. The passing group had a higher percentage of females; the failing and withdrawing groups had higher percentages of males. The failing and withdrawing groups also contained higher percentages of minority students and students

with English as a second language. Ethnicity was considered a significant predictor for student success in this study.

Grade point average (GPA) score at the time of admission to the nursing program and college mean science course GPA scores were significant predictors. Students in the passing group had higher mean admission grade point averages than the failing and withdrawing groups. Students in the passing group also had noticeably higher mean grade point averages in all college science courses. NET scores were not considered significant predictors, at least for students who met the requirements for admission, and minimal differences were noted between the three groups in the study.

The results of the study supported the use of variables identified in Tinto's Longitudinal Model of Dropout (1975) for predicting program success with nursing students. Individual attributes and pre-college experiences were predictors of student success for this sample, and demographic differences were identified between successful and unsuccessful students.

Based on the results, the nursing department should consider placing more emphasis on admission and college science course grade point averages during the application process. A future conceptual model should include college science course GPAs, specifically anatomy and physiology and microbiology, and admission grade point average. Remedial or support services should be emphasized for minority students and students with English as a second language. Strategies should be implemented to retain men in the nursing program.

To Christopher
and Craig

ACKNOWLEDGMENTS

This dissertation came to realization only through the help of the following people:

To my Chair, Dr. Rosemarye Taylor, I would like to thank you for the guidance and support you provided throughout this process. Your dedication provided me with the desire and determination to complete this endeavor. I would also like to thank Dr. Conrad Katzenmeyer, Dr. Angeline Bushy, and Dr. Levester Tubbs for their guidance and commitment to the dissertation process.

I would like to thank my employer, Daytona Beach Community College, for providing me with this wonderful opportunity. I would also like to thank Dr. Charles Carroll for the cohort structure and the support he provided the group.

I would like to thank the members of my cohort group: Alice, Karen, Mary, Ted, and Stan, for their friendship and support throughout this process.

Most important, I would like to thank my husband whom without his love and support this could have never happened.

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CHAPTER ONE: INTRODUCTION

The nursing shortage and its subsequent impact on society have been well documented in the literature. Nursing programs nationwide have increased the number of applicants they admit in response to the shortage. The National Center for Health Workforce (2002) reported that 61,146 nurses will be needed in Florida alone by the year 2020. The Florida Hospital Association (2005) forecasts a greater need for nurses in the future because of the baby boomer population and a large number of nurses expected to retire. A nationwide effort to infuse nurses into the workforce has been undertaken. Private and public organizations have joined together and designed creative marketing campaigns. Financial incentives have been provided for applicants interested in attending nursing programs such as scholarships and loan forgiveness. The overall image and role of the nurse has changed in order to attract more candidates into the field. As a result, applications to nursing programs have dramatically increased over the past few years but with little impact on the nursing shortage.

The Florida Center for Nursing reported that in 2004 more than half of the 10,923 qualified applicants who applied for admission to nursing programs in Florida were turned away. Nationally, 32,000 qualified applicants were turned away from nursing programs in 2004 because of an insufficient number of student slots. Two factors have been identified by the Florida Center for Nursing as barriers to education institutions expanding their nursing programs: shortage of qualified nursing faculties and insufficient clinical sites (Brunell, 2005).

In the height of the nursing shortage, it has been difficult to identify strategies to effectively address the nursing faculty shortage. Legislation has been proposed that would provide incentives for nurses to continue their education and work in nursing programs in community colleges. Creating shared databases so that nursing programs could identify part time faculty that may be accessed for use in the clinical area has also been proposed. Clinical training in health care facilities comprises over half of the nursing education curricula. Clinical training is critical to the success of any nursing program. Community colleges must choose clinical opportunities for students within the boundaries of the community they serve. Other than constructing new health care facilities, a comparable solution has yet to be defined that addresses the insufficient number of clinical sites. The limited clinical availability, coupled with the shortage of nursing faculties, thwarts the opportunity for nursing programs within community colleges to increase their enrollment (Brunell, 2005; Evans, 2005).

Nationally, nursing programs have been pressured to increase their enrollment in response to the nursing shortage. Increasing the enrollment provides additional opportunities for colleges to obtain public and private funding. Collaborative relationships have been developed between nursing programs and community organizations to provide additional resources. Nursing programs have increased their enrollment to the point that providing satisfactory learning opportunities for students is difficult. With the increased enrollment, programs have worked tirelessly to preserve their quality while maintaining sensitivity to nursing needs (Brunell, 2005).

Nursing programs are measured according to the number of students who complete and students' abilities to successfully pass the National Council Licensure Examination for the Registered Nurse (NCLEX-RN). The NCLEX-RN measures the competencies needed to perform safe, effective care as a new graduate and reflect the current level of nursing practice (National Council State Board of Nursing, 2003). Boards of nursing and accrediting bodies use program completion rates and NCLEX-RN scores as academic measurements of program effectiveness.

In an effort to produce more graduates, nursing education programs are refocusing their resources on students who do not successfully complete the program. Student attrition has been a chronic problem for nursing programs as well as higher education in general (Braithwaite, Elzubeir, & Stark, 1994). With the current nursing shortage that is being experienced nationwide, it is of the utmost importance for nursing educators to attract, retain, and graduate students who can successfully enter the nursing workforce.

In order for students to be successful in nursing programs, they must be proficient in reading, writing, and mathematics. Pre-requisite courses that are required for admission into nursing programs provide the foundation for the nursing curricula. The assumption is that if students can successfully pass the required pre-requisite courses, they have the necessary skill sets to accomplish nursing courses. In general, this assumption has not always been correct; students successfully complete general education courses and still lack the necessary skills to be successful in nursing programs. Some of the issues that have been identified with general education courses are that curricula are not standardized and courses are assigned grades using different criteria.

The National League for Nursing Accrediting Commission (NLNAC), the organization that is responsible for accrediting associate degree nursing programs, mandates that nursing programs work with other departments within the college to show departmental collaboration. By doing this, departments that provide the general education courses required for nursing students can work with nursing faculties to identify the necessary curricula. The continued challenge has been that even with ongoing departmental collaboration, students continue to enter nursing programs without the necessary competencies to be successful. Because of this, nursing programs have begun devising their own admission criteria which students must meet in order to be eligible to submit an application for admission.

It would seem as though nursing programs could standardize their admission criteria and only select students that have the ability to be successful. The problem has been that many combinations of variables have been used in the admission process. The majority of nursing programs require a minimum grade point average, passing score on a preadmission test, and completion of pre-requisite courses. Many times the selection of admission criteria depends on the geographic area, or whether the nursing program is offered at a two or four-year institution of higher education. Certain variables are frequently used by nursing programs in the selection process, but little research is available that validates their ability to predict student success.

Because of the persistent attrition associated with nursing programs, the need to identify eligibility criteria that truly reflects the attributes needed for a student to be successful such as past academic experiences has become more apparent. Nursing

programs are identifying the need to structure their admission criteria so that it truly reflects the competencies required to be successful in their programs. Defining valid admission criteria will better allow educators to identify students who have the potential of succeeding and students who should be referred for remedial services prior to entering. Identification of valid criteria will provide a basis for developing remedial services for students to improve skills such as reading, writing and mathematics prior to entering nursing programs so that they can be successful.

Purpose of the Study

Community colleges pride themselves on being open-access institutions, serving the educational needs of the minority and underserved populations in their local area. Often times students who choose to enroll in a community college have limited financial means, poor academic records, or language difficulties (Community College Survey of Student Engagement, 2004). These students are more at-risk for being unsuccessful due to their family background, individual attributes and pre-college experiences (They can present challenges for educational programs, especially nursing, that are evaluated according to the number of students who successfully complete the program and go on to pass the NCLEX-RN.

An abundance of research was available that supported the use of student attributes to predict success in the educational setting. The majority of literature that deals specifically with nursing students focused on baccalaureate nursing programs. Few

studies were done with two year associate degree nursing programs and for the purpose of validating and refining a conceptual model to use during the admission process for selection of students.

Tinto's Longitudinal Model of Dropout (1975) provided the theoretical framework for this study (Appendix A). The model takes into account the longitudinal process and the interaction that takes place between the student and the educational institution. The model indicates that student attrition in educational institutions is based on five theories: psychological, societal, economic, organizational, and interaction (Tinto, 1987). Family background, student attributes and pre-college experience impact student persistence. This study will test student variables identified in Tinto's Longitudinal Model of Dropout (1975) with associated degree nursing students at a community college in Florida.

The associate degree nursing program at Daytona Beach Community College (DBCC) identifies eligibility criteria that must be met before a student can submit an application. Students must have a 2.5 GPA, completion of pre-requisite courses with a minimum of a "C" grade, and a 50% overall score on the NET. According to Tinto (1987), these eligibility criteria are pre-college experiences that impact student persistence. Once students are admitted to the nursing program, their success depends on the commitment of the student and program in assuring educational needs are identified and services provided.

The purpose of this exploratory, retrospective study was (a) to determine the relationship between student demographics and academic variables and if any of these

can predict student persistence and success in an associate degree nursing program in Florida and (b) to test the use of Tinto's Longitudinal Model of Dropout (1975) with associate degree nursing students. Currently, characteristics that have been associated with at-risk for failure are not discovered until after a student has withdrawn or failed a nursing course. Early identification of at-risk characteristics will benefit potential applicants by providing early interventional strategies. This will in turn improve student success and increase the number of graduates that are eligible to enter the nursing profession. Strategies can also be employed for students who are requesting readmission to the same program of study and increase their chances of being successful with future attempts.

Statement of the Problem

The problems addressed in this study were (a) which demographic and academic variables best predict student success in an associate degree nursing program in Florida and (b) can a conceptual model be used to guide the selection process in the associate degree nursing program in Florida?

Research Questions

The following research questions guided this study:

1. To what extent are there differences in essential math scores, reading comprehension scores, and overall scores on the Nurse Entrance Test (NET) among students in the passing group, failing group, or withdrawing group?
2. To what extent are there differences in community college grade point averages upon admission to the associate degree nursing program among students in the passing group, failing group, or withdrawing group?
3. To what extent are there differences in college science course mean grade point averages among students in the passing group, failing group, or withdrawing group?
4. To what extent are there differences in demographic variables among students in the passing group, failing group, or withdrawing group?

Assumptions

1. All student records are considered accurate.
2. Calculations of all course grades are considered accurate.
3. All students reported their primary language accurately.
4. Students answered all of the questions on the admission application.
5. The NET is a valid and reliable tool.
6. NET results are available for all students.

7. Student reports of pass and fail are made available for the NCLEX-RN.
8. All students met the minimum requirements for entrance into the nursing program.

Limitations

1. The first limitation of the study is that a convenience sample was used.
2. The second limitation of the study is that generalizations can not be made outside of the study setting because data was collected on students enrolled in one nursing program at one college.
3. The third limitation of the study is that only students who met the eligibility requirements for admission to the associate degree nursing program at DBCC were included in the study.

Significance of the Study

Validation of the effectiveness of variables as predictors of student success will provide evidence to base future development of a conceptual model to use during the admission process. Throughout the literature review evidence supported the growing concern of attrition in nursing programs. A large number of students who could have otherwise entered the nursing profession are lost. Select interventional strategies might have been utilized successfully in nursing programs to improve student success.

Ethically, it is the responsibility of educators to provide students with the services needed to be successful. Identifying student retention strategies during the admission process can be cost-effective for the educational institution. Academic advising during the admission process with early warning and early intervention improves students' abilities to be successful. By providing preadmission advising and ongoing advisement, nursing education programs can better address student needs and increase the number of program completers.

Definition of Terms

The following key terms will be used in this study:

Academic variables: the scores received in general education courses, nursing courses and admission grade point average.

Achieving group: students enrolled in the first course of study in the associate degree nursing program and were eligible for continued enrollment.

Associate degree nursing program: a two year college credit program generally offered in a community college setting. It prepares applicants to take the registered nurse licensure examination.

Attrition: occurs when a student leaves college without completing the program of study as a result of failing or dropping.

Ethnicity: the race of the subject as self-reported on the college application. A value was assigned for the following ethnicities: Asian/ Pacific, Black, White, American Indian/ Alaskan, Hispanic, and other.

Failing group: students who had received an unsuccessful grade in a course required for the associate degree nursing program and were not eligible to progress in the program. They were eligible to take the course a second time for a passing grade and progress in the program.

Grade point average: the cumulative average of college courses as it appears on the official college transcript at the time of entry into the associate degree nursing program.

Non-persistence group: students who had dropped out of the associate degree nursing program prior to receiving a passing or failing grade. For the purpose of this study, these students were included in the withdrawing group.

Nurse Entrance Test: a test developed by Educational Resources, Incorporated, that is administered to students prior to starting the associate degree nursing program. It provides 31 diagnostic scores for students using seven profiles: essential math skills, reading rate placement, reading comprehension, written expression composite, stress level profile, learning style profile, and test-taking skills.

Passing group: students who had completed the associate degree nursing program within a three year timeframe and were granted an associate degree in nursing.

Wastage: occurs when a student leaves college without completing the program of study as a result of failing or dropping.

Withdrawing group: students who had dropped out of the associate degree nursing program prior to receiving a passing or failing grade.

Organization of the Study

This retrospective study analyzed academic and demographic variables of nursing students who attended a community college in Florida and investigated the use of variables that were identified as predicting student success in Tinto's Longitudinal Model of Dropout (1975). Chapter 1 provides an introduction into the current nursing shortage and the importance of admitting students who can successfully complete the nursing program. Chapter 2 provides a review of the literature on two topics: the use of academic and demographic variables in educational settings and student wastage. The two categories provide a foundation for the development of this study. Chapter 3 describes the methodology used to investigate the topic. Chapter 4 provides the results and a discussion of the findings. Chapter 5 consists of the conclusions, implications and recommendations for future research.

CHAPTER TWO: LITERATURE REVIEW

Student Wastage

Because of the financial instability that is being experienced in postsecondary education, accountability of public resources has intensified. Federal and state funding for postsecondary education has decreased, causing community colleges to reexamine their mission and search for alternative sources of funding. To remain competitive, educational institutions must enroll more students who can graduate in a timely fashion. Lotkowski, Robbins, and Noeth (2004) contended that problems associated with student attrition will increase in number and further intensify. Low retention rates in an academic program waste human talent and resources, jeopardize the nation's economic future, and threaten the economic viability of postsecondary education. Colleges are allocating more resources towards retention strategies in an effort to increase the number of degree completers. Student retention has been viewed as an important education quality measurement and also cost-effectiveness measurement.

The Community College Survey of Student Engagement (CCSSE, 2004) data indicated that a high percentage of students enrolled in community colleges with career aspirations but departed prior to completing their degree requirements. Of the students surveyed in community colleges, 11% indicated that they successfully accomplished their educational goals. The CCSSE (2004) suggested that community colleges must design and implement effective institutional strategies that promote student success and reduce

student wastage. Identifying and comparing benchmarks across all levels of education institutions provides valuable data to develop future retention efforts. The CCSSE identified five major areas for institutions to measure (a) active and collaborative learning, (b) student effort, (c) academic challenge, (d) student-faculty interaction, and (e) support for learners. In an effort to improve educational quality and effectiveness, the CCSSE suggested that postsecondary education should devote additional resources to the areas.

Joehnes (1990) contended that student wastage has financial as well as psychosocial implications. Lau (2003) stated that student wastage affects the reputation of an institution because fewer students graduate. Summers (2003) identified student wastage in community colleges as a matter of economic survival. Refocusing institutional resources from student enrollment to increasing student retention has been viewed as a more effective enrollment-management strategy (Tinto, 1987; Cuseo, 2002). “Institutions have come to view retention of students to degree completion as the only reasonable cause of action left to ensure their survival” (Tinto, 1987, p. 2). Student retention initiatives are identified as being more cost-effective than recruiting new students. Completion rate is an outcome measurement that education institutions are required to track; it is an indicator of institutional quality (Cuseo, 2002).

No single definition is used in postsecondary education for student wastage and institutions use different measures for reporting. Joehnes (1990) defined student wastage as “the percentage of students who enter a program and do not obtain a degree within six years” (p.88). Mashaba and Mhlongo (1995) defined student wastage as “abandoning a

course of study for which a student is registered” (p.365). Many community colleges report their completion rate as the percentage of students that graduate out of the number enrolled under a specific program code. Students are responsible for assuring their program code correctly identifies the program of study. Currently, there are no safeguards in place to assure the accuracy of student program codes. Students who fail or leave college are still included when calculating the student completion rate of their prior program of study. The inability of community colleges to assure the correctness of program codes presents concerns with data integrity. Lau (2003) contends that colleges do not consider transfer students when measuring retention; therefore, colleges are not reporting accurately the number of students who drop out.

Several models have been developed over the years and utilized in the community college setting to identify variables that could potentially impact student wastage. Spady’s Model of Student Attrition (1970), Tinto’s Theory of Student Departure (1975) and Bean’s Student Attrition Model (1980) have been widely used in educational settings to address student retention. Their models used past and present student performance as measurements to base future predictions of student success.

Spady’s model (1970) assumed that wastage was influenced by the interaction between the student and college environment. The student’s disposition, interests, attitude, and skills were influenced by expectations from faculty, administrators, and peers. Students’ grade performance, intellectual development, normative congruence, and friendships influenced their social integration. These variables were indirectly associated with student persistence.

Tinto (1975) believes individuals enter the educational setting with a variety of pre-existing attributes. These attributes guide the student's expectations and commitment to the college experience. The interaction between the individual's commitment to his or her educational goals and to the institution determines the decision to depart prior to degree completion. Tinto (1975) contended that students' individual attributes, pre-college experiences, and social status influence college performance. These academic and demographic variables also influence the level of student commitment and the educational experience. Student level of commitment affected the ability to integrate into social and academic life and ultimately the decision to continue in college. Students from lower socio-economic families were considered most at-risk for non-degree completion. They were less prepared academically because of limited educational, financial and parental support. They also had more difficulty establishing relationships and were less committed to their educational studies, both affecting their overall performance in college.

Bean's Student Attrition Model (Bean, 1980; Bean & Metzner, 1985; Summers, 2003) took into account the differences in traditional and non-traditional students. The non-traditional students were defined as being older, part-time, and commuting. They were found to be less committed to academic and social life than traditional college-age students and differed in the socialization process. Additional variables were identified that influenced persistence in non-traditional students. In order to effectively address the attrition with non-traditional students, additional support services were needed. Bean's

model considers the differences in non-traditional students and the unique factors that influence student persistence.

Noel, Levitz, Saluri, and Associates (1985) considered factors that influenced student achievement and persistence in college. Academic skills prior to entering college, motivation to succeed, and career aspirations were of the utmost importance to student success in postsecondary education. Psychological and psychosocial factors such as: fear of success and fear of rejection, self-doubt, boredom and loneliness were identified as important variables. External forces such as: financial, housing, transportation, and discrimination also influenced student persistence.

Ishitani and DesJardins (2002) contended that earlier research addressed student persistence and wastage, but did not fully explain the circumstances which caused students to drop out. Students who entered college were considered at-risk of failure due to numerous complex reasons. Their model considered the occurrence and timing of student drop out and completion, which allowed educators to implement student success initiatives and assess effectiveness with different events. Since college drop out is a longitudinal process, they contended to effectively address student wastage a model must be used that tracks students over a period of time. The longitudinal model provides educators the benefit of observing at-risk students at different times in the program. It also allows the educator to design student specific interventional strategies.

The majority of the earlier research on student wastage did not delineate between the traditional and non-traditional student. Previous models were developed with the assumption that students exhibited similar characteristics and age was not a determining

factor when considering type of educational services. Community colleges have undergone tremendous changes in demographics, evolving from a traditional to a non-traditional and racially diverse student body. The change in demographics has presented significant challenges with retention because of the differences in the traditional and non-traditional student population (Harvey-Smith, 2002). Non-traditional students have been identified as having different academic needs than traditional students requiring personalized support services. The literature suggests that faculties who teach at postsecondary institutions should have prior educational experience and training with non-traditional students (Kevern, Ricketts, & Webb, 1999; Pascarella & Terenzini, 1991).

Prior retention models focused on interventions with the student and did not address the student-faculty relationship. Student-faculty relationship has been positively associated with student level of satisfaction and retention (Pascarella & Terenzini, 1991). Pascarella's model considers the student-faculty relationship and examines the degree that student characteristics interact with faculty characteristics to affect perseverance. The degree of student-faculty interaction significantly impacted student retention, especially with the non-traditional and minority student population.

Faculties are essential in the teaching and learning process within educational institutions and have the greatest amount of contact with students. Faculties are considered the most important link in student retention (Harvey-Smith, 2002). Noel et al. (1985) identified a relationship between faculty level of commitment and student success; faculty role modeling impacted student persistence. The CCSSE (2004) identified student-faculty interaction as a benchmark for postsecondary institutions to consider.

Faculty interaction strengthens the student's commitment to college and improves his or her academic performance.

Student Nurse Wastage

Nursing programs have a selected admission process which requires students to meet additional admission criteria. They are approved by their state boards of nursing to admit no more than a specific number of students annually. The nursing department is responsible for administering and overseeing the selection process. The selection process is both costly and requires significant resources. Depending on how students are selected, many nursing programs have a one to two year waiting list for students to enter. Nursing programs strive to select students that have the potential for being successful.

Consequently, nurse student wastage is a common problem in nursing programs. Braithwaite et al. (1994) defined nurse student wastage as "students who drop out, fail academically, or fail to seek employment as a nurse" (p.16). Land (1993) identified future economic and workforce issues related to student nurse wastage. Mashaba and Mhlongo (1995) contended that nurse student wastage has serious financial and societal implications. In the first year of nursing programs, nurse student wastage varies from 18% to 50%. Braithwaite et al. (1994) reported that 75% of student wastage was associated with non-academic factors. The numbers are alarming coupled with the continued failure to effectively address the issue. Because of this, a huge number of students who could potentially complete their nursing program and become registered

nurses are lost. Land (1993) suggested an important relationship exists between recruitment and selection. Locating a pool of qualified candidates is vital to the selection process. Kevern et al. (1999) maintained that a recruitment strategy targeting qualified applicants enhances student retention and degree completion.

The potential impact of the nursing shortage was identified many years ago, leading to the implementation of Project 2000. It was designed to produce a smaller, intellectually elite nursing workforce. The project focused on recruiting motivated, mature candidates with a desire to nurse but did not consider their academic qualities. Students were ranked according to their values, qualities, and commitment to nursing. Academically challenged students were unable to successfully master course content; additional resources were required to assist them with successful completion of their courses (Land, 1993).

The student population in an associate degree nursing program mirrors the demographic make-up described in community colleges. Historically, the largest percentages of associate degree nursing programs are offered in community colleges. Because of their open access policy, it is difficult to restrict admission to candidates who meet the college's admission requirements. The community college strives to identify and support the workforce needs of the community it serves. The majority of students enrolled are commuters who are displaced workers or seeking a career change. Burd (2006) described community college students as being at-risk for failure at the time they enter college due to the realities of their lifestyle. Stark and Redding (1993) described the nursing student at a community college as married with children, working, and

financially unstable. Because of the differences, other variables should be used with nursing students in a community college setting.

Academic and Demographic Variables

Nursing programs have searched for many years to find the combination of variables that would best predict student success. Houltram (1996) identified the importance of using academic performance to predict success in nursing programs. Entry qualifications were identified as having a direct relationship to academic success. Many nursing programs use the information they collect during the admission process to predict student success. Using predictors to measure success allows programs to graduate more students with the potential of entering the workforce sooner. According to Waterhouse and Beeman (2003), variables that predict student success have increased in numbers and complexity. The challenge has been to identify the specific qualities needed to be successful in nursing programs and ultimately the National Council Licensure Examination for the Registered Nurse (NCLEX-RN).

In 1988, the National Council of State Boards of Nursing (NCSBN) implemented a pass or fail grading system for the NCLEX-RN. This method of grading has made it increasingly difficult to identify specific content areas where students are unsuccessful or design remedial services to assist students with passing the exam. The NCLEX-RN is also only offered in a computerized format. This has added another dimension to students' potential for passing the examination (Waterhouse & Beeman, 2003).

The identification of variables that truly reflect student success has been a challenge for nursing educators. The ability to identify variables that predict success across all levels of nursing education will allow educators to better identify students who will potentially succeed in nursing programs and ultimately on the national licensure examination.

Academic Variables

A plethora of literature is available that cites the use of academic variables for predicting success in nursing programs. Tinto's Longitudinal Model of Dropout (1975) identified students' pre-college experiences as predictive of student persistence and success in educational programs.

Pre-College Experiences

Grade Point Average

The literature identifies student GPA as an important variable for educators to consider in nursing programs. Several studies (Crouch, 1999; Kroll, 1990; Joehnes, 1990) identified college prerequisite GPA as a predictor of student success in nursing programs. Sayles, Shelton, and Powell (2003) and Yin and Burger (2003) identified college GPA prior to entry into nursing programs as an important predictor of student success in nursing programs and on the NCLEX-RN. Houltram (1996) supported the use of GPA in

associate degree nursing programs but questioned the predictability in baccalaureate nursing programs. Dentlinger (2003) disputed prior research that pre-college and college GPA scores were predictors of success in nursing programs.

Standardized Testing

Standardized examination scores prior to entry into nursing programs were highly predictive of student success (Dentlinger, 2003). Crouch (1999) and Sayles et al. (2003) identified preadmission test scores and scores on program exit examinations as being highly predictive of student success in nursing programs and subsequently on the NCLEX-RN. Gallagher, Bomba, and Crane (2001) identified reading comprehension obtained through preadmission testing as an important predictor of student success. Critical thinking as measured by the Watson-Glaser Critical Thinking Appraisal pre-test positively correlated with nursing students' GPA and program success (Crouch, 1999). Schmidt (2000) indicated that preadmission test scores were predictive for students graduating from baccalaureate programs but did not consider them good predictors for students who graduated from associate degree nursing programs.

Student Preparation

Student preparation prior to entering college has been identified as an important predictor of student success in nursing programs. Joehnes (1990) contended that students are not prepared in elementary and high school for the rigorous curricula in

postsecondary education. Polotsky, Cohen, and Saylor (2003) identified student preparation prior to entering college as having a direct relationship to students' abilities to successfully complete their first semester nursing course. Lau (2003) contended that students who enter postsecondary education without competencies in math and writing find it difficult to succeed with college level courses.

Student Grades

Chinwe Nnedu (2000) and Peroco (2001) found significant correlations between students' grades in nursing courses and performance on the NCLEX-RN. Specifically, there was a strong correlation between the psychiatric nursing course grade and performance on the NCLEX-RN. Peroco (2001) identified correlations between students' grades in pharmacology, psychology, and biology and their potential for being successful in nursing programs. Pharmacology course grade also significantly correlated with success on the NCLEX-RN. Potolsky et al. (2003) identified student prerequisite college science course grades as being predictive of academic performance in the first semester nursing course. Grades were also used to identify students who might benefit from academic assistance during the nursing program (Chinwe Nnedu, 2000).

Demographic Variables

Selection criteria based on personality attributes has been proposed for nursing programs, but continues to be controversial (Kevern et al., 1999). Tinto's Longitudinal

Model of Dropout (1975) identified individual attributes and family background as variables that influenced student persistence.

Individual Attributes

Affective Qualities

Caring, warmth, and compassion are affective qualities important for nursing students (Land, 1993). Mashaba and Mhlongo (1995) studied student nurse wastage in under-privileged nursing students and found that in the first year of the program wastage was seen more frequently with first generation college students who did not experience fulfillment of their basic needs. Mashaba and Mhlongo's theory supports early work of Noel et al. (1980) who contended that student wastage was associated with inability to experience satisfaction. Satisfaction is a higher level need according to Maslow's hierarchy of needs and is rarely met if lower level needs are not fulfilled. According to Mashaba and Mhlongo (1995), students whose lower level needs were met performed a great deal better in their studies.

Student Nurse Role

Other reasons identified that impacted student nurse persistence were realization that nursing was not a good career choice and feeling of inadequate training (Braithwaite et al., 1994; Deary, Watson, & Hogston, 2003). Land (1993) maintained students enter

into nursing school without a full understanding of the skill requirements and job responsibilities. Kotecha (2002) contended that students' decision to drop out of nursing school was many times influenced by their inability to understand role requirements. Nursing programs are rigorous, requiring a great deal of student discipline and academic requirements can be unclear. Often times, students enter nursing school without a full understanding of the commitment and amount of work required to be successful.

Student Nurse Burnout

A relatively new concept that has been identified is burnout in nursing students. Students enter into nursing because it is perceived as being a good career that is both gratifying and rewarding. After entering nursing school, students experience conditions different than what was initially perceived. They experience exceptional stress related to clinical placement, staff attitudes, academic requirements and role ambiguity (Kevern et al., 1999; Lindop, 1991). Once students enter clinical practice, they identify what they believe is a disparity between what they know as ideal clinical practice and what is experienced.

The nursing shortage has resulted in creating unfriendly work environments in the clinical areas because of unprofessional staff attitudes and excessive nurse-patient staffing ratios. The quality patient care that the nursing student is introduced to in his or her nursing program in actuality is not being provided in the clinical area. The clinical experiences provide student nurses with different environmental and professional

experiences than what was described during the recruitment stage. Lindop (1991) identifies this as a great source of dissatisfaction, resulting in student nurse burnout. Students who are identified as being less conscientious, irritable, and irresponsible are more likely to experience nurse student burnout early and drop out prior to completing the first year of their nursing program (Deary et al., 2003).

Phillips (1997) contended that a disproportionate number of students in nursing programs had prior difficulties in childhood and teenage years. Many students also have had prior personal responsibilities of caring for family members. Because nursing is considered a helping profession and admirable qualities are associated with the nurse, a large number of students with early experiences that are associated with psychological problems are attracted to the profession. Students may experience similar psychological difficulties due to the stressful experiences associated with clinical placement in nursing programs resulting in increased student nurse burnout.

Desire to Nurse

With the incentives that are currently provided for someone to enter into nursing, there has been a concern that students are entering into the nursing profession for reasons other than a desire to nurse. Students enter because of social, economic, or political factors which may differ from their own values. Desire to nurse has been identified as an important motivator for students completing their nursing program (Land, 1993; Phillips, 1997). Nurses are expected to exhibit caring, compassion and empathy towards patients.

Vanhanen and Janhonen (2000) found that students were not oriented to caring or role requirements prior to entering their nursing program. Male and female nursing students also were viewed as displaying different attitudes towards caring and the nursing profession. Students' perceptions and attitudes towards their profession greatly influenced their satisfaction with the educational experience, development of nursing skills, and commitment to the nursing profession.

Age

There is considerable research that supports age as being an important predictor of success in nursing programs. Non-traditional students have been identified as being more focused on their studies due to financial and family obligations. Low wastage rates and absenteeism has been reported among older non-traditional students. Older non-traditional students that have the academic foundation perform better overall than younger traditional college-age students, but some do not have the skills that are necessary to be successful (Chinwe Nnedu, 2000; Joehnes, 1990; Kevern et al., 1999). Beeson and Kissling (2001) contended that nontraditional students who were successful in nursing programs had significantly higher passing rates on the NCLEX-RN than traditional college-age students. Dentlinger (2003) identified age as an important predictor of course grade, but not reflective of student persistence.

Non-traditional students have different learning styles and benefit from instructors that are comfortable with a variety of teaching modalities. Research identified the need

for instructors to obtain continuing education and learn new strategies to enhance their role (Carlisle, Kirk, & Luker, 1996; Houltram, 1996).

Ethnicity

The literature identified minority students as having a greater chance of being unsuccessful on the NCLEX-RN (Chinwe Nnedu, 2000; Sayles et al., 2003). Minority students have been identified as having an improved chance to succeed in educational programs if they are provided with academic, financial, social and emotional support. Many exhibit traits associated with students at-risk for failure such as: poor reading skills, study habits, and difficulty with standardized testing. They also have difficulty socializing and adapting to college life because of financial problems, inadequate social and emotional support, low self-confidence, mistrust of authority figures, and language difficulties. With adequate support services prior to entering nursing programs, minority students have an increased chance of successfully completing their degree. Ormeaux and Redding (1990) identified the need for nursing programs to alter recruitment strategies and identify measures to retain minority students.

Family Background

Financial

Smith (1990) identified the reasons cited most frequently by nursing students for dropping out of college as being related to finances and the inability to coordinate class and work schedules. Insufficient financial resources resulted in students increasing the number of hours they worked, which was detrimental to their academic success. Joehnes (1990) identified employment and residency status as variables that correlated with student degree completion; parental occupation also correlated with student success in traditional college-age students. Mashaba and Mhlongo (1995) contended that underprivileged students who received parental support were more successful in nursing programs. Kotecha (2002) suggested that the amount and types of support services required for student success may not be easily attained by nursing students. Many times scholarships and financial assistance are offered for nursing students, but it is difficult for them to meet the donor requirements for obtaining the funds.

Interventions to Retain Nursing Students

Admission strategies have been implemented in nursing programs to better identify students who are at-risk for failure so that early interventional support can be provided. Identifying students who have been classified as at-risk does not exclude them from entry into nursing programs; it provides students with the services needed to be

successful. Many interventional strategies have been utilized successfully in nursing programs.

Advising

Crocket (as cited in Cuseo, 2002) identified academic advising as the “cornerstone of student retention” (p.1). Student retention of at-risk students was significantly improved when students received advising services (Cuseo, 2002). Since the early 1980s, the national attrition rates have been increasing in all levels of educational institutions. Abdur-Rahman, Femea, and Gaines (1994) contended that academic advising and counseling were integral to effective remedial programs. Identifying students’ academic and social stressors early and implementing retention strategies improves academic outcomes for at-risk students. Retention is influenced by institutional behavior as much as student characteristics.

Student level of satisfaction with their educational experience has been directly correlated with student retention and a predictor of student success. College satisfaction is an assessment outcome that is not influenced by student pre-entry characteristics. Metzner (1989) maintained that student satisfaction is associated with the quality of academic advising and retention rate.

Cuseo (2002) contended that students enter college without a firm commitment to an educational major or career path. Willingham (1985) maintained that students’ inability to commit to career paths or define educational goals, were barriers preventing

them from experiencing successful and satisfying college experiences. Wyckoff (1999) contended that student commitment to educational and career goals is the strongest factor associated with student persistent and degree completion. Academic advising influences student retention through educational and career planning.

Academic advising prior to admission has been identified as an ethical approach to the success of students (Smith, 1990). Smith (1990) contended that student nurse attrition represents a loss in time and effort for both the educational institution and student. Identifying student retention strategies during the admission process can be cost-effective for the educational institution. Academic advising during the admission process with early warning and early intervention improves students' abilities to be successful in the program. By providing preadmission advising and ongoing advisement, nursing education programs can better address student needs and increase the number of program completers.

Walter and Smith (as cited in Cuseo, 2002) maintained that students underutilize support services, especially those who are most in need. Levin and Levin (1991) contended that students who are at-risk for being unsuccessful in their college experience had difficulties recognizing they were having trouble. Kulik, Kulik, and Shwalb (1983) maintained that support services that were designed for the at-risk student population, impacted retention and improved student performance.

In the *Role of Academic and Non-Academic Factors in Improving College Retention*, a policy report published by ACT, Lotkowski et al. (2004) contended that retention programs were improved when integrated with support services for academic

and non-academic factors. Students targeted for support services were those identified as having poor past or present academic performance, decreased self-confidence, decreased motivation, or insufficient social support. Identification of academic and non-academic factors assisted educational institutions with selection of students who benefited from retention programs and areas where support services were needed. Strong affiliations between academic programs and support services strengthened retention programs (Braxton & McClendon, 2001).

Socialization into Nursing

Socialization into nursing is important in reducing stress and anxiety that students experience when entering a new role. Gray and Smith (1999) defined professional socialization as the process whereby individuals enter a profession and learn the culture, values, and practices associated with the profession. Nursing applicants subscribe to certain social expectations and abide by professional codes of conduct upon entering the nursing profession. Nursing students' moral qualities as well as intellectual capabilities are considered during the selection process for entry into nursing programs. In order to be considered for admission to nursing programs, candidates must be selected based on a competitive admission process. Upon graduation both society and the nursing profession have clear expectations for the professional nurse (Campbell, Larrivee, Field, Day, & Reuter, 1994). Nursing is considered a helping profession and nurses care for vulnerable

populations. Because of this, nurses are held to higher standards than individuals in other professions.

Nursing instructors as well as clinical staff play a vital role in shaping the students existence and socialization into the nursing role (Wilson & Startup, 1991). The behaviors students observe of health care professionals in clinical facilities help form their image of the nursing profession. The clinical instructor was identified by Campbell et al. (1994) as the most influential to the socialization process. The caring attitude and professionalism engrained in nursing students begins the moment they enter nursing school. Nursing instructors and clinical staff are responsible for role modeling professionalism to the student nurse. Instructors who students perceived as being good role models were identified as most effective in the learning process. Effective clinical teaching, credibility, and sound judgment are important in the socialization process. Students strive to emulate the instructors' behaviors that they find most valuable.

Bradby (1990) identified role socialization as a status passage from one profession to another. Status passage includes the anxiety and anticipation experienced prior to entering a new occupation and continues until individuals feel comfortable and accepted in their new role. Nursing students undergo an identity change when assuming a new role and often have conflicting feelings over that perceived and truly experienced. Philpin (1999) identified a theory gap that exists in the socialization process for the nursing profession because of the disparity that exists between the espoused values in nursing programs and the values exhibited in the clinical area. The amount of support and feedback received by the clinical staff and their behaviors and mannerisms are important

in determining students' feelings of acceptance. The relationship between the nursing instructor and clinical staff was also important in determining the level of student acceptance in the clinical area. The degree which clinical facilities value the education process and their receptiveness to student nurses shapes the overall clinical experience.

Campbell et al. (1994) identified student nurses as significantly impacting the socialization process of their peers. Student nurses form bonds and relationships that serve them long after their nursing program. Peer relationships in the clinical area and the feeling of acceptance are identified as sources of comfort for students. Students experience feelings of inadequacy because of their inability to understand nursing concepts. Student collaboration in the clinical area and the amount of support received while providing patient care are important factors in determining the student level of comfort with their experience.

Student Placement Testing

The NCLEX-RN is a national examination that students must successfully pass in order to obtain a license to practice nursing. The National Council State Board of Nursing (2003) developed the licensure examination that is used by state boards of nursing in determining the eligibility for licensing. The examination ensures safe practice by assuring all graduates are competent to provide safe and effective care. The examination is developed by using best practices of the entry level nurse. A test plan was generated that guides the nursing curricula for all levels of nursing education. Testing vendors have

used the test plan to develop nationally standardized tests that determines students' potential for being successful in nursing programs and on the NCLEX-RN.

Nursing programs have implemented student testing prior to entry into the program, during the program, and upon completion to assess student's level of understanding of course content. Preadmission testing is designed to assess the fundamental skills needed in order to be successful in nursing programs. Student testing during the program assesses student level of mastery with course content. Testing upon completion of the program assesses students understanding of program content and their potential for being successful on the NCLEX-RN. Many nursing programs require students prove competency on the end of program examination in order to graduate. Testing provides valuable information to nursing programs to base support services. Identifying at-risk students allows nursing programs to better design student resources that improve their potential for success.

The Nurse Entrance Test (NET) developed by Educational Resources, Incorporated, is a diagnostic tool that evaluates academic, social, and learning profiles of beginning nursing students. The NET is used widely in nursing programs because it measures both academic and non-academic variables. The test provides 31 diagnostic scores for students using seven profiles: essential math skills, reading rate placement, reading comprehension, written expression composite, stress level profile, learning style profile, and test-taking skills (Abdur-Rahman et al., 1994; Educational Resources, Incorporated, 2005).

Abdur-Rahman et al. (1994) contended that NET scores significantly correlated with academic outcomes of first year nursing students. Sayles et al. (2003) identified specific sub-scores on the NET that were predictive of student success such as academic stress, money and time stress, social interaction profile, and visual learning styles. Rubino (2001) identified a relationship between the NET overall score and nursing student's first semester grade point average (GPA). The NET essential math sub-score was predictive of student persistence in the second year of the nursing program and successful completion. The NET composite reading sub-score positively correlated with successful achievement on the NCLEX-RN. Femea, Gaines, Brathwaite, and Abdur-Rahman (1995) used the NET to compare the socio-demographic and academic characteristics of nursing students who spoke English as a second language (ESOL) and compared those with nursing students whose primary language was English. ESOL nursing students scored significantly lower in reading comprehension, essential math, and test-taking than primary English speaking nursing students. ESOL students had higher family, social, and workplace stress scores than students whose primary language was English and lower academic stress scores.

Summary

In summary, nursing programs have been pressured nationally to increase the number of students they admit in response to the nursing shortage. Creative marketing campaigns have been developed to attract students into the field of nursing. Partnerships

between community colleges and industry have been developed to address the resources required for expansion. Even with additional resources, shortage of qualified nursing faculty and limited clinical opportunities prevent many programs from increasing to the point that the shortage is being impacted. In an effort to produce more graduates, nursing programs are refocusing their resources to student selection and retention efforts. Finding a pool of qualified applicants and providing support services that increase the number of program completers have been viewed as being more cost-effective than recruiting new students.

Nurse student wastage is a common problem in nursing education. A large number of students who could have completed their nursing program and become registered nurses are lost. Many academic and demographic variables were identified in the literature review that impacted student nurse persistence. The academic variables that were (a) grade point average, (b) predictive testing, (c) standardized test scores, (d) critical thinking test scores, (e) pre-college experiences, (f) grades in college science course, and (g) grades in general education and nursing courses. The demographic variables were (a) compassion, (b) privilege, (c) parental support, (d) financial status, (e) desire to nurse, (f) age, and (g) ethnicity. These variables are being used to identify students who are likely to succeed in nursing programs and ultimately on the NCLEX-RN.

CHAPTER THREE: RESEARCH METHODOLOGY

Statement of the Problem

The problems addressed in this study were (a) which demographic and academic variables best predict student success in an associate degree nursing program in Florida and (b) can a conceptual model be used to guide the selection process in the associate degree nursing program in Florida?

Research Questions

The following research questions guided this study:

1. To what extent are there differences in essential math scores, reading comprehension scores, and overall scores on the Nurse Entrance Test (NET) among students in the passing group, failing group, or withdrawing group?
2. To what extent are there differences in community college grade point averages upon admission to the associate degree nursing program among students in the passing group, failing group, or withdrawing group?
3. To what extent are there differences in college science course mean grade point averages among students in the passing group, failing group, or withdrawing group?
4. To what extent are there differences in demographic variables among students in the passing group, failing group, or withdrawing group?

Setting

The setting for this study was the associate degree nursing program at Daytona Beach Community College (DBCC). DBCC is an accredited institution that provides education for two year programs and certificate courses to residents of Volusia and Flagler Counties. The college has an annual enrollment of approximately 16,000 students. The nursing department is one of the allied health programs that functions within the School of Health, Human and Public Services. The associate degree nursing program has been in existence since 1961 and the school of nursing provides education leading to a two-year associate degree in nursing. The nursing program received initial accreditation by the National League for Nursing Accreditation Commission in 1985. It was reaccredited in 2005 and received an outstanding report. The program was compliant with all of the standards required to receive accreditation and had many strengths. The maximum accreditation of eight years was received.

The associate degree nursing program increased its annual enrollment in 2001. The program went from an annual enrolment of 166 to its current annual enrollment of 340. It recently expanded to the Deltona campus and is currently available to students on five campuses in Volusia and Flagler Counties: Daytona Beach, New Smyrna, Deland, Deltona, and Flagler Palm Coast. Students can take the first year of the two year program on any of the five campuses but they must complete the second year on the Daytona Beach campus. Students enter the nursing program as a cohort group and if successful in all courses graduate with the same group of students.

Study Population

The associate degree program at DBCC offers three tracks by which someone can pursue an associate degree in nursing. The generic track is for students who have no previous health care experience. The licensed practical nurse to associate degree nursing transition program is for students who are licensed as practical nurses in the state of Florida. The last track is the paramedic and respiratory therapy transition program; students who enter must be certified as paramedics or respiratory therapists in the state of Florida. Students were not discriminated as to the program they were admitted. After completion of the initial transition course, licensed practical nurses, registered respiratory therapists, paramedics, and associate degree nursing students join together and graduate as a cohort group.

The sample population (N=304) for this study was students enrolled in one of the initial courses of the associate degree nursing program at Daytona Beach Community College (DBCC) in Daytona Beach, FL from August 2002 through August 2003. The nursing department only recently started retaining five years of student records instead of three. The individual scores on the NET were not part of the student's permanent record and only four years were available in the nursing department. Because of this, the researcher reduced the sample population from three academic years to students admitted August 2002 through August 2003. All students who entered during this timeframe were included in the sample population. A convenience sample was used because only students that were admitted during the years that records were available were used in the study.

For data collection and analysis purposes, students were assigned to one of three groups (a) passing group, (b) failing group, or (c) withdrawing group. The passing group was composed of students who had successfully completed the associate degree nursing program within a three year timeframe. The failing group was composed of students who had received an unsuccessful grade in one of the required nursing courses and the withdrawing group was composed of students who had withdrawn prior to successful completion of a required nursing course. All students who were accepted and admitted to the nursing program between the timeframe of August 2002 and August 2003 were assigned to one of the three groups. Three different classes of students were used in the study and identified by the proposed date of graduation if they had been successful in all nursing courses. Successful students would have graduated during one of the following semesters: spring 2004, fall 2004 or spring 2005.

The first group in the sample was 82 students (27% of the sample) who entered the associate degree nursing program during the fall 2002 semester and were slated to graduate during the spring 2004 semester. The second group in the sample was 100 students (33% of the sample) who entered the associate degree nursing program during the spring 2003 semester and were slated to graduate during the fall 2004 semester. The last group in the sample was 122 students (40% of the sample) who entered the associate degree nursing program fall 2003 and were slated to graduate spring 2005. Table 1 reflects the program status of students by admission date to the associate degree nursing program.

Table 1

Program Status by Admission Semester

Program Status	Fall 2002	Spring 2003	Fall 2003
Passing	68	76	90
Failing	8	8	16
Withdrawing	6	16	16

The three groups provided the sample of (N=304) students. Students who failed the NCLEX-RN were reported as a separate group in order to identify any unique demographic differences. They were included with the passing group because they successfully completed the nursing program and were reported separately from the group because they were unsuccessful on the national examination. The group that failed the NCLEX-RN contained 27 students of the 234 in the passing group (12 percent of the sample) who entered the nursing program during the timeframe identified for the sample population.

Instrumentation

Two tools were used in this study. Shafer (2002) developed a Data Collection Worksheet that was adapted and used to guide data collection for the study. The Data Collection Worksheet (Appendix B) was constructed so that the researcher could collect

student demographics, grades in general education and nursing courses, scores on the NET, admission GPA, and students' status on the NCLEX-RN. The worksheet was adapted so that data collection followed the program of study for the associate degree nursing program at DBCC. Further information was also collected concerning student demographics.

The second tool was the Nurse Entrance Test (NET) by Educational Resources, Incorporated, which is used by the DBCC nursing program during the selection process to evaluate content mastery in specific areas. The NET is used widely in nursing programs because it measures both academic and non-academic variables. The test provides 31 diagnostic scores for students using seven profiles: essential math skills, reading rate placement, reading comprehension, written expression composite, stress level profile, learning style profile, and test-taking skills (Abdur-Rahman et al., 1994; Educational Resources, Incorporated, 2005). The test is administered nationally and an overall score of 50 is required for students to be considered for admission at DBCC.

The NET was developed by a committee of experts who teach in health occupation programs. The committee is responsible for reviewing each test item and evaluating student answers to assure question clarity, content coverage, and currency. The NET was validated by comparing its scores with scores on the ACT. The validation was based on the testing of 1385 beginning nursing students from health occupation programs. Cronbach's alpha was used to test the reliability of the instrument and a reliability coefficient of .89 was achieved (Simmons, 2004). The different subsets were also tested and the reliability coefficients are listed in Table 2.

Table 2

Reliability Coefficients of Nurse Entrance Test Subsets

Subset	Coefficient
Reading Comprehension	.89
Stress Decisions	.97
Social	.92
Math	.81
Learning Styles	.91

Data Collection

Tinto's Longitudinal Model of Dropout (1975) and the literature review provided the foundation for which student variables were selected for this study. The Data Collection Worksheet developed by Schafer (2002) was modified and used as a data collection tool (Appendix B) for the study. Permission was received from Shafer (2002) to adapt and utilize the Data Collection Worksheet (Appendix C). The student variables collected were (a) date of graduation from high school, (b) primary language, (c) GPA upon entry to the nursing program, (d) GPA in required college science courses, (e) nursing course grades; (f) NET overall score, reading, and math composite scores, and (g) passage on the NCLEX-RN.

Once approval was received for the study from the University of Central Florida Institutional Review Board, the primary investigator collected all data from student and graduate records at DBCC. Permission was received to access all student records from Dr. James Greene, Dean of the School of Health, Human and Public Services and Joe Roof, Associate Vice President of Enrollment (Appendix D). Data were collected from student records in the Department of Records and student files in the Department of Nursing. Only records of associate degree nursing students who were included in the study were accessed. Students were assigned a random number from the primary investigator using a random number generator so that confidentiality was maintained.

Data were entered for each student on the Data Collection Worksheet. The Data Collection Worksheets were color coded according to the student group for easy identification. Data were entered on a pink Data Collection Worksheet for students who were in the passing group. Students in the passing group were also analyzed according to their status with passing the NCLEX-RN examination. Data were entered on a white Data Collection Worksheet for students who were in the withdrawing group. Data were entered on a green Data Collection Worksheet for students who were in the failing group. The researcher counted the number of pink, white, and green Data Collection Worksheets to assure all students in the sample (N=304) were included in the study.

The investigator analyzed student Nurse Entrance Tests (NET) and collected the overall, reading, and math composite scores. The data collection process took approximately 80 hours and another 20 hours to enter the data in Statistical Package for the Social Sciences (SPSS).

Descriptive statistics and multinomial logistic regression analysis were used to answer the research questions. Table 3 provides an overview of the independent and dependent variables and the statistical test used to answer each research question.

Table 3

Statistical Test by Dependent Variable and Research Question

Research Questions	Independent Variables	Dependent Variables Logistic Regression	Descriptive Statistics
1.	NET reading comprehension score NET essential math score NET overall score	Program status: Passing, failing and withdrawing groups	NET reading comprehension score NET essential math score NET overall score
2.	Grade point average	Program status: Passing, failing and withdrawing groups	Grade point average
3.	College science mean grade point average	Program status: Passing, failing and withdrawing groups	College science mean grade point average
4.	Student demographics: Age, gender, ethnicity, and ESOL	Program status: Passing, failing and withdrawing groups	Student demographics: Age, gender, ethnicity, and ESOL

Multinomial logistic regression was used to answer research questions 1, 2, 3 and 4: to what extent are there differences in essential math scores, reading comprehension scores, and overall scores on the Nurse Entrance Test (NET) among students in the passing group, withdrawing group, or failing group; to what extent are there differences in community college grade point averages upon admission to the associate degree nursing program among students in the passing group, withdrawing group, or failing group; to what extent are there differences in college science course mean grade point averages among students in the passing group, withdrawing group, or failing group; and to what extent are there differences in demographic variables among students in the passing group, withdrawing group, or failing group?

This type of regression was used because it provided the researcher with information on relationships that may have existed between multiple independent variables and a dependent variable with more than two levels. It uses maximum likelihood estimation for analyzing relationships and transforms the probability of an event occurring. Multinomial logistic regression also accommodates independent and dependent variables that are categorical in nature and it does not assume a linear relationship between variables (Cizek & Fitzgerald, 1999; Polit & Hungler, 1995).

Descriptive statistics were also used to answer the four research questions and analyze differences among students who failed the NCLEX-RN. Descriptive statistics allowed the researcher to organize and summarize data so that it was more meaningful. Results were entered into table and graph format so that the researcher could easily

identify any important differences between the three groups (Coladarci, Cobb, Minium, & Clarke, 2004; Lomax, 2001).

Data Analysis

Data analysis was guided by the four research questions. Multinomial logistic regression was used to identify any variables that predicted student success in the nursing program. Descriptive statistics were used to identify any unique differences between the three groups of students in the study. This allowed the researcher to make inferences and generalizations concerning student success in the associate degree nursing program at DBCC. Variables that were identified as important predictors of student success will be considered for future development of a conceptual model to guide the student selection process.

Summary

The sample was (N=304) associate degree students who had been admitted to one of the initial courses of the nursing program at Daytona Beach Community College during the timeframe of August 2002 to August 2003. The students in the sample were identified according to the date they were slated to graduate and divided into three groups (a) passing group, (b) withdrawing group, or (c) failing group. All students were assigned a unique number so that confidentiality was maintained. Students who were successful in the nursing program were the largest sample and identified as the passing group. Students

who were not successful were in either the withdrawing or failing group. These were students who withdrew or received a failing grade in a nursing course. Students who failed the NCLEX-RN were also evaluated for demographic differences.

The researcher adapted Schafer's (2002) Data Collection Worksheet so that it contained all variables that were deemed important to the study. The worksheet was color coded according to the student group for easy identification (a) pink for the passing group, (b) white for the withdrawing group, and (c) green for the failing group. Each student was assigned a separate worksheet that the researcher used to collect and manually enter student data. The Data Collection Worksheet was used to collect all student data; data were collected from multiple sources at DBCC. The student data were entered into the SPSS software package to allow for analyses. Descriptive statistics and multinomial logistic regression were used so the researcher could organize and summarize the data in order to generalize and make inferences.

CHAPTER FOUR: ANALYSIS OF DATA

This study was a retrospective, exploratory study that analyzed academic and demographic variables of students in an associate degree nursing program to answer the research questions. Both descriptive and inferential statistics were used so the researcher could make generalizations concerning the findings. Tinto's Longitudinal Model of Dropout (1975) and the literature review provided a foundation for the selection of student variables and identification of the research questions. Four research questions provided the basis for collection of student data.

The study sought to identify the usefulness of demographic and academic variables in predicting student success in the associate degree nursing program at Daytona Beach Community College (DBCC) and on the NCLEX-RN. The ability to use student variables to predict success in the associate degree nursing program would provide evidence to base future development of a conceptual model for use during the admission process. Throughout the literature review evidence supported the growing concern of attrition in nursing programs. Identification of variables that predict student success will allow more students to graduate and enter the nursing profession.

The population used in this study consisted of (N=304) students who entered one of the initial nursing courses of the associate degree nursing program at DBCC. Students entered the nursing program during the timeframe of August 2002 to August 2003. Three classes of students were used in this study. Students were placed in one of three groups (a) passing group, (b) failing group, or (c) withdrawing group. Each group identified

students' status while in the associate degree nursing program at DBCC. The number of students in the passing group greatly outnumbered those in the failing or withdrawing groups. The passing group represented 77% of the sample population. Of the passing group, 27 students (12 percent of the sample) were unsuccessful in passing the NCLEX-RN. The other two groups represented the additional 23% of the sample population.

Statement of the Problem

The problems addressed in this study were (a) which demographic and academic variables best predict student success in an associate degree nursing program in Florida and (b) can a conceptual model be used to guide the selection process in the associate degree nursing program in Florida?

Research Questions

The following research questions guided this study:

1. To what extent are there differences in essential math scores, reading comprehension scores, and overall scores on the Nurse Entrance Test (NET) among students in the passing group, failing group, or withdrawing group?
2. To what extent are there differences in community college grade point averages upon admission to the associate degree nursing program among students in the passing group, failing group, or withdrawing group?

3. To what extent are there differences in college science course mean grade point averages among students in the passing group, failing group, or withdrawing group?
4. To what extent are there differences in demographic variables among students in the passing group, failing group, or withdrawing group?

Findings

Research Question One

The first research question sought to find differences in essential math scores, reading comprehension scores, and overall scores on the Nurse Entrance Test (NET) among students in the passing, failing, and withdrawing groups. Students are assigned points for each subsection of the NET and an overall score; they can receive a minimum score of 0 and maximum score of 100 on each subsection and overall.

Descriptive Statistics

As reflected in Table 4, the mean essential math score on the NET for students in the passing group was 74.67. The descriptive statistics reported nationally for the essential math subsection on the NET are listed in Table 5. As noted, students in the passing group scored comparable with those in the national group. Nationally, scores were slightly lower than that of the passing group with a minimum score of 39.00 and

maximum score of 95.00. Figure 1 provides a graphical representation of student test scores in the passing group. The histogram is negatively skewed, which reflects a higher percentage of test scores above the mean.

Table 4

Descriptive Statistics NET Math Scores of Passing Group

n	Range	Minimum	Maximum	Mean
234	53.00	45.00	98.00	74.67

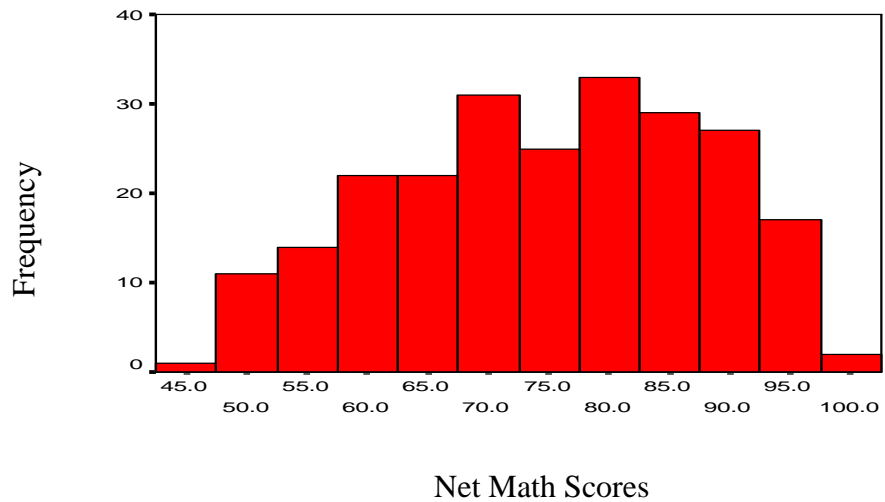


Figure 1

Histogram NET Math Scores of Passing Group

Table 5

Descriptive Statistics NET Math Scores Nationally

n	Minimum	Maximum	Mean
128	39.00	95.00	73.64

As reflected in Table 6, the mean score for students in the passing group for the reading comprehension portion of the NET was 67.17. Students are assigned points on the reading comprehension section of the NET depending on their abilities to read; they can receive a minimum score of 0 and maximum score of 100.

The descriptive statistics reported nationally for the reading comprehension score on the NET are listed in Table 7. The mean score reported nationally for reading comprehension was 50.91. Students in the passing group had a noticeably higher mean than the national average. Nationally, scores were more variable with the range reported from 1 to 99. Figure 2 provides a graphical representation of student test scores in the passing group. The histogram for the passing group is negatively skewed, which reflects a higher percentage of test scores above the mean.

Table 6

Descriptive Statistics NET Reading Scores of Passing Group

n	Range	Minimum	Maximum	Mean
234	61.00	33.00	94.00	67.17

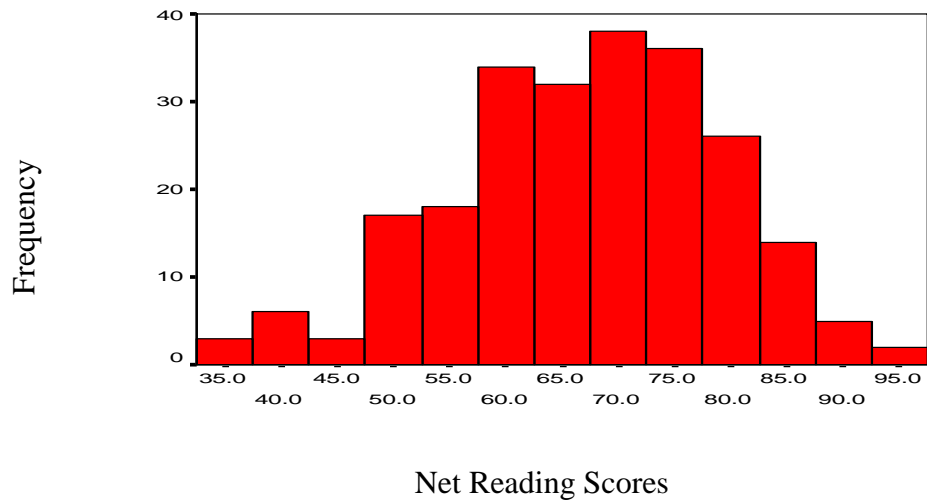


Figure 2

Histogram NET Reading Scores of Passing Group

Table 7

Descriptive Statistics NET Reading Scores Nationally

n	Minimum	Maximum	Mean
128	1.00	99.00	50.91

As reflected in Table 8, the mean overall score for students in the passing group was 71.09. Students are assigned a cumulative score for the NET depending on their scores on the individual subsections; they can receive a minimum score of 0 and maximum score of 100. As indicated in Table 9, the descriptive statistics reported nationally reflected an overall mean score on the NET of 63.52. Students in the passing group had a higher mean than the national average. Nationally, scores were more variable with a range from 2 to 99. Figure 3 provides a graphical representation of student test scores in the passing group. The histogram is negatively skewed, which reflects a higher percentage of test scores above the mean score.

Table 8

Descriptive Statistics NET Overall Scores of Passing Group

n	Range	Minimum	Maximum	Mean
234	41.00	50.00	91.00	71.09

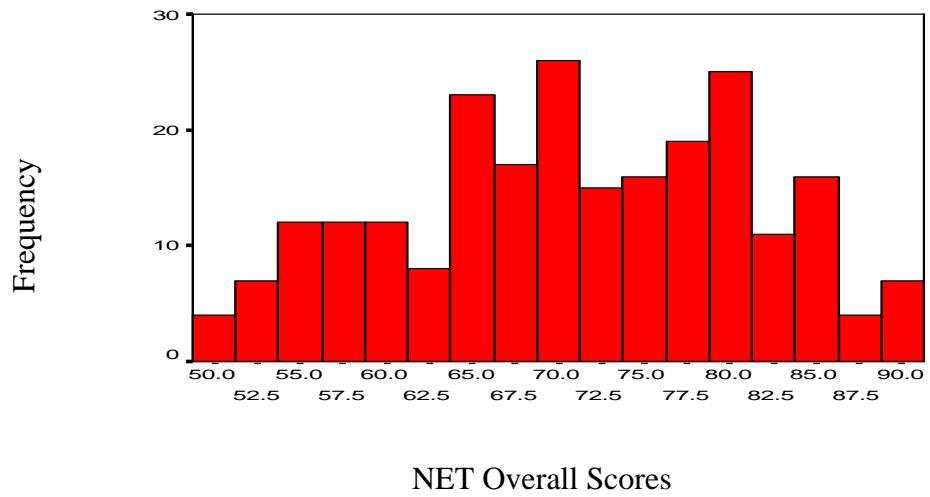


Figure 3

Histogram NET Overall Scores of Passing Group

Table 9

Descriptive Statistics NET Overall Scores Nationally

n	Minimum	Maximum	Mean
128	2.00	99.00	63.52

As noted in Table 10, the mean NET essential math sub-score for students in the failing group was slightly lower than that of the passing group and national average. The failing group had a higher minimum score on the essential math portion and a similar maximum score. Student scores were less variable with a range from 45 to 97. As reflected in Figure 4, the shape of the histogram indicates a normal distribution of student scores around the mean.

Table 10

Descriptive Statistics NET Math Scores of Failing Group

n	Range	Minimum	Maximum	Mean
32	45.00	52.00	97.00	73.03

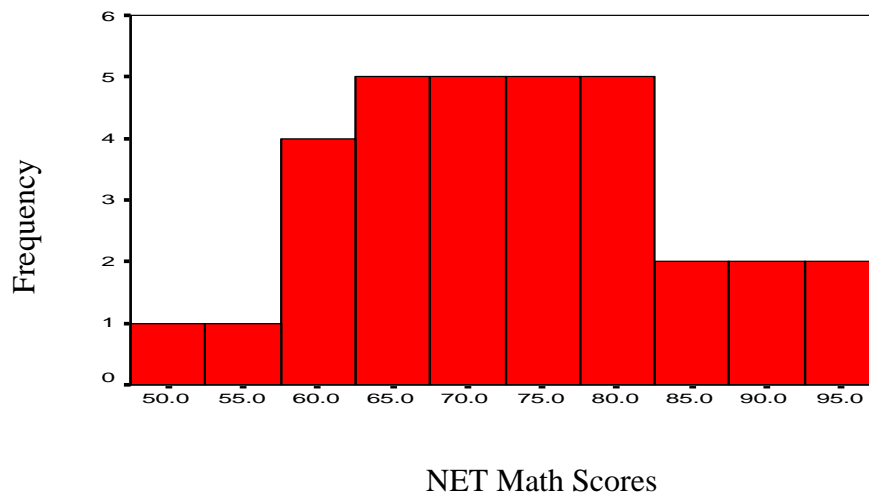


Figure 4

Histogram NET Math Scores of Failing Group

As reflected in Table 11, the failing group had a noticeably larger range than that of the passing group reflecting more variability. The minimum score of 9.00 was dramatically lower than the score reported for the passing group and more reflective of the national average. The group mean was 63.69, which was slightly lower than the passing group and considerably higher than the national average. As reflected in Figure 5, a small percentage of students in the group had dramatically low scores. The percentage of students who scored close to the minimum skewed the scores for the group. The majority of student scores were more closely approximated around the mean.

Table 11

Descriptive Statistics NET Reading Score of Failing Group

n	Range	Minimum	Maximum	Mean
32	82.00	9.00	91.00	63.69

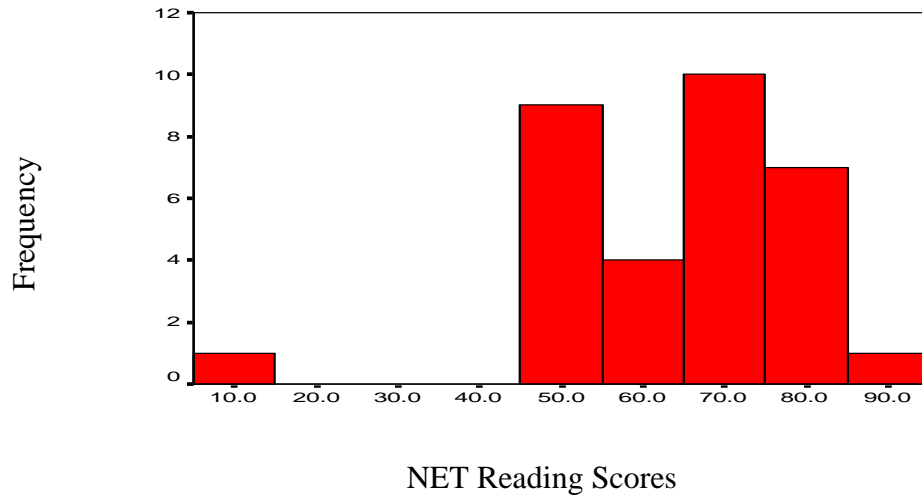


Figure 5

Histogram NET Reading Scores of Failing Group

As reflected in Table 12, the overall mean score for students in the failing group was slightly lower than the passing group but better than the national average. The overall NET score was similar to the reading comprehension score; a small percentage of students scored close to the minimum score skewing the results for the group. As represented in Figure 6, the majority of student scores were approximated around the mean.

Table 12

Descriptive Statistics NET Overall Scores of Failing Group

n	Range	Minimum	Maximum	Mean
32	55.00	37.00	92.00	69.28

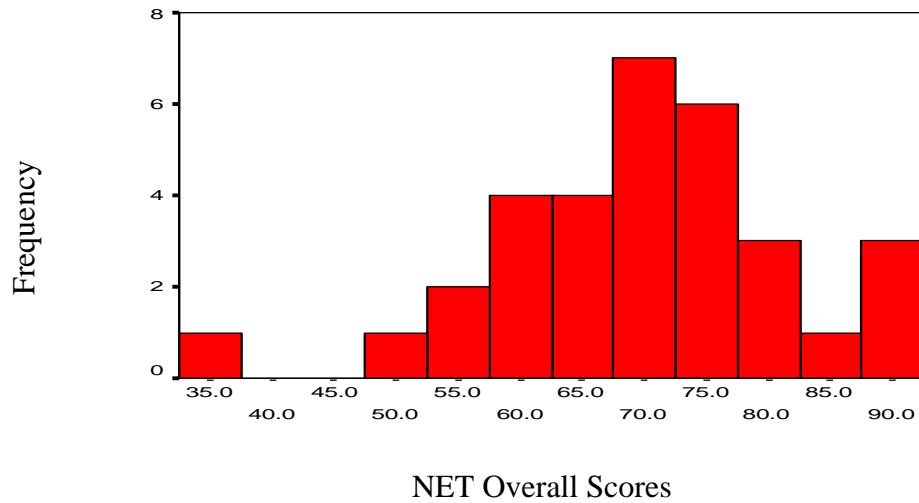


Figure 6

Histogram NET Overall Scores of Failing Group

As noted in Table 13, the range of scores for the withdrawing group was greater than the failing group and similar to the passing group. The mean is slightly higher than the failing group and similar to the scores of the passing group and national average. As reflected in Figure 7, student scores are more normally distributed around the mean.

Table 13

Descriptive Statistics NET Math Scores of Withdrawing Group

n	Range	Minimum	Maximum	Mean
38	52.00	45.00	97.00	73.42

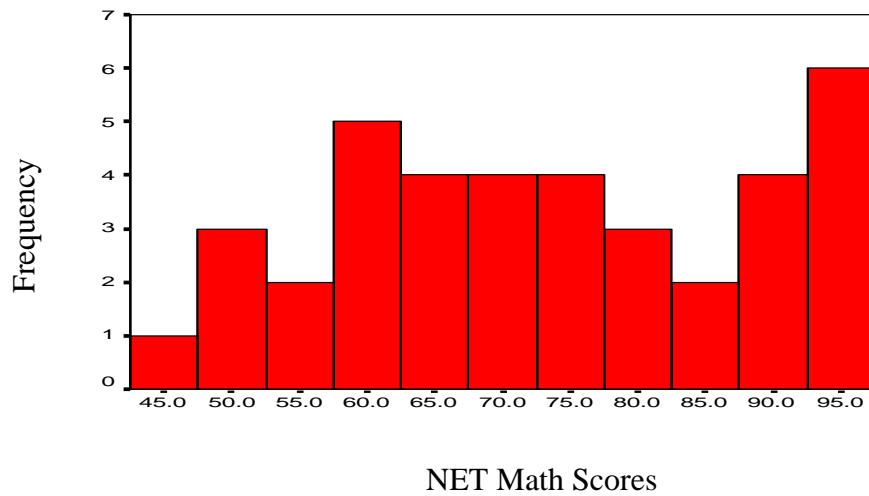


Figure 7

Histogram NET Math Scores of Withdrawing Group

As reflected in Table 14, the reading comprehension mean was lower than that of the passing group and higher than the mean of the failing group. The score was also noticeably higher than the mean national average. The scores were less variable than the passing or failing groups with a higher minimum score. As noted in Figure 8, student scores were normally distributed around the mean with a high number of students scoring near the mean.

Table 14

Descriptive Statistics NET Reading Score of Withdrawing Group

n	Range	Minimum	Maximum	Mean
38	46.00	42.00	88.00	65.58

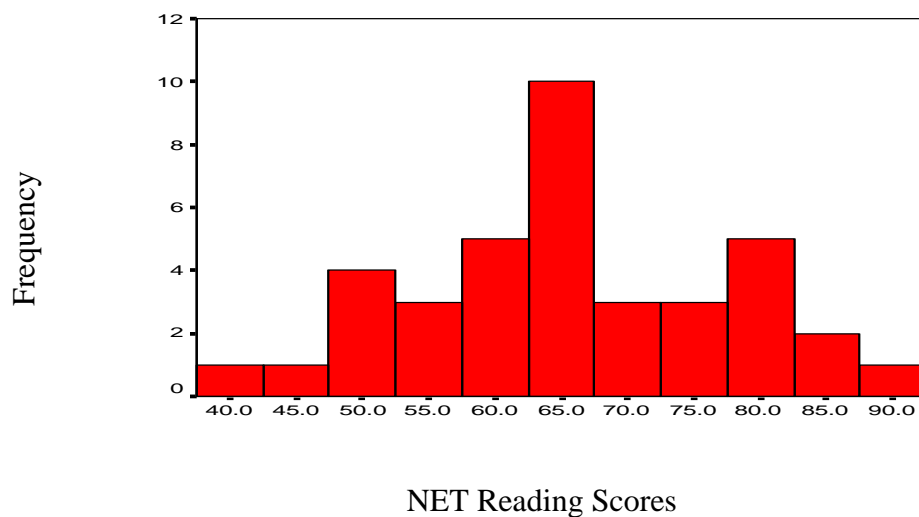


Figure 8

Histogram NET Reading Scores of Withdrawing Group

As reflected in Table 15, the overall mean score for the withdrawing group was slightly lower than the passing group and similar to the failing group. The mean score was also higher than the national average. The minimum and maximum scores closely mirrored that of the passing group. As Figure 9 reflects, scores were positively skewed indicating that a higher number of students scored below the mean.

Table 15

Descriptive Statistics NET Overall Scores of Withdrawing Group

n	Range	Minimum	Maximum	Mean
38	39.00	52.00	91.00	69.58

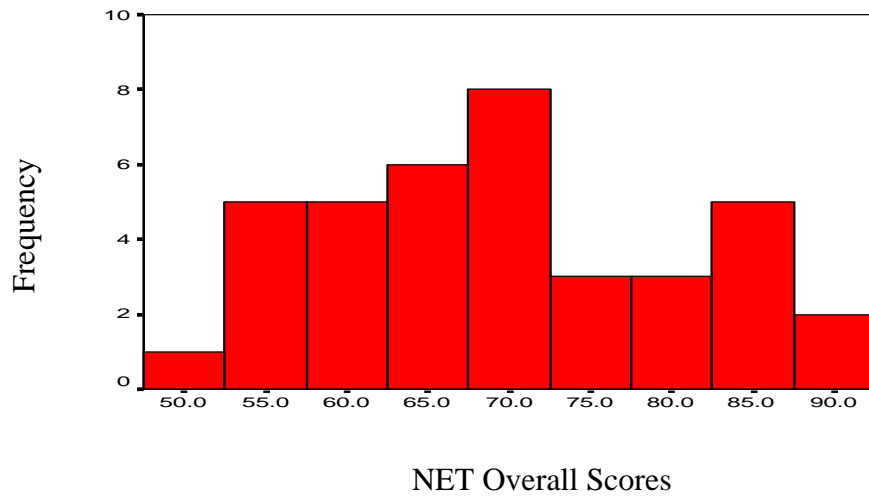


Figure 9

Histogram NET Overall Scores of Withdrawing Group

Multinomial Logistic Regression

This statistical test identified a reference group to which the other groups were compared. The withdrawing group was coded as the reference group simply because it was the last group of the three levels of the dependent variable and was excluded from the analysis. The reference group consisted of those students who withdrew from a course prior to completion. SPSS utilized indicator contrast coding to produce the two new variables: passing and failing groups. The parameter compared the association of NET scores with the reference group. The coefficient B for each predictor variable was the change in log odds of group placement related to one unit change in the predictor variable.

As reflected in Table 16, the B coefficient for the NET essential math sub-scores for the passing group compared to the reference group was .007; this reflected the change in log odds of passing the course related to a one unit change in the predictor variable. An increase of passing had a slight association with a higher NET score. The B coefficient for the failing group was -.002; the odds of failing the course slightly decreased as the predictor variable increased.

An alpha level of .05 was used for all statistical tests. Any value greater than .05 was not considered significant. Multinomial logistic regression calculated a significance probability for each level of the dependent variable and the set of predictors. It tested whether there were significant changes in the overall model after the predictor variables were added. The effect of essential math scores was not statistically significant. The use

of the predictor variable did not improve prediction of the dependent variables. There were no differences in the NET essential math scores of the passing, failing, or withdrawing groups. The values reported for the reading comprehension and overall NET scores were similar. The uses of the variables in the model as predictors were not significant at least for students who met the requirements for admission to the nursing program.

Table 16

Multinomial Logistic Regression of NET Scores by Groups (N = 304)

Independent Variables		<i>B</i>	<i>p</i>	Overall <i>p</i>
NET math	Passing group (n = 242)	.007	.580	.714
	Failing group (n = 32)	-.002	.900	
NET reading	Passing group (n = 242)	.010	.62	.300
	Failing group (n = 32)	.011	.546	
Net overall	Passing group (n = 242)	.014	.405	.504
	Failing group (n = 32)	-.003	.905	

Note: The model uses the withdrawing group as a reference category.

Research Question Two

The second research question sought to find differences in community college grade point averages (GPA) among students in the passing, failing, and withdrawing groups. Students must have a minimum GPA of 2.5 to submit an application to the nursing program at DBCC. The admission GPA is the accumulation of grades from all courses taken prior to applying to the nursing program. If students have completed a higher degree than offered at a community college, their advanced course work is considered but may not be reflected in the GPA. This could cause a student who has been accepted to the program to have a lower GPA.

Descriptive Statistics

As reflected in Table 17, students in the passing group had a greater range of scores than that of the failing and withdrawing groups. The mean average admission GPA of the passing group was also greater than that of the failing and withdrawing groups. Figure 10 provides a graphical representation of the differences in the admission GPA among the three groups. As reflected in Figure 11, the distribution of the passing group was negatively skewed reflecting a greater percentage of students' admission GPA scores higher than the mean. As reflected in Figure 12, the distribution of the failing group was positively skewed reflecting a higher percentage of students' admission GPA scores lower than the mean. Figure 13 reflects the bimodal distribution of the withdrawal group indicating two central tendencies.

Table 17

Admission Grade Point Average by Groups

	n	Minimum	Maximum	Mean
Passing group	234	1.99	4.00	3.16
Failing group	32	2.21	3.72	2.92
Withdrawing group	38	2.27	3.86	3.10
Overall	304	1.99	4.00	3.13

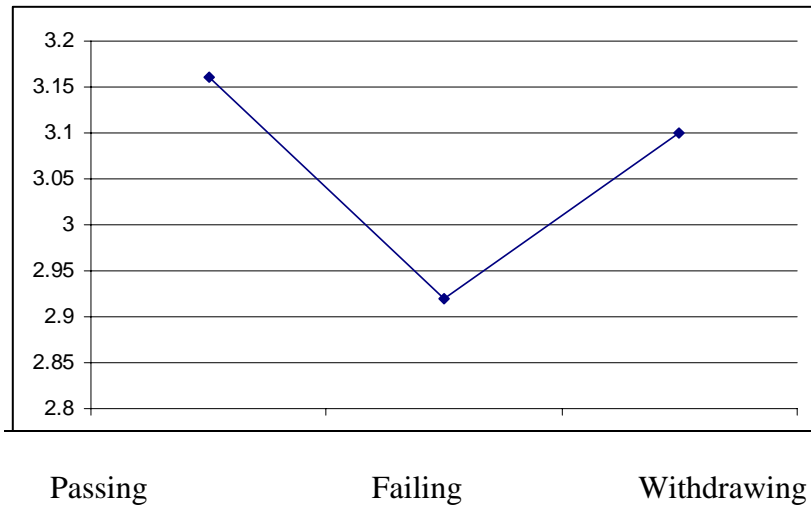


Figure 10

Line Graph of Admission Grade Point Average by Group

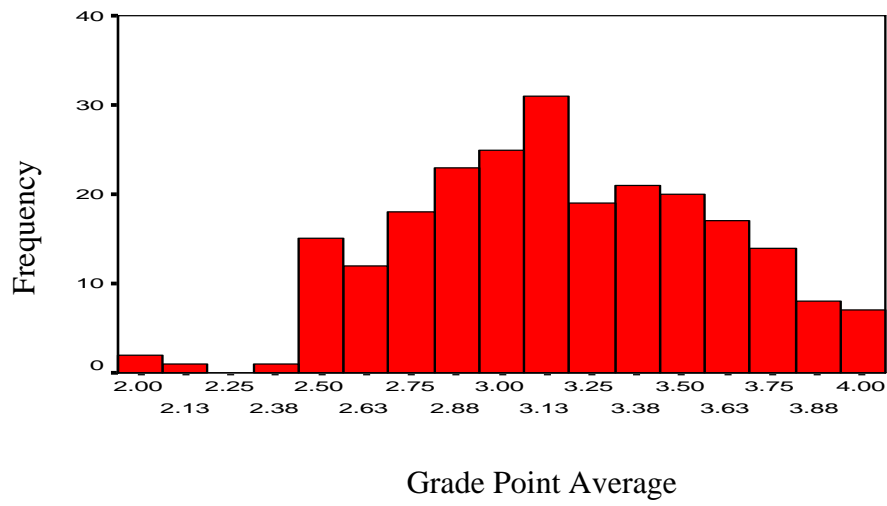


Figure 11

Histogram Admission GPA of Passing Group

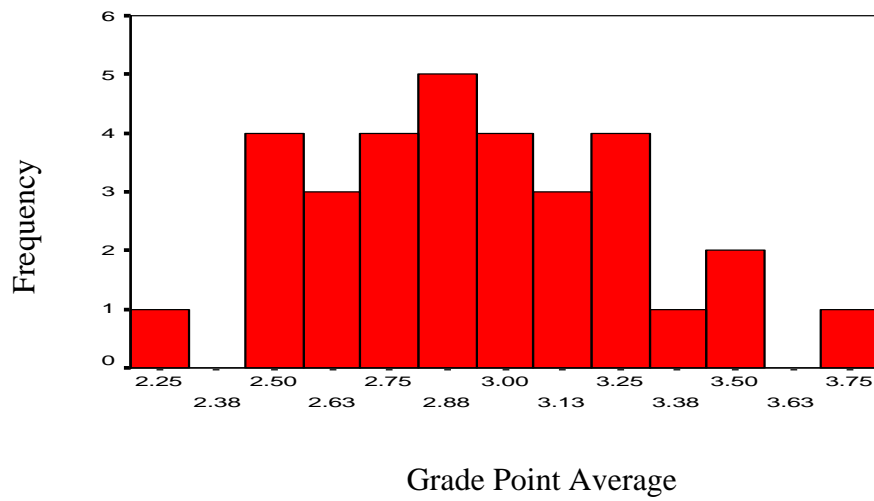


Figure 12

Histogram Admission GPA of Failing Group

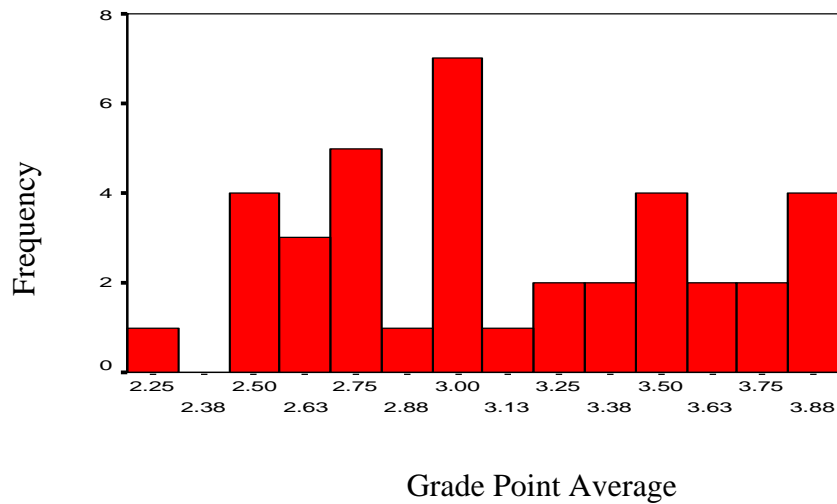


Figure 13
Histogram Admission GPA of Withdrawing Group

Multinomial Logistic Regression

The withdrawing group was coded as the reference group for the test because of its level ranking and was excluded from the analysis. As shown in Table 18, admission GPA was positively associated with the passing group. Compared to the reference group, the change in log odds of passing the course was related to a one unit change in the predictor variable. An increase of passing had an association with an increase in the admission GPA. Admission GPA was negatively associated with the failing group. The odds of failing the course slightly decreased as the predictor variable increased. The calculated level of significance for the model was .007. With the level of significance for the test set at .05, the coefficient in the model was significantly different than zero. The use of the predictor variable improved prediction of the dependent variables. There were

differences in the grade point averages of students in the passing, failing, and withdrawing groups.

Table 18

Multinomial Logistic Regression of Admission GPA Scores by Groups (N = 304)

Independent Variables		<i>B</i>	p	Overall p
Admission grade point average	Passing group (n = 234)	.374	.379	.007
	Failing group (n = 32)	-1.091	.070	

Note: The model uses the withdrawing group as a reference category.

Research Question Three

The third research question sought to identify differences in college science course mean grade point averages (GPA) among students in the passing, failing, and withdrawing groups. College science GPA scores were calculated for each individual science course and an overall mean was reported.

Descriptive Statistics

As noted in Table 19, students in the failing and withdrawing groups had significantly lower GPA scores in all college science courses. The calculated mean of the college science courses was similar for the failing and withdrawal groups. The passing group scored noticeably higher in all college science courses and the mean averages. The failing group scored higher in anatomy and physiology I (A & P I) and anatomy and physiology II (A & P II) than the withdrawing group. The mean microbiology score for students in the failing group was 1.82; students must achieve a 2.0 to receive credit in nursing for course work.

Table 19

Mean Science Course Grade Point Averages by Groups (N = 304)

	Passing group (n = 234)	Failing group (n = 32)	Withdrawing group (n = 38)
Anatomy and physiology I	3.04	2.87	2.53
Anatomy and physiology II	3.12	2.70	2.53
Microbiology	3.15	1.82	2.31
Mean college science grade point average	3.10	2.46	2.46

Grade Point Average

Multinomial Logistic Regression

As reflected in Table 20, the withdrawing group was coded as the reference group for the test because of its level ranking and excluded from the analysis. The coefficients represent changes in the log odds of passing for each level of the A & P I GPA compared with the reference group. B coefficients with values greater than 1.00 indicated the odds of passing increased while negative numbers indicated the odds decreased. For example, when all other variables were held constant, students who received credit for A & P I without assigned GPA points have a B coefficient of 17.231. The students in the group have an increase in odds of passing when compared to the reference group. Students with a GPA of 1.00 received a grade of D or F. The B coefficient of -.627 indicated a decrease change in log odds of passing the course compared to the reference group. The alpha level for the test was statistically significant, even though only two individual variables were significant in the passing group and none in the failing group. The results of the test indicated that there were differences in the A & P I grade point averages of students in the passing, failing, and withdrawing groups.

Table 20

Multinomial Logistic Regression of Anatomy and Physiology I GPA Sores (N=304)

Independent Variables		<i>B</i>	<i>p</i>	Overall <i>p</i>
Anatomy and physiology I	Passing group (n = 234)			
	GPA=0	17.231	.000	
	GPA=1.00	-.627	.192	
	GPA=2.00	-1.210	.045	
	GPA=2.50	.051	.932	
	GPA=3.00	16.990		
	GPA=3.50	-.908	.124	
	GPA=4.00	0b		
	Failing group (n = 32)			
	GPA=0	20.175	.258	
	GPA=1.00	.901		
	GPA=2.00	-1.099	.209	
	GPA=2.50	1.281	.376	
	GPA=3.00	.521	.122	
	GPA=3.50	-1.099		
	GPA=4.00	0b	.376	
				.049

Note: The model uses the withdrawing group as a reference category.

The level of significance identified for the test was established at .05. Any value less than .05 was considered significant. Multinomial logistic regression calculated a significance probability for each level of the dependent variable and the set of predictors. As reflected in Tables 21 and 22, there were significant changes in the overall model after the predictor variables were added. One or more coefficients in the model were

significantly different than zero. The alpha levels .002 and .000 indicated that the use of the predictor variables improved the prediction of the dependent variables. There were differences in the A & P II and microbiology GPA scores of the passing, failing and withdrawing groups. The use of the variables in the model as predictors was significant.

Table 21

Multinomial Logistic Regression of A & P II GPA Scores (N = 304)

Independent Variables		<i>B</i>	p	Overall p
Anatomy and physiology II	Passing group (n = 234)			
	GPA=0	-2.890	.023	
	GPA=1.00	-20.821		
	GPA=2.00	-.731	.124	
	GPA=2.50	-.750	.254	
	GPA=3.00	-.066	.902	
	GPA=3.50	-.118	.868	
	GPA=4.00	0b		
	Failing group (n=32)			
	GPA=0	.118	.931	
	GPA=1.00	.811	.598	
	GPA=2.00	.965	.179	
	GPA=2.50	19.863		
	GPA=3.00	1.263	.102	
	GPA=3.50	-2.88	.825	
	GPA=4.00	0b		
				.002

Note: The model uses the withdrawing group as a reference category.

Table 22

Multinomial Logistic Regression of Microbiology GPA Scores (N = 304)

Independent Variables		B	p	Overall p
Microbiology	Passing group (n = 234)			
	GPA=0	-24.53		
	GPA=1.00	-4.522	.000	
	GPA=2.00	-1.025	.196	
	GPA=2.50	-.427	.649	
	GPA=2.80	16.348		
	GPA=3.00	-1.264	.063	
	GPA=3.50	-.079	.420	
	GPA=4.00	0b		
	Failing group (n = 32)			
	GPA=0	.288	.706	
	GPA=1.00	-1.386	.148	
	GPA=2.00	-.981	.679	
	GPA=2.50	.405	.468	
	GPA=2.80	.811		
	GPA=3.00	-.460	.386	
	GPA=3.50	-.799	.560	
	GPA=4.00	-.693		
		0b		
				.000

Note: The model uses the withdrawing group as a reference category.

Research Question Four

The fourth research question sought to identify differences in demographic variables among students in the passing, failing, and withdrawing groups.

Descriptive Statistics

Ages of Subjects

As shown in Table 23, the passing group had the largest sample in the population. Students who failed the NCLEX-RN were also included in the passing group because of their success in the program. The ages of students were similar across the three groups. Students in the passing group had a slightly higher mean age than that of students in the failing or withdrawing groups. They also had the most variability with a minimum age of 22 and maximum age of 65. Students who failed the NCLEX-RN had a slightly lower mean than the three groups.

Table 23

Ages of Subjects by Groups

Groups	n	Mean Age	Maximum	Minimum	Standard Deviation
Passing	234	35.39	65.00	22.00	9.00
Failing	32	33.75	57.00	23.00	9.33
Withdrawing	38	33.37	53.00	24.00	8.63
Failed NCLEX-RN	27	32.25	57.00	24.00	8.74

Descriptive Statistics

Gender of Subjects

As reflected in Table 24, the sample population had a higher percentage of females than males. The sample population contained 83% females and 17% males. The most noticeable difference in the gender between the groups were the passing group and students who failed the NCLEX-RN. They had higher percentages of females than the failing or withdrawing groups. The failing and withdrawing groups contained considerably higher percentages of males.

Table 24

Gender of Subjects by Groups (N = 304)

Groups	Female	%	Male	%
Passing (n = 234)	198	85	36	15
Failing (n = 32)	23	72	9	28
Withdrawing (n = 38)	30	79	8	21
Failed NCLEX-RN	21	78	6	12

Descriptive Statistics

Ethnicity of Subjects

As reflected in table 25, the ethnicity of the subjects varied by groups; however, the percentage of White students in the passing group was noticeably higher than that of the failing or withdrawal groups. The failing and withdrawing groups had higher percentages of minority students. Students who failed the NCLEX-RN had similar results as the failing and withdrawing groups. The passing group reflected the following student ethnicity: 4% Asian Pacific, 6% Black, 86% White, .04% American Indian, 2% Hispanic and .16% other. The failing group reflected the following student ethnicity: 6% Asian Pacific, 16% Black, and 78% White. The withdrawing group reflected the following student ethnicity: 18% Black, 66% White, and 16% Hispanic. The group that failed the NCLEX-RN reflected the following student ethnicity: 4% Asian Pacific, 15% Black, 70% White, 7% Hispanic, and 4% other.

Table 25

Ethnicity of Subjects by Groups (N = 304)

Groups	Asian Pacific	Black	White	American/ Indian	Hispanic	Other
	n	n	n	n	n	n
Passing (n = 234)	10	13	200	1	6	4
Failing (n = 32)	2	5	25	0	0	0
Withdrawing (n = 38)	0	7	25	0	6	0
Total	12	25	250	1	12	4
Failed NCLEX-RN	1	4	19	0	2	1

Descriptive Statistics

English as a Second Language

As noted in Table 26, the number of students with English as a second language (ESOL) in the sample population was small. The sample population contained 2% of students with ESOL. The passing group had the lowest percentage of ESOL students. The withdrawing group had a considerably higher percentage of ESOL students. The group that failed the NCLEX-RN only contained one student that had ESOL.

Table 26

Students with English as a Second Language by Group (N = 304)

Groups	ESOL		NON-ESOL	
	n	%	n	%
Passing (n = 234)	3	1	231	99
Failing (n = 32)	1	3	31	97
Withdrawing (n = 38)	3	8	35	92

Multinomial Logistic Regression

The withdrawing group was coded as the reference group for the test because of its level ranking and excluded from the analysis. As reflected in Table 27, age was positively associated with the passing and failing groups when compared to the reference group, but not considered a significant predictor. The category age was not significant and the use of it as a predictor variable did not improve the prediction of group placement.

Gender was negatively associated with the passing group and female gender was negatively associated with the failing group when compared to the reference group. Male gender was positively associated with the failing group. Even though male in the passing

group was significant, the variable gender was not significant in predicting student success in the associate degree nursing program at DBCC.

Asian Pacific and American Indian were positively associated with the passing and failing groups and White with the failing group. Black and Hispanic were negatively associated with the passing and failing groups and White with the passing group. White was negatively associated with the passing group and positively associated with the failing group. Being Black and White were the only categories of ethnicity that were significant and they lowered the odds for passing. There was a decrease chance of passing with a change in the independent variable. Since there were higher percentages of White and Black students in the passing group, a change in ethnicity would increase their chances for being unsuccessful. With the significance level established at .05 for the test, ethnicity was considered a significant predictor. The use of ethnicity as a predictor variable improved prediction of group placement for students in the study.

English as a second language was positively associated with the passing and failing groups when compared to the reference group. The overall level of significance for the variable did not indicate that it was a good predictor for student success in the nursing program.

Table 27

Multinomial Logistic Regression Results of Independent Variables (N = 304)

Independent Variables			<i>B</i>	<i>p</i>	Overall <i>p</i>
AGE	Passing group (n = 234)		.027	.203	
	Failing group (n = 32)		.006	.847	.298
GENDER	Passing group (n = 234)	Male	-.14710	.000	
		Female	-.14365		
	Failing group (n = 32)	Male	.290	.605	
		Female	-.094		.485
ETHNICITY	Passing group (n = 234)	Asian	.750	.456	
		Pacific	-19.623	.000	
		Black	-18.162	.000	
		White	.000		
		American			
		Indian	-20.242		
		Hispanic	0b		
	Failing group (n = 32)	Asian	19.555	.800	
		Pacific	-.165		
		Black	.172		
		White	.000		
		American			
		Indian	-20.101		
		Hispanic	0b		
	Other			.008	
ESOL	Passing group (n = 234)	No	.1887	.024	
		Yes	0b		
	Failing group (n = 32)	No	.977	.408	
		Yes	0b		.098

Note: The model uses the withdrawing group as a reference category

Summary

Table 28 provides a summary of the variables that multiple logistic regression analyses indicated improved the prediction of student success in the associate degree nursing program at DBCC. The results of the study indicated that students who were successful in the nursing program at DBCC had higher admission and college science course GPA scores, specifically anatomy and physiology and microbiology. The results also supported Tinto (1975), that pre-college experiences influenced student persistence.

Table 28

Significant Predictor Variables (N=304)

Variable	Significance
Admission GPA	.007
Anatomy and physiology I GPA	.049
Anatomy and physiology II GPA	.002
Microbiology GPA	.000
Ethnicity	.008

Ethnicity was also identified as a significant predictor of student success in the associate degree nursing program at DBCC. The results also supported Tinto (1975), that individual attributes influenced student performance in college.

Even though age, gender, and English as a second language were not considered significant predictors; there were higher percentages of these variables in the unsuccessful groups. The results were not consistent with Tinto's Longitudinal Model of Dropout (1975), because gender was identified as a predictor of student success.

CHAPTER FIVE: CONCLUSION

The purpose of this study was (a) to determine the relationship between student demographics and academic variables and if any of these could predict student persistence and success in an associate degree nursing program and (b) to test the use of Tinto's Longitudinal Model of Dropout (1975) with associate degree nursing students. The setting for this study was the associate degree nursing program at Daytona Beach Community College (DBCC). The sample population (N=304) for this study was students who enrolled in one of the initial courses of the associate degree nursing program at DBCC from August 2002 through August 2003. All students who applied for admission and were accepted to the nursing program during the timeframe were considered in the study. Three classes of students were used and identified by the proposed date of graduation if they had been successful in all courses. All students would have graduated if successful during one of the following semesters: spring 2004, fall 2004 or spring 2005.

A convenience sample was used for the study; all students admitted during the timeframe that records were available were used in the study and not discriminated as to the program they were admitted. Students were assigned to one of three groups (a) passing group, (b) failing group, or (c) withdrawing group. The passing group was defined as students who had successfully completed the associate degree nursing program within a three year timeframe. The failing group was defined as students who had received an unsuccessful grade in one of the required nursing courses and the

withdrawing group was defined as students who had withdrawn prior to successful completion of a required nursing course.

The final chapter, composed of three sections, begins with the discussion of findings for each of the four research questions that guided this study. The next section consists of limitations that were found during the investigation of the research questions and the last section will provide recommendations to base future studies.

Research Question One

Discussion

The first research question sought to find differences in essential math scores, reading comprehension scores, and overall scores on the Nurse Entrance Test (NET) among students in the passing, failing, and withdrawing groups. Tinto (1975) identified pre-college experience as having an impact on student commitment and persistence. Several studies identified preadmission testing as predictive of student success in associate degree nursing programs. Crouch (1999) and Sayles et al. (2003) identified preadmission test scores as being highly predictive of student success in associate degree nursing programs. Gallagher et al. (2001) identified reading comprehension scores as important predictors of student success in nursing programs. The literature also supported the use of the NET in predicting student success. The NET math sub-scores were

predictive of student persistence in the second year of nursing programs and successful completion (Rubino, 2001).

The NET scores for students at DBCC included in the study were analyzed using descriptive statistics and multinomial logistic regression. The essential math, reading comprehension, and overall scores were evaluated individually to identify significance since the literature supported the use of individual subsections. Descriptive statistics showed slight differences in scores between the three groups in the study. The passing group had slightly higher essential math, reading comprehension, and overall means than the failing or withdrawing groups. The failing group had a slightly lower reading comprehension mean than the withdrawing group; the essential math and overall means were comparable.

The NET scores for students in the study were also compared to national averages. Students in the passing group at DBCC typically scored higher than students nationally. Students in the failing and withdrawing groups scored higher than the national average in reading comprehension. The passing and withdrawing groups scored comparable with the national average on the essential math subsection and overall. Even though some significance was noted using descriptive statistics, multinomial logistic regression analysis did not find the use of NET scores as predictor variables improved prediction of student success. The analysis provided evidence to dispute research question one. Results showed that there were no significant differences in the NET scores among students in the passing, failing, and withdrawing groups. This was not consistent with Tinto's Longitudinal Model of Dropout (1975), that pre-college experience

impacted student success. Only students who met the requirements for admission were used in the study. This could have impacted the results of the study because an important subpopulation was excluded.

Abdur-Rahman et al. (1994) contended that NET scores significantly correlated with academic outcomes of first year nursing students. Students were not discriminated as to whether they completed the first year or second year. They were only included in the study with the passing group if they successfully completed the two-year nursing program. Otherwise, they were placed in the failing or withdrawing groups.

Implications

The results used in the study came solely from students who submitted an application and met the school of nursing requirements for entry. Information was not available for students who took the test and did not receive an acceptable score, or the number of times students took the test to achieve an acceptable score. There was also no information available on students who sought remedial assistance prior to testing. The scores could have been predictive of students who did not meet the minimal requirement for admission; however, those scores were not available to the nursing program. Students who scored below the required overall score of 50 were not considered in the study which excluded an important subpopulation.

DBCC requires an overall NET score of 50 for students to apply for admission to the nursing program. The essential math and reading comprehension scores are not used

in the admission process. Students who do not score the minimal score required to submit an application are referred for remedial services prior to retaking the test. The results of this study do not support the use of NET scores in the admission process for predicting student success but could be valuable for screening. Considering there is an additional cost for students associated with the NET, along with the time and stress imposed for test takers, the nursing program should reevaluate the purpose and usefulness of the NET in the admission process or seek other valid predictors of success.

Higher education in general should evaluate the ability of preadmission tests to predict student success. The NET is solely used to evaluate students' readiness for nursing programs. Students are usually given other tests to evaluate their placement and ability to succeed in college level courses. Once predictive tests have been deemed reliable, support services should be developed and provided that prepare students to take the tests. Providing remedial programs for students identified as at-risk for failure and effectively predicting students' abilities to be successful in college level courses can be cost-effective for community colleges as well as nursing programs.

Research Question Two

Discussion

The second research question sought to find the differences in community college grade point averages (GPA) among students in the passing, failing and withdrawing

groups. Tinto (1975) identified GPA as a pre-college experience that impacted student success. Several studies (Crouch, 1999; Kroll, 1990; Joehnes, 1990) identified college GPA at the time of admission to the nursing program as predictive of student success. Sayles et al. (2003) and Yin and Burger (2003) identified college GPA prior to admission to nursing programs as predictive of student success in nursing programs and on the NCLEX-RN.

Both descriptive statistics and multinomial logistic regression were used to analyze admission grade point averages (GPA) of the sample population at the time they applied for admission to the associate degree nursing program at DBCC. Students in the passing group had significantly higher GPA scores than students in the failing and withdrawing groups. Students in the withdrawing group had higher GPA scores than students in the failing group. Multinomial logistic regression analysis also found that the use of admission GPA as a predictor variable improved the ability to identify students who could potentially be successful in the associate degree nursing program at DBCC. This also supported Tinto (1975), that pre-college experiences have an impact on student success.

Implications

Currently, students must have a cumulative GPA of 2.50 in order to submit an application to the associate degree nursing program at DBCC. Interestingly, a small percentage of applications were accepted for admission to the nursing program. Instances

were with students who had completed higher degrees and their coursework was not considered when the cumulative GPA was calculated. The results of descriptive analyses identified students in the passing group at DBCC as having higher admission GPAs than students in the failing and withdrawing groups. The mean admission GPA for the passing group was 3.16; compared to 3.10 for the withdrawing group and 2.92 for the failing group. The test results supported the use of admission GPA in the selection process. Ranking students according to cumulative GPA could provide the ability to have a select pool of applicants that might have a better chance of successfully completing the nursing program.

GPA should also be considered when students are receiving academic advising prior to entry into the nursing program. GPA is important to consider when designing student remedial programs. Improving students' abilities to be successful in nursing programs can be cost effective for the student and higher education.

Research Question Three

Discussion

The third research question sought to identify differences in college science course mean grade point averages among students in the passing, failing, and withdrawing groups. College science GPA scores were calculated for each individual science course required for students in the associate degree nursing program at DBCC.

Tinto (1975) identified GPA as directly impacting student success. Potolsky et al. (2003) compared student science course grades with student success in the first semester since the largest amount of attrition is experienced in this semester. Science course grades were predictive of academic performance in the first semester nursing course.

Both descriptive statistics and multinomial logistic regression were used to evaluate the usefulness of college science course GPA scores in predicting student success. Anatomy and physiology I GPA scores were predictive of student success in the nursing program at DBCC. Students in the passing group had a significantly higher mean GPA than students in the failing or withdrawing groups. Students in the failing group had a higher mean GPA than students in the withdrawing group. Multinomial logistic regression produced an overall level of significance of .049 for the variable. This finding indicated that there were differences in the A & P I GPA scores of students in the passing, withdrawing, and failing groups.

The anatomy and physiology II GPAs were predictive of student success in the nursing program at DBCC. Students in the passing group had a significantly higher mean GPA score than the failing and withdrawing groups. Students in the failing group had a higher mean GPA score than students in the withdrawing group. Multinomial logistic regression produced an overall level of significance of .002. With the significance level set at .05 for the test, the effects of A & P II GPA scores were statistically significant. There were differences among students in the passing, failing, and withdrawing groups.

Microbiology GPA scores were predictive of student success in the nursing program at DBCC. The passing group had a significantly higher mean GPA than students

in the withdrawing or failing groups. The mean GPA of students in the withdrawing group was higher than students in the failing group. The mean GPA for students in the failing group was less than that required for admission. Multinomial logistic regression produced an overall significance level of .000, indicating microbiology GPA scores were different among students in the passing, failing, and withdrawing groups.

The results of multinomial logistic regression analysis indicated that there were significant changes in the overall model after the predictor variables were added. The use of the predictor variables improved the prediction of student success in the associate degree program at DBCC. Students in the passing group had higher mean GPA scores in all college science courses than students in the failing or withdrawing groups.

All disease processes taught in the nursing curricula are based on a scientific foundation. General education courses provide the foundation which nursing curricula are developed. Students who do not have a solid foundation in science have a difficult time understanding disease processes. The results of the study supported the anecdotal reports that have been expressed by nursing faculty with students at DBCC. That is to say, students have had a poor understanding of the material that relates to science courses. The results also supported Tinto (1975), that pre-college experiences impact student success.

Implications

The results of the study indicated that college science course GPA scores were predictive of student success in the associate degree nursing program at DBCC. Students in the passing group had mean GPA scores for all science courses of at least 3.10, compared to 2.46 for the failing and withdrawing groups. Currently, the associate degree nursing program at DBCC does not use college science course GPA scores in the admission process. This study supported the use of these variables during the admission process to the nursing program. Consideration should be given to assigning points for students who have higher GPA scores in the sciences, specifically anatomy and physiology and microbiology. This might provide the ability to have a select pool of applicants to consider for admission.

Strong remedial programs should be developed and provided for students who have low GPA scores in college science courses. College science course GPA scores should also be considered when advising students who are requesting entry to nursing programs. Developing science remedial programs and providing academic advising for students who are not proficient in courses, such as anatomy and physiology and microbiology, can be cost effective for nursing programs as well as higher education.

Research Question Four

Discussion

The fourth research question sought to identify differences in demographic variables among students in the passing, failing, and withdrawing groups. Student age, gender, ethnicity, and English as a second language were collected on the sample population.

Age

There was considerable research that supported age as an important predictor variable of student success in nursing programs. Tinto (1975) identified age as an individual attribute that influenced student commitment to college. The mean age of students in the sample population for this study varied from 33.4 to 35.4 years of age except for students who failed the NCLEX-RN. When they were evaluated separately from the passing group their mean age was 32.25 years. Students in the study ranged from 22 to 65 years of age. They mirrored that of the non-traditional community college student described in the literature. Older non-traditional students have been identified as being more focused on their studies due to financial and family obligations. Those that had a strong academic foundation were identified as performing better overall than younger traditional college-age students (Chinwe Nnedu, 2000; Joehnes, 1990; Kevern et al, 1999).

Descriptive statistics and multinomial logistic regression were used to analyze age. The passing group had a slightly higher mean age than students in the failing or withdrawing groups. Even though some significance was noted using descriptive statistics, regression analysis did not find the use of age as a predictor variable improved prediction of student success in the nursing program at DBCC.

Gender

Tinto (1975) identified sex as an individual attribute that influenced student expectation and commitment to the educational experience. Historically, nursing has been a female dominated profession. In the past ten years, males have made a dramatic difference in the workforce. Towns (2002) identified a 226% increase in the number of men who have entered the nursing profession since 1980; even so, only 5.4% of the nursing workforce was male nurses.

Descriptive statistics were used to analyze the gender of students in the study. The sample population contained considerably more females than males. Males represented 17% of the sample population. The failing and withdrawing groups had noticeably higher percentages of males than the passing group; however, multinomial logistic regression analysis did not find its use as a predictor variable significant. Gender did not predict student success in the nursing program at DBCC. The results in this study were not consistent with Tinto's Longitudinal Model of Dropout (1987). This could have resulted from the disproportion number of male and female students in the program.

Ethnicity

Tinto's model (1975) identified race as an individual attribute that influenced student persistence. There was considerable literature that supported minority students as being at-risk because of poor reading skills, study habits, and difficulty with testing (Chinwe Nnedu, 2000; Sayles et al., 2003). Descriptive statistics were used to analyze the ethnicity of students in the study. The sample population contained considerably more White students than minority students. White students made up 82% of the sample population versus 18% minority students. The failing and withdrawing groups had noticeably higher percentages of minority students than the passing group. Students that failed the NCLEX-RN also mirrored that of the failing and withdrawing groups.

Multinomial logistic regression produced a significance level of .008; there was a significant change in the overall model after the predictor variable was added. The results support Tinto's Longitudinal Model of Dropout (1975), that student attributes impact educational success. The use of the variable improved the prediction of student success in the associate degree program at DBCC. Minority and disadvantaged students have been identified as having an improved chance to succeed in educational programs if they are provided with academic, financial, social, and emotional support.

Student ethnicity was collected and entered using six different categories: Asian Pacific, Black, White, American Indian, Hispanic, and other. In this study, because of low enrollment by minority students, some categories had less than five subjects. Consequently, the results of this study must be viewed with some caution.

English as a Second Language (ESOL)

Little research was available that supported the use of ESOL as a predictor of student success in nursing programs. Femea et al. (1995) compared NET scores of nursing students with English as a second language (ESOL) to scores of primary English speaking nursing students and found that students with ESOL had significantly lower reading comprehension, essential math and test-taking scores. This study did not compare the differences in NET scores of ESOL students with primary English speaking students, but did analyze ESOL as a predictor of student success. The sample population in this study only contained 2% of students with ESOL; however, interestingly the largest percentage of students was in the withdrawing group. The withdrawing group contained 8% students with ESOL and the passing group only contained 1%. While descriptive statistics produced significant results, multinomial logistic regression analysis did not find that ESOL predicted student success in the nursing program at DBCC. This finding could have resulted from the small percentage of students with ESOL represented in the sample population of the study.

Implications

Age

There was a great deal of literature that identified non-traditional students as having different learning styles than traditional college age students. Burd (2006)

described non-traditional students at community colleges as being at-risk for failure at the time they enter college due to the realities of their lifestyle. Stark and Redding (1993) described the nursing student at a community college as married with children, working, and financially unstable. Research suggested additional education for instructors who work with non-traditional students in order to learn new strategies (Carlisle et al., 1996; Houltram, 1996). Non-traditional students also required more support services and remedial assistance in order to be successful.

The nursing department at DBCC provides continuing education for faculties, but does not provide it specifically dealing with non-traditional students. Students are referred for support services once they have been identified as having difficulties. Unfortunately, many of the problems that non-traditional students experience are difficult to address. For instance, familial support and financial obligations have been associated with age. Even though scholarships are available, many times the financial assistance is insufficient to address the financial needs. The findings indicated that faculties in the nursing departments at DBCC might benefit from additional continuing education working with the non-traditional student body. Early referrals of students for academic and social support might also be considered. A student's age in and of itself, can be used as a guide for faculties on the type of advising to offer students, but should not be used in the admission process because of the potential for discrimination.

Gender

Even though males represented a small percentage of the total nursing student population, they are an important segment of the nursing profession. With the current nursing shortage, it is more important than ever to attract and retain men as well as women in the nursing profession. Five years ago, only 5% of the nursing student population at DBCC was male students. Even though gender was not a significant predictor of student success, the fact that larger percentages of male students were in the withdrawing and failing groups indicated that their advising and/ or educational needs were not being met. With males representing a greater percentage of the student population today, strategies should be implemented to evaluate and address their individual needs. There is an increasing amount of evidence to support the premise that males have differing learning needs than females in the educational setting.

Vanhanen and Janhonen (2000) found that male and female nursing students displayed different attitudes towards the nursing profession and experienced different levels of caring. Campbell et al. (1994) identified the clinical instructor as being the most influential to the socialization process for nursing students. The literature indicated that students should be oriented to their new role prior to entering. It reduces the anxiety they experience from their new role and improves persistence in the nursing program. The majority of nursing programs use part time instructors in the clinical areas who are not afforded the continuing education that full time faculties receive. Strategies should be considered for providing clinical instructors the continuing education needed to more

effectively work with students in transitioning them into their new role and identifying the unique needs of male students.

Ethnicity and ESOL

Even though minority students represent a small percentage of the sample population in the study, multinomial logistic regression analysis identified it as a significant predictor of student success. ESOL was not considered a significant predictor of student success; however, the fact that the highest percentages of ESOL students were found in the withdrawing and failing groups was alarming. The literature indicated that with adequate support services prior to entering the nursing program, minority students have an increased chance for degree completion. Ormeaux and Redding (1990) identified the need for nursing programs to identify measures for retaining minority students. In particular, DBCC has remedial services and English courses for ESOL students. Typically, once ESOL students have been identified as having difficulties in the nursing program they are referred to the ESOL department. One of the issues is that usually only tenured faculties identify that ESOL students are having trouble early enough to refer them so that they can receive services prior to withdrawing or failing.

Some continuing education is provided for full time faculty on working with the unique needs of minority students and ESOL students but none is provided for part time instructors. Part time instructors represent 65% of the total nursing department workforce. Additional continuing education should be provided for instructors and

faculties in the nursing department so that they can better work with the unique needs of the student body. Early referrals for ESOL students for remedial services might also be considered so they can be retained in the nursing program.

Summary

The findings of the study supported the need to develop remedial programs that are student and program specific. The study identified variables that were significant predictors of student success in the nursing program at DBCC. These variables could be effectively used in the selection process and should be considered when advising students. Providing academic advising for students who have been identified as at-risk for failure can be cost-effective for nursing programs as well as higher education. The ability to identify students who are at-risk and provide support services will increase the number of students who graduate and enter the nursing profession. Providing continuing education for faculty on student risk factors, types of support services, and the importance of early referral for at-risk students will benefit students and higher education in general.

The results of the study indicated that Tinto's Longitudinal Model of Dropout (1975) could be adapted and effectively used in nursing programs. Specific pre-college experiences and individual attributes were significant for predicting student success in the associate degree nursing program at DBCC and should be considered when developing a conceptual model for use during the admission process. Family background was not a

variable that could be used in the nursing program at DBCC because of the inability to obtain the student information. When developing the conceptual model, increased importance should be given to cumulative admission GPA scores and college science GPA scores, specifically anatomy and physiology and microbiology. The ability to choose the pre-college experiences and individual attributes that were identified as significant in this study will allow the researcher to adapt and utilize Tinto's Longitudinal Model of Dropout in the nursing program at DBCC.

This study identified variables that were significant predictors of success for students who applied for admission to the associate degree nursing program at DBCC, but cannot be generalized to a larger population because of the sample that was used. The ability to identify variables that predict student success with a more representative population and effectively integrating them in the selection process will be important for nursing programs because of the limited number of slots available for nursing students. As the need grows for nurses in the future, the ability of nursing programs to identify a select pool of candidates will benefit the nursing profession by providing more nurses to address the nursing shortage. It will also improve program outcomes and ultimately be more cost-effective for higher education because of the increased number of students who will successfully complete the program and graduate.

Limitations

The first limitation was that a convenience sample was used in the study. Students were from one program at one college for a limited period of time. The findings can be generalized to students in the associate degree nursing program at DBCC, but the inability to use a more representative population in the study limited the ability to generalize the findings to a larger population.

The second limitation of the study was that not all students met the minimum requirements. All students in the total population were used, even though some had a grade point average lower than the minimum score.

The third limitation of the study was that DBCC does not have a time limit for acceptance of general education course. The age of general education courses varied dramatically among students in the sample population. Students could also request course substitutions for transfer courses with similar content. The age of the science courses could have made a difference in students college science course GPA. Data were not available to evaluate the age of college science courses for students in the passing group versus students in the failing and withdrawing groups. Even though the findings were significant for use at DBCC, it would be difficult to generalize to other nursing programs.

The fourth limitation of the study was that NET scores were not available for students who did not meet the minimum requirement for admission to the nursing program. This excluded a subpopulation from the study that could have been important when evaluating if NET scores predicted student success.

The fifth limitation of the study was there were small representations of minority students, male students, and students with English as a second language in the sample population. Because of sampling biases, this could have produced results that might be questioned as far as reliability.

The last limitation of the study was that not all variables identified as important in the community college student were considered. Familial support, finances, and number of hours worked were identified as extremely important in student success. This information was not available on the sample population.

Recommendations for Future Research

Future studies should use a population from more than one program at more than one school. Students must pass a national examination in order to obtain licensure. Nationally, nursing programs experience similar issues and many are implementing retention strategies. Efforts should be made to standardize entry requirements to nursing programs.

Future studies should focus on the required college science courses. Attention should be given to the age of the college science courses and differences between those students who were successful and not successful. Science college course grade point averages (GPA) were significant predictors of student success at DBCC. The passing group had noticeably higher GPA scores in all college science courses. Since science is

such an important component in the nursing curricula, it would be interesting to know if students in the unsuccessful groups had older courses than students in the passing group.

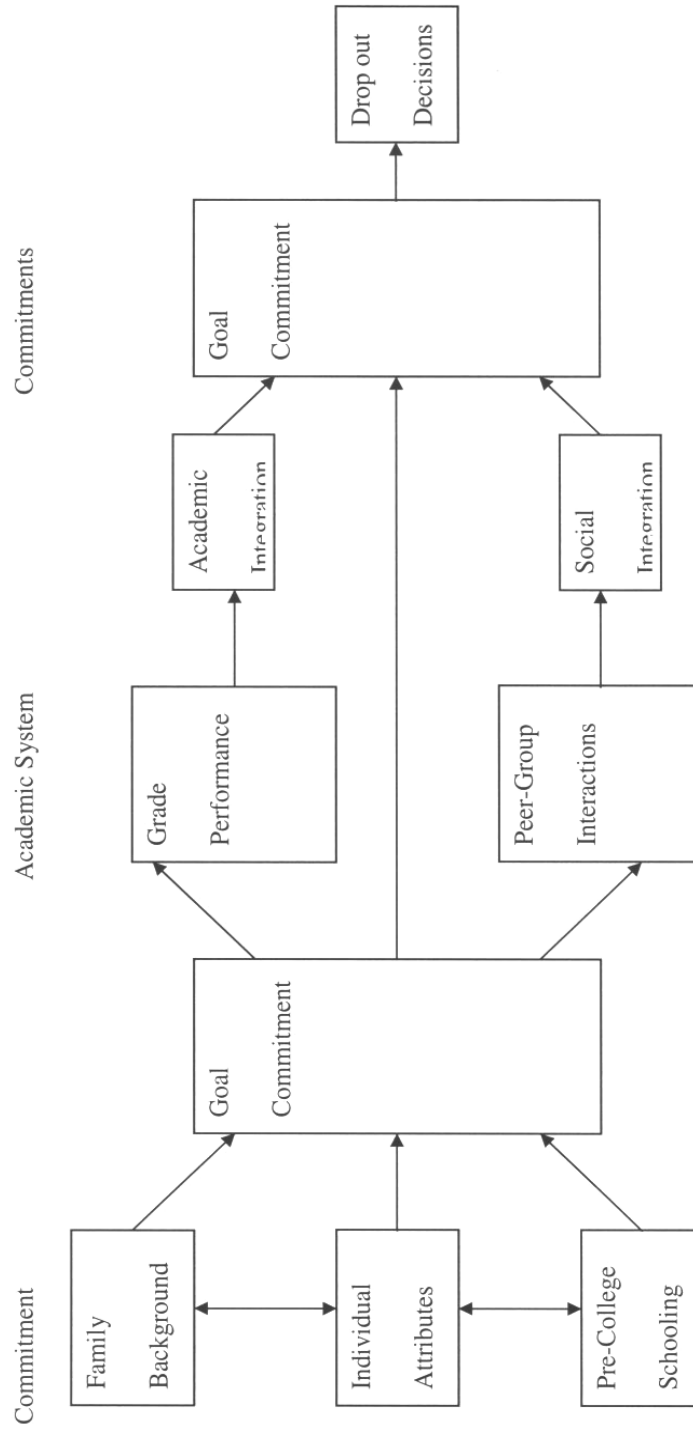
With the growing segment of males in the nursing profession, future studies should focus on the unique differences of male and female students and strategies to retain men as well as women in the nursing profession. Socialization into nursing would be an important variable to consider for future studies.

Future studies should be done using larger populations of minority students and male students to reduce the biases of sample size. Compare and differentiate the results with national trends that focus on student success in nursing programs and support services.

The last recommendation would be to consider student risk factors such as financial obligations and number of hours worked. The literature indicates that these risk factors are predictors of student commitment and persistence in education, especially in non-traditional students.

APPENDIX A: CONCEPTUAL MODEL

Tinto's Longitudinal Model of Dropout



Tinto, V. (1975). Dropout from higher education: A theoretical synthesis of recent research. *Review of Educational Research*, 45(1), 89-125.-

APPENDIX B: DATA COLLECTION WORKSHEET

Data Collection Worksheet

Name	ID No.	Grad. Year	Gender	Ethnicity			
				AP Other	Black	White	AA/AL Hispanic

Adm GPA?	F. Lang?	Pass NCLEX?	No of admits to nsg program?

NET	Reading		Math	Overall

Pre/ Co-requisite	Hrs.	Grade	GPA	Attempts
English I				
A & P I				
College Alg				
A & P II				
Gen Psych				
English II				
Microbiology				
Oral Comm				
C & A Elec				

Nursing Courses	Hrs.	Grade	GPA	Attempts
Nursing Fund				
LPN/ AD Trans				
Para/ RT Trans				
Med Surg				
Med Surg Para/RT				
Maternal Health				
Child Health				
Psych				
Adv Med Surg				
Mngmt & Lead				

APPENDIX C: LETTER OF PERMISSION TO MODIFY DATA COLLECTION
WORKSHEET

MIDAMERICA
NAZARENE UNIVERSITY

Division of Nursing

February 13, 2006

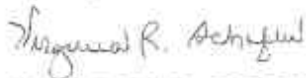
Linda Miles
Nursing
1200 W. International Speedway Blvd.
Daytona Beach, FL 32120

Dear Ms. Miles:

Thank you for your interest in my dissertation and data collection tool. You have my permission to use my data collection worksheet for your own study. Please feel free to modify it, as needed, to fit your specific needs.

Best wishes on your dissertation.

Sincerely,



Virginia R. Schafer, PhD, RN
Professor, Division of Nursing

APPENDIX D: CONSENT FORMS

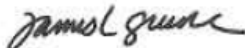
Daytona Beach
Community College

Linda Miles
Chair, Nursing Department
1200 W. International Speedway Blvd
Daytona Beach, FL 32120

Dear Mrs. Miles:

This letter is to verify that you have my permission to access student and graduate records kept in the Division of Nursing at Daytona Beach Community College for the purpose of gathering data for your doctoral dissertation. The records may include, but are not limited to, student files, student transcripts and standardized test scores. Permission of individual students is not required provided you report data in aggregate form and refrain from releasing individual student information. In addition, it is expected you will follow the Family Education Rights and Privacy Act (FERPA) when handling any student data.

Sincerely,



James Greene, Dean
School of Health, Human and Public Services

Daytona Beach Campus • 1200 West International Speedway Boulevard • Daytona Beach, Florida 32114 • (386) 506-3000
Advanced Technology Center (ATC) • 1770 Technology Boulevard • Daytona Beach, Florida 32124 • (386) 506-4100
DeLand Campus • 1135 County Road 4139 • DeLand, Florida 32724 • (386) 755-2000
Deltona Center • 2351 Providence Boulevard • Deltona, FL 32725 • (386) 769-7302
Flagler/Palm Coast Campus • 3000 Palm Coast Parkway Southeast • Palm Coast, Florida 32137 • (386) 246-4800
New Smyrna Beach-Edgewater Campus • 940 Timb Street • New Smyrna Beach, Florida 32168 • (386) 423-0300

An Equal Access/Equal Opportunity Institution

Daytona Beach Community College

Linda Miles
Chair, Nursing Department
1200 W. International Speedway Blvd
Daytona Beach, FL 32120

Dear Mrs. Miles:

This letter is to verify that you have my permission to access student and graduate records kept at Daytona Beach Community College for the purpose of gathering data for your doctoral dissertation. The records may include, but are not limited to, student files, student transcripts and standardized test scores. Permission of individual students is not required provided you report data in aggregate form and refrain from releasing individual student information. In addition, it is expected you will follow the Family Education Rights and Privacy Act (FERPA) when handling any student data.

Sincerely,



Joseph Roof, Associate Vice President
Enrollment and Student Services

Daytona Beach Campus • 1200 West International Speedway Boulevard • Daytona Beach, Florida 32114 • (386) 201-1000
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DeLand Campus • 1155 County Road 4139 • DeLand, Florida 32714 • (386) 785-2000
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