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A Study of Persistence in the Walters State Community College

Associate-Degree Nursing Program

A dissertation

presented to

the faculty of the Department of Educational Leadership and Policy Analysis

East Tennessee State University

In partial fulfillment

of the requirements for the degree

Doctor of Education

by

Jeffrey Tom Horner

August, 2005

Dr. Terrence Tollefson, Chair

Dr. James Lampley

Dr. Louise MacKay

Dr. Jack Rhoton

Keywords: Academic Persistence, Persistence Variance, Associate-Degree Nursing, Positive Correlates, Non-Traditional Students, Nursing, Attrition, and Retention

ABSTRACT

A Study of Persistence in the Walters State Community College

Associate-Degree Nursing Program

by

Jeffrey T. Horner

The WSCC ADN program had 66.57% persistence rate between the years 2000-2004. This retrospective study analyzed 28 demographic, pre-clinical, and clinical variables to identify correlates for persistence within the WSCC ADN program. The population size was 730 first-time candidates or the entire population of five consecutive clinical classes graduating between the years of 2000-2004. The candidates were identified and the variables tabulated using the WSCC student information system. SPSS 13.0 software was employed to conduct descriptive, frequency, multiple regression, multivariate analysis of variance, and univariate analysis of variance tests. The criterion variables included persistence within the entire population, gender-specific persistence factors, and age-specific factors within the traditional and non-traditional populations that persisted.

Descriptive and frequency analysis found that most candidates were female (90.82%), Caucasian (96.44%), and classified as non-traditional (63.97%). Females and particularly non-traditional females maintained the highest persistence rates. The mean pre-clinical and clinical admittance ages were 25.04 and 28.39 years. Seventy percent of the candidates lived within the WSCC service area. The mean distance commuted was 37.71 miles.

Statistical tests revealed that nine predictor variables influenced persistence within the entire population. The largest contributors of variance were 2nd semester clinical GPA ($\eta^2 = .33$), cumulative pre-clinical GPA ($\eta^2 = .15$), and grades in microbiology ($\eta^2 = .14$). These variables along with the number of course withdrawals and/or grades of “F” were found to be major indicators for persistence within the female and male sub-populations. The number of full-time semesters was a more significant contributor in the male population ($\eta^2 = .12$) than the female population ($\eta^2 = .02$). Data analysis revealed that non-traditional students who persisted had higher human anatomy and physiology II grades while the traditional students had a higher rate of transferring coursework into the nursing program.

These findings will aid in the direction of the recruitment, evaluation, and selection of potential candidates for this very demanding program of study while validating the importance of prerequisite core knowledge. The findings should serve as predictive evidence to better identify and inform potential “at-risk” candidates of the factors that affect persistence in this nursing program.

DEDICATION

One of the most difficult things in life is to find the words to say thank you for caring and believing. In my life, many people have placed permanent imprints. From my parents, grandparents, and sister to the young ladies that I have been honored to coach over the years, I have been inspired to dream and encouraged to reach higher. Yet, two individuals have touched me the deepest, my daughter, Casey, and my wife, Kim. Hopefully, the achievement of this degree will illustrate to Casey that from hard work and patience many challenges can be accomplished.

Kim has displayed tremendous patience and lovely support throughout this endeavor. She established a strong foundation for my commitment to improving the nursing shortage. As a trauma nurse for over 15 years, Kim's dedication and persistence has saved many lives, including mine daily. To her and all the nurses that save lives 24 hours a day, seven days a week, I simply say thanks for your efforts they are not forgotten.

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CHAPTER 1

INTRODUCTION

Ignoring catechistic events, a medical personnel shortage will eminently impede managing the medical concerns of our graying, baby-boomer population (Prescott, 2000). It has been estimated that an unchecked nursing shortage will result in a 40% decline in patient care between the years of 2010 and 2030 (University of Illinois, 2001). The potential avoidable effects emanating from such a shortage of nurses is documented in a recent study that found insufficient staffing levels had contributed to 24.1% of the 1609 unanticipated deaths or injuries in hospitals evaluated since 1996 (Joint Commission on Accreditation of Healthcare Organizations, 2002). These data coincide with findings that patient safety and healthcare quality are compromised as the proportion of care and hours of care by registered nurses are diminished and that patients who have common surgeries in hospitals with higher than a 4:1 nurse-to-patient ratio have up to a 31.0% increased chance of dying (Aiken., Clarke, Sloane, Sochalski, & Silber, 2002; Needleman, Buerhaus, Mattke, Stewart, & Zelevinsky, 2002). Coincidentally, a survey of 831 physicians found that 53.4% said the most common cause for medical errors to be the understaffing of nurses in hospitals (Blendon et al., 2002).

These studies depict the importance of the diverse tasks that nurses perform in patient care and are strong support for insuring that the nursing sector is the most populous medical personnel division. There are about 2.7 million registered nurses, including 81.7% who are employed at least part-time (Health Resources and Services Administration (HRSA), 2002). Within the State of Tennessee, there are 55,075 practicing registered nurses (Tennessee Department of Health (TDOH), 2003).

Even when considering these numbers, an endemic nursing shortage is continuously documented in certain geographical areas and within specific disciplines (HRSA, 2000; Jacobs, 2001). A recent federal report cited 30 states with nursing shortages in the year 2000, a figure that is estimated to grow to 44 states by the year 2020 (HRSA, 2002). If not addressed, the nursing shortage is predicted to expand by at least 29%, or a shortage of more than 400,000 nurses, by 2020 (HRSA, 2002; Buerhaus & McCue, 2000). Tennessee was one of those 30 states and was projected to have a nursing shortage of 13%, or about 6,800 nurses in 2000. This shortage was estimated to expand by at least 31% or more than 19,000 nurses by 2010, and by 48.50% or more than 36,000 nurses by 2020.

The latest U. S. Bureau of Labor Statistics study estimates that more than 1.0 million additional nurses will be needed by the year 2010 (Hecker, 2001). This correlates as a 21.2% needed increase in nursing professionals between the years 1998 to 2008 as compared to a 14.2% needed average expected increase in all other occupations. When considering that 40.5% of all nurses will be over the age of 50 by 2010, a significant portion of these additional nurses are needed to replace the retiring nurses (United States General Accounting Office, 2001). This GAO study is supported by a National Sample Survey of Registered Nurses that found the average age of working nurses was 43.30 years of age in 2000, up from 42.30 years of age in 1980. The active registered nursing population under the age of 30 has dropped from 25.1% in 1980 to 9.1% in 2000, suggesting the shortage may be due largely to factors associated with recruitment and attrition prior to attainment of the license (HRSA, 2000).

This medical paradigm is further impeded by an increasing emigration of practicing nurses. As many as 40% of nurses are dissatisfied with their careers, with as many as 1 in 3 nurses considering leaving the patient care environment within two years for reasons other than

retirement. Performance-induced stress, mandatory overtime, overwork, and stress over patient safety are cited as leading causes for premature burnout (Aiken, Clarke, Sloane, Sochalski, & Silber, 2002; Aiken et al., 2001; Berliner & Ginzberg, 2002; Spratley, Johnson, Sochalski, Fritz, & Spencer, 2000; Steinbrook, 2002).

Even more alarming are findings by the that the number of first-time U.S. educated nursing school graduates who sat for the NCLEX-RN, the national licensure examination for registered nurses, decreased by 26.9% from 1995 to 2002 (Crawford, Marks, Reynolds, & White, 2002). With a total of 70,540 first-time attempts in 2002, this 26.9% decrease resulted in 25,898 fewer first-time students attempting the exam in 2002 as compared with 1995. Of this reduction, 15,598 or 60% of the attrition was in the associate degree nursing (ADN) population. This was especially striking when ADN graduates represented roughly 60% of the replacement population of U.S. educated candidates that sat for the NECLEX in 1995 and 2002 (Crawford et al.).

For the first time, researchers predict that by 2010 the supply of registered nurses will no longer exceed requirements for full-time registered nurse demands (Geolot, 2000). Currently 90% of long-term care providers report they are challenged to provide even the most basic needs for their clients (Centers for Medicare & Medicaid, 2002). The most drastic shortage is in hospitals, where about 2 million nurses are currently needed. A national survey indicates that only 1.90 million nurses were working in a hospital setting. This represented a shortage of 110,000 nurses, or about 6% of the total nurse workforce. The effects of this shortage were realized in an American Hospital Association (2001) warning of more than 126,000 nursing vacancies nationwide in hospitals in 2001 representing 75% of all hospital-related vacancies.

Exhaustive data analysis has identified predominant indicators and compared them to indicators of previous nursing shortages (Buerhaus, 2000a; Fagin, 2001; HRSA, 2000; Peterson,

2001; Purnell, Horner, Gonzalez, & Westman, 2001). While nursing shortages are shown to be cyclical, distinctive indicators suggest this shortage is unique, because it coincides with shortages in such other health-related careers as medical technicians and support staff (Buerhaus, 2000b). Previous remedies such as sign-on bonuses, relocation coverage, flexible workloads, and premium packages when applied to the current shortage are more likely to temporarily solve nursing shortages within a geographical area by redistributing the supply of nurses. Due to limited pools of future nurses, these temporary marketing techniques will not necessarily result in an increase in the nursing population (Nevidjon & Erikson, 2001).

Statement of the Problem

The nurse shortage could partially be caused by academic persistence within the secondary institutions prior to obtainment of the nursing degree. This factor combined with the potential effects of The Nurse Reinvestment Act on rural ADN nursing program enrollment and the possible results of the Tennessee lottery on student enrollment supports the examination of positive predictive variables that influence persistence in a rural ADN program. Similar studies suggest that overall College GPA, English GPA, and Core Biology GPA, along with Core Biology repetitions are key indicators related to persistence (Phillips, Spurling, & Armstrong, 2002).

Many of these variables have been examined within a 5-year population of Walters State Community College (WSCC) nursing candidates. The effects on persistence based on demographic variables such as gender, race, age, and distance from the campus will be considered to determine if a rural nursing program has unique dilemmas that may limit success.

Research Questions

The following questions guide this investigation:

1. What, if any, student demographic characteristics are associated with persistence to graduation in the Walters State associate-degree nursing program?
2. What, if any, academic variables are associated with persistence to graduation in the Walters State associate-degree nursing program?
3. What, if any, academic variables and/or demographic variables are associated with persistence to graduation in the Walters State associate-degree nursing program?
4. What, if any, prerequisite academic variables and/or clinical variables are associated with persistence to graduation in the Walters State associate-degree nursing program?
5. What, if any, demographic variables and/or clinical variables are associated with persistence to graduation in the Walters State associate-degree nursing program?

Significance of the Study

Many variables have been identified as potential barriers to overcoming the nursing shortage. Variables that mitigate chronic stress and the resultant burnout effect to demographic and socioeconomic variables limit the pool of potential candidates. Some researchers speculate that the declining preparedness of entering freshmen, as measured by their math and science scores on the ACT and/or SAT, may be indicative of declining abilities to persist in science-based curricula. These “at-risk” students are especially prevalent in the community college settings because of “open-door” policies that permit under-prepared students admittance. Research by Gray-Barnett (2001) suggested that individuals required to take developmental courses were less successful in college-level mathematics courses.

While functioning to re-evaluate a cluster of research that addresses persistence within nursing programs and specifically associate-degree nursing (ADN) programs, this study will act as a comparative tool for recent studies conducted on students at this same institution (Apple, 2002; Goodman, 1999; Gray-Barnett, 2001). Comparative results will aid in the direction of the recruitment, evaluation, and selection of potential candidates for this very demanding program of study while validating the importance of prerequisite core knowledge. It should serve as predictive evidence to better identify and inform potential “at-risk” candidates of the factors that effect persistence in this particular program. It could allow the redirection of career objections for less qualified candidates while potentially identifying candidates that are not considering nursing as a career.

Delimitations/Limitations

1. The evaluation in this study was conducted on the first-time admissions into the ADN nursing clinical program at WSCC.
2. This study only included those individuals who had been admitted and had enrolled in the clinical program.
3. This study excluded all Licensed Practical Nurses (LPN) admissions through career-mobility articulation.
4. This study addressed only variables realized from the ADN population within the five year period of 2000-2004.
5. No investigations were conducted to address variances due to causation associated with specific instructor(s).
6. Because this study was limited to the 2000-2004 nursing population at Walters State Community College, the results may not be generalized to other populations.

Assumptions

1. Information obtained from the Student Information System (SIS) will be accurate.
2. The method of collecting and managing this information throughout this investigation will be efficient and confidential.
3. The method of acceptance into the ADN program between the periods of 1998 through 2002 will be consistent.
4. There is no significant variance of course material and testing methods within a prerequisite variable during this time period.
5. All requirements and evaluation methods by faculty remains consistent during this time period (Apple, 2002).
6. All GPAs are based on interval data.

Definitions

The following definitions are used throughout this investigation:

1. The ADN program at WSCC is a program of study that culminates with the associate degree in nursing after successful completion of two consecutive years of clinical instruction (Tennessee Department of Health, 2002).
2. Academic grades are based on a 4.0 quality-point scale that awards a letter grade based on these point distributions per semester hour: A = 4.0, B = 3.0, C = 2.0, D = 1.0, and F = 0.0 points (Starke & Bear, 1988).
3. A cumulative grade point average (GPA) is based on the total number of quality points earned divided by the total number of semester hours attempted. This study uses three separate admission GPAs. The first GPA includes only the developmental courses required, the second GPA includes only the prerequisite college courses, and the third GPA is the overall GPA

including both developmental and prerequisite courses (Walters State Community College, 2003).

4. Developmental courses are designed to remediate deficiencies in academic areas that are assessed as below college-level knowledge. These deficiencies are identified by an institutional admission test and/or standardized admissions tests, and must be remedied prior to enrolling in a college-level course within the given discipline. The areas of concentration are mathematics, reading, and writing. These courses do not count on the institutional GPA toward a degree seeking endeavor and are non-transferable to senior institutions.

5. Prerequisite courses are any courses listed within the WSCC catalog that are required prior to receiving an associate degree in nursing.

6. A traditional student is defined as any individual under 21 years old or younger who enrolls continuously from the first term until completion of the program.

7. A non-traditional student is defined as an individual who does not immediately enroll in college after high-school graduation, is married, is a parent, is 22 years-old or older, is enrolled part-time more than two semesters consecutively, and/or obtains a General Education Diploma (GED) (Preston, 1993).

8. A full-time student must maintain a minimum of 12 semester hours during both the fall and spring semesters of a school calendar year.

9. Successful persistence is defined as completing all clinical core requirements that lead to graduation within two school calendar years as prescribed by the WSCC catalog.

10. Admission requirement is a minimum of “C” in each of the required natural and computer sciences courses along with a minimum overall GPA of “C” as specified by the WSCC nursing program and defined within the WSCC catalog (Walters State Community College, 2003).

11. Situational variables are any characteristics that may impact a student's life situation at a given moment and culminate in a lack of adequate time to devote to educational endeavors (Cross, 1981)

12. Institutional variables are any practices and/or procedures that hinder or discourage adult learners from participation and completion of degree programs (Cross, 1981).

13. Dispositional variables include any student behaviors, attitudes, self-perceptions, or prior academic performances that can predict future academic success (Cross, 1981).

Overview

Chapter 1 provides an introduction and is designed to identify the importance of this study, while defining the perimeters and limitations of the study. Chapter 2 is a review of literature designed to identify pertinent research that will act as comparative measures, adding to the relevance of the study. Chapter 3 identifies the methods of inquiry that are used to identify significant variables. Chapter 4 presents findings of the investigation within a set of tables. Chapter 5 discusses the relevancy of the findings, links pertinent conclusions with other comparative findings and presents any suggestions for future study that may be significant.

CHAPTER 2

LITERATURE REVIEW

One of the greatest accomplishments perceived by parents and students is the attainment of a college degree (Kramer, 1982). One of the greatest challenges in postsecondary education has been to understand why nearly half of all first-time students who entered two-year colleges and 28.50% of students who entered four-year colleges did not persist to graduate (Tinto, 1993). One comprehensive analysis revealed that only 7.00% of those students entering associate's degree programs were found to have completed all degree requirements within 3 years. An encouraging finding was that more than half were still enrolled in postsecondary education, with many having transferred to senior institutions (Berkner, He, & Cataldi, 2002).

Previous studies reported that the majority of attrition in public community colleges was within the first year of enrollment and that those students often did not re-enroll (Horn, 1998; Tinto, 1993). Even when controlling background and educational factors, the rate of attrition within two-year institutions has been much higher than that of four-year institutions (Horn, Peter, & Rooney, 2002; Tinto, 1993).

Whether it was the need for institutional assessment and accountability (Cohen & Brawer, 1996), the impact of high cost for recruitment of new students (Brooks-Leonard, 1991), or merely survival needs during periods of declining governmental support (Grossett, 1991), institutions have continually explored aspects of student attrition as a vehicle of institutional effectiveness and strategic planning.

While this study specifically examines the persistence predictors within the WSCC ADN program, a review of related literature provides guidelines and explanations for the factors analyzed within this study. Initially, a brief limitation for generalization of research data

discussion explored the validity of research findings included within this review. This was followed by a discussion of influential persistence models that introduced and documented relevant key factors that were continually evaluated within post-secondary studies.

A review of national data concerning student characteristics and predictor factors was explored to identify tendencies within the entire undergraduate population. Research findings that specifically addressed factors within the community college sector was explored to discern unique characteristics such as “non-traditional” and “at risk” student sub-populations that more frequently influenced persistence within the community college division. A similar data analysis of previous studies was explored within the associate nursing sector. Finally, the WSCC associate nursing program was analyzed to determine if there were similar tendencies that coincided with national data findings.

Postsecondary Research Terminology, Limitations, and Tools

Descriptive Terminology

A brief review of literature revealed that researchers have examined student persistence by the enrollment and student behaviors associated with the continual enrollment patterns from one semester to the next (Horn, Peter, & Rooney, 2002; Phillips, Spurling, & Armstrong, 2002). In this instance, the descriptive terminology was typically student persistence, retention, or attrition. The other mode of enrollment and student behavior studies examined the factors that were present when students did not enroll in consecutive semesters. In this instance, the descriptive terminology was typically either attrition or dropout. Throughout this review, findings using each of these four descriptive terms were analyzed to determine relevant relationships.

Limitations to Postsecondary Findings

Exhaustive studies have examined variables that contributed to persistence of student cohorts within individual institutions. The fact that a majority of persistence research was acquired from case studies within individual institutions limited the reliability to generalize predictive factors upon a national population (Lee, 1996) or the population within this study. Often factors within a community college case study such as inadequate parking have been a factor only to that institution (Luan, 1996). Research also suggested that descriptive factors often were not considered holistically in order to discern if there were mutual relationships among student characteristics.

The generalization of these primarily baccalaureate program data upon community college populations has often been discerned based on the reliability of the data when considering that such populations had distinctively unique persistence factors. Many students entering community colleges did not intend to graduate or receive a certificate. These students may simply have been taking course(s) that were of personal interest for job training or that met the general educational requirements for senior institutions (Choy, 2002).

Another factor that seemed to be more prevalent in community colleges was the large number of students who temporarily left school only to return after work, family, and/or financial situations permitted. Horn (1998) identified these individuals as “stopouts” or “stayouts”. Preston (1993) described these “stopouts” as a significant cluster of community college students who were over the age of 21 years, attended college mostly part-time, and enrolled intermittently. The term Preston used to describe these students was “non-traditional”. Literature reviewed throughout this document indicated that non-traditional students have unique effects upon the community college persistence and attainment goals.

For these reasons, valid persistence research typically measured only those individuals who had stated a particular educational goal and the effectiveness with which they attained the stated educational objective (Summers, 2003). While this research limited generalization to larger populations outside the given case study, these descriptive findings provided vital comparable evidence for further analysis.

Inference Tools

Frequently, persistence variables have been examined individually using inference tools such as ANOVA, chi-square, and t-tests. Yet, other data suggested that persistence cannot be effectively explained unless a multivariate approach is used to discern relationships between and within numerous variables (Grimm & Yarnold, 2001). Some of the most effective predictors have associated interrelationships between demographic and disposition factors.

Early Empirical Modeling

The conventional method used to explore persistence has been to identify predictor factors through modeling studies. This portion of the literature review addressed four conceptual persistence models from the foundational work of Durkheim (1951) and Spady (1971) to the refined designs of Tinto, Bean, and Metzner, and culminating with the Cross model. Aspects from each of the models were analyzed in this study to identify predictors for persistence.

Durkheim (1951) found that suicidal individuals tended to have more difficulty integrating socially and normatively into social systems. Spady (1971) adapted this finding into one of the initial test models for education by applying these social difficulties to collegiate attrition. He initially identified five independent factors that have been examined extensively. The first four variables were grade performance, intellectual development, normative congruence, and friendship support. These four factors cumulatively affected the impact of the

fifth factor, social integration. Spady used the criterion variable “dropout” to test a cluster of students from the University of Chicago in 1965. From this study, he revised previous variables to include structural relationships and friendship support, as well as refining the relationships among his original variables.

Tinto's Student Integration Model

The next major advancement in attrition modeling came from studies initiated by Tinto in 1975. More than 170 dissertations and 400 citations within postsecondary persistence studies can be attributed to an interactionist model postulated by Tinto (Braxton, Sullivan, & Johnson, 1997; Tinto, 1975, 1993). Tinto (1993) used demographic, psychosocial, and institutional factors to propose that there was a relationship between institutional integration and college persistence. Tinto defined institutional integration as the degree that students socializes with both peers and faculty and believes that their learning is facilitated by the faculty. Tinto suggested that integration could be measured directly by institutional and goal commitment levels. The institutional integration was the level of student commitment to graduate from a particular college. The goal integration was the level of student commitment in obtaining a degree in general.

Additionally, the institutional and goal commitments were influenced externally by social and academic integration. The relationship between these commitment goals and persistence was substantiated by several empirical studies (Cabrera, Castaneda, Nora, & Hengstler, 1992; Chartrand, Camp, & McFadden, 1992).

Significant Studies

Factors identified as influencing social and academic integration included age, socioeconomic status, personality needs, pre-college academic experience, previous academic

achievement, and initial experiences in college (Pascarella, Smart, & Ethington, 1986). Munro (1981) found that high school GPA had a direct effect on academic and goal commitment for first-time, full-time four-year students. More recent data supported this model and suggested that the most significant initial goal commitment was self-esteem and those females and older students had greater initial institutional commitment (Napoli & Wortman, 1998).

Level of motivation was revealed as a significant persistence factor for minorities (Allen, 1999). Social support and larger campus size were revealed as significant social integration factors with such academic integration factors as age, socioeconomic status, and previous academic achievement (Napoli & Wortman, 1998).

Drawbacks to Tinto's Model

Several researchers have noted that a major drawback of Tinto's theoretical approach was the lack of attention to environmental factors outside the institutional setting on college persistence (Bean & Metzner, 1985; Cabrera, Castaneda, Nora, & Hengstler, 1992). Pascarella and Terenzini (1983a, b) analyzed the effects of distinctive institutional types on integration. By grouping the institution as either four-year primary residential, four-year primary commuter, or two-year primary commuter, they found that social integration was directly associated with persistence within four-year residential colleges. They found that only academic integration had a direct effect on persistence in both commuter groupings. This was supported by a study on two-year institutions that found that academic integration influenced persistence (Nora, Atinnasi, & Matonak, 1990). Pascarella and Terenzini (1991) revealed that social integration was negatively related to persistence in commuter colleges. Yet, they did find that students had become more open-minded, acquired improved verbal skills, and gained occupational advantages during their higher educational experiences.

Other studies have found that social and academic integration factors influenced long-term and short-term persistence and graduation within two-year college institutions (Napoli & Wortman, 1996; Pascarella, Smart, & Ethington, 1986). Skahill (2002) revealed that commuter students were less likely to persist, while residential students who reported making greater numbers of new friends with connections to the school also reported attaining personal and academic goals at a significantly higher rate.

At least two studies found social integration to be a better predictor for persistence than academic integration (Bers & Smith, 1987; Napoli & Wortman, 1996). This led Napoli and Wortman (1996) to conclude that academic integration contributed a large and positive influence on persistence behavior, whereas social integration weighed heavily on the persistence decisions that were largely influenced by term-to-term enrollment and were not weighed as heavily for those that considered the academic year outcome.

This finding was not unique, considering the high number of first-semester dropouts in two-year institutions (Tinto, 1993). These findings suggested that a more powerful measure for persistence within community college settings would be term-to-term data instead of year-to-year data (Napoli & Wortman, 1996).

Refinements for Tinto's Model

Validation studies focused on the degree of support for the 13 primary factors identified in Tinto's 1975 foundational theory (Braxton, Sullivan, & Johnson, 1997). Analytical tests supported only 5 of the 13 primary factors with 4 factors having a symbiotic relationship as ways student entry characteristics affect the level of initial commitment to the institution. The student entry characteristics included family background characteristics such as socioeconomic status, parental educational level as well as individual attributes such as academic ability, race, gender,

and pre-college academic experiences such as high-school academic achievement. Additionally, the higher the initial level of commitment to the institution, the greater the likelihood of student persisted in college.

Tinto's social integration factors were found to be insignificant unless they were analyzed in the context of active learning (Braxton, Milem, & Sullivan, 2000). Active learning is defined in this instance as any class activity that "involves students in doing things and thinking about the things they are doing" (Bonwell & Eison, 1991, p. 2). In particular, this study revealed that faculty classroom behaviors played a key role in social integration, subsequent institutional commitment, and students' intent to return. Only active learning emphasizing group work failed to influence any of these constructs.

In addition, this study supported the lecture method, collaborative learning, and personalized systems of instruction as examples of teaching methods that might variously affect social integration, subsequent institutional commitment, and persistence (Braxton et al., 1997).

Recent educational delivery trends like distance education and online degree programs have challenged the relationship between student subgroups, virtual campuses, and persistence. Current data suggest that Tinto's theories will need refinement to explore the persistence relationships between these mostly non-traditional students and the virtual campuses that they employ (Rovai, 2003).

Bean's Student Attrition Model

Another body of research built on the weaknesses of Tinto's model and added to our understanding of persistence factors within "at-risk" cohorts such as non-traditional and minority students. The student attrition model examined college persistence based on theories that argued that environmental factors external to the institution impact a student's decision to continue in

college (Bean, 1980, 1983, 1985; Bean & Metzner, 1985). Bean and Metzner contended that previous models weighed socialization too heavily and did not equally consider the persistence related to non-traditional students who have fewer opportunities for social integration.

Bean and Metzner (1985) contended that nontraditional student persistence was determined by academic variables as measured by grade point average, high school performance, and educational goal. Bean and Metzner considered two compensatory relationships essential in measuring levels of attrition. First, the relationships between academic variables and environmental variables that was influential enough to prevent students with low academic variables from withdrawing and/or stopping out. Secondly, any psychological variable(s) that were influential enough to prevent students with low academic variables from withdrawing (1985).

With this contention, Bean and Vesper (1990) have argued that student attrition is similar to turnover in work organizations and they have stressed the importance of behavioral intentions as predictors of persistence behavior. In this context, the student attrition model presumes that a process whereby beliefs shaped attitudes, and attitudes, in turn, influenced behavioral intents shaped behavioral intentions. Beliefs were presumed to be affected by a student's experiences with the different components of an institution. This student attrition model also recognized that factors external to the institution could play a major role in affecting both attitudes and decisions while the student was still attending college. External factors that have been associated with this model were social and workplace support.

Social Support Research

Research indicated that social support from family and friends was associated with student persistence (Bean & Metzner, 1985; Cabrera et al., 1992; Malin, Bray, Dougherty, &

Skinner, 1980). In studies that explored family support separately from the support of friends it was found that family support was a stronger persistence factor (Mutter, 1992). Because the family and work commitments often differed from those of traditional students, family support may be a more potent predictor of persistence than college integration for non-traditional students. One of the few studies that examined family support on non-traditional students' intentions to continue an academic program found that family support and encouragement had a direct relationship with both psychological adjustment to college and intent to continue (Chartrand, 1992).

While examining a group of non-traditional child care providers, Buell (1999) revealed that along with college integration, family support was identified as a key predictor of persistence within this population. While this finding supported other studies that suggested a direct link between family support and commitment to completing program of study (Allen, 1994; Bean & Metzner, 1985; Chartrand, 1992; Mutter, 1992), the study revealed that family support becomes increasingly important as funding becomes more limited (Buell).

Social support seemed to be a significant predictor for academic persistence within racial and ethnic minorities. A recent study conducted with 160 Asian Americans found that social support was the most prominent predictor for academic persistence (Gloria & Ho, 2003). This finding supported one of Tinto's revisions that speculated that racial and ethnic minorities adapt to college differently than Caucasian students (ACE, 1998; Tinto, 1993).

Workplace Support Research

Another important variable in an analysis of academic persistence is support from co-workers and colleagues. Similar to family support, support in the workplace may be critical to non-traditional students' persistence (Bean & Metzner, 1985). However, within Buell's (1999)

study group, workplace support appeared to have no significant relationship with academic persistence within non-traditional populations (Buell). Even with these mixed findings, logic asserts that positive workplace reinforcements would only help persistence.

Cross's Attrition Model

Cross's attrition model linked shared relevant associations between previous persistence theories. The attrition characteristics examined situational, dispositional, and institutional factors that increased participation and facilitated learning in non-traditional adults, ethnic and racial minorities, and "at-risk" students (Cross, 1981).

Situational Factors

Cross theorized that situational variables that impacted a student's life situation at a given moment frequently culminated in a lack of adequate time to devote to educational endeavors. Time constraining tasks such as childcare, needs of a spouse, and changes in work schedules or job responsibilities were necessarily prioritized over educational endeavors. Financial constraints such as transportation problems, moving, and medical problems also limited accessibility. At the community college level, the need to work at least part-time to finance education and family needs limited opportunities.

Considering that 75% of contemporary students have been identified to have at least one of these factors, situational factors evolved into an avenue of persistence research that addressed qualitative characteristics derived from survey analysis. Lenning, Beal, and Sauer (1980) conducted a key study that initially recognized the relevance of situational characteristics as predictors of persistence. The investigation used situational findings to identify at-risk students early in their academic careers. The research goal was to use situational findings to guide the

development of remedial programs that addressed academic deficiencies and financial aid programs that could effectively address socioeconomic concerns.

This study's data were supported by data indicating that low-wage students, and Asian American and African American students had one or more situational factors that challenged persistence (Gloria & Ho, 2003; Howard, 2001; Kasworm, 2002; Matus-Grossman & Gooden, 2001). These were some of the same sub-populations of students that Horn et al. (2002) identified as non-traditional, primarily community college bound students.

Even with strong predictive evidence within the community college sector, many of these situational characteristics were impractical, transitory, unreliable, and monetarily prohibitive when exploring persistence factors because of the limited collective data. These limitations had restricted application of situational factors within this study.

Institutional Factors

Another Cross (1981) tenet emphasized the validity of institutional factors that measured retention in adult learners. Institutional factors were described as practices and procedures that hindered or discouraged adult learners from participation and completion of degree programs. Typical characteristics included inconvenient scheduling of required courses, inconvenient location of classes, maintaining a full course load, and mandatory prerequisite courses. Institutional factors including support services, financial aid access, and flexible course selection have been tested to reveal persistence relationships. While these characteristics were frequently conspicuous, they influenced student course load, time to complete pre-requisite courses, and selection method for admittance in clinical programs.

Recent Institutional Factors

Reviews of the curriculum (Cohen & Ignash, 1994; Schuyler, 1999; Striplin, 2000) suggested a shift in the number of students within various types of course offerings. Studies revealed that students under the age of 25 years were more likely to enroll in academic courses (excluding non-remedial or development); whereas students over the age of 25 years were more likely to enroll in occupational courses (Maxwell, et al., 2003).

Cohen and Ignash (1994) found that enrollment patterns in the humanities changed little between 1978 and 1991, while at the same time enrollments in some science subjects doubled, and enrollments in ESL courses tripled. A more recent review by Striplin (2000) noted that between 1991 and 1998, computer science courses showed the greatest increase in enrollments. Examinations of types of course offerings provided another form of evidence that course-taking patterns were changing (Striplin).

When ethnicity was considered, Maxwell et al. (2003) found that 58% of first-time Hispanic students needed developmental math and 59% needed developmental English.

Dispositional Factors

While situational and institutional characteristics are continually evaluated in higher educational studies, literature often reveals that dispositional and demographic variables tend to have superior explanatory or predictive powers (Phillips et al., 2002). Literature also suggests that the factors associated with persistence within community college settings may often differ from the factors that influence persistence within four-year colleges (Dougherty, 1994; Feldman, 1993).

Cross (1981) stipulated that dispositional characteristics arose from behaviors, attitudes, self-perception, and abilities of adult learners as they traversed in higher education.

Uncertainties about their ability to perform adequately in college based on past performance or feedback from counselors, faculty, and peers were often identified as key predictors of persistence. Often, prior preparation and academic abilities of the students limited their opportunity for success unless there was early intervention. Individual characteristics involving motivation, stress, and family expectations were identified as significant predictors that institutions needed to address (Perrine, 2001). Extenuating demographic variables like age, gender, and socioeconomic status are often used to explain many dispositional effects in contemporary research.

Recent Dispositional Factors

Dispositional factors such as social integration and career/educational goals have been examined for their association with persistence. Frequently, the studies examining dispositional variables have been inclusive of both demographic and educational variables that influence characteristics of motivation, intent to return, and career goals. For this reason, inferences concerning dispositional findings are often related to significant relationship(s) between demographic and educational variables. Within the demographical category, persistence relationships between such predictive variables as age, gender, ethnicity, and socioeconomic status have been explored. Educational variables of high school grade point average (GPA), high school rank, college GPA, admission test scores, first-semester and subsequent college grades, and grades within particular core courses have been examined for their potential relationship to persistence.

One of the most frequently tested predictor factors for persistence in higher education has been age. Early studies suggested that there was no significant association between age and persistence (DeVecchio, 1972). However, colleges and universities today enroll a more diverse

student population in terms of average age and percentage of non-traditional students (Jalomo, 2000; Terenzini et al., 1996). Phillippe and Patton (2000) found that, even though 50% of the students in community colleges were less than 25 years of age, those who were age 40 or above represented about 16% of the enrollments.

Age has been found to be a predictor independently and in concert with other variables (Lanni, 1997), with older individuals having higher attrition rates (Windham, 1995). A survey of the Latino population in California revealed that age was one of only two factors that contributed to attrition within this population (Hagedorn, Maxwell, Chen, Cypers, & Moon, 2002). Leppel (2002) found that age when grouped with marriage and hours worked had a negative relationship to persistence.

When gender was considered independently, mixed results have been documented. While some studies suggested that females have higher persistence rates (Mohammadi, 1994), other studies suggested that no significant differences exist based on gender (Aquino, 1990; Fischbach, 1990).

Ethnicity was found related to student persistence in several studies. Mohammadi (1994) and Zhao (1999) found that African American students were more likely to drop out, but other research has found no significant relationship between ethnicity and dropout (Aquino, 1990).

Finally, the study of student socioeconomic status and its relationship to attrition is inconclusive because several studies do not report consistent findings (Grosset, 1991; Rendon, 1995; Wetzel, 1977).

Dispositional Factors in Community Colleges

A recent Guilford Technical Community College (GTCC) survey revealed that 52% of prospective graduates, 41% of non-returning students, and 66% of current students spoke with

faculty (Schmid & Abell, 2003). This North Carolina community college study found that student interchanges were limited in the sense that only 37% of prospective graduates, 22% of non-returning students, and 41% of the students participated in study groups.

When analyzing the 1995-1996 Beginning Postsecondary data set, Coley (2000) found community college students were less likely to participate in college life than were students at public four-year schools. Seventy-seven percent of public four-year college students participated in study groups as compared to 46% of the national sample of community college students. These findings are consistent with other research indicating that involvement in school activities leads to greater persistence (Hagedorn et al., 2002; Maxwell et al., 2003; Napoli & Wortman, 1998).

Coley (2000) also found that community college students were less likely than four-year college students to participate in study groups, to speak to faculty outside of class, and to participate in school clubs. Tinto and Russo (1994) contended that student involvement was difficult to achieve at most community colleges. This was a significant finding considering that student persistence studies have continually indicated that contact with faculty and students outside class is a critical factor in a student's decision to remain in college (Chickering & Gamson, 1987; Glennen, Farren, & Vowell, 1996).

National Descriptive Profile of Postsecondary Students

Within a generation, the U. S. college undergraduate population increased by 72%, with a higher proportion of part-time (39% versus 28%) and 2-year college enrollees (44% versus 31%) (United States Department of Education, 2002). A recent descriptive profile inclusive of all undergraduates revealed that approximately 16.5 million postsecondary students were enrolled in higher education institutions ranging from 4-year universities offering baccalaureate, 2-year

community colleges offering associate degrees, to vocational educational institutions offering certificate programs. Public, private not-for-profit and for-profit institutions were included within the data (Horn et al., 2002).

From this analysis, the authors revealed that demographic characteristics like ethnicity and age tended to influence institutions and attendance status in postsecondary education. Ethnicity, age, dependence, and marital status tended to influence degree program enrollment. Student characteristics like single parenthood with one or more dependents and being 30 years-old or older increased the average number of risk factors challenging persistence and attainment of educational goals.

Data from this study frequently have been used to extrapolate limits for “at-risk” and/or non-traditional student factors. From this study the age distributions revealed that approximately 50% of beginning undergraduate students met the age and part-time requirements for non-traditional students as posited by Preston (1993). The research revealed that as age increased the frequency of 2-year community college attendance and part-time attendance status increased. The data also suggested that minorities, with the exclusion of Asians, were more likely to attend community colleges, have part-time attendance status, and state as their educational goal an associate degree.

Horn et al. (2002) analyzed the national postsecondary student population to determine the relationship of persistence and risk factors within the student characteristics. The risk factors analyzed were delayed entry, attending part-time, being financially independent, having children, being a single parent, working full-time while enrolled, being a high school dropout, or a GED recipient (Horn & Premo, 1995). Seventy-five percent of all students had at least one of these risk factors.

Horn (1996) defined “non-traditional” on a continuum based on the number of characteristics presented. Students were considered minimally non-traditional if they had one risk factor, moderately non-traditional if they presented two or three characteristics, and highly non-traditional if they presented four or more of these characteristics. Choy (2002) analyzed the 1999-2000 entering postsecondary freshmen and found that 27% were labeled traditional, while 28% were highly non-traditional, and another 28% were considered moderately non-traditional. When community college students were analyzed separately, 90% were labeled as non-traditional with 40.2% considered highly nontraditional with four or more risk factors (Choy). The most frequent risk factors among community college students were part-time attendance (69.5%), financial independence (63.5%), and delayed enrollment (58.7%). Sixty-seven percent of the highly nontraditional students considered themselves primarily employees, while only 67% of the traditional students considered themselves primarily students that work.

When gender was compared to these risk factors, females tended to have higher risks for financial independence (53.5%), having dependents (31%), and single parents (16.5%) while males tended to delay enrollment (46.4%) and work full-time while enrolled (40.7%). The average number of risk factors for females was 2.3 as compared to 2.1 in males (Choy, 2002).

When ethnicity was considered, African Americans and American Indian/Alaska Native students had the highest average number of risk factors, which were 2.7 and 2.8, respectively. White, non-Hispanic students had an average number of risk factors of 2.0. Older students, students with dependents, single parents, and disabled students had higher average numbers of risk factors. The highest average number of risk factors among all the student characteristics was single parents (4.7), students with one or more dependents (4.3), and students 30 years of age or older (3.8) (Horn et al., 2002).

Demographic Characteristics

When considering all institutions cumulatively, the national data has revealed that 56% of the undergraduate students were female, 33% were minorities, and 57% were under the age of 24 years. The largest minority sector was African American, non-Hispanic students representing 12% of the total student population. The average beginning community college student age was 26 years, with 17% between the ages of 24-29, 14% between the ages of 30-39, and 12% being over 40 years of age (Horn et al., 2002).

Seventy-nine percent of the undergraduate population was U.S. citizens, 49.3% attended exclusively full-time, 87% spoke English at home while growing up, 73% had no dependents, and 91% had no disabilities. Of the 27% who had dependents, nearly half of the population had dependents and were single parents. As for institutions attended, 45.4% attended 4-year public and private not-for-profit institutions while 42.1% attended public 2-year institutions. This equated to nearly 7 million students attending community colleges (Horn et al., 2002).

Institutions Attended and Attendance Status

When considering trends related to the institutions attended, the data revealed that gender tended to play no significant role in the institution attended or attendance status. When ethnicity was considered, minorities with the exclusion of Asians were more likely to attend 2-year public institutions when compared to the Caucasian, non-Hispanic population. While 47.5% of the Caucasian, non-Hispanic population attended 4-year institutions, only 39.3% of the African American and 39.6% of the Native Hawaiian populations attended 4-year institutions. While 41.3% of the Caucasian, Non-Hispanic students attended 2-year institutions, 53.4% of the American Indian/Alaska Native population attended 2-year institutions. When ethnicity was compared to attendance status, 49.5% and 34.4% of the Caucasian, non-Hispanic population

attended exclusively full-time and part-time. All minorities displayed similar tendencies except the Asian and American Indian/Alaska Native populations. The attendance status in the Asian population was 51.4% and 29.3% exclusively full-time and part-time. The attendance status in the American Indian/Alaska Native population was 44.2% and 37.3% exclusively full-time and part-time (Horn et al., 2002).

When the relationship between age and institution attended was evaluated, the data revealed that older students tended to more frequently attend public 2-year colleges instead of 4-year institutions. While 55.4% of 19-23 year-old students attended 4-year schools, only 26.3% of 40 year or older students attended the same institutions. Only 32.3% of 19-23 year-old students attended 2-year schools, 63.4% of the 40 year or older students attended 2-year schools (Horn et al., 2002).

The data revealed that age played a significant role in attendance status. Younger students were more likely to attend full-time, while older students were more likely to attend exclusively part-time. When family income was considered, as income levels increased, the frequency of 4-year institution attendance increased and the 2-year institution attendance decreased. There were no differences when family income and attendance status were explored (Horn et al., 2002).

Degree Program

Horn et al. (2002) analyzed the relationship between various student characteristics and the degree programs in which they chose and found that 44.5% of males and 43.2% of females pursued baccalaureate degrees, while 36.4% of males and 38.4% of females pursued associate degrees. The remaining male and female students initially enrolled in vocational/technical programs of study. When ethnicity was considered, 46.2% of the Caucasian, non-Hispanic

students enrolled in baccalaureate and 36.7% associate degree programs. Excluding the Asian students, all other minority students were enrolled more frequently in associate degree programs of study.

When age was considered as a factor relating to degree program, younger students tended to seek baccalaureate degrees more frequently while older students tended to enroll in associate degree programs. Whereas 55.7% of the 19-23 year-olds were enrolled in baccalaureate programs, 44.9% of 30-39 year-olds were enrolled in associate degree programs (Horn et al., 2002).

Finally, students with no dependents more frequently enrolled in baccalaureate programs (50.1%). Students with one or more dependents enrolled more frequently in associate degree programs (45.3%) and certificate programs (20.1%). When marital status was considered, single students without children enrolled in baccalaureate degree programs 46.4% and associate degree programs 36.2% of the time. If they were single parents, they enrolled in associate degree programs 46% and baccalaureate degree programs 26.7% of the time (Horn et al., 2002).

Entering Postsecondary Class of 1995-1996 Profile

At the national level some of the most recent relevant findings concerning persistence have evolved from the cohort data set accumulated by the National Center for Educational Statistics. This report, *The Beginning Postsecondary Students Longitudinal Study of 1996-2001*, included survey data that addressed persistence and attainment for approximately 3 million undergraduate students who entered various types of higher education institutions during the 1995-1996 academic year (Wine et al., 2002). Surveys were conducted on this cohort at the end of their first academic year of 1995-1996, during their third academic year of 1997-1998, and during the sixth academic year of 2000-2001. From this survey data extensive analysis has

discerned many persistence factors that were shared among all beginning higher education students, as well as factors that were unique within certain types of institutions.

Initial Student Characteristics

Analysis of the 1995-1996 survey found that 46% of beginning postsecondary students initially enrolled in community colleges during the 1995-1996 academic years and that 41.5% had transferred from their initial colleges after the first year. Another 26% enrolled initially in public 4-year institutions with about 13% leaving their initial 4-year institutions after the first year (Berkner et al., 2002). Forty-nine percent of the 2-year students initially stated a desire to complete an associate degree, while 25% stated their educational goal to be to transfer to a 4-year college and attain a baccalaureate degree.

When comparing the private-for-profit and public less-than 4-year institutions, Berkner, Horn, and Clune (2000) found that 80% of private-for-profit students initially enrolled in vocational certificate programs, while 80% of public 2-year students enrolled in associate degree programs.

First-time community college students tended to have predictive factors including being older, financial status of independent, lower planned educational goals, and lower scores on entrance exams. This cohort of students was also found to have higher first-year attrition than either private or public 4-year institution students (Kojaku & Nunez, 1998).

Coley (2000) found that only 26% of students in four-year institutions had no situational risk factors in comparison to 70% of students in two-year institutions. This analysis concluded that seven situational factors put students at high risk of not attaining a degree or completing a program. These situational factors included delayed entry, part-time enrollment, full-time work, financial independence, dependents, single parenthood, and community college attendance

without a high school diploma. While only 4% of students entering four-year public universities shared at least four of these factors, it was found that over 24% of entering community college students shared at least four of these factors.

This study documented that 48% of beginning community college students had delayed entry. Students categorized as delayed entry did not enter college in the first year after high school. Almost 46% of first-time entrants into the community colleges enrolled part-time with less than 12 semester hours as compared to 11% of first-time students attending public four-year institutions. Thirty-five percent of first-time entrants into community colleges worked full time compared to 11% in four-year colleges. About 35% of community college students were financially independent and approximately 20% had dependents.

Student Characteristics after Three Years

Analysis of the 1996-1998 Beginning Postsecondary Students Longitudinal Study revealed that community college students generally had lower educational goals and more frequent work and financial constraints. Lower persistence due to lower academic performance was shared between two and four-year institutions. Persistence at four-year institutions increased as tuition cost increased (Bradburn & Carroll, 2002). After three years only 7% of those individuals who entered into associate's degree programs graduated while nearly 58% were still enrolled in post-secondary institutions, with many having transferred to senior institutions (Berkner et al., 2002). Within this population, 62% were identified as highly non-traditional (Berkner et al., 2000).

Analysis revealed that completion of rigorous high school curricula significantly increased the likelihood that beginning students were persistent in their initial institution to graduation and/or successfully transferred to a 4-year institution. Students from low-income

families, those with parents who attained no higher than a high school graduation, and/or those who attended a high school where a large sector of students received free or reduced lunch were inferred to have less persistence when compared to students with rigorous high school curricula. It was found that students with more rigorous high school curricula had higher entrance exam scores, attended more selective higher education institutions, and maintained higher first-year grade point averages. When considering first-year grade point average and high school predictors, a rigorous high school curriculum was found to have a significant, positive relationship. Yet, entrance exams scores were not related significantly with first-year GPA (Horn, Kojaki, & Carroll, 2001).

This was consistent with Adelman's (1999) research conclusions that high school curriculum was a better predictor of persistence to bachelor's degree attainment than either entrance exams or high school academic performance based on class rank. Horn et al., (2001) concluded that a rigorous high school curriculum could effectively help students to overcome socioeconomic disadvantages to persistence and attain their academic goals.

Student Characteristics after Five Years

Among the 58% of community college transfer students, 36% had obtained a baccalaureate degree after five to six academic years. Compared to a 54% degree attainment by traditional students, only 31% percent of the non-traditional students attained a degree with only 11% of the highly non-traditional students attaining their degree objective. When an associate degree goal was considered, non-traditional students were less likely to attain a degree than were traditional students. Only 27% of non-traditional students earned an associate degree within six years, while 53% of traditional students earned an associate degree within six years. Forty-seven percent of the non-traditional students had exited postsecondary education without earning a

degree during this period, while only 22% of the traditional student population had left (Choy, 2002).

Associate-Degree Nursing Data

While institutional research was addressing characteristics that predicted persistence in the general collegiate population, Catalano and Eddy (1990) verbalized the lack of retention studies within the nursing discipline. They compared studies by McDonald et al. (1983) and Marshall (1989) that revealed a significant relationship between support group activities and persistence within nursing programs. McDonald et al. found that a support group within the one institution he studied increased persistence from 58% to 84%. This was supported by findings that support group activities had a positive effect on persistence for BSN students that have minimal grades and that peer support groups were a significant component of persistence in BSN programs (Catalano & Eddy, 1990).

Early Influential Dispositional Research

A frequent tenet for debate in ADN programs is the causal effect of open-access policies on the quality of the candidate pool and necessity for high academic standards (Bissett, 1995). These policies have challenged the validity of dispositional and situational characteristics. These limitations have been effectively overcome by using longitudinal data and multivariate analysis. From these analytical studies has evolved the weighted points scale used in the admission process at WSCC.

A foundational study conducted on ADN students at one Connecticut community college concluded that the open-access policies contributed to a 41% attrition rate for students in the ADN program (Bello, Haber, & King, 1977). The most significant dispositional predictor variables were age, high school algebra grades, and English, reading, and mathematics

assessment scores. Coincidentally, the most significant situational characteristics were marital status, number of dependents, and hours spent working. Of all the predictors of persistence characteristics analyzed, Bello et al. found that grades in college science courses were most predictive. Bello's recommendations to raise the minimum college science grade to a letter "C" along with requiring minimum skills in reading and math has been continually enforced within the WSCC ADN analyzed in this study.

A North Carolina community college system-wide study included 11 admissions factors within its model. The predictive characteristics for persistence were correlated to age and admissions tests in math, reading, and science (Petty & Todd, 1985). A similar follow-up correlational analysis study in Florida examined dispositional characteristics that were predictive of persistence in an ADN program including passage of the NCLEX-RN examination on the initial attempt. The significant positive correlates included grades in nursing courses and GPA in pre-clinical science courses. The number of repeated courses was found to have a negative correlation (Naron & Widlak, 1991).

These investigators recommended more pre-clinical counseling and advising along with substantial weight placed on pre-clinical science GPA when determining clinical admittance. As a result of this and similar studies, WSCC ADN admissions formula awards significant points for overall pre-clinical science GPA.

Recent Influential ADN Research

Catalano and Eddy (1993) investigated the validity of persistence programs by conducting surveys with 430 National League of Nursing accredited BSN programs and found 70.77% retention rates in institutions with retention programs and only 56.19% retention rates in institutions without retention programs. Similar characteristics of retention programs included

orientation, counseling, and advising programs. Retention programs were incorporated in a discussion that encouraged a multi-tier epidemiological approach of primary, secondary, and tertiary intervention to replace Tinto's analysis for retention in nursing education (Wells, 2003). This intervention approach was supported by research that revealed perceived institutional and faculty support could increase persistence within an associate degree nursing program (Brady & Sherrod, 2003; Shelton, 2003). These authors suggested that men have a different learning style and need more role models, faculty support, and counseling to insure persistence effectively within a mostly female program of study. While Catalano and Eddy (1993) and Brown (1987) found a positive relationship between peer support group activities and retention, Hughes et al. (2003) has more recently found that peer support group activities have a negative effect on emotional well-being and socialization of baccalaureate degree nursing students.

These findings were re-enforced by a binary logistic regression study that posited that the strongest predictors of persistence included the academic dispositional characteristics of entering overall science GPA along with the grades in each pre-requisite biology and chemistry course (Spahr, 1995; Wharrad, Chapple, & Price, 2003; Wood, 1990). Other characteristics like previous study of biology, level of previous biology achievement, class attendance, grades in nursing courses, and use of recommended readings have been identified as significant variables identified as for retention of first year students (Barkley, DuFour, & Rhodes, 1998; McKee, 2002). Again, these variables have been implemented and weighted within the WSCC ADN program.

Recent studies suggest that attrition among nursing students points to the result of academic difficulties, wrong career choices, family, health and financial problems, and age (Glossop, 2002; Ofori, 2000). While these factors are similar to previous data, Glossop found

that nearly 50% of the respondents listed multiple factors, suggesting that causation is not linear. These characteristics were supported by a survey of 211 racially diverse community college nursing students that found that ‘at-risk’ students typically have lower annual incomes, job hours over 20 per week, English as the second language, birthplace outside U.S., and non-Caucasian ethnicity (Wilson, 2001).

Waterhouse and Beeman (2001) used discriminant analysis tools and seven predictor variables to develop a persistence equation that had a predictive power of 94% when testing pass/fail rates on NECLEX-RN. A similar study by Phillips et al. (2002) analyzed the 20 ADN programs within the California system and found dispositional and demographic factors to be predictive of persistence within this population. The key predictor factors were overall college GPA, English GPA, core biology GPA, and number of core biology course repeats, with persistence favoring traditional, female students. Discriminant analysis established a predictive power of 86% and showed little discriminative effect.

Analysis of the Walters State Community College Population

Several retrospective studies on the Walters State Community student population have been descriptive while exploring characteristics that can possibly identify persistence factors. Demographic, pre-matriculation, and post-matriculation factors have been identified in a retrospective analysis conducted by Goodman (1999). Students who persisted tended to be Caucasian and female and have higher high-school GPAs and admission test scores. Those students who attended public high schools, lived within the college’s 10-county service area, and applied for admission within two months prior to the first day of classes persisted at a higher rate. Students with higher college GPAs who were required to take only one or two

developmental/remedial courses, had received no final course grades of “F”, and had more than one class absence persisted at a higher rate.

Finally, students who attained financial aid, maintained a full-time status, changed their major at least once, and enrolled in programs of study that required transfer to 4-year institutions for completion were more likely to persist to completion of educational goals. Goodman (1999) concluded that these positive predictive factors should be incorporated into a retention program that addressed the needs of “at-risk” students.

Gray-Barnett (2001) analyzed the effects of developmental/remedial math and English courses on success within college-level math and English courses. Retrospective data from 5-years of WSCC freshmen cohorts revealed that non-developmental math students had higher grades in college-level math courses and higher cumulative GPAs. There was no significant difference between the two cohorts in college-level composition courses and graduate rates.

In a case study, Gunnin (2003) analyzed a cluster of 10 Appalachian first-generation students enrolled at WSCC and found that they were challenged with socioeconomic factors but did have strong family support for their educational goals.

A recent study analyzed the effect of potential grade inflation on persistence within Tennessee Board of Regents associate-degree nursing programs. The study revealed that no significant grade inflation existed between the 1995 and 2000 nursing students within the TBR associate-degree nursing populations. While the associate-degree nursing program at Walters State was analyzed, only cumulative data were revealed. System-wide analysis revealed that a cumulative mean nursing admission GPA was a key positive persistence factor for completion of an associate-degree nursing program (Apple, 2002). This complemented previous findings that

pre-clinical GPAs were effective predictors for persistence and completion of program requirements (Campbell & Dickson, 1996).

CHAPTER 3
METHODOLOGY

Appropriateness

While previous research has identified important academic and demographic predictors of success in bachelor of nursing and graduate nursing programs, comparable data for associate of nursing programs were limited. Recent studies of grade-inflation in associate degree nursing programs have identified the importance of grade-related correlates in identifying persisters within the Tennessee Board of Regents ADN programs (Apple, 2002). A study completed by the Center for Student Success, a California Community College initiative, revealed that dispositional and institutional variables could be effectively used in developing a predictive composite formula that satisfied a “do no harm” mandate concerning minority factions (Phillips et al., 2002).

This secondary analysis examined five consecutive clinical populations to identify correlates for persistence within the WSCC ADN program. A comparison of these results to those obtained in other studies allowed the identification of institutionally distinctive factors. Frequently, secondary analysis of existing data provided opportunities to refine admissions guidelines to better serve the evolving student population. Limitations in secondary analysis depend on the reliability of data used in the study. For this reason, only institutional admissions-mandated demographic and academic data were used while elective data acquired by the institution that was not uniformly available like number of children, marital status, and number of employed hours were excluded from this analysis.

Research Design

This retrospective study analyzed empirically derived relationships within the entire Walters State nursing population from the periods of 1998-1999 through 2003-2004 academic years. These five nursing classes were identified from official fall semester rolls after the 14th day of classes. The clinical curriculum included two academic years of study and, thus, required the clinical variables to be collected throughout the 1998-2004 academic years. The first candidates were from the 1999-2000 clinical class and the final candidates were acquired from the 2003-2004 clinical class.

Measured Variables

The variables concerning pre-clinical requirements were collected regardless of academic year and institution obtained; but, the point of initial post-secondary courses until admittance in the clinical portion of the nursing program were considered as a potential correlate for persistence.

Criterion Variable

The criterion variable in this study was persistence. Persistence was categorized into persister and non-persister groups. The persisters completed the clinical core within four semesters after initial admittance. Non-persisters included all individuals who did not receive an ADN diploma at the culmination of four semesters of clinical core. To limit extraneous data from impacting the findings, all re-admittance and career mobility-LPN students were excluded from this study

Once the persistence analysis was completed for the persister and non-persister groups, persistence between the male and female populations along with the traditional and non-

traditional student sub-groups within each main category were analyzed to explore any relationship between persistence and these student populations.

Demographic Predictor Variables

The predictor variables included demographic and academic data. The demographic data included:

1. Gender,
2. Ethnicity
3. Age when first enrolled in pre-clinical courses,
4. Age when clinical admittance,
5. County of residence, and
6. Distance traveled from residence to campus.

Academic Predictor Variables

The academic data included pre-clinical and clinical variables. The pre-clinical variables included:

1. Overall pre-clinical GPA,
2. Overall GPA in development/remedial courses,
3. GPA in human anatomy and physiology I and II courses,
4. GPA in microbiology courses,
5. Cumulative natural science GPA,
6. GPA in composition I course,
7. GPA in developmental psychology course,
8. GPA in introduction to speech communications course,
9. GPA in required mathematics course,

10. Cumulative GPA excluding natural science courses,
11. Number of natural science courses,
12. Number of repeated core courses,
13. Number of grades of F and/or withdrawals from courses,
14. Number of total semesters,
15. Number of semesters with full and/or part-time loads, and
16. The campus that the human anatomy and physiology courses are taken.

The clinical variables included:

1. Overall clinical GPA,
2. GPA after the first clinical semester,
3. GPA after the second clinical semesters, and
4. Clinical entry status.

Data Collection

The demographic and academic data in this retrospective analysis were gathered from the Walters State Community College Student Information System (SIS). The Institutional Review Boards at Walters State Community College and East Tennessee State University approved this study with the understanding that all personal information was kept confidential. Individual student numbers were used instead of student names and/or social security numbers for the purpose of categorization. Upon written request, any information not directly disclosed in Chapter 4 of this summary would be made available to the presidents and/or academic chief officers of those institutions.

Initially, the candidates were identified from the 107 window listing of students enrolled in fall semester clinical courses. The SIS window 103 was used to verify all candidates were

first-time clinical students. The first-time clinical students were grouped initially as persisters and non-persisters based on whether they successfully completed the ADN program within four consecutive semesters. The demographic data were gathered from window 103, with the distance commuted to campus data being estimated based on zip code.

The academic data for each population were acquired using the 136 window of SIS. When evaluating pre-clinical variables, the first acquired grade for a core course was used. This method correlated with current nursing program guidelines (Walters State Community College, 2003). The overall GPA and the GPA for a given course included the average from all repeats.

Research Hypotheses

The following null hypotheses directed this investigator:

Hypothesis 1: There were no differences among any combination of demographic, pre-clinical, and/or clinical variables in regard to persistence in this ADN program.

Hypothesis 2: There were no differences among any combination of demographic, pre-clinical, and/or clinical variables in regard to persistence within the female population in this ADN program.

Hypothesis 3: There were no differences among any combination of demographic, pre-clinical, and/or clinical variables in regard to persistence within the male population in this ADN program.

Hypothesis 4: There were no differences among any combination of demographic, pre-clinical, and/or clinical variables in regard to the traditional and non-traditional student populations who persisted in this ADN program.

Research Methods

The initial phase in this investigation required grouping the students based on the criterion variable persistence into persister and non-persister categories. Within each category the predictor variables, demographic, pre-clinical, and clinical, were tabulated into a Microsoft Excel spreadsheet. From this data set, SPSS 13.0 software was employed to analyze descriptive and frequency statistics for the various quantitative and qualitative variables. A multivariate analysis of variance (MANOVA) identified significant relationships between the independent variables and persistence (Grimm & Yarnold, 2001). Wilks's lambda (Λ), eta-squares (η^2), and the accompanying F statistic was analyzed to determine if any variances existed in the vector of means (Pedhazur, 1982). The eta-squares (η^2) statistic was given in a scale of 0 to 1 and indicated the proportion of explained variance within the vector means. A statistical significance of $p < .05$ was observed throughout this study. To reduce the chance of inadvertently committing a Type I error, a simplified Bonferroni adjustment of the original alpha value of .05 was formulated by dividing .05 by the number of analyses performed (Tabachnick & Fidell, 1996). Similar MANOVA analyses were conducted within each category using the criterion variable of gender and traditional and non-traditional to identify significant relationships between persistence and vectors of means.

Variables that illustrated no unique relationship with persistence were eliminated. Variables that met the adjusted alpha value criteria were re-analyzed together to determine best-fit possibilities. Revised Wilks's lambda (Λ), eta-square (η^2), and the accompanying F statistic data were collected.

To ensure that a correlation between related independent variables was not too high, multiple regression analyses were performed using the variables in the revised model. The

bivariate correlation between the persistence and the independent variables were analyzed to ensure that they shared a relationship above .30. A revision of the variables was mandated if any two variables shared a Pearson correlation of .70 or higher and/or a multicollinearity tolerance coefficient are .10 or less.

When the best-fit model variables met all these criteria, an R^2 value was tabulated to determine the explained persistence variance by all the variables in the model. Individual standardized beta values explained the unique impact that each variable had in the model. Finally, a MANOVA was performed and the level of significance of each variable was determined by the tests of between-subjects effects using the adjusted Bonferroni alpha value. The partial η^2 values were used to determine the unique impact that each variable had in the model (Pallant, 2002).

Data Analysis

Descriptive and Frequency Analysis

The initial data analysis identified the descriptive quantitative and qualitative factors that differentiated a persister and non-persister. The traditional and non-traditional student populations who persisted along with the male and female populations were analyzed to determine descriptive factors that might influence persistence.

Multivariate Analysis of Variance

Multivariate analysis of variance (MANOVA) was employed to reveal statistical significance variances between predictor variables and persistence along with identifying significant relationships between combinations of predictor variables and persistence. MANOVA instead of ANOVA was used initially to limit the probability of rejecting a true null hypothesis (Type I error) as a result of multiple separate univariate F tests (American

Psychological Association, 1995; Grimm & Yarnold, 2001). Similar data analyses were conducted on the criterion variables of gender and traditional/non-traditional students to determine statistically significant factors for persistence.

Multiple Regression Analysis

Multiple regression tests were conducted on the significant independent variables initially identified using MANOVA. To ensure that a correlation between related independent variables was not too high, multiple regression analyses were performed using the variables in the revised model. The bivariate correlation between the persistence and the independent variables were analyzed to ensure that they shared a relationship above .30. A revision of the variables was mandated if any two variables shared a Pearson correlation of .70 or higher and/or a multicollinearity tolerance coefficient are .10 or less. The R^2 value was formulated using the best-fit model variables. The standardized beta values that met the significance criteria suggested the unique contribution of variance that each unique variable contributed to persistence.

CHAPTER 4

DATA ANALYSIS

Twenty-eight demographic, pre-clinical academic, and clinical academic variables were collected and analyzed for each of the 730 clinical candidates. Initially, descriptive and frequency data were tabulated for the entire ADN population along with similar data analysis for candidates who persisted and did not persist. The effect of gender on persistence was considered. The influence of age was also considered to evaluate the persistence within traditional and non-traditional sub-populations. Multiple regression analysis and multivariate analysis of variance tests were performed to identify unique relationships between these independent variables and persistence within this ADN population.

Demographic Data

The demographic data collected included gender and ethnicity of the ADN candidates along with the age when the candidates initially began pre-clinical and clinical coursework. The county of residence and the distance that the candidates commuted to the WSCC nursing facility was determined using the residential zip code. In each instance, the variables were considered overall and by comparing persistence within gender and age sub-populations.

Seven hundred thirty students began clinical coursework during this period of time, with 486 (66.57%) of the students persisting to graduation. Six hundred sixty-three (90.82%) of the candidates were females. The prominent ethnicity was Caucasian representing 704 (96.44%) of the candidate population. The mean age when candidates began pre-clinical coursework was 25.04. The mean clinical-entry age was 28.39. Nearly 70% of the population resided within the college's service area counties, with the mean distance commuted to the nursing campus being 37.71 miles.

Gender Frequency Data

Female candidates represented 90.82% of the clinical-entry population, with 451 of this group persisting to graduation. Sixty-seven of the ADN candidates were male, with 35 of the males persisting to graduation. The non-persisting population included 212 females and 32 males. The gender persistence rate was 68.02% for females and only 52.24% for males (Table 1).

Table 1
Ethnicity Frequency of the ADN Population

Number of	Caucasian American	African American	Hispanic American	Asian American	Other	Total
Students						
Who Persisted	472	8	2	2	2	486
Who Did Not Persist	232	9	1	1	1	244
Females						
Who Persisted	438	8	2	2	1	451
Who Did Not Persist	202	7	1	1	1	212
Males						
Who Persisted	34	0	0	0	1	35
Who Did Not Persist	30	2	0	0	0	32
Traditional Who Persisted						
Females	150	4	0	1	0	155
Males	8	0	0	0	0	8
Non-Traditional Who Persisted						
Females	288	4	2	1	1	296
Males	26	0	0	0	1	27

Ethnicity Frequency Data

The most prominent ethnicity was Caucasian with 472 (67.05%) of Caucasian candidates persisted to graduate. There were 4 minority populations with the largest population of minority candidates being African Americans, 17 or 2.33% of the total population. Only 8 or 47.06% of the African American candidates persisted. As a group, 53.85% of the minority candidates persisted (Table 1).

Caucasian candidates represented 97.12% of all the candidates who persisted, including 438 females and 34 males. The only other male who persisted was of Native American ethnicity. Caucasian candidates represented most of the non-persisting candidates (95.08%), including 202 females and 30 males. African Americans represented 3.69% of the non-persisting candidates with 7 females and 2 males (Table 1).

Four hundred thirty-eight (68.44%) of the Caucasian females persisted while only 53.13% of the Caucasian males persisted. Fourteen of the 26 minority candidates persisted representing only a 53.85% persistence rate within the minority population. When age was considered a factor in students who persisted, 288 (65.75%) of the females who persisted were classified as non-traditional and Caucasian while 26 (76.47%) of the males were non-traditional and Caucasian (Table 1).

Pre-Clinical Age Frequency Data

At pre-clinical admittance, the mean age of candidates that persisted was 25.27 while those who did not persist the mean age was 24.58. The most frequent pre-clinical age group was 18 years old or younger with 214 candidates or 29.32% of the total population. This group contained 136 candidates who did and 78 candidates who did not persist. The highest overall persistence rate was in the age group of 40-42 years old with an 86.67% persistence rate. The lowest persistence rate was in the 43-45 years old population at 50.00% (Table 2).

The mean pre-clinical age of females and males who persisted was 25.17 and 26.69 respectively. One hundred twenty-eight or 28.38% of the 451 females who persisted began pre-clinical coursework at the age of 18 years or younger. Eight males or 22.86% of the males who persisted were 18 years or younger (Table 2).

The mean ages of females and males who did not persist was 24.23 and 26.49. The most common age for non-persisting candidates was 18 years or younger and included 69 females and 9 males. This age group represented 31.97% of the total non-persisting population, including 32.55% of the non-persisting females and 28.13% of the non-persisting males (Table 2).

Table 2
Frequency of Age when Pre-Clinical coursework began

Number of	18- Younger	19- 21	22- 24	25- 27	28- 30	31- 33	34- 36	37- 39	40- 42	43- 45	46- 48	49- over	Total
Students													
Who Persisted	136	69	66	50	50	42	21	19	13	7	7	6	486
Who Did Not Persist	78	39	29	29	23	12	9	9	2	7	4	3	244
Females													
Who Persisted	128	66	62	46	45	37	19	18	11	7	7	5	451
Who Did Not Persist	69	37	27	25	18	9	8	4	2	7	3	3	212
Males													
Who Persisted	8	3	4	4	5	5	2	1	2	0	0	1	35
Who Did Not Persist	9	2	2	4	5	3	1	5	0	0	1	0	32

When a comparison of traditional and non-traditional students who persisted was considered, 322 students (44.11%) of the ADN population were classified traditional students based on the age of 21 years or younger. Two hundred five (63.66%) of the traditional students persisted, including 194 females and 11 males. One hundred seventeen traditional candidates did not persist, including 106 females and 11 males. The persistence rate of traditional females and males was 64.67% and 50.00% respectively (Table 2).

The 408 non-traditional students maintained a persistence rate of 68.87%, with 281 candidates persisting. This included 257 non-traditional females and 24 non-traditional males. One hundred twenty-seven non-traditional students did not persist, including 106 females and 21 males. The persistence rate of non-traditional females and males was 70.80% and 53.33% respectively (Table 2).

Clinical Entry Age Frequency Data

At clinical admittance, the mean age of candidates who persisted was 28.58 years while those who did not persist were 28.01 years. The most frequent clinical age group was 21-23 years and included 147 candidates or 20.14% of the total population. The highest overall persistence rate was in the age group of 42-44 years at 80.00% and the lowest persistence rate was in the 51 years or over population at 42.86% (Table 3).

The mean clinical entry ages of females and males who persisted was 28.46 and 30.37 years respectively. One hundred or 21.17% of the 451 females who persisted began clinical coursework between the ages of 21-23. Ten males or 28.57% of the males who persisted were between the ages of 18-20 when they began clinical coursework (Table 3).

The mean clinical entry age of females and males who did not persist was 27.70 and 30.06 years respectively. The most frequent age for non-persisting candidates was between the ages of 23 years or younger and included 82 females and 12 males. This age group represented 38.52% of the total population, including 38.68% of the non-persisting females and 37.50% of the non-persisting males (Table 3).

The clinical entry age for traditional students was extended 2 years to account for completion of pre-clinical coursework. As a result, a traditional student was defined as anyone of the age of 23 years or younger. The traditional student population included 262 students or 35.89% of the ADN population. One hundred sixty-eight or 64.12% traditional candidates persisted, including 155 females and 13 males. Ninety-four traditional candidates did not persist, including 82 females and 12 males. The persistence rate of traditional females and males was 65.40% and 52.00% respectively (Table 3).

Table 3
Frequency of Age when Clinical coursework began

Number of	18- 20	21- 23	24- 26	27- 29	30- 32	33- 35	36- 38	39- 41	42- 44	45- 47	48- 50	51- over	Total
Students													
Who Persisted	68	100	75	71	46	36	24	27	16	10	10	3	486
Who Did Not Persist	47	47	35	37	26	13	14	8	4	6	3	4	244
Females													
Who Persisted	58	97	69	67	40	34	24	24	16	10	9	3	451
Who Did Not Persist	37	45	32	33	21	12	8	8	4	5	3	4	212
Males													
Who Persisted	10	3	6	4	6	2	0	3	0	0	1	0	35
Who Did Not Persist	10	2	3	4	5	1	6	0	0	1	0	0	32

The 468 non-traditional students maintained a persistence rate of 67.95%, with 318 candidates persisting. This included 296 non-traditional females and 22 non-traditional males who persisted. One hundred fifty non-traditional students did not persist, including 130 females and 20 males. The persistence rates of non-traditional females and males was 69.48% and 52.38% (Table 3).

County of Residence Frequency Data

The county of residence for each candidate was determined using the residential zip code. Residents from 22 separate counties along with 7 out-of-state residents were represented in the candidate pool. The largest candidate population came from Hamblen County, the home county for the nursing campus. While Knox County was the second highest with 10.00% of the total population, the next two counties with the highest percentage of candidates admitted to the nursing clinical program were Sevier and Greene counties, two counties that also maintain WSCC campuses (Table 4).

Table 4
Frequency of County of Residence

County of Residence	Distance Commuted to Campus ^b	Number of			Percent of Total Pop.	Ratio of Persistence
		Students	Persisted	Non-Persist		
Hamblen ^a	3.06	106	76	30	14.52	.72
Jefferson ^a	20.16	56	37	19	7.67	.66
Cocke ^a	31.09	51	35	16	6.99	.69
Greene ^a	37.49	67	48	19	9.18	.72
Hawkins ^a	35.61	51	38	13	6.99	.75
Grainger ^a	23.26	37	23	14	5.07	.62
Sevier ^a	39.95	70	53	17	9.59	.76
Claiborne ^a	38.39	45	26	19	6.16	.58
Hancock ^a	33.80	9	3	6	1.23	.33
Union ^a	51.23	10	5	5	1.37	.50
Washington	58.90	46	35	11	6.30	.76
Knox	46.34	73	45	28	10.00	.62
Sullivan	63.40	53	33	20	7.26	.62
Carter	79.99	12	6	6	1.64	.50
Anderson	70.61	6	3	3	.82	.50
Blount	67.80	14	7	7	1.92	.50
Johnson	100.52	3	3	0	.41	1.00
Roane	85.13	1	0	1	.14	.00
Unicoi	83.42	6	4	2	.82	.67
Loudon	74.21	1	1	0	.14	1.00
Hamilton	152.40	2	1	1	.27	.50
Campbell	76.88	2	1	1	.27	.50
Out of State	83.54	9	3	6	1.23	.33
Total		730	486	244		.67

a. Walters State Community College service-area counties

b. Distance commuted is in average miles.

Five hundred two candidates (68.88%) of the candidates resided in the 10 service-area counties that WSCC supports. Hamblen County provided 106 (14.52%) of the total candidate population. Hancock County provided the fewest candidates while Union County was the only service-area county outside a 40-mile radius of the campus. Three hundred forty-four or 68.53% of the service-area candidates persisted to graduation. Hancock County was the only service-

area county to have a persistence rate below 50%, with a persistence rate of 33.33%. Sevier County had the highest persistence rate within the service-area counties at 75.71% (Table 4).

Two hundred twenty-eight candidates resided outside the service-area. Of these candidates, 142 (62.28%) persisted to graduation, with 6 of the 12 counties having a persistence rate of 50.00% or less. Johnson and Loudon Counties had the highest out-of-service area and highest overall persistence rate at 100%. No students from Roane County persisted while the out-of-state persistence rate was 33.33% (Table 4).

Distance Commuted Frequency Data

When these candidates were grouped based on distance commuted to campus, data analysis revealed that 492 candidates resided within a 40-mile radius of the nursing campus. This included all the service-area counties except Union County and represented 67.40% of the candidate population. When persistence was considered, this sector had a 68.90% persistence rate. The persistence rate declined in relationship to distance commuted to campus with those candidates who resided over 60 miles from the main campus persisting at a rate of 56.88% (Table 5).

Seventy-one percent of the females and 54.29% of males who persisted commuted a distance of less than 40 miles to the nursing campus. One hundred fifty-three or 62.70% of non-persisting candidates resided within 40 miles of the nursing campus. This included 135 (63.68%) of the females and 18 (56.25%) of the males who did not persist. The most frequent commute distance was 20-39.99 miles. The highest female persistence rate was within the 0-19.99 miles range at 72.55%. Fifty-one (76.12%) of the male candidates had a commute distance of 20-59.99 miles of the nursing campus, with the most frequent commute distance being 20-39.99 miles (Table 5).

Table 5
Frequency of Distance Commuted to Nursing Campus

Number of	Miles Commuted					Total
	0-19.99	20-39.99	40-59.99	60-79.99	80-above	
Students						
Who Persisted	76	263	85	51	11	486
Who Did Not Persist	30	123	44	37	10	244
Females						
Who Persisted	74	246	73	48	10	451
Who Did Not Persist	28	107	35	34	8	212
Males						
Who Persisted	2	17	10	3	3	35
Who Did Not Persist	2	16	8	3	3	32
Traditional Who Persisted						
Females	30	84	20	14	7	155
Males	0	6	2	0	0	8
Non-Traditional Who Persisted						
Females	44	162	53	34	3	296
Males	2	11	8	3	3	27

For the candidates who persisted, 73.55% of the traditional females and 69.59% of the non-traditional females commuted less than 40 miles to the nursing campus. All of the traditional males and 70.37% of the non-traditional males commuted between 20-59.99 miles to the nursing campus (Table 5).

Pre-Clinical Data

Nineteen pre-clinical academic variables were considered to determine possible relationships between persistence and pre-clinical factors. These variables included the grades from each of the science and non-science core-required courses as well as the cumulative science and non-science GPAs. The required science courses were human anatomy and physiology I and II and microbiology. Each of the science courses had a graded lecture and lab component that

was combined for a cumulative course GPA. The other science-specific variables analyzed were number of pre-clinical natural science courses and the campus where the human anatomy and physiology courses were completed.

The required non-science courses included composition I, developmental psychology, speech communication, mathematics, and computer sciences. In gathering the data for the latter two courses, the required mathematics and computer science courses varied depending on the academic year. For this reason, the required courses for each academic year were tabulated into a general mathematics and computer science category.

The overall pre-clinical GPA along with the cumulative GPA in developmental/remedial courses was analyzed in this study. The number of course repetitions, number of course withdrawals and grades of “F”, and the number of pre-clinical full-time and part-time semester loads as well as the total number of pre-clinical semesters were tabulated to analyze any possible relationships with persistence.

Pre-Clinical Science-Core

The descriptive mean statistics for the pre-clinical science-core variables analyzed within the ADN populations that persisted and did not persist to graduation are listed in Table 6. A comparison of the descriptive statistics suggested that the mean for the pre-clinical science-core coursework was significantly higher for those candidates who persisted.

In each of the prerequisite science courses, the candidates who did persist averaged course GPA means that equated to letter grades of “B” while those candidates who did not persist had mean GPAs that equated to mid-level letter grades of “C”. While the mean GPAs in the science courses were higher, candidates who persisted took fewer science courses than non-persisting students (Table 6).

Table 6
Science-Core Descriptive Statistics

Number of	Human Anatomy & Physiology I	Human Anatomy & Physiology II	Microbiology	Cumulative Pre-Clinical Science GPA	Number of Natural Science GPA
Students					
Who Persisted	3.04	3.10	3.06	3.07	6.81
Who Did Not Persist	2.67	2.70	2.61	2.66	7.04
Females					
Who Persisted	3.05	3.10	3.07	3.07	6.78
Who Did Not Persist	2.61	2.62	2.12	2.45	7.04
Males					
Who Persisted	2.96	3.11	2.96	3.01	7.17
Who Did Not Persist	2.90	2.95	1.88	2.82	7.00
Traditional Who Persisted					
Females	2.96	2.90	2.96	2.94	6.97
Males	3.06	2.97	2.63	2.89	6.63
Non-Traditional Who Persisted					
Females	3.10	3.21	3.13	3.15	6.69
Males	2.93	3.14	3.06	3.04	7.33

Females maintained higher mean science-core GPAs than their male counterparts in the microbiology and human anatomy and physiology I courses as well as overall science-core GPA. The non-persisting male population had higher mean GPAs in these areas when compared to their female counterparts. The highest mean science-core GPA for those that persisted was in human anatomy and physiology II. The greatest difference between persistence and non-persistence for both females and males was the mean GPAs in microbiology (3.07 to 2.12 and 2.96 to 1.88), respectively. The cumulative pre-clinical science GPAs of 3.07 and 3.01 for both females and males that persisted equated to a letter grade of “B” and suggested that a possible tendency for persistence could be a minimum GPA of 3.0 in combined science core courses (Table 6).

Non-traditional females had the highest mean science-core GPA in each science course as well as cumulative science-core GPA. When the other three sub-populations were compared, non-traditional males maintained higher mean GPAs in the science-based courses excluding the human anatomy and physiology I grades. The greatest mean GPA difference between traditional and non-traditional females was in human anatomy and physiology II at .31 and in males the greatest mean GPA difference was in microbiology at .53. The cumulative science GPAs for the non-traditional females and non-traditional males was 3.15 and 3.04 while that of the traditional females (2.94) and traditional males (2.89) was slightly lowered.

The cumulative descriptive statistical means revealed that candidates who persisted enrolled in fewer pre-clinical science courses than candidates who did not persist. Yet, when gender was considered, only females who persisted tended to enroll in fewer science courses. Males who persisted averaged the most science class enrollments at 7.17 while the traditional males who persisted enrolled in the fewest pre-clinical science courses (6.63) (Table 6).

Frequency of Human Anatomy and Physiology I Grades. Seven hundred twenty-six ADN candidates completed human anatomy and physiology I courses, the most of any of the science-core courses. Of the 726 candidates, 483 (66.53%) persisted to complete the ADN program. Of the 483 students who persisted, 478 (98.97%) earned a letter grade of “C” or better. The most frequent letter grade for those that persisted was a “B” and included 212 students. The letter grade “C” was the most frequently attained grade for the non-persisting students and included 131 of the 243 non-persisting students. The persistence rate had a direct relationship with increasing grade averages, with those students who maintained a letter grade of “A” having the highest persistence rate at 86.21%. Only the candidates with a letter grade of “B” and better

actually maintained a persistence rate higher than 50%, suggesting that persistence and human anatomy and physiology I grades were related (Table 7).

Table 7
Frequency of Grades in Human Anatomy and Physiology I

Number of	A	B	C	D	F	Total
Students						
Who Persisted	150	212	116	5	0	483
Who Did Not Persist	24	74	131	12	2	243
Females						
Who Persisted	144	196	106	3	0	449
Who Did Not Persist	24	62	112	11	2	211
Males						
Who Persisted	6	16	10	2	0	34
Who Did Not Persist	0	12	19	1	0	32
Traditional Who Persisted						
Females	40	70	43	0	0	153
Males	1	4	3	0	0	8
Non-Traditional Who Persisted						
Females	104	126	63	3	0	296
Males	5	12	8	2	0	27

Females and males who persisted maintained GPAs of 3.05 and 2.96 respectively in human anatomy and physiology I. Three hundred forty (75.73%) of the females who persisted earned a letter grade of “B” or better while only 22 (64.71%) of the males who persisted attained a letter grade of “B” or better (Table 7). One hundred twenty-five (59.24%) of the females who did not persist earned a letter grade of “C” or below in human anatomy and physiology I.

The most frequent letter grade for males was “C”, with only 34.48% persisting to graduation. This was lower than the 66.67% persistence rate of those males who earned a letter grade of “D”. Two hundred ninety-six or 61.28% of the persisting population was classified as non-traditional females. Over 70% of the traditional and non-traditional females who persisted earned a letter grade of “B” or better while over 62% of the traditional and non-traditional males earned a letter grade of “B” (Table 7).

Frequency of Human Anatomy and Physiology II Grades. Seven hundred twenty-four candidates completed the human anatomy and physiology II course. Of these candidates, 482 persisted and 242 did not persist to complete the nursing program. Of the 482 candidates who persisted, 477 (98.96%) maintained a letter grade of “C” or better and 373 (77.39%) maintained a letter grade of “B” or better. The persistence rate increased directly as the letter grade increased; yet only the students with letter grades of “B” or better maintained a persistence rate higher than 50% (Table 8).

Table 8
Frequency of Grades in Human Anatomy and Physiology II

Number of	A	B	C	D	F	Total
Students						
Who Persisted	170	203	104	5	0	482
Who Did Not Persist	37	77	112	12	4	242
Females						
Who Persisted	161	187	96	4	0	448
Who Did Not Persist	30	62	103	12	4	211
Males						
Who Persisted	9	16	8	1	0	34
Who Did Not Persist	7	15	9	0	0	31
Traditional Who Persisted						
Females	38	68	46	2	0	154
Males	2	3	2	0	0	7
Non-Traditional Who Persisted						
Females	123	119	50	2	0	294
Males	7	13	6	1	0	27

The most frequently earned letter grade for both females and males who persisted was a “B”, with 77.68% of the females and 73.53% of the males averaging a letter grade of “B” or better. The letter grade of “C” was the most frequently earned grade by non-persisting females (48.82%) while 48.39% of the non-persisting males earned a letter grade of “B”. Fifty-six percent of the non-persisting females attained letter grades of “C” or less, suggesting that grades

may influence persistence in the female population. Unlike females, 70.97% of the non-persisting males attained letter grades of “B” or better, suggesting that grades in human anatomy and physiology II are less influential in the male population (Table 8).

Frequency of Microbiology Grades. Seven hundred twenty-one candidates completed the microbiology courses with 479 (66.44%) persisting to complete the nursing program. The most frequent letter grade was “B” and was received by 219 students who persisted. The most frequent letter grade for students who did not persist was “C” and included 94 (38.84%) of the population of non-persisting students. Candidates with a letter grade of “B” or better maintained a persistence rate of 79.22% while those individuals who earned a letter grade of “C” and below had a persistence rate 43.63% (Table 9).

Table 9
Frequency of Grades in Microbiology

Number of	A	B	C	D	F	Total
Students						
Who Persisted	147	219	111	2	0	479
Who Did Not Persist	26	70	94	4	48	242
Females						
Who Persisted	137	204	101	2	0	444
Who Did Not Persist	21	65	82	3	39	210
Males						
Who Persisted	10	15	10	0	0	35
Who Did Not Persist	5	5	12	1	9	32
Traditional Who Persisted						
Females	35	79	38	2	0	154
Males	2	2	4	0	0	8
Non-Traditional Who Persisted						
Females	102	125	63	0	0	290
Males	8	13	6	0	0	27

The distribution and frequency findings for females were similar to the overall findings. Of the 654 females who completed microbiology, 444 (67.89%) persisted. Only 2 of the 444 female candidates who persisted maintained less than a 2.00 GPA. Of the 67 males who

completed the microbiology course, 35 (52.24%) of the males persisted while 32 (47.76%) did not persist to graduation. The persistence rate was directly related to the letter grade, with 76.80% of the females and 71.43% of the males who persisted earning a letter grade of “B” or better. The most frequent letter grade for both non-persisting genders was “C” at 38.80%, with only 39.67 % of those non-persisting earning a letter grade of “B” or better (Table 9).

Seventy-eight percent of the non-traditional females and males attained a letter grade of “B” or better. Only the traditional males established no significant tendency between letter grades of “B” or better and “C” or less (Table 9).

Frequency of Cumulative Science-Core GPA. Seventy percent of the students who persisted maintained a cumulative science- core GPA of “B” or better while only 43.85% of the non-persisting students maintained a science-core GPA of “B” or better. The most frequent letter grade for persisting students was “B” and represented 45.57% of the persisting population. The most frequent letter grade for the non-persisting candidates was “C” and represented 49.59% of the non-persisting population (Table 10).

When gender was considered, 71.56% of the persisting females and 54.29% of the persisting males maintained a cumulative science-core GPA of “B” or better. Only 44.81% of the non-persisting females and 37.50% of the non-persisting males maintained a letter grade of “B” or better (Table 10).

Table 10
Frequency of Cumulative Science-Core GPA

Number of	A	B	C	D	F	Total
Students						
Who Persisted	120	221	139	5	0	485
Who Did Not Persist	18	89	121	14	2	244
Females						
Who Persisted	117	205	124	4	0	450
Who Did Not Persist	18	77	102	13	2	212
Males						
Who Persisted	3	16	15	1	0	35
Who Did Not Persist	0	12	19	1	0	32
Traditional Who Persisted						
Females	15	61	75	3	0	154
Males	1	2	5	0	0	8
Non-Traditional Who Persisted						
Females	102	144	49	1	0	296
Males	2	14	10	1	0	27

The non-traditional students maintained a significantly higher cumulative GPA with 83.11% of the females and 59.26% of the males maintaining letter grades of “B” or better. The most frequent letter grade for the traditional population was a “C” (Table 10).

Frequency of Natural Science Courses. Four hundred sixty-two or 63.29% of the candidates enrolled in 6 or fewer natural science courses prior to entering the clinical program. The overall persistence rate for these students was 68.83%. Candidates who enrolled in 16-18 natural science courses prior to entering their clinical coursework had the highest persistence rate at 71.43%. The candidates who enrolled in more than 6 natural science courses had an overall persistence rate of 62.69% (Table 11).

Table 11
Frequency of Natural Science Courses

Number of	1-3	4-6	7-9	10-12	13-15	16-18	19-above	Total
Students								
Who Persisted	16	302	111	45	6	5	1	486
Who Did Not Persist	7	137	61	25	11	2	1	244
Females								
Who Persisted	15	280	106	40	4	5	1	451
Who Did Not Persist	6	124	48	21	10	2	1	212
Males								
Who Persisted	1	22	5	5	2	0	0	35
Who Did Not Persist	1	13	13	4	1	0	0	32
Traditional Who Persisted								
Females	0	94	44	15	1	0	1	155
Males	0	6	2	0	0	0	0	8
Non-Traditional Who Persisted								
Females	15	186	62	25	3	5	0	296
Males	1	16	3	5	2	0	0	27

Two hundred ninety-five (65.41%) of the female candidates and 23 (65.71%) of the male candidates who persisted enrolled in 6 or fewer natural science courses. While females who enrolled in 16 or more natural science courses had the highest persistence rate at 100%, the overall persistence rate for females who enrolled in more than 6 natural science courses was 34.59%. Of the 67 male candidates, 37 enrolled in 6 or fewer natural sciences and maintained a persistence rate of 62.16%. Males enrolled in 4-6 natural science courses had the highest frequency at 22 (62.86%) of all males that persisted. The overall persistence rate for males who enrolled in more than 6 natural science courses was only 40.0% (Table 11).

Traditional-aged males who persisted and were enrolled in fewer than 6 natural science courses averaged the highest frequency at 75.00%. Non-traditional females who persisted had a greater tendency to enroll in 6 or fewer natural sciences when compared to traditional females (Table 11).

Frequency of Human Anatomy and Physiology Enrollment Location. Nearly 54% of the students received their human anatomy and physiology instruction at the WSCC main campus in Morristown, while only 18.36% of the students received their instruction at WSCC off-campus sites. The remaining 27.80% of the students transferred their human anatomy and physiology grades into the program, with 75 or 10.27% of the total student population transferring into the program from another local community college, Northeast State Community College. As a group, the students who took their human anatomy and physiology courses at WSCC maintained a persistence rate of 68.88% while the students who transferred in their human anatomy and physiology grades maintained a persistence rate of 60.59%. The persistence rate for main campus students was 68.19% while that of the off campus students was 70.90%. The students who received their human anatomy and physiology instruction at the Greeneville campus maintained the highest persistence rate at 78.57% while the lowest persistence rate was for students who transferred their human anatomy and physiology in from a college other than Northeast State Community College (56.25%) (Table 12).

Over 81% of the females who received their human anatomy and physiology instruction at the Greeneville campus persisted compared to 69.14% of the females from the Morristown campus. Females from WSCC off-campus sites had an overall persistence rate of 72.13%. Forty-four percent of the males received their instruction at the Morristown Campus. While these male candidates maintained a persistence rate of 56.67%, the male candidates from the Sevierville campus maintained the highest persistence rate at 75.00%. As a group, males from WSCC off-campus sites maintained a persistence rate of 58.33% while those males who transferred in their grades maintained a persistence rate of 44.00% (Table 12).

Over 52% of the non-traditional females and 61.94% of the traditional females received their human anatomy and physiology instruction at the Morristown campus. The non-traditional females represented 73.86% of the off-campus and 67.86% of the transferred-in female populations respectively. Over 48% of the male population received their instruction at the Morristown campus. While 77.14% of the males were non-traditional, 7 of the 8 traditional males received their instruction at the Morristown campus (Table 12).

Table 12
Frequency of Location where Human Anatomy and Physiology Completed

Number of	Morris.	Sevier.	Greene.	Taze.	Northeast		Total
					CC	Other	
Students							
Who Persisted	268	17	55	23	51	72	486
Who Did Not Persist	125	12	15	12	24	56	244
Females							
Who Persisted	251	14	53	21	49	63	451
Who Did Not Persist	112	11	12	11	21	45	212
Males							
Who Persisted	17	3	2	2	2	9	35
Who Did Not Persist	13	1	3	1	3	11	32
Traditional Who Persisted							
Females	96	1	13	9	15	21	155
Males	7	0	0	0	0	1	8
Non-Traditional Who Persisted							
Females	155	13	40	12	34	42	296
Males	10	3	2	2	2	8	27

Pre-Clinical Non-Science Core Data

In each of the prerequisite non-science courses, the statistical means data suggested that candidates who persisted outperformed the non-persisting candidates significantly. While the individual differences within the non-science mean GPAs were less evident than those of the science courses, the non-science cumulative GPA means of 3.26 and 2.77 for those that persisted

as compared to those that did not suggested that statistical tests may support persistence relationships when non-science grades are considered (Table 13).

Table 13
Non-Science-Core Descriptive Statistics

Cumulative Number of	Comp. I	Dev. Psych.	Speech Comm.	Math	Computer Science	Non-Science GPA
Students						
Who Persisted	2.99	3.41	3.39	3.14	3.34	3.26
Who Did Not Persist	2.84	3.10	3.21	2.94	3.13	2.77
Females						
Who Persisted	2.99	3.42	3.40	3.15	3.34	3.27
Who Did Not Persist	2.72	2.91	2.90	2.27	2.97	2.76
Males						
Who Persisted	2.91	3.26	3.29	2.96	3.44	3.17
Who Did Not Persist	2.61	3.00	2.84	2.75	2.99	2.83
Traditional Who Persisted						
Females	2.93	3.26	3.34	3.16	3.29	3.20
Males	2.63	2.63	3.38	3.00	3.38	2.98
Non-Traditional Who Persisted						
Females	3.03	3.50	3.43	3.15	3.36	3.31
Males	3.00	3.46	3.27	2.95	3.46	3.23

The females who persisted outperformed the males in each of the non-science courses except computer sciences. Females averaged a letter grade of “B” or better in 4 of the 5 non-science courses while the males averaged a letter grade of “B” or better in 3 of the 5 non-science courses. Composition I was the only course that neither averaged a letter grade of “B” or better. Each persisting gender population averaged a cumulative non-science GPA exceeding 3.00 while the non-persisting groups averaged cumulative non-science mean GPAs below 3.00 (Table 13).

The non-traditional and traditional females who persisted outperformed the non-traditional and traditional males in each of the non-science courses except computer sciences. The non-traditional females averaged a letter grade of “B” in 5 of the 5 non-science courses

while the non-traditional males and the traditional females averaged a letter grade of “B” in 4 of the 5 non-science courses (Table 13).

Frequency of Composition I Grades. Four hundred seventy-one (66.06%) of the 713 candidates who completed composition I persisted. Five hundred nine (71.39%) of the candidates earned a letter grade of “B” or better with an average persistence rate of 67.98%. The highest overall persistence rate was 76.92% for those candidates who attained a letter grade of “A”. Candidates earning a letter grade of “C” or less had a persistence rate of 61.27% (Table 14).

Table 14
Frequency of Grades in Composition I

Number of	A	B	C	D	F	Total
Students						
Who Persisted	130	216	116	9	0	471
Who Did Not Persist	39	124	61	7	11	242
Females						
Who Persisted	122	200	105	9	0	436
Who Did Not Persist	33	111	52	4	10	210
Males						
Who Persisted	8	16	11	0	0	35
Who Did Not Persist	6	13	9	3	1	32
Traditional Who Persisted						
Females	36	71	42	2	0	151
Males	1	3	4	0	0	8
Non-Traditional Who Persisted						
Females	86	129	63	7	0	285
Males	7	13	7	0	0	27

Females with a letter grade of “B” or above encompassed 73.85% of all candidates who persisted and had a persistence rate of 69.10% within the female population. Females attaining a letter grade of “C” or less had a persistence rate of 63.33%. Forty-three (64.18%) of the male candidates attained a letter grade of “B” or better in composition I with 24 persisting. This

equated into a persistence rate of 55.81% for these males while male candidates earning a letter grade of “C” or less had a persistence rate of 45.83% (Table 14).

One hundred twenty-four (51.24%) of the students who did not persist attained a letter grade of “B”. When compared to the persisting females and males, 163 (67.36%) of the non-persisting students attained a letter grade of “B” or better. In the non-persisting population, 68.57% of the females and 59.38% of the males attained letter grades of “B” or better in composition I. Seventy-five percent of the persisting, non-traditional students attained a letter grade of “B” or better. The traditional males who persisted had a 50% chance of attaining either a letter grade of “C” or a “B” or better (Table 14).

Frequency of Developmental Psychology Grades. Seven hundred sixteen candidates completed the developmental psychology requirement, with an overall persistence rate of 66.48%. Over 84% of the population made a letter grade of “B” or better, with all 476 candidates who persisted attaining a letter grade of “C” or better. Nineteen of the 240 candidates who did not persist in the nursing program made a letter grade less than “C”. The highest persistence rate was 78.23% for the candidates who earned letter grades of “A”, while the remaining persistence rate were 61.00% or less suggesting that possibly only a letter grade of “A” in developmental psychology was a key indicator for persistence (Table 15).

Nearly 90% of the females who persisted earned a letter grade of “B” or higher while 75.12% of the non-persisting females earned a letter grade of “B” or better. The female candidates earning a letter grade of “A” had the highest persistence rate at 80.07% while females making a letter grade of “C” or less represented nearly 15% of the female population and had a persistence rate of 46.39% (Table 15).

Sixty-five males took developmental psychology with 34 or 52.31% persisting to graduate. Eighty percent of the male population earned a letter grade of “B” or better. The letter grade of “A” was most frequently earned by persisting males and represented 44.12% of the persisting male population. Only 6 (17.65%) of the males who persisted earned a letter grade of “C”, with no males who persisted earning a letter grade less than “C” (Table 15).

Table 15
Frequency of Grades in Developmental Psychology

Number of	A	B	C	D	F	Total
Students						
Who Persisted	248	17	51	0	0	476
Who Did Not Persist	69	112	40	5	14	240
Females						
Who Persisted	233	164	45	0	0	442
Who Did Not Persist	58	99	35	5	12	209
Males						
Who Persisted	15	13	6	0	0	34
Who Did Not Persist	11	13	5	0	2	31
Traditional Who Persisted						
Females	60	75	19	0	0	154
Males	3	4	0	0	8	11
Non-Traditional Who Persisted						
Females	173	89	26	0	0	288
Males	14	10	2	0	0	26

While only 10.18% of the females and 17.65% of the males who persisted earned a letter grade of “C” or less, 24.88% of the non-persisting females and 22.58% of the males earned a letter grade of “C” or less. Over 88% of females and non-traditional males who persisted earned a letter grade of “B” or better while 50.00% of the traditional males earned a letter grade of “B” or better (Table 15).

Frequency of Speech Communications Grades. Seven hundred eighteen candidates completed the speech communication course requirement. Of the 718 candidates, 476 or 66.30%

persisted to complete the nursing program. The individuals who earned a letter grade of “A” had the highest persistence rate of 75.24%. Nearly 87% of the population averaged a letter grade of “B” or better with a persistence rate of 69.66%. Individuals averaging a letter grade of “C” or less had a persistence rate of 44.21% (Table 16).

Table 16
Frequency of Grades in Speech Communications

Number of	A	B	C	D	F	Total
Students						
Who Persisted	234	200	38	4	0	476
Who Did Not Persist	77	112	27	2	24	242
Females						
Who Persisted	219	185	35	3	0	442
Who Did Not Persist	66	101	20	2	21	210
Males						
Who Persisted	15	15	3	1	0	34
Who Did Not Persist	11	11	7	0	3	32
Traditional Who Persisted						
Females	66	73	13	0	0	152
Males	3	5	0	0	0	8
Non-Traditional Who Persisted						
Females	153	112	22	3	0	290
Males	12	10	3	1	0	26

Over 91.4% of the females who persisted earned a letter grade of “B” or better. While the overall female persistence rate was 67.79%, those making a letter grade of “B” or better had a persistence rate of 70.75%. Of the 66 males who completed the speech communication course, 52 (78.79%) earned a letter grade of “B” or better in speech communications, with 88.24% of the males who persisted earning a letter grade of “B” or better. The overall male persistence rate was 51.52%.

While only 8.60% of the females and 11.76% of the males who persisted earned a letter grade of “C” or less, 20.48% of the females and 31.25% of the males who did not persist earned

a letter grade of “C” or less. When age within the persisting population was considered, over 85% of the traditional and non-traditional candidates who persisted attained a letter grade of “B” or better (Table 16).

Frequency of Mathematics Grades. Six hundred twenty-five candidates completed a mathematics course. Sixty-one percent of the candidates persisted, with the letter grade of “B” or better representing 76.50% of the persisting population and 57.44% of the non-persisting population. Three hundred eighty-three students who completed a prerequisite mathematics course persisted to graduate from the ADN program, with the female and male persistence rates of 62.96% and 44.83% respectively. Six more males who completed a prerequisite mathematics course did not persist than persisted. Seventy-eight percent of the persisting females and 61.54% of the persisting males attained a letter grade of “B” or better (Table 17).

Table 17
Frequency of Grades in Mathematics Course

Number of	A	B	C	D	F	Total
Students						
Who Persisted	151	142	84	6	0	383
Who Did Not Persist	56	83	41	12	50	242
Females						
Who Persisted	141	136	75	5	0	357
Who Did Not Persist	48	70	34	9	49	210
Males						
Who Persisted	10	6	9	1	0	26
Who Did Not Persist	8	13	7	3	1	32
Traditional Who Persisted						
Females	149	60	24	2	0	135
Males	2	1	2	0	0	5
Non-Traditional Who Persisted						
Females	92	76	51	3	0	222
Males	8	5	7	1	0	21

Two hundred forty-two candidates who completed a mathematics course did not persist including 210 females and 32 males. The most frequent grade for non-persisting candidates was a letter grade of “B”. Fifty-six percent of the non-persisting females and 65.63% of the non-persisting males attained a letter grade of “B” or better. While only 1.57% of the persisting candidates attained a letter grade of less than “C”, 25.62% of the non-persisting candidates attained this grade. The females who averaged a letter grade of “B” or better had a frequency rate of above 75% while the males had a frequency rate close to 60% individually (Table 17).

Frequency of Computer Science Grades. Seven hundred sixteen candidates completed a required computer science course. Of the 716 candidates, 472 or 65.92% persisted to complete the nursing program. The individuals who earned a letter grade of “A” had the highest persistence rate at 72.01%. Nearly 82% of the population made a letter grade of “B” or better with a persistence rate of 69.51%. Individuals making a letter grade of “C” or less had a persistence rate of 49.61% (Table 18).

Over 82.31% of the females earned a letter grade of “B” or better. While the overall female persistence rate was 67.38%, those earning a letter grade of “B” or better had a persistence rate of 70.65%. Of the 66 males who completed the required computer science course, 34 or 51.52% earned a letter grade of “B” or better. The male candidates who earned a letter grade of “B” or better had a persistence rate of 57.69% (Table 18).

Seventy-four percent of the non-persisting females and 68.75% of the non-persisting males earned a letter grade of “B” or better. Over 86% of the females along with the non-traditional males attained a letter grade of “B” or better while the traditional males had a frequency rate of 75.00% (Table 18).

Table 18
Frequency of Grades in Computer Science Course

Number of	A	B	C	D	F	Total
Students						
Who Persisted	229	179	63	1	0	472
Who Did Not Persist	89	90	48	5	12	244
Females						
Who Persisted	210	168	59	1	0	438
Who Did Not Persist	73	84	42	3	10	212
Males						
Who Persisted	19	11	4	0	0	34
Who Did Not Persist	16	6	6	2	2	32
Traditional Who Persisted						
Females	66	67	21	0	0	154
Males	5	1	2	0	0	8
Non-Traditional Who Persisted						
Females	144	101	38	1	0	284
Males	14	10	2	0	0	26

Frequency of Cumulative Non-Science Core GPA. Four hundred ninety-six or 67.95% of the candidates averaged a cumulative non-science core GPA of “B” or better, with over 77.73% of the candidates who persisted attaining a letter grade of “B” or better. All the students who persisted earned a cumulative letter grade average of “C” or better (Table 19).

The most frequent letter grade for both females and males who persisted was “B”. Seventy-eight percent of the females who persisted and 71.43% of the males who persisted averaged a non-science letter grade of “B” or better. While the most frequent non-science GPA for non-persisting female candidates was a letter grade of “C”, the most frequent non-science GPA for the non-persisting males was a letter grade of “B”. All candidates with a cumulative non-science letter grade of “D” or less were non-persisting. All of the traditional males maintained a letter grade of “B or better, while 77.78% of the non-traditional males earned this

average. Eighty percent of the non-traditional females and 74.03% of the traditional females earned a letter grade of “B” or better (Table 19).

Table 19
Frequency of Cumulative Non-Science Core GPA

Number of	A	B	C	D	F	Total
Students						
Who Persisted	43	334	108	0	0	485
Who Did Not Persist	10	109	105	18	2	244
Females						
Who Persisted	40	312	98	0	0	450
Who Did Not Persist	5	90	98	18	1	212
Males						
Who Persisted	3	22	10	0	0	35
Who Did Not Persist	5	19	7	0	1	32
Traditional Who Persisted						
Females	10	104	40	0	0	154
Males	1	3	4	0	0	8
Non-Traditional Who Persisted						
Females	30	208	58	0	0	296
Males	2	19	6	0	0	27

Pre-Clinical Academic Tendencies

When cumulative pre-clinical GPA and development/remedial GPA means were considered, the persisting candidates averaged .22 and .34 points higher respectively than the non-persisting candidates. The number of course repetitions and the number of course withdrawals and grades of “F” were higher for the non-persisting population. Candidates who persisted averaged more full-time, part-time, and total semester course loads than those candidates who did not non-persist (Table 20).

Table 20
Pre-Clinical Cumulative Descriptive Statistics

Number of	GPA		Course Repetitions	Average Number of			
	Pre-Clinical	Developmental		Withdrawals/ Grades of "F"	FS ^a	PS ^b	TS ^c
Students							
Who Persisted	2.90	3.14	.32	2.44	4.71	4.46	9.16
Who Did Not Persist	2.68	2.80	.57	6.07	3.56	3.96	7.68
Females							
Who Persisted	2.90	3.15	.30	2.37	4.72	4.46	9.18
Who Did Not Persist	2.68	2.79	.62	6.00	3.64	4.11	7.75
Males							
Who Persisted	2.84	3.09	.63	3.40	4.69	4.34	9.03
Who Did Not Persist	2.68	2.89	.22	6.56	3.03	4.19	7.22
Traditional Who Persisted							
Females	2.83	3.04	.33	1.93	5.08	3.70	8.79
Males	2.78	2.93	.50	2.13	5.13	4.00	9.13
Non-Traditional Who Persisted							
Females	2.94	3.20	.28	2.60	4.53	4.86	9.38
Males	2.86	3.13	.67	3.78	4.56	4.44	9.00

a: Full-time Semester Loads b: Part-time Semester Loads c: Total Semester Loads

Frequency of Cumulative Pre-Clinical GPA. The most frequent cumulative pre-clinical GPA for the persisting and non-persisting students was a letter grade of “C”. Over 62% of the persisting and 72.13% of the non-persisting students averaged a letter grade of “C”. While 37.94% of the persisting students averaged a letter grade of “B” or better, only 22.13% of the non-persisting students averaged a letter grade of “B” or better. A letter grade average of “D” or less was found only in the non-persisting population (Table 21).

The male and female sub-populations mirrored closely the overall persistence rate of the population. The traditional females and males averaged higher frequency rates than non-traditional females and males when attaining a letter grade of “C”. While 75.00% of the traditional males averaged a letter grade of “C”, only 55.07% of the non-traditional females

averaged this letter grade. Forty-five percent of the non-traditional females averaged a letter grade of “B” or better while of 25.32% of the traditional females averaged this grade (Table 21).

Table 21
Frequency of Cumulative Pre-Clinical GPA

Number of	A	B	C	D	F	Total
Students						
Who Persisted	3	181	301	0	0	485
Who Did Not Persist	0	54	176	14	0	244
Females						
Who Persisted	3	169	278	0	0	450
Who Did Not Persist	0	48	153	11	0	212
Males						
Who Persisted	0	12	23	0	0	35
Who Did Not Persist	0	6	23	3	0	32
Traditional Who Persisted						
Females	1	38	115	0	0	154
Males	0	2	6	0	0	8
Non-Traditional Who Persisted						
Females	2	131	163	0	0	296
Males	0	10	17	0	0	27

Frequency of Cumulative Developmental/Remedial GPA. The most frequent cumulative developmental/remedial GPA for students who persisted was a letter grade of “B” while that for the non-persisting students was a letter grade of “C”. Over 63% of the persisting students attained a letter grade of “B” or better while only 35.66% of the non-persisting students attained this average (Table 22).

The averages were consistently represented within the female and male populations who persisted and did not persist. Females tended to have more letter grade averages of “C” or less with the non-persisting females having the largest frequency at 64.62%. Within the persisting population, 68.58% of the non-traditional females and 66.67% of the non-traditional males averaged letter grades of “B” or better. The frequency of letter grades of “B” or better was

significantly lower in the traditional female and male populations at 53.55% and 50.00% respectively (Table 22).

Table 22
Frequency of Cumulative Developmental/Remedial GPA

Number of	A	B	C	D	F	Total
Students						
Who Persisted	26	282	173	5	0	486
Who Did Not Persist	4	83	145	11	1	244
Females						
Who Persisted	25	261	160	5	0	451
Who Did Not Persist	4	71	126	10	1	212
Males						
Who Persisted	1	21	13	0	0	35
Who Did Not Persist	0	12	19	1	0	32
Traditional Who Persisted						
Females	7	76	70	2	0	155
Males	0	4	4	0	0	8
Non-Traditional Who Persisted						
Females	18	185	90	3	0	296
Males	1	17	9	0	0	27

Frequency of Course Repetitions. Over 96.85% of the candidates repeated 3 or fewer courses. This included 91.14% of the candidates who persisted and 94.67% of the non-persisting candidates. The rate of persistence declined after each consecutive two repeated course (Table 23).

When gender was considered, 98.67% of the persisting females and 91.43% of the persisting males repeated 3 or fewer courses. Ninety-four percent of the non-persisting females and 100% of the non-persisting males repeated 3 or fewer courses. Over 89% of all the traditional and non-traditional candidates who persisted had 3 or fewer repeated courses, with all the traditional males repeating 3 or fewer courses (Table 23).

Table 23
Frequency of Course Repetitions

Number of	0-1	2-3	4-5	6-7	Total
Students					
Who Persisted	443	33	7	2	485
Who Did Not Persist	214	17	7	6	244
Females					
Who Persisted	414	30	5	1	450
Who Did Not Persist	183	16	7	6	212
Males					
Who Persisted	29	3	2	1	35
Who Did Not Persist	31	1	0	0	32
Traditional Who Persisted					
Females	140	13	1	0	154
Males	6	2	0	0	8
Non-Traditional Who Persisted					
Females	274	17	4	1	296
Males	23	1	2	1	27

Frequency of Course Withdrawals and/or Grades of “F”. Nearly 74.64% of the candidates who persisted had 3 or fewer course withdrawals and/or grades of “F”. Thirty-nine percent of the non-persisting candidates had 3 or fewer course withdrawals and/or grades of “F”. While 8.45% of the persisting candidates had 8 or more course withdrawals and/or grades of “F”, 29.10% of the non-persisting candidates had 8 or more (Table 24).

Over 75.33% of the persisting females and 65.71% of the persisting males had 3 or fewer course withdrawals and/or grades of “F”. Forty-one percent of the non-persisting females and 28.13% of the non-persisting males had 3 or fewer course withdrawals and/or grades of “F”. Thirty-seven percent of the non-traditional males had more than 3 course withdrawals and/or grades of “F”, while the 81.17% of the traditional females had fewer than 3 course withdrawals

and/or grades of “F”. As a group, the non-traditional students who persisted had higher frequencies of course withdrawals and/or grades of “F” (Table 24).

Table 24
Frequency of Course Withdrawals and/or Grades of “F”

Number of	0-3	4-7	8-11	12-15	16-19	20-23	24-above	Total
Students								
Who Persisted	362	82	28	5	5	2	1	485
Who Did Not Persist	96	77	37	19	8	4	3	244
Females								
Who Persisted	339	76	23	5	5	1	1	450
Who Did Not Persist	87	64	32	15	7	4	3	212
Males								
Who Persisted	23	6	5	0	0	1	0	35
Who Did Not Persist	9	13	5	4	1	0	0	32
Traditional Who Persisted								
Females	125	21	6	2	0	0	0	154
Males	6	1	1	0	0	0	0	8
Non-Traditional Who Persisted								
Females	214	55	17	3	5	1	1	296
Males	17	5	4	0	0	1	0	27

Frequency of Full-Time Semester Loads. Seventy-four percent of the candidates averaged 5 or fewer full-time semester loads. Sixty-three percent of the candidates who persisted completed 3-5 full-time semesters. While 29.48% of the candidates who persisted completed 6 or more full-time semesters, only 17.62% of the non-persisting candidates completed 6 or more full-time semester loads (Table 25).

Seventy percent of the persisting females and 80.00% of the persisting males completed 5 or fewer full-time semester course loads. Eighty-two percent of the non-persisting females and 84.38% of the non-persisting males completed 5 or fewer full-time semester course loads. The traditional females who persisted had the most frequent full-time semester loads over

6 with 37.66%, while the other age groups averaged taking 5 or fewer full-time semester loads at rates above 75.00% (Table 25).

Table 25
Frequency of Full-Time Semester Loads

Number of	0-2	3-5	6-8	9-11	12-14	Total
Students						
Who Persisted	38	304	120	19	4	485
Who Did Not Persist	99	102	34	9	0	244
Females						
Who Persisted	37	277	115	18	3	450
Who Did Not Persist	81	93	30	8	0	212
Males						
Who Persisted	1	27	5	1	1	35
Who Did Not Persist	18	9	4	1	0	32
Traditional Who Persisted						
Females	3	93	54	2	2	154
Males	0	6	1	1	0	8
Non-Traditional Who Persisted						
Females	34	184	61	16	1	296
Males	1	21	4	0	1	27

Frequency of Part-Time Semester Loads. Over 67% of the students who persisted and 72.54% of the non-persisting students completed 5 or fewer part-time semesters. The rate of persistence increased directly up to 12 or more part-time semester loads, with those candidates having 15 or more part-time semester loads averaging a persistence rate of 40.00% (Table 26).

Sixty-seven percent of the females who persisted and 71.43% of the males who persisted enrolled in 5 or fewer part-time semester loads. Seventy-three percent of the non-persisting females and 71.88% of the non-persisting males enrolled in 5 or fewer part-time semester loads. The non-traditional students who persisted tended to enroll in more part-time semester loads, with the females having the highest frequency (Table 26).

Table 26
Frequency of Part-Time Semester Loads

Number of	0-2	3-5	6-8	9-11	12-14	15-over	Total
Students							
Who Persisted	176	155	94	46	14	4	485
Who Did Not Persist	107	70	40	15	6	6	244
Females							
Who Persisted	161	141	87	44	14	3	450
Who Did Not Persist	92	62	35	13	4	6	212
Males							
Who Persisted	11	14	7	2	0	1	35
Who Did Not Persist	15	8	5	2	2	0	32
Traditional Who Persisted							
Females	59	62	23	9	1	0	154
Males	2	4	2	0	0	0	8
Non-Traditional Who Persisted							
Females	102	79	64	35	13	3	296
Males	9	10	5	2	0	1	27

Frequency of Total Semester Loads. Students most frequently enrolled in 9-11 pre-clinical semesters. Only 45.88% of the persisting students enrolled 8 or fewer pre-clinical semesters while 59.02% of the non-persisting students enrolled in 8 or fewer pre-clinical semesters. This average was consistent within the gender populations who persisted and did not persist except for the males who persisted tended to enroll in fewer pre-clinical semesters (Table 27).

Nearly 50% of the traditional students enrolled in 8 or fewer pre-clinical semesters. Within the non-traditional student populations, 42.57% of the females and 55.56% of the males enrolled in 8 or fewer pre-clinical semesters (Table 27).

Table 27
Frequency of Total Semester Loads

Number of	0-2	3-5	6-8	9-11	12-14	15-17	18-above	Total
Students								
Who Persisted	0	96	127	145	78	30	10	486
Who Did Not Persist	18	67	59	67	18	8	7	244
Females								
Who Persisted	0	89	115	137	73	28	9	451
Who Did Not Persist	14	57	54	57	17	8	5	212
Males								
Who Persisted	0	7	12	8	5	2	1	35
Who Did Not Persist	4	10	5	10	1	0	2	32
Traditional Who Persisted								
Females	0	26	52	49	21	7	0	155
Males	0	1	3	2	2	0	0	8
Non-Traditional Who Persisted								
Females	0	63	63	88	52	21	9	296
Males	0	6	9	6	3	2	1	27

Clinical Data

As expected, the clinical GPA means were appreciably lower for non-persisting candidates. The difference in GPA means between the candidates who persisted and those who did not was .92 for the 1st semester and 1.37 for the 2nd semester. These averages were consistent within gender with males averaging higher 1st semester GPAs while females averaged higher 2nd semester GPAs. The non-traditional females averaged the highest mean GPAs in the first clinical year (Table 28).

Table 28
Clinical Descriptive Statistics

Number of	Clinical GPA	
	1 st Semester	2 nd Semester
Students		
Who Persisted	2.76	2.47
Who Did Not Persist	1.84	1.10
Females		
Who Persisted	2.76	2.47
Who Did Not Persist	1.84	1.10
Males		
Who Persisted	2.77	2.37
Who Did Not Persist	1.84	1.06
Traditional Who Persisted		
Females	2.67	2.40
Males	2.81	2.45
Non-Traditional Who Persisted		
Females	2.81	2.51
Males	2.76	2.35

Frequency of Student Entry Status

Fifty-five percent of the ADN population completed all their prerequisite coursework at a WSCC campus, including 62.96% of the persisting and 39.34% of the non-persisting students. Over 64% of the persisting females and 48.57% of the persisting males completed their prerequisite coursework at a WSCC site while 63.67% of the non-persisting females and 40.63% of the non-persisting males transferred in at least a portion of their pre-clinical required coursework (Table 29).

Over 71% of the traditional females and 60.47% of the non-traditional females who persisted were indigenous to WSCC. While 75.00% of the traditional males were indigenous to WSCC, 59.26% of the non-traditional males transferred in at least a portion of the required pre-clinical coursework (Table 29).

Table 29
Frequency of Student Entry Status

Number of	Indigenous	Transfer	Total
Students			
Who Persisted	306	180	486
Who Did Not Persist	96	148	244
Females			
Who Persisted	289	162	451
Who Did Not Persist	77	135	212
Males			
Who Persisted	17	18	35
Who Did Not Persist	19	13	32
Traditional Who Persisted			
Females	110	45	155
Males	6	2	8
Non-Traditional Who Persisted			
Females	179	117	296
Males	11	16	27

Frequency of 1st Semester Clinical GPA

Of the 730 students who enrolled in the 1st semester of nursing clinical coursework, 302 (41.37%) earned a 1st semester GPA letter grade of “C”. Nearly 59.47% of the persisting candidates earned a letter grade average of “B” or better. Only 10.25% of the non-persisting candidates earned a letter grade average of “B” or better. Over 59.20% of the females and 62.86% of the males who persisted averaged a 1st semester GPA of a letter grade of “B” or better while 8.96% of the females and 18.75% of the males who did not persist averaged a letter grade of “B” or better (Table 30).

Nearly 63.19% of the traditional females and males who persisted averaged a letter grade of “C” in the 1st semester of the clinical program while 60.37% of the non-traditional students averaged a letter grade of “B” in the 1st semester clinical program. Over 70.89% of the non-

traditional students averaged a letter grade of “B” or better while less than 36.81% of the traditional students averaged a letter grade of “B” or better (Table 30).

Table 30
Frequency of 1st Semester Clinical GPA

Number of	A	B	C	D	F	Total
Students						
Who Persisted	38	251	194	2	1	486
Who Did Not Persist	1	24	108	61	50	244
Females						
Who Persisted	35	232	181	2	1	451
Who Did Not Persist	1	18	94	57	42	212
Males						
Who Persisted	3	19	13	0	0	35
Who Did Not Persist	0	6	14	4	8	32
Traditional Who Persisted						
Females	4	53	98	0	0	155
Males	0	3	5	0	0	8
Non-Traditional Who Persisted						
Females	31	179	83	2	1	296
Males	3	16	8	0	0	27

Frequency of 2nd Semester Clinical GPA

One hundred twenty-seven fewer students enrolled in the 2nd semester of clinical coursework. This represented an 82.60% persistence rate after the 1st semester clinical coursework. The persistence rate in the 2nd semester of clinical coursework was 78.14%. Nearly 97.94% of the students who persisted earned a semester average equated to a letter grade of “C” or better while 70.59% of the non-persisting students attained a letter grade of “D” or less (Table 31).

These averages were consistent for both the female and male populations. The most frequent letter grade average for the traditional and non-traditional students who persisted was

“C”. Only the non-traditional females maintained frequency rates for letter grades of “B” or better that were above 40.00%, with an overall frequency rate at 44.59% (Table 31).

Table 31
Frequency of 2nd Semester Clinical GPA

Number of	A	B	C	D	F	Total
Students						
Who Persisted	35	161	280	4	6	486
Who Did Not Persist	4	14	22	28	68	136
Females						
Who Persisted	34	149	259	4	5	451
Who Did Not Persist	4	12	21	19	49	105
Males						
Who Persisted	1	12	21	0	1	35
Who Did Not Persist	0	2	1	9	19	31
Traditional Who Persisted						
Females	10	41	100	2	2	155
Males	0	3	5	0	0	8
Non-Traditional Who Persisted						
Females	24	108	159	2	3	296
Males	1	9	16	0	1	27

Statistical Analysis of Population

Persistence Variance Due to All variables

Distribution and frequency data supported possible differences between the students who persisted and the students who did not persist. A one-way multivariate analysis of variance was conducted using persistence as the fixed variable to address hypothesis 1 which postulated that, “There were no differences among any combination of demographic, pre-clinical, and/or clinical variables in regard to persistence in this ADN program.” The analysis revealed a statistically significant difference between students who persisted and students who did not persist: $F(25, 444) = 22.45, p < .01$; Wilks’s Lambda = .44; $\eta^2 = .56$. The p value was less than .05, indicating that there was a statistical difference between persisting and non-persisting students when these

variables were considered. This finding permitted an investigation of the tests of between-subjects effects to analyze the relationship that each independent variables had on persistence. To reduce the chance of inadvertently committing a Type I error, a simplified Bonferroni adjustment of the original alpha value of .05 was formulated by dividing .05 by the 27 variables analyzed. The new alpha value that was used to analyze individual variable effects was $p < .01$.

Thirteen variables were found to have no unique relationship with persistence in this population. These variables included all five of the demographic variables and the computer science, math, and composition I grades. The transfer status of the students, the number of natural science courses, the location of human anatomy and physiology course completion, and the number of part-time and total semesters were found to have no significant relationship with persistence.

Fifteen variables met the adjusted alpha value criteria and were re-analyzed together to determine best-fit possibilities. The analysis revealed a statistically significant difference between students who persisted and students who did not persist: $F(14, 467) = 32.54, p < .01$; Wilks's Lambda = .51; $\eta^2 = .49$. The 2nd semester clinical GPA, pre-clinical science-core GPA, cumulative pre-clinical GPA, and pre-clinical non-science GPA had the most significant relationships with persistence.

While the cumulative grades were the most significant, grades in specific courses were also statistically significant. To ensure that a correlation between the related independent variables was not too high, multiple regression analysis was conducted using these variables. A Pearson correlation of .70 or higher was considered too high a relationship between the independent variables (Tabachnick & Fidell, 1996). The cumulative science-core GPA was found to have a high Pearson correlation with each of the science courses while the cumulative

pre-clinical developmental and non-science GPAs and each of the human anatomy and physiology course GPAs were found unfit because their multicollinearity tolerance levels were below .30. The level of significance of the standardized beta values for course repetitions, developmental psychology, speech communications, and math were above .05 indicating that they did not make a unique contribution to the persistence model.

The remaining 8 variables were found to have a significant and unique impact on persistence in the WSCC ADN program. This revised model had a R^2 value of .60, indicating that 60.00% of the persistence variance was explained by these variables. The largest unique contribution was the 2nd semester clinical GPA (beta = -.43) and the cumulative pre-clinical GPA (beta = .35).

Table 32
Multiple Regression Analysis and Multivariate Analysis of Variance Data from the Entire Population

Independent Variable	Standard Beta	F	η^2	Persist		Non-Persist	
				M	SD	M	SD
Pre-Clinical Academic							
Cumulative Pre-Clinical GPA	.35	65.46	.10	2.89	.02	2.56	.04
Human Anatomy and Physiology I	-.05	36.68	.06	3.04	.04	2.57	.07
Human Anatomy and Physiology II	-.09	63.03	.10	3.10	.04	2.48	.70
Microbiology	-.19	85.66	.13	3.06	.04	2.28	.08
Course Withdrawals and/or Grades of "F"	.34	59.53	.09	2.46	.18	5.58	.36
Full-time Semester Loads	-.29	15.39	.03	4.76	.09	3.94	.19
Clinical Academic							
1 st Semester Clinical GPA	-.19	31.51	.08	2.76	.03	2.29	.06
2 nd Semester Clinical GPA	-.43	269.08	.31	2.47	.04	1.09	.08

When multivariate analysis of variance was performed using these 8 variables, a statistically significant difference was revealed between students who persisted and students who

did not persist: $F(8, 580) = 55.69, p < .01$; Wilks's Lambda = .57; $\eta^2 = .43$. Each of the variables was found to be significant using the tests of between-subjects effect when applying a Bonferroni adjusted $p < .01$.

As indicated from Table 32, the η^2 indicated that 2nd semester clinical GPA (.31) and Microbiology GPA (.13) represented the greatest variances in persistence. An inspection of the 2nd semester clinical mean GPAs indicated that the students who persisted did significantly better ($M = 2.47, SD = .04$) than the students who did not persist ($M = 1.09, SD = .08$). Students who persisted attained higher Microbiology GPA mean scores ($M = 3.06, SD = .04$) than the students who did not persist ($M = 2.3, SD = .08$).

Persistence Variance Due to Demographic Variables

Multiple regression analysis was performed to address the effect that the demographic, pre-clinical, and clinical variables individually had on persistence within the entire ADN population. When the demographic variables were analyzed, Pearson correlation data revealed little relationship between the five demographic variables (less than .10) and persistence except for the two age variables. This was confirmed by high multicollinearity tolerance values except for associated pre-clinical and clinical entry ages. The R^2 value was .02 with a $p < .01$, indicating that only 2.00% of the variance was contributed by the demographic variables. The only two demographic variables that made a significant contribution to persistence were distance commuted to the nursing campus (beta = .11) and gender (beta = .09). The other demographic variables were found to have significance values above .05.

When multivariate analysis of variance was performed using these 2 variables, a significant difference was found between students who persisted and students who did not persist: $F(2, 727) = 6.06, p < .01$; Wilks's Lambda value of .98; $\eta^2 = .02$. The distance

commuted and gender variables were found to be significant using the tests of between-subjects effect when applying a Bonferroni adjusted significance value of .03. As indicated in Table 33, the η^2 values indicate that .90% and .80% of the persistence in the ADN program was attributed to gender and distance commuted. An inspection of the gender indicated that the students who persisted had a slightly higher number of females ($M = 1.07$, $SD = .01$) than the students who did not persist ($M = 1.13$, $SD = .02$). This was discerned because this study designated females as 1 and males as 2. Students who persisted commuted a slightly shorter distance to the nursing facility ($M = 2.30$, $SD = .04$) than the students who did not persist ($M = 2.48$, $SD = .06$).

Persistence Variance Due to Pre-Clinical Variables

When the pre-clinical variables were analyzed using multiple regression analysis, the R^2 value was .50 with a $p < .01$. While this model explained 50.00% of the persistence variance, the Pearson correlation data found a highly correlated relationship between the cumulative science GPA and each of the required science courses. The multicollinearity tolerance values were below .30 for cumulative developmental GPA, non-science cumulative GPA and the part-time, full-time, and total semester variables indicating that multiple correlations with other variables were high. Pearson correlation and multicollinearity tolerance values had a best-fit model when only the full-time semester variable was included with the remaining pre-clinical variables. The revised model R^2 value was .43 with a $p < .01$ and all variables conformed to Pearson correlation and multicollinearity tolerance constraints. The largest unique contribution was the number of course withdrawals and/or grades of “F” (beta = .41) and the number of full-time semesters (beta = -.34). The grades in microbiology (beta = -.27) and math (beta = -.12) were the courses with the largest unique contribution to persistence (Table 33).

When multivariate analysis of variance was performed using these 9 variables, a statistically significant difference between students who persisted and students who did not persist was identified: $F(9, 597) = 54.86, p < .01$; Wilks's Lambda = 0.55; $\eta^2 = .45$. Each of the variables was found to be significant using the tests of between-subjects effect when applying a Bonferroni adjusted $p < .01$. The η^2 values indicated that 19.00% and 15.00% of the persistence in the ADN program was attributed to grades in microbiology and number of course withdrawals and/or grades of "F" (Table 33). An inspection of the microbiology GPA means indicated that the students who persisted had a substantially higher GPA ($M = 3.08, SD = .05$) than the students who did not persist ($M = 2.13, SD = .06$). Students who persisted had significantly fewer course withdrawals and/or grades of "F" ($M = 2.40, SD = .22$) than the students who did not persist ($M = 6.07, SD = .28$).

Persistence Variance Due to Clinical Variables

When the clinical variables were analyzed using multiple regression analysis, the R^2 value was .39 with a $p < .01$ and all variables conforming to Pearson correlation and multicollinearity tolerance constraints. The largest unique contribution was the 2nd semester clinical GPA (beta = -.42) while the 1st semester clinical GPA (beta = -.31) and the transfer status (beta=-.06) had a lesser unique contribution to persistence (Table 33).

When multivariate analysis of variance was performed using these 3 variables, the transfer status was found to not be significant using the tests of between-subjects effect when applying a Bonferroni adjusted significance value of .02. There was a statistically significant difference between students who persisted and students who did not persist when the 1st and 2nd semester clinical GPA were consisted: $F(2, 596) = 131.37, p < .01$; Wilks's Lambda = .70; $\eta^2 = .31$. The η^2 values indicated that 30.00% and 8.10% of the persistence in the ADN program was

attributed to 2nd and 1st semester clinical GPAs (Table 33). An inspection of the 2nd semester clinical GPA means indicated that the students who persisted had a substantially higher GPA ($M = 2.47, SD = .04$) than the students who did not persist ($M = 1.10, SD = .08$). Students who persisted maintained higher 1st semester GPA means ($M = 2.76, SD = .02$) than the students who did not persist ($M = 2.29, SD = .06$).

Table 33
Variance Within Entire Population When Grouped Variables Considered

Independent Variable	Standard Beta	F	η^2	Persist		Non-Persist	
				M	SD	M	SD
Demographic							
Distance Commuted to Nursing Facility	.11	6.14	.01	2.30	.04	2.48	.06
Gender	.09	6.86	.01	1.07	.01	1.13	.02
Pre-Clinical Academic							
Course Withdrawals and/or Grades of "F"	.41	106.41	.15	2.40	.22	6.07	.28
Full-time Semester Loads	-.34	59.60	.09	4.92	.11	3.58	.14
Microbiology	-.27	143.24	.19	3.08	.05	2.13	.06
Cumulative Pre-Clinical GPA	.17	56.53	.09	2.94	.02	2.68	.03
Mathematics	.12	79.54	.12	3.14	.06	2.33	.07
Developmental Psychology	-.10	54.29	.08	3.44	.04	2.94	.05
Speech Communications	-.09	47.55	.07	3.41	.05	2.89	.06
Human Anatomy and Physiology II	-.12	54.14	.08	3.13	.04	2.66	.05
Courses Repetitions	-.10	14.30	.02	.26	.05	.58	.07
Clinical Academic							
1 st Semester Clinical GPA	-.42	259.78	.30	2.47	.04	1.10	.08
2 nd Semester Clinical GPA	-.31	52.52	.08	2.76	.03	2.29	.06

Statistical Findings Concerning Hypothesis 1

These multivariate analysis of variance and multiple regression analyses revealed that there were statistically significant differences between the students who persisted and the students who did not persist. The 9 variables identified as significant within the entire ADN population were supported by findings that 2 demographic, 9 pre-clinical academic, and 2

clinical academic were significant when the independent variables were analyzed within their groups. These findings support rejecting hypothesis 1 which postulated that, “There were no differences among any combination of demographic, pre-clinical, and/or clinical variables in regard to persistence in this ADN program.”

Statistical Analysis of Female Population

Persistence Variance Due to All variables

A one-way multivariate analysis of variance was conducted to test the validity of hypothesis 2 which postulated that, “There were no differences among any combination of demographic, pre-clinical and/or clinical variables in regard to persistence within the female population in this ADN program.” The analysis identified a statistically significant difference between females who persisted and females who did not persist: $F(23, 411) = 23.80, p < .01$; Wilks’s Lambda = .43; $\eta^2 = .57$. This was less than the alpha value of .05, indicating that there was a statistical difference between persisting and non-persisting females when these variables were considered. This finding permitted an investigation of the tests of between-subjects effects to analyze the relationship that each independent variable had on persistence. To reduce the chance of inadvertently committing a Type I error, a simplified Bonferroni adjustment of the original .05 alpha value was formulated by dividing it by the 26 variables analyzed (excluding gender). The new alpha value that was used to analyze individual variable effects was $p < .01$.

Eleven variables were found to have no unique relationship with persistence in this population. These variables included all five of the demographic variables and the computer science and composition I grades. The transfer status of the students along with the location of human anatomy and physiology course completion, the number of natural science courses, and part-time and total semesters were found to have no significant relationship with persistence.

Fifteen variables met the adjusted alpha value criteria and were re-analyzed together to determine best-fit possibilities. The analysis identified a statistically significant difference between females who persisted and females who did not persist: $F(14, 431) = 31.58, p < .01$; Wilks's Lambda = .49; $\eta^2 = .51$. The 2nd semester clinical GPA, pre-clinical science-core GPA, cumulative pre-clinical GPA, and required mathematics course had the most unique relationships with persistence.

While the cumulative grades were most significant, grades in specific courses were also statistically significant. To ensure that a correlation between the related independent variables was not too high, multiple regression analysis was conducted using these variables. The science-core GPA was found to have a high Pearson correlation with each of the science courses while the cumulative pre-clinical developmental GPA and non-science GPA were found unfit because their multicollinearity tolerance levels were below .30. The level of significance of the standardized beta values for course repetitions, developmental psychology, speech, mathematics, and human anatomy and physiology I and II were above .05 indicating that they did not provide a unique contribution to the persistence model.

The remaining 6 variables were found to have a significant and unique impact on persistence within the female population in the WSCC ADN program. This model had a R^2 value of .54, indicating that 54.00% of the persistence variance was explained by these variables. The largest unique contribution was the 2nd semester clinical GPA (beta = .43) and course withdrawals and/or grades of "F" (beta = .34).

When multivariate analysis of variance was performed using these 6 variables, a statistically significant difference between the females who persisted and the females who did not persist was identified: $F(6, 539) = 65.26, p < .01$; Wilks's Lambda = .58; $\eta^2 = .42$. Each of

the variables was found to be significant using the tests of between-subjects effect when applying a Bonferroni adjusted $p < .01$. As shown in Table 34, the η^2 values indicated that 2nd semester clinical GPA (.31) had the highest variance in persistence with microbiology having the second highest variance (.14) when all other variables were held constant. An inspection of the 2nd semester clinical GPA means indicated that the females who persisted had a substantially higher GPA ($M = 2.48, SD = .04$) than the females who did not persist ($M = 1.10, SD = .08$). Females who persisted maintained higher microbiology GPA means ($M = 3.07, SD = .04$) than the females who did not persist ($M = 2.27, SD = .08$).

Table 34
Multiple Regression Analysis and Multivariate Analysis of Variance Data Within the Female Population

Independent Variable	Standard Beta	F	η^2	Persist		Non-Persist	
				M	SD	M	SD
Pre-Clinical Academic							
Cumulative Pre-Clinical GPA	.27	67.29	.11	2.90	.02	2.54	.04
Microbiology	.19	86.90	.14	3.07	.04	2.27	.08
Course Withdrawals and/or Grades of "F"	.34	61.16	.10	2.37	.18	5.65	.38
Full-time Semester Loads	.29	13.25	.02	4.76	.09	3.98	.19
Clinical Academic							
1 st Semester Clinical GPA	.18	44.92	.08	2.76	.03	2.31	.06
2 nd Semester Clinical GPA	.43	244.24	.31	2.48	.04	1.10	.08

Persistence Variance Due to Demographic Variables

Multiple regression analysis was performed to address the effect that the demographic, pre-clinical, and clinical variables individually had on persistence within the female ADN population. When the demographic variables were analyzed, Pearson correlation data revealed little relationship between the five variables (less than .10). This was confirmed by high multicollinearity tolerance values except for associated pre-clinical and clinical entry ages. The

R^2 value was $p < .01$ with a significance of .38, indicating that no demographic variable contributed to persistence within the female population.

Persistence Variance Due to Pre-Clinical Variables

When the pre-clinical variables were analyzed using multiple regression analysis, the R^2 value was .50 with a $p < .01$. While this model explained 50.00% of the persistence variance within the female population, the Pearson correlation data found a highly correlated relationship between the cumulative science GPA and each of the required science courses. The multicollinearity tolerance values were below .30 for cumulative developmental GPA, non-science cumulative GPA, and the part-time, full-time, and total semester variables indicating that multiple correlations with other variables were high. Pearson correlation and multicollinearity tolerance values had a best-fit model when only the full-time semester variable was included with the remaining pre-clinical variables. The number of course repetitions, number of science courses, and grades in human anatomy and physiology I and II and composition I were found to have a significance value above .05 and were removed. The revised model R^2 value was .42 with a $p < .01$ with all variables conforming to Pearson correlation and multicollinearity tolerance constraints. The largest unique contribution was the number of course withdrawals and/or grades of "F" (beta = .37) and the number of full-time semesters (beta = -.32). The grades in microbiology (beta = -.28) and mathematics (beta = -.16) were the courses with the largest unique contribution to persistence (Table 35).

When multivariate analysis of variance was performed using these 9 variables, a statistically significant difference between the females who persisted and the females who did not persist was realized: $F(7, 546) = 62.70, p < .01$; Wilks's Lambda = 0.55; $\eta^2 = .45$. Each of the variables was found to be significant using the tests of between-subjects effect when applying

a Bonferroni adjusted $p < .01$. As shown in Table 35, the η^2 values indicated that the female persistence in the ADN program was attributed to grades in microbiology (.19) and number of course withdrawals and/or grades of “F” (.15) when all other variables were held constant. An inspection of the microbiology GPA means indicated that the females who persisted had a substantially higher GPA ($M = 3.09$, $SD = .05$) than the females who did not persist ($M = 2.14$, $SD = .07$). Females who persisted had fewer number of course withdrawals and/or grades of “F” ($M = 2.29$, $SD = .23$) than the females who did not persist ($M = 5.97$, $SD = .29$).

Table 35
Variance Within Female Population When Grouped Variables Considered

Independent Variable	Standard Beta	F	η^2	Persist		Non-Persist	
				M	SD	M	SD
Pre-Clinical Academic							
Cumulative Pre-Clinical GPA	.14	55.12	.09	2.95	.02	2.67	.03
Microbiology	-.28	131.19	.19	3.09	.05	2.14	.07
Course Withdrawals and/or Grades of “F”	.37	98.45	.15	2.29	.23	5.97	.29
Full-time Semester Loads	-.32	49.76	.08	4.94	.11	3.66	.14
Mathematics	-.16	86.93	.14	3.15	.06	2.25	.08
Developmental Psychology	-.10	57.05	.09	3.44	.04	2.90	.06
Speech Communications	-.08	44.71	.08	3.41	.05	2.89	.06
Clinical Academic							
1 st Semester Clinical GPA	-.30	45.09	.08	2.76	.03	2.31	.06
2 nd Semester Clinical GPA	-.42	237.68	.30	2.47	.04	1.10	.08

Persistence Variance Due to Clinical Variables

When the clinical variables were analyzed using multiple regression analysis, the R^2 value was .38 with a $p < .01$ and all variables conforming to Pearson correlation and multicollinearity tolerance constraints. The largest contribution was the 2nd semester clinical GPA (beta = -.42) while the 1st semester clinical GPA (beta = -.30) and the transfer status (beta = -.06) had a lesser contribution to persistence (Table 35).

When multivariate analysis of variance was performed using these 3 variables, a statistically significant difference between the females who persisted and the females who did not persist was realized: $F(2, 548) = 119.05, p < .01$; Wilks's Lambda = .70; $\eta^2 = .30$. Only the transfer status was found to not be significant using the tests of between-subjects effect when applying a Bonferroni adjusted $p < .01$. As shown in Table 35, the η^2 values indicate that the female persistence in the ADN program was attributed to 2nd semester (.30) and 1st semester (.08) clinical GPAs. An inspection of the 2nd semester clinical GPA means indicated that the females who persisted had a substantially higher GPA ($M = 2.47, SD = .04$) than the females who did not persist ($M = 1.10, SD = .08$). Females who persisted also attained higher 1st semester clinical GPA means ($M = 2.76, SD = .03$) than the females who did not persist ($M = 2.31, SD = .06$).

Statistical Findings Concerning Hypothesis 2

These multivariate analysis of variance and multiple regression analyses revealed that there were statistically significant differences between the females who persisted and the females who did not persist. The 6 variables identified as significant within the entire female ADN population were supported by findings that 7 pre-clinical academic, and 2 clinical academic were significant when the independent variables were analyzed within their groups. These findings support rejecting hypothesis 2 which postulated that, "There were no differences among any combination of demographic, pre-clinical and/or clinical variables in regard to persistence within the female population in this ADN program."

Statistical Analysis of Male Population

Persistence Variance Due to All variables

A one-way multivariate analysis of variance was conducted to evaluate the validity of hypothesis 3 which postulated that, “There were no differences among any combination of demographic, pre-clinical and/or clinical variables in regard to persistence within the male population in this ADN program”. A statistically significant difference between the males who persisted and the males who did not persist was realized: $F(3, 63) = 15.43, p < .01$; Wilks’s Lambda = .07; $\eta^2 = .93$. This was less than the alpha value of .05, indicating that there was a statistical difference between persisting and non-persisting male students when these variables were considered. This finding permitted an investigation of the tests of between-subjects effects to analyze the relationship that each independent variable had on persistence. To reduce the chance of inadvertently committing a Type I error, a simplified Bonferroni adjustment of the original .05 alpha value was formulated by dividing it by the 26 variables analyzed. The new alpha value that was used to analyze individual variable effects was $p < .01$.

Only the 2nd semester clinical GPA met the adjusted alpha value criteria with a $p < .01$ in the between-subject effects test and was re-analyzed using univariate analysis of variance tests. The analysis revealed an $F(1, 45) = 10.53, p < .01, \eta^2 = .30$. The mean scores indicated that the males who persisted had higher 2nd semester clinical GPAs ($M = 2.37, SD = .69$) than non-persisting males ($M = 1.06, SD = 1.0$).

Persistence Variance Due to Demographic Variables

Multiple regression analysis was performed to address the effect that the demographic, pre-clinical, and clinical variables individually had on persistence within the male ADN population. When the demographic variables were analyzed, Pearson correlation data revealed

little relationship between the five variables (less than .10). This was confirmed by high multicollinearity tolerance values except for associated pre-clinical and clinical entry ages. The R^2 value was 0.008 with a significance of 0.91, indicating that no demographic variable contributed to persistence within the male population.

Persistence Variance Due to Pre-Clinical Variables

When the pre-clinical variables were analyzed using multiple regression analysis, the R^2 value was .59 with a $p < .01$. While this model explained 59.00% of the persistence variance within the male population, the Pearson correlation data found a highly correlated relationship between the cumulative science GPA and each of the required science courses. The multicollinearity tolerance values were below .30 for cumulative developmental GPA, non-science cumulative GPA and the part-time, full-time, and total semester variables indicating that multiple correlations with other variables were high. Pearson correlation and tolerance values had a best-fit model when only the full-time semester variable was included with the remaining pre-clinical variables. The number of course repetitions, number of natural science courses, cumulative pre-clinical GPA, and grades in both human anatomy and physiology courses, the composition I, speech communications, mathematics, developmental psychology, and computer science courses were found to have a significance value above .05 and were removed. The revised model R^2 value was .42 with a $p < .01$ and all variables conforming to Pearson correlation and multicollinearity tolerance constraints. The largest contribution was the number of full-time semesters (beta = -.46) and the number of course withdrawals and/or grades of “F” (beta = .40). The grade in microbiology (beta = -.30) was the only course and other independent variable with a contribution to male persistence (Table 36).

Table 36
Variance Within Male Population When Grouped Variables Considered

Independent Variable	Standard Beta	F	η^2	Persist		Non-Persist	
				M	SD	M	SD
Pre-Clinical Academic							
Full-time Semester Loads	-.46	8.95	.12	4.69	.38	3.03	.40
Course Withdrawals and/or Grades of "F"	.40	8.42	.12	3.40	.75	6.56	.79
Microbiology	-.30	14.89	.19	2.96	.19	1.88	.20
Clinical Academic							
1 st Semester Clinical GPA	-.26	6.64	.13	2.77	.13	2.13	.22
2 nd Semester Clinical GPA	-.50	19.29	.30	2.37	.15	1.06	.26

When multivariate analysis of variance was performed using these 3 variables, a statistically significant difference between males who persisted and males who did not persist was revealed: $F(3, 63) = 15.43, p < .01$; Wilks's Lambda = 0.58; $\eta^2 = .42$. Each of the variables was found to be significant using the tests of between-subjects effect when applying a Bonferroni adjusted significance value of $p < .01$. As displayed in Table 36, the η^2 values indicated that male persistence in the ADN program was attributed to grades in microbiology (.19), number of full-time semester course loads (.12) and course withdrawals and/or grades of "F" (.12). An inspection of the microbiology GPA means indicated that the males who persisted had a substantially higher GPA ($M = 2.96, SD = .19$) than the males who did not persist ($M = 1.88, SD = .20$). Males who persisted had fewer number of course withdrawals and/or grades of "F" ($M = 3.40, SD = .75$) than the males who did not persist ($M = 6.56, SD = .79$). Yet, males who persisted enrolled in more full-time semesters ($M = 4.69, SD = .38$) than males who did not persist ($M = 3.03, SD = .40$).

Persistence Variance Due to Clinical Variables

When the clinical variables were analyzed using multiple regression analysis, the R^2 value was .37 with a $p < .01$ with only the clinical GPA variables conforming to Pearson correlation and multicollinearity tolerance constraints. The largest contribution was the 2nd semester clinical GPA (beta = -.50) while the 1st semester clinical GPA (beta = -.26) had a lesser contribution to persistence (Table 36).

When multivariate analysis of variance was performed using these 2 variables, a statistically significant difference between the males who persisted and the males who did not persist was realized: $F(2, 44) = 12.67, p < .01$; Wilks's Lambda = .64; $\eta^2 = .37$. As shown in Table 36, the η^2 values indicated that male persistence in the ADN program was attributed to 2nd semester (.30) and 1st semester (.13) clinical GPAs. An inspection of the 2nd semester clinical GPA means indicated that the males who persisted had a substantially higher GPA ($M = 2.37, SD = .15$) than the males who did not persist ($M = 1.06, SD = .26$). Males who persisted also attained higher 1st semester clinical GPA means ($M = 2.77, SD = .13$) than the males who did not persist ($M = 2.13, SD = .22$).

Statistical Findings Concerning Hypothesis 3

These multivariate analysis of variance and multiple regression analyses revealed that there were statistically significant differences between the males who persisted and the males who did not persist. The 2nd semester clinical GPA variable identified as significant within the entire male ADN population were supported by findings that 3 pre-clinical academic, and 2 clinical academic were significant when the independent variables were analyzed within their groups. These findings support rejecting hypothesis 3 which postulated that, "There were no

differences among any combination of demographic, pre-clinical and/or clinical variables in regard to persistence within the male population in this ADN program.”

Statistical Analysis of Population Based on Age

Persistence Variance Due to All Variables

A one-way multivariate analysis of variance was conducted to evaluate the validity of hypothesis 4 which postulated that, “There were no differences among any combination of demographic, pre-clinical, and/or clinical variables in regard to the traditional and non-traditional student populations who persisted in this ADN program.” These variables were found to have a statistically significant difference between the traditional and non-traditional students who persisted: $F(27, 329) = 18.29, p < .01$; Wilks’s Lambda = .43; $\eta^2 = .57$. This was less than the alpha value of .05, indicating that there was a statistical difference between traditional and non-traditional students who persisted when these variables were considered. This finding permitted an investigation of the tests of between-subjects effects to analyze the relationship that each independent variable had on age of persisting student. To reduce the chance of inadvertently committing a Type I error, a simplified Bonferroni adjustment of the original .05 alpha value was formulated by dividing it by the 24 variables analyzed. The new alpha value that was used to analyze individual variable effects was $p < .01$.

Only four variables met the adjusted alpha value criteria and were re-analyzed together to determine best-fit possibilities. These variables were found to have a statistically significant difference between the traditional and non-traditional students who persisted: $F(4, 468) = 8.76, p < .01$; Wilks’s Lambda = .93; $\eta^2 = .07$. Cumulative developmental GPA, human anatomy and physiology II GPA, developmental psychology GPA and transfer status of the students averaged between-subjects effect levels below the $p < .01$.

Multiple regression analysis was conducted using these variables to ensure that a correlation between the related independent variables was not too high. The 4 variables were found to have a significant and unique impact within specific age sub-populations in the WSCC ADN program. This model had a R^2 value of .07, indicating that 7.00% of the age variance was explained by these variables. The largest contribution was the human anatomy and physiology II grade (beta = .24) and the developmental psychology grade (beta = .18) (Table 37).

Table 37

Multiple Regression Analysis and Multivariate Analysis of Variance Data Within Persisting Populations When Age Is Considered

Independent Variable	Standard Beta	F	η^2	Persist		Non-Persist	
				M	SD	M	SD
Pre-Clinical Academic							
Developmental GPA	-.14	10.07	.02	3.04	.04	3.19	.03
Human Anatomy and Physiology II	.24	18.03	.04	2.90	.06	3.20	.04
Developmental Psychology	.18	16.50	.03	3.23	.05	3.50	.04
Clinical Academic							
Transfer Status	-.11	6.76	.01	1.74	.04	1.61	.03

Each of the variables was found to be significant using the tests of between-subjects effect when applying a Bonferroni adjusted $p < .01$. The η^2 values indicated that human anatomy and physiology II grades (.04) had the highest variance with developmental psychology (.03) having the second highest variance when all other variables were held constant. The means scores indicated that the non-traditional students who persisted had higher human anatomy and physiology II grades ($M = 3.20$, $SD = .04$) than traditional students ($M = 2.90$, $SD = .06$) while the traditional students had a higher rate of transferring coursework into the nursing program from another institution ($M = 1.73$, $SD = .03$) than the non-traditional students ($M = 1.61$, $SD = .04$) (Table 37).

Persistence Variance Due to Demographic Variables

Multiple regression analysis was performed to address the effect that the demographic, pre-clinical and clinical variables individually had on the traditional and non-traditional students who persisted in the ADN populations. The R^2 value was .004 with a significance of .34, indicating that no demographic variable contributed to a difference between the two populations.

Persistence Variance Due to Pre-Clinical Variables

When the pre-clinical variables were analyzed using multiple regression analysis, the R^2 value was .17 with a $p < .01$. While this model explained 17.00% of the variance within the age population, the Pearson correlation data found a highly correlated relationship between the cumulative science GPA and each of the required science courses. The multicollinearity tolerance values were below .30 for cumulative developmental GPA, non-science and science GPAs along with the part-time, full-time, and total semester variables indicating that multiple correlations with other variables were high. Pearson correlation and tolerance values had a best-fit model when only the full-time semester variable was included with the remaining pre-clinical variables. The number of course repetitions and grades in human anatomy and physiology I, computer science, mathematics, speech communications, and microbiology were found to have an alpha value above .05 and were removed. A revised model R^2 value was .08 with a $p < .01$ and all variables conforming to Pearson correlation and multicollinearity tolerance constraints. The largest unique contribution was the number of course withdrawals and/or grades of “F” (beta = .17), with grades in developmental psychology (beta = -.17) and human anatomy and physiology II (beta = .16) being the courses with the largest contribution to persistence (Table 38).

When multivariate analysis of variance was performed using these variables, a statistically significant difference between the traditional and non-traditional students who persisted was realized: $F(3, 469) = 14.25, p < .01$; Wilks's Lambda = .92; $\eta^2 = .08$. The η^2 values indicated that variance when age was a factor in the ADN program was attributed to grades in human anatomy and physiology II (.04) and developmental psychology (.03) respectively (Table 38).

Table 38
Variance Within Persisting Population When Age is Considered

Independent Variable	Standard Beta	F	η^2	Persist		Non-Persist	
				M	SD	M	SD
Pre-Clinical Academic Course Withdrawals and/or Grades of "F"	.17	6.05	.01	1.94	.28	2.79	.20
Human Anatomy and Physiology II	.16	18.03	.04	2.90	.06	3.20	.04
Developmental Psychology	.17	16.54	.03	3.23	.05	3.50	.04

Persistence Variance Due to Clinical Variables

When the clinical variables were analyzed using multiple regression analysis, the R^2 value was .16 with a $p < .01$ and all variables conforming to Pearson correlation and multicollinearity tolerance constraints. The 2nd semester clinical GPA and the 1st semester clinical GPA were found to have a significance value above .05 and were removed. The transfer status (beta = -.13) had the only significant relationship between the traditional and non-traditional populations (Table 38).

Univariate analysis of variance using transfer status revealed an $F(1, 483) = 22.13, p < .01, \eta^2 = .02$. The mean scores indicated that the traditional students who persisted had slightly

higher transfer tendencies ($M = 1.73$, $SD = .48$) than non-traditional students ($M = 1.59$, $SD = .50$).

Statistical Findings Concerning Hypothesis 4

These multivariate analysis of variance and multiple regression analyses revealed that there were statistically significant differences between the traditional-aged students who persisted and the non-traditional-aged student who persisted. The 4 variables identified as significant between the traditional-aged and non-traditional-aged ADN populations were supported by findings that 3 pre-clinical academic, and 1 clinical academic were significant when the independent variables were analyzed within their groups. These findings support rejecting hypothesis 4 which postulated that, “There were no differences among any combination of demographic, pre-clinical, and/or clinical variables in regard to the traditional and non-traditional student populations who persisted in this ADN program.”

CHAPTER 5

CONCLUSIONS

Demographic Variable Summary

Descriptive and Frequency Summary

The descriptive demographic analysis revealed that the persistence rate for the students who entered the ADN program between the academic years of 1998-2002 was 66.57%, with the enrollment and persistence rate being higher in females, particularly non-traditional females. Females made up 90.82% of the population and maintained a better than 66.67% chance of persistence while males had a little more than a 50.00% chance of persistence. The vast majority of the ADN population was Caucasian, with Caucasian females being the largest sector in the population and averaged a better than 66.67% chance of persistence while Caucasian males and all minorities had a little more than a 50.00% chance of persistence. This frequency difference suggested that gender and ethnicity may be significant persistence indicators.

The pre-clinical age of 33-35 had the highest overall persistence. When gender and pre-clinical age were considered jointly, females who persisted tended to be considerably older than their male counterparts, with the highest persistence ratios being 39-41 years and 24-29 years respectfully. Frequency analysis of pre-clinical age persistence rate indicated that non-traditional females had a better than 66.67% chance of persistence and the traditional females had nearly a 66.67% chance of persistence while traditional and non-traditional males had at best a little more than a 50.00% chance of persistence. While the individual persistence rates mirrored the overall gender persistence rates, a significant variance was suggested between the non-traditional and traditional females, with the non-traditional females having a higher frequency of enrollment and persistence rate.

When persistence as a factor of age when candidates entered the ADN clinical program was considered, individuals who were 42-44 had the highest persistence. Frequency analysis of clinical age persistence rates indicated that non-traditional females had a better than 66.67% chance of persistence and the traditional females had nearly a 66.67% chance of persistence while only the non-traditional males had at best little more than a 50.00% chance of persistence. As with the pre-clinical age, males tended to have higher persistence rates at a younger age than females, with their highest persistence being at the 39-41 year grouping. The clinical age difference decreased significantly from the pre-clinical age suggesting that male students may spend more time in pre-clinical coursework. While the persistence rates were similar to those of the overall and gender-based persistence, a potentially significant persistence indicator is the relationship between the traditional and non-traditional female populations and persistence and why traditional male students had a higher tendency of non-persisting.

When county of residence and distance commuted to campus were analyzed, the ADN candidates tended to most frequently come from the home county that the nursing campus resided or from counties that abutted the home county. Three of the four counties with the highest persistence rates, Hamblen, Sevier, and Greene, were counties that maintained WSCC campuses, suggesting that persistence maybe related to previous experience at the institution.

Students tended to commute less than 40 miles to the nursing campus. The persistence rates for the distance commuted suggested an inverse relationship when female candidates of any age were considered, with those females who had shorter commute distances having higher persistence rates. Persistence ratios were highest for females who commuted from within the home county while males tended to have higher persistence rates when they commuted a distance of 40-60 miles from campus.

Overall, the female population, in particular the non-traditional female sub-population that lived closer to the nursing campus, had the highest percentage of enrollment and significantly higher persistence rates in all demographic variables analyzed. Frequency data suggests that the traditional male and minority sub-populations suffered non-persistence significantly higher than other sub-populations when demographic factors were considered suggesting that these may be “at-risk” populations.

Statistical Analysis Summary

A one-way between-groups multivariate analysis of variance and multiple regression analysis were performed to examine differences in persistence within the entire ADN population. While no demographic variable was found to have a unique relationship when analyzed along with the pre-clinical and clinical variables, gender and distance commuted were found to have significant and unique relationships with persistence within the entire population when only the demographic group of variables was analyzed. Yet, they each explained less than 1.00% of the persistence variance within the entire population with neither of these variances replicable in the analyses of the female and male populations nor the traditional and non-traditional populations who persisted. For this reason, the statistical findings did not directly support the frequency findings that the males and minorities may be “at-risk” populations within this ADN population. Yet, even without the statistical support, the disparaging persistence frequencies realized support the hypothesis that males and minorities are “at-risk” students within this ADN program and necessitate additional academic supportive measures.

Pre-Clinical Science-Based Variable Summary

Descriptive and Frequency Summary

The science-core GPA means suggested that a possible tendency for persistence may be a minimum 3.00 GPA in combined science core courses. Evidence from frequency data suggests that science course persistence indicators may be gender and age specific, with highest persistence rates usually associated with the non-traditional female sub-population.

The female persistence rates were appreciably higher than males when a letter grade of “B” or better was attained in the human anatomy and physiology I course. Yet 62.87% of the males attaining a letter grade of “B” or better in human anatomy and physiology I persisted, a frequency rate that is significantly higher than the overall male persistence rate. Only the candidates with a letter grade of “B” or better actually maintained a persistence rate above 50.00% suggesting that persistence and grades in human anatomy and physiology I may be statistically significant within the persisting population as well as related in both female and male populations. Age tended to have no bearing on persistence within male and female populations.

While over 77.39% of the persisting population attained a letter grade of “B” or better in human anatomy and physiology II, only the candidates with a letter grade of “B” or better actually maintained a persistence rate above 50.00%. Nearly 88.62% of the non-traditional students maintained a letter grade of “B” or better while only 68.94% of the traditional students maintained a “B” or better letter grade in human anatomy and physiology II. This suggests that grades in human anatomy and physiology II may be a key persistence indicator between the non-traditional and traditional student populations.

While the persistence rates in microbiology mirrored the overall gender sub-populations, 79.22% of the candidates who persisted attained a letter grade of “B” or better in microbiology.

This better than 75.00% chance of persistence when attaining a letter grade of “B” or better along with data findings that only 39.67% of the non-persisting attained a letter grade of “B” or better, suggests that grades in microbiology have influenced persistence and that further analysis may reveal a significant association between minimum grade of “B” in microbiology and persistence rate.

The frequency of overall science-core GPA suggests that letter grades and persistence were associated, with a letter grade of “B” or better being a possible key persistence indicator. Females in general and non-traditional females in particular tended to perform better in science-based courses. Age tended to influence overall science-core GPAs for persisting candidates, with the non-traditional students maintaining significantly higher averages.

While most of the students received their instruction at the main campus in Morristown, non-traditional students who took their human anatomy and physiology at a WSCC off-campus site maintained higher persistence rates. Only the students who transferred in their human anatomy and physiology grades maintained a persistence rate below 50%. This supports a premise that the WSCC natural science department was more attuned to the pre-clinical science-based knowledge needs of the nursing students.

Females tended to perform better in and take fewer natural science courses than males while enrolling in more pre-clinical semesters. When the number of natural science courses taken by candidates was analyzed, a significant benchmark seemed to be 6 or fewer. While over 68.83% of the persisting students enrolled in 6 or fewer natural science courses, the overall persistence rates for females and males taking more than 6 natural sciences courses were 34.59% and 34.29% respectively. Yet when age was considered with gender, non-traditional females had a tendency to take fewer natural science courses than non-traditional males suggesting that other

gender and/or age factors may influence the number of natural science courses taken by sub-populations.

Statistical Analysis Summary

Two pre-clinical science-core variables were found to have a significant and unique relationship with persistence when analyzed along with the demographic and clinical variables (Table 39). Microbiology grades were found to be the third most prominent persistence indicator within this study. Within the entire population, 13.00% of the persistence variance was related to microbiology grades. Within the female population, 14.00% of the persistence variance was explained by microbiology grades while microbiology was the only unique pre-clinical curricular variable within the male population and explained 19.00% of the persistence variance in the male population.

The only other limitedly significant persistence indicator within the science-core prerequisite coursework was grades in human anatomy and physiology II. Human anatomy and physiology II was found to explain 10.00% of persistence variance within the entire population but only when considered with other pre-clinical variables. Nearly 4.00% of the variance between the traditional and non-traditional students who persisted was linked to the human anatomy and physiology II grades, with the non-traditional students averaging a GPA of 3.20 while the traditional students averaged a 2.90.

The expected impact of the human anatomy and physiology course grades was not realized within this study possibly due to grade inflation but equally due to the previous institutional emphasis placed on these course grades as represented by the weighted admission model. Possible grade inflation could be due to multiple sections that used both full-time and adjunct faculty and/or an ineffective measurement tool of student-acquired knowledge. If the

latter is the case, then a follow-up study within five years may find that human anatomy and physiology grades will have significant persistence variance because of a recently adopted comprehensive final within all sections.

Equally possible is the realization that pre-clinical students traditionally complete the human anatomy and physiology courses prior to the microbiology. As a result, only those most committed students actually enroll in microbiology. Additionally, unlike human anatomy and physiology courses, there is likely more consistent emphasis of instructional material because microbiology is only taught by three full-time professors and only at the Morristown campus.

Table 39
Most Frequent Persistence Indicators Across Study Groups

Independent Variable	Populations							
	<u>Entire</u>		<u>Female</u>		<u>Male</u>		<u>Aged</u>	
	A ^a	I ^b	A ^a	I ^b	A ^a	I ^b	A ^a	I ^b
Pre-Clinical Academic								
Course Withdrawals and/or Grades of “F”	X	X	X	X	X			X
Microbiology	X	X	X	X	X			
Full-Time Semester Loads	X	X	X	X	X			
Cumulative Pre-Clinical GPA	X	X	X	X				
Human Anatomy and Physiology II	X	X					X	X
Developmental Psychology		X		X			X	X
Clinical Academic								
1 st Semester Clinical GPA	X	X	X	X		X		
2 nd Semester Clinical GPA	X	X	X	X	X	X		

a. All variables considered jointly. b. Variables grouped individually.

In any case, the nursing faculty will need to review and possibly apply more weight to the microbiology grades. Because there has been a significant frequency of persistence realized when attaining a letter grade of “B” or better in these three science courses, a revised clinical-entry model is recommended that requires letter grades of “B” or better in at least two of the three science courses and/or a minimum science-core GPA of 2.80.

Pre-Clinical Non-Science-Based Variable Summary

Descriptive and Frequency Summary

The pre-clinical non-science-core GPA means suggested that a possible tendency for persistence may be a minimum 3.00 GPA in combined non-science-core courses. Evidence from frequency data suggests that non-science coursework persistence indicators may be gender and age specific, with the highest persistence rates usually associated with the non-traditional population, particularly the non-traditional females.

In Composition I, the students who persisted averaged a 2.99 or better GPA and those students who did not averaged a 2.84 or better GPA. The overall frequency differences suggest that persistence and grades in composition I may not be closely related. Yet, when age and persistence were considered jointly, a letter grade of “B” or better and persistence were statistically significant suggesting that composition I may be a significant persistence indicator when age is considered. This may partially be explained by the realization that most non-traditional students enter pre-clinical coursework requiring remedial reading/writing courses, with possibly only those most skilled persisting to complete composition I.

The developmental psychology GPA for persisting and non-persisting candidates was 3.41 and 3.10, with all the persisting candidates maintaining a letter grade of “C” or better in developmental psychology. The persistence rate for females with letter grades of “B” and better suggested that grades in developmental psychology could be a significant persistence indicator for females. This was not evident in the male population where rate of persistence and non-persistence for those candidates earning a letter grade of “B” or better was nearly equivalent.

The speech communications GPA for persisting and non-persisting candidates was 3.39 and 3.21 respectively. Frequency data suggested that a letter grade of “B” or better in speech

communications may be a significant persistence indicator for overall persistence and persistence within a gender but not when age is considered. When compared to the female population that had a significantly higher overall persistence ratio along with higher persistence ratio for those earning a letter grade of “B” or better, the data suggested that grades in speech communication may not be as strong a persistence indicator for males as for females.

The mathematics mean GPA for persisting and non-persisting students was 3.14 and 2.94 while the computer science averages were 3.34 and 3.13. Frequency data suggested that grades in mathematic and computer science courses maybe more closely associated with persistence in female populations. Females within any age group earning a letter grade of “B” or better maintained a significantly higher persistence rate. Oddly, males who enrolled in a mathematics course maintained a lower persistence rate when compared to males who did not enroll in a mathematics course.

Possibly the most significance frequency indicator for persistence was the cumulative non-science GPAs. The persisting students averaged a 3.26 GPA while the non-persisting students averaged a 2.77 GPA. Frequency analysis of cumulative non-science GPA suggested that within the age groups, the overall non-science GPA may be a very significant persistence indicator in males, especially because few previous variables suggest such a significant male tendency.

Statistical Analysis Summary

Three pre-clinical non-science core variables were found to have significant and unique relationships with persistence (Table 39). Over 12.00% of the persistence variance within the entire population was related to mathematics grades, while mathematics grades explained 14.00% of persistence variance in the female population when considered along with other pre-

clinical variables. Within the entire population, 8.00% of the persistence variance was related to developmental psychology grades while developmental psychology grades explained 9.00% of persistence variance in the female population when considered along with other pre-clinical variables and 3.00% of the persistence variance between the traditional and non-traditional students who persisted.

Within the entire population, 7.00% of the persistence variance was related to speech communication grades, while 8.00% of the variance within the female population was attributed by speech communications. In each instance, students who persisted averaged well above a 3.00 GPA while non-persisting candidates attained GPA averages below 3.00. This suggests that a revised clinical entry model should recognize the importance of a 3.00 GPA benchmark, especially for female candidates, for each of these prerequisite courses. A more inclusive persistence tool for the male and minority populations may be a minimum cumulative non-science-core GPA of 3.00.

Pre-Clinical Academic Tendencies Summary

Descriptive and Frequency Summary

The average pre-clinical and developmental/remedial GPAs suggested that a possible tendency for persistence maybe a minimum 2.90 and 3.00 GPAs, respectively. Evidence from frequency data suggests that cumulative pre-clinical GPA and developmental/remedial GPAs persistence indicators may be gender and age specific. The average pre-clinical and developmental/remedial GPAs were higher for non-traditional females and males, with non-traditional females who persisted maintaining the highest GPAs in each category.

Persisting students averaged .32 course repetitions while non-persisting students averaged .57. Frequency data suggested that course repetitions might only be a significant persistence

indicator in the male population, especially the non-persisting males who repeated 4 or more courses.

The average number of course withdrawals and/or grades of “F” were significantly different between the persisting and non-persisting populations, averaging 2.44 and 6.07 respectively. The persistence rate declined with each additional course withdrawals and grade of “F”. Frequency data suggests that 3 or fewer may be a key persistence indicator for persistence in general, with non-traditional males who persisted having a higher tendency for course withdrawals and grades of “F”.

Students who persisted enrolled in more full-time, part-time, and total semesters. Frequency data suggests that the number of full-time loads may be more relevant for younger females. The analytical finding that only 17.62% of the non-persisting candidates completed 6 or more full-time semester loads suggests that full-time loads and non-persistence may be closely associated.

The number of part-time course loads was higher in non-traditional female populations while the non-traditional males had higher rates of course repeats and course withdrawals and/or grades of “F”, suggesting that these higher rates and the elevated number of natural science courses may be mutually linked to persistence. While persistence increased with the number of part-time semester loads, the data suggests that this is more prominent for the non-traditional population. Further review may find that the reduced number of full-time loads and increased ratio of part-time loads by non-persisting students, particularly within the non-traditional population, were linked to time constraints associated with outside commitments of family and work. If so, a cohort plan of clinical study may better accommodate this “at-risk” population, and equally improve retention.

Statistical Analysis Summary

Three pre-clinical academic tendencies variables were found to have significant and unique relationships with persistence (Table 39). The analysis of pre-clinical variables found the second strongest persistence indicator for the entire ADN population was cumulative pre-clinical GPA. The 10.00% persistence variance when analyzed along with all the other variables was supported by a 9.00% persistence variance when analyzed with other pre-clinical variables. Cumulative pre-clinical GPA also explained 11.00% of the persistence variance in the female population. In each analysis, the average cumulative pre-clinical GPA for students who persisted was 2.90 or better while the average for non-persisting students was at best 2.70. This suggests that the current clinical entry model that requires a minimum cumulative pre-clinical GPA of 2.50 may be too low. A more effective benchmark GPA that takes into consideration all sub-populations might be a cumulative pre-clinical GPA of 2.80.

Academic tendencies like the number of course withdrawals and/or grades of “F” and the number of full-time semesters were found to have unique relationships with persistence when considered along with all other variables and when considered with other pre-clinical variables as well as within the female and male populations.

The 9.00% persistence variance related to the number of course withdrawals and/or grades of “F” was accompanied by averages for persisting and non-persisting candidates of 2.46 and 5.58. This was further supported by a 15.00% persistence variance within the pre-clinical group, with persistence and non-persistence averages of 2.40 and 6.07. The number of course withdrawals and/or grades of “F” were found to have significant and unique persistence variances within the female (10.00%) and male populations (12.00%) as well as a slight variance between the traditional and non-traditional students that persisted. Along with frequency

findings that persistence was highest in students who had 3 or fewer course withdrawals and/or grades of “F”, statistical evidence supports a revised clinical entry model that rewards students that have 3 or more course withdrawals and/or grades of “F”.

While 3.00% of the persistence variance in the entire population was related to number of full-time semesters, the actual difference was less than 1 semester. Within the female population (8.00%) and male population (12.00%) candidates who persisted actually enrolled in slightly more than 1.5 full-time semesters compared to the non-persisting candidates. While significant, this relationship was not unique enough to require adjustment to the current entry requirements. This was also true of the 2.00% of persistence variance associated with course repetitions that was realized only when analyzed within the pre-clinical variables group.

Clinical Variable Summary

Descriptive and Frequency Summary

The clinical entry status data revealed that 55.00% of the candidates completed all their pre-requisite coursework at a WSCC campus, including 62.93% of the persisting and 39.34% of the non-persisting students. Gender and persistence appeared to be unrelated between the indigenous and transfer students. However, within the persisting populations, only the persisting non-traditional males had an indigenous frequency less than 41.00%.

The clinical GPA averages were appreciably lower for the non-persisting candidates. The difference in the GPA means between candidates who persisted and those who did not was .92 for the 1st clinical semester and 1.37 for the 2nd clinical semester. These averages were consistent within the gender populations, with the non-traditional females averaging the highest mean GPA in the first clinical year. The male students averaged higher 1st semester GPAs while the female students averaged higher 2nd semester GPAs.

Frequency data indicated that a 1st clinical semester letter grade of “B” or better was significant, with 59.47% of the persisting and only 10.25% of the non-persisting attaining this average. While nearly 62.86% of the males attained a letter grade of “B” or better, 70.89% of the non-traditional students and less than 36.87% of the traditional students who persisted attained this average, suggesting that 1st semester clinical GPA maybe a significant indicator for gender and age sub-populations.

The largest disparaging clinical factor was the 2nd semester clinical GPA. First, only 82.60% of the initial candidates actually enrolled in the 2nd semester clinical coursework. The persistence rate in 2nd semester clinical was 78.14%, with 100% of the students who persisted to complete the 2nd semester clinical coursework graduating from the nursing program. The most frequent letter grade for those who persisted was a “C” and for those who did not persist was an “F”. This was consistent within the gender sub-populations, with the non-traditional females who persisted having the highest frequency of letter grade of “B” or better at 44.59%.

Statistical Analysis Summary

Two clinical non-science core variables were found to have significant and unique relationships with persistence (Table 39). The analyses revealed that the 2nd clinical semester GPA was the strongest persistence indicator for the entire ADN population and within both the female (31.00%) and male (30.00%) populations. The 2nd clinical semester GPA represented 31.00% of the persistence variance when analyzed along with demographic and pre-clinical variables was supported by a 30.00% persistence variance when analyzed with other clinical variables.

The 8.00% of persistence variance related to 1st clinical semester GPA was supported by an 8.00% persistence variance when analyzed with other clinical variances. The 1st clinical

semester GPA was also found to be a significant persistence indicator within the female (8.00%) and male (13.00%) populations. The high persistence variance associated with the 2nd and 1st clinical semester GPA can be explained by the high attrition rates for students during and at the completion of these semesters. While the traditional and non-traditional students who persisted did not have significant clinical GPA differences, the persistence differences support pro-active measures to assist students who attain a 1st clinical semester GPA of less than 2.60 and a 2nd clinical semester GPA of less than 2.40.

Recommendations to Improve Practice

Several key academic indicators along with supportive performance values have been identified from this retrospective study. This study recommends that WSCC and particularly the nursing faculty review these suggested academic grade benchmarks and incorporate their weighted values into a revised points-earned model for clinical entry based on academic performance. To be an effective incentive plan, the revised model should be outlined within the college catalog. While letter grades of “B” or better should be priced with significant point values, these grades within cumulative pre-clinical, cumulative science and non-science, microbiology, and developmental psychology should be highly priced and continually evaluated for the importance.

A concern revealed within the study’s data analysis was the persistence differences between females and the male and minority sub-populations. The institution needs to revisit its nursing programs marketing planning and further encourage innovative class scheduling and/or incentive plans that encourage diversity within a female dominated occupation.

Possibly the most encouraging finding was the high persistence within the non-traditional population. This was positive considering the additional work and family responsibilities that

this sub-population typically must overcome to succeed in post-secondary academic endeavors. The findings support increasing recruitment of non-traditional students, catering particularly to non-traditional adults who currently work within medical settings. Alternative class scheduling and possibly delivery of pre-clinical courses to more local settings within medical facilities might be warranted to encourage highly motivated and caring individuals to pursue continual education within a feasible time-frame. The rewards of tested and proven quality health-care providers and increased academic persistence within the nursing program will be realized by the community well being.

Recommendations for Further Research

Future persistence studies within this ADN program could evaluate the percentage of persistence realized when these variables are compared to the post-hoc cohorts. If a significant relationship is realized, a composite equation that incorporates these persistence variables could be employed as an admission guidepost and/or a method to identify “at-risk” students early in their academic careers. Such a composite equation could be trial tested against the next incoming clinical class. While possibly increasing persistence, the equation could support the self-evaluation needs of the nursing facility while acting as an embedded assessment tool to address Tennessee Board of Regents protocol.

To further strengthen the validity of this study’s findings, surveys and exiting questionnaires could be designed to identify variables that are currently not consistently available from the WSCC student information system. This institutional and dispositional data could support and enrich the academic findings while possibly revealing extraordinary non-academic factors that influenced persistence and/or academic outcomes. Data like marital status, number of children at home, study and work hours per week, prior health care experience, socioeconomic

status, flexible class times and locations, and factors for seeking a health care career have been found to influence persistence in other nursing programs. Community surveys could explore cultural, gender, ethnicity, and/or geographical issues that have challenged the WSCC ADN program in recruiting ethnic minorities and male candidates. Trial cohorts that participate in study groups, peer-sessions, and/or frequent faculty-student conferences could examine the importance of institutional factors on persistence while enriching the current findings.

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