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Academic Performance, Persistence, and Degree Completion of Associate in Arts Degree Recipients Transferring to a Four-Year Multi-Campus Institution

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Academic Performance, Persistence, and Degree Completion of Associate in Arts Degree Recipients Transferring to a Four-Year Multi-Campus Institution

by

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DEDICATION

I dedicate this work to my parents, Omar and Ada Reyes, who instilled in their children the values of faith and family; to my wife, Sharon L. Reyes, who supported and encouraged me through this long process; and to my sons, Joshua, Benjamin, and Caleb, who were very understanding when I was busy with school work. I'm so proud to be your dad.

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ABSTRACT

This study assessed if there were differences in the academic performance, persistence, and degree completion for Associate in Arts transfer students in selected majors who enrolled in the different campuses of a multi-campus university. This causal comparative study analyzed historical student enrollment data from a large, urban, public, research university. Multiple and logistic regression techniques were used to simultaneously control for important independent variables identified in the literature. Variables that were significant ($p < .05$) for at least one of the three dependent variables included campus, major, community college GPA, gender, and ethnicity. Significant campus differences were found in academic performance, but not for persistence or degree completion. Significant differences by major were reported for academic performance, persistence, and degree completion.

CHAPTER 1: INTRODUCTION

One of the perplexing issues in American higher education is the continuing problem of student attrition. Despite the research attention this issue has received, graduation rates have not improved substantially over time. In a large study by the National Center for Education Statistics, Horn and Berger (2004) report that only 55 percent of the students who begin post-secondary study at a four-year institution complete a baccalaureate degree within six years of initial enrollment. Low graduation rates are of concern to students and their families, educational institutions, governing boards, state and local governments, employers, and society.

Much of the research on student retention focuses on the first year of college. This interest in the first year is not without merit. Many of the students who leave college without earning a degree leave in the first year. This focus on the first year has left a gap in what we know about persistence in the years that follow. Nora, Barlow, and Crisp (2005) note that “major gaps in the persistence literature exist on student retention past the first year of college” (p. 129).

Part of the problem of student attrition is that students increasingly attend more than one institution on their path to degree completion. Peter and Forrest Cataldi (2005) reported that 59 percent of the 2001 college graduates in their national sample attended more than one institution prior to degree completion. In addition, students who enrolled in more than one institution delayed degree completion when compared to those who attended one institution.

These three conditions come together to form the context for this proposed study. First, retention and degree completion continue to be important concerns for the various constituents of higher education. Secondly, transfer students, community colleges, and regional campuses play an increasingly important role in Florida's postsecondary education system. Thirdly, there remains a gap in the retention research literature beyond the first year of college. Clearly there is a need to know more about the conditions that promote persistence and degree completion among transfer students.

Problem Statement

This study explored the role of regional campuses in academic performance, persistence, and degree completion of community college transfer students. There is little information in this area of research. State articulation policies highlight the priority given by governing bodies to the transfer role of community colleges. This study sought to understand the regional campus issues related to degree completion for Associate in Arts (A.A.) transfer students.

Critics of community colleges pointed to low degree completion rates and transfer rates (Clark, 1960; Brint and Karabel, 1989). For these critics, community college enrollment reduced the chances of student attainment of a bachelor's degree. Clark (1960) maintained that community colleges served a "cooling out" function that diverted or discouraged the dream of higher education for many students. This study analyzed whether or not regional campuses similarly serve to divert student aspirations of a college degree. This study examined the evidence to see if there is a "cooling out" effect at regional campuses compared to the main campus of a large university.

Rationale for Proposal

This research study examined if there were differences by campus in the retention, academic performance, and degree completion of community college transfer

students at a four-year university. It sought to add new insights to the field of retention research and add to the literature on the degree completion of transfer students.

Florida's 28 community colleges serve as a large entry point for the state's postsecondary system. Transfer and articulation policies are in place to promote seamless degree completion. Issues related to higher education governance, funding, and access, along with population growth and demographic shifts, have contributed to enrollment squeeze at the state level. Increasingly, students are looking to community colleges and regional campuses to begin their postsecondary education. Regional campuses can help meet this enrollment need, especially if their retention and degree completion rates meet or exceed the rates of the main campus.

The purpose of this investigation was to determine the relationship of campus to persistence and degree completion. How well do regional campuses serve student expectations for a four-year degree? Are students from local community colleges better served by attending the regional campuses than by attending the main campus for similar degree programs? Specifically, is there a difference in the academic performance, persistence, and degree completion for A.A. transfer students in selected majors who enrolled in the different campuses of a multi-campus university?

Research Questions

The study sought to answer four quantitative research questions.

1. Is there a difference by campus in the academic performance, as measured by University GPA, for A.A. transfer students who enroll in the various campuses of a multi-campus institution?
2. Is there a difference by campus in the three-year rate of persistence for A.A. transfer students who enroll in the various campuses of a multi-campus institution?

3. Is there a difference by campus in the three-year rate of degree completion of A.A. transfer students who enroll in the various campuses of a multi-campus institution?
4. What is the relationship between Community College GPA and University GPA, three-year rate of persistence, and three-year rate of degree completion?

Conceptual Framework

One of the most cited comprehensive retention theories was developed and subsequently revised by Tinto (1975, 1987, and 1993). The student integration model explains a student's social and academic integration with the institution and takes into consideration student's pre-enrollment characteristics. The model predicts retention based on a student's initial and continuing commitment to the institution. Tinto identified important predictors of student retention. Significant variables/constructs were a student's initial and ongoing commitment to an institution, degree aspirations, and academic and social integration with the institution. According to his theory, greater levels of academic and social integration led to greater institutional commitment and retention (Tinto, 1975, 1987, 1993). While Tinto has been criticized for being too dependent on traditional-age majority students in his study samples, his model continues to provide an important conceptual framework for studying retention and degree completion at the institutional level. Furthermore, Tinto's student integration model of student retention is the most frequently cited theory of student retention (Braxton and Hirschy, 2005; Reason, 2003).

There are many student and institutional variables that influence student persistence in college and eventual degree attainment. Numerous studies have focused on the pre-matriculation characteristics of students and their relationship to persistence

and graduation. These variables have included measures of academic background of students such as high school curriculum, high school grades, and standardized tests scores, and the demographic variables of ethnicity, social-economic status, parental educational attainment, age, and gender. (Astin, 1993; Astin & Oseguera, 2005a; Carter, 2001; Pascarella & Terenzini, 1991; Tinto, 1993). Several studies confirm that females are more likely to persist in college than males (Astin, 1975; Astin, Korn, and Green, 1987; Tinto, 1987). Horn and Berger (2004) report retention and degree attainment differences by student ethnicity and gender. Several researchers indicate that four student background variables account for the bulk of variance in retention: high school grades, standardized test scores, gender, and race/ethnicity (Astin, 1997; Astin and Oseguera, 2002; Astin and Oseguera, 2005a).

Other studies have shown a relationship between retention and institutional characteristics. Studies have examined retention by type of institution: private or public, two-year or four-year, residential or commuter. Researchers have reported degree attainment differences for students enrolled in two-year and four-year institutions (Brint & Karabel, 1989; Clark, 1960; Dougherty, 1992; Pascarella & Terenzini, 2005). Other researchers report that size of institution (Astin, 1993) and selectivity (Adelman, 1999; Pascarella & Terenzini, 2005) are related to degree completion. On average, private institutions have higher retention and graduation rates than public institutions (Horn and Berger, 2004).

Another set of variables that influence student retention is in the category of student interaction with the institution and members of the college community including other students, faculty, and staff. Measures of social integration focus on the formal and informal student interaction with faculty and peers. These studies have tried to measure a student's attachment or connection to the institution. Researchers report significant

findings relative to informal and semiformal interaction with peers (Astin, 1993; Eaton and Bean, 1995; Pascarella & Terenzini, 1991) and formal and informal faculty contact (Pascarella & Terenzini, 2005).

Retention studies have also researched the importance of the student's academic experience in the college environment. Influences researched have included classroom experiences, instructional methods, academic climate, college curriculum, and grades. Many researchers have found academic performance to be strongly correlated with persistence. Astin reported that a student's involvement or amount of energy expended in academic pursuits was related to persistence (Astin, 1984). Several attendance patterns are related to retention and graduation including stopout (Carroll, 1989; Horn, 1998; Hoyt & Winn, 2004) and transfer (McCormick and Carroll, 1997). Peter and Forrest Cataldi (2005) reported that 59 percent of the 2001 college graduates in their national sample attended more than one institution prior to degree completion and that transfer negatively impacted degree completion. Curriculum and major are related to persistence (Adelman, 1998). Active learning strategies and learning communities promote retention and degree completion (Tinto, 1997; Tinto & Russo, 1994).

Research Methods

This study analyzed historical student enrollment data on persistence, academic performance, and degree completion for a cohort of students from a large public university in the Southeast. In a causal comparative (*ex post facto*) study, the independent variables are not manipulated. Instead, naturally occurring variations in the presumed independent and dependent variables are observed. These variables are selected on the basis of previous research and theory. Some of the benefits of causal comparative ex post facto studies are that they can predict or control phenomena,

stimulate further research, and a theory can be enlarged or modified as it explains more phenomena (Schenker and Rumrill, 2005).

This study used Astin's (1991) input-environment outcome (I-E-O) model to assess the impact of home campus on student retention and degree completion while controlling for student input variables. This research design allowed the researcher to control student input differences, estimate the effects of college experiences/environments, and compare against student outputs. The model enabled the researcher to study the influence of environmental factors while statistically controlling for student input characteristics.

Logistic regression is used when one has dichotomous dependent variables such as persistence. Multinomial logistic regression was employed when degree completion was the dependent variable with three possible categories (graduated, did not graduate, still enrolled). Logistic and multinomial logistic regressions are the appropriate analytical tools for this study because they describe the relationship between a categorical dependent variable and a number of both interval and categorical independent variables (Agresti, 2007). Cumulative University GPA, as a measure of academic performance, can be tested using multiple regression techniques.

The study was limited to the three majors offered on all the campuses of the institution: elementary education, general business, and psychology. To insure adequate sample size, the researcher studied cohorts of transfer students beginning in the fall semester of 2004, 2005 and 2006. Because they have shown to be consistently significant predictors, and because they are readily available from institutional enrollment data, the primary input variables of interest are community college GPA, gender, major, and home campus. In multiple and logistic regression the researcher can control for all the student input variables by including them in the regression model (Agresti, 2007).

Limitations and Key Assumptions

This study was conducted at a large urban research university with an enrollment of 45,000 undergraduate and graduate students. Approximately 30% of the students are minorities and 58% of the students are female. Because the study was limited to one institution, the findings may not be generalized to other settings. Tinto's student integration model (1975) is an institutional retention model. Though problems of generalizability exist, researchers have suggested that single institution studies may contribute to a better understanding of the issues of student retention and degree attainment. Nora, Barlow, and Crisp (2005) make the case for single institution studies in the following manner:

> "Institution specific experiences play a larger role in student persistence as time passes, so that a more fruitful understanding of the nature of these experiences and how institutions may influence them must be drawn not from data sets that combine data from many types of institutions, but from single-institution and like-institution studies that are designed to capture the persistence process over time within the unique context of an institution". (p. 150)

While this study used inputs frequently identified in the literature, they together only account for a portion of the variance in degree attainment. The benefit is that an institution can use a few readily available input measures on which to make a prediction. The drawback is that there are many other input and environmental variables that impact college student retention. The role of financial aid is beyond the scope of this study.

This study was limited to students earning a transfer degree. Students transferring prior to an associate's degree were not included in this study. There are many transfer paths and students often leave one institution for another before completing a degree (Adelman, 2005). Since some of the campuses in this study only

enrolled upper division students, the decision was made to only include students with an A.A. degree that could enroll at any campus of the institution.

There may be other potential factors related to persistence and degree completion which were not included in the scope of this present study. A student's socioeconomic status or need for financial aid was not included in the analysis. This study did not explore the reasons for student transfer or departure from the four-year university.

This study used community college GPA and university GPA as the measure or proxy of a student's academic performance. A student may have completed courses at a third institution and transferred credits into their associate's or bachelor's degree program. These transfer courses were not included in the institution's GPA calculations, although the credits may have been applied towards the degree requirements.

Home campus was designated by the student and the potential existed that the designation may have been coded erroneously. Institutional researchers on each campus can verify home campus designation through course enrollment history and make corrections to the student's record. One director of institutional research reported that home campus designation was coded correctly in 96%-98% of cases (K. Calkins, personal communication, January 23, 2010).

Data for the study was obtained from the Registrar's Office of the institution. To protect student privacy, no identifying information were included in the data request.

Definition of Terms

1. Transfer students. The term describes students who enrolled at one postsecondary institution, earned some credits, and then enrolled at another postsecondary institution. For the purpose of this study, the term referred to students who earned an associate's degree from a Florida community college and subsequently enrolled at a four-year state

university. Students transferring prior to the A.A. degree were not included in the analysis.

2. Swirling. This term describes the enrollment pattern of a student who transfers multiple times.

3. Graduation Rate/Degree Completion. The term refers to the percentage of students from an initial cohort who earn a degree after a specified amount of time. For the purpose of this study, this term referred to the percentage of transfer students in multiple cohorts who earned a bachelor's degree within three years of initial enrollment at a four-year university.

4. Persistence Rate. The term refers to the percentage of students in an initial cohort who continue to be enrolled in a degree-seeking program following a specified interval of time. Persistence typically refers to the percentage of first-year students that continue to be enrolled at the same institution a year after initial enrollment. This study reported the proportion of students who persisted or earned a degree within three years of initial enrollment.

5. Attrition Rate. The term refers to the percentage of students in an initial cohort who leave or dropout from an institution following a specified interval of time. While retention refers to students who remain enrolled at an institution, attrition refers to those who leave the institution. Students who withdraw without earning a degree at any point during the three years of initial enrollment were coded as non-persistors.

6. GPA. The term refers to the cumulative grade point average earned in academic courses completed by the student. For the purpose of this study, Community College GPA refers to the cumulative grades earned by the student while enrolled at a community college. University GPA refers to the upper division grades earned by the student while enrolled at a four-year institution. Community college grades are obtained

from the student's transcript during the admission process to the university and recorded in the university's student information system.

7. Campus. This term refers to the student's home campus designation as maintained by the university's student information system. While students may be able to complete courses on multiple campuses most students complete the majority of their coursework on their home campus. Home campus is designated by the student and is verified with course registration data.

8. Major. This term refers to the upper division academic program of study that a student selects. For the purpose of this study, major refers to a student's final major, for those students who earned a bachelor's degree, and the most recent major, for those students who did not graduate but were still enrolled at the end of the third year. Major designation is maintained in the institution's student information system. Only the three majors offered on all four campuses were included in this current study: elementary education, general business, and psychology.

Summary

Chapter One introduced the need for research on regional campus performance in the area of transfer student persistence and degree attainment. The problem and rationale outline the need to identify if there is a cooling out effect at the regional campuses of an institution. The researcher proposed to use a causal comparative research design. The quantitative analysis used logistic regression and multiple regression to analyze student differences by campus. In the closing section of the chapter, the researcher defined key terms and discussed limitations and key assumptions.

Chapter Two reviews the relevant research literature on college student retention and degree completion. It highlights retention theories that have achieved significant

attention in the research literature over the last thirty years. Secondly, it identifies student and institutional variables of interest in past research. Finally, it reviews research on transfer students related to academic performance, retention, and degree completion.

Chapter Three describes the methodology of this study. It identifies variables, target population, data collection, and data analysis methods.

Chapter Four provides the results of the statistical analysis. In addition to descriptive statistics, it also provides the correlation and regression analysis for the research questions.

Chapter Five summarizes the findings by research question. The second part of the chapter discusses implications for practice and future research.

CHAPTER 2: REVIEW OF THE RELATED LITERATURE

This chapter reviews the relevant research literature on college student retention and degree completion. It highlights retention theories that have achieved significant attention in the research literature over the last thirty years. Secondly, it identifies student and institutional variables of interest in past research. Finally, it reviews research on the academic performance, persistence, and degree completion of transfer students.

Retention Theories

Much of the early research on student attrition was descriptive. Researchers reported on the prevalence of student attrition and on the characteristics of students leaving a particular college. As retention research matured, researchers sought to explain and predict student departure behavior. One of the most cited early retention theories was initially proposed by Tinto about thirty-five years ago (1975).

Tinto (1975, 1987, & 1993) proposed a longitudinal, interactional, sociological model of student departure from college. His model describes voluntary student attrition from an institution. It is an institutional, rather than system, model of describing why students leave college. Tinto theorized that a student's pre-entry attributes (family background, skills and abilities, prior schooling) directly influence their decision to stay or leave college. These pre-entry characteristics also interact with a student's goal of graduating from college and their initial commitment to the institution. It is a longitudinal model. Students voluntarily leave institutions at different points in their college tenure. Tinto sought to understand and explain the ongoing nature of these student departure decisions. Tinto theorized that a student's social and academic integration were

important parts of their college experience. Academic integration was impacted by the formal academic experiences of the student including time in class, grades, and also the informal interactions with faculty and staff at the institution. Social integration occurred outside the class through peer group interactions and extracurricular activities. A student's academic and social integration, or lack thereof, influenced their departure decisions. He proposed that a relationship exists between a student's social and academic integration and their subsequent institutional commitment and intent to graduate. Tinto later added other external commitments as an influence on student departure. These external influences could include financial aid, work, and family obligations.

Astin (1975) proposed a theory for preventing student dropout. Astin (1977, 1985) suggested that involvement was related to student persistence. He defined involvement as the amount of physical and psychological energy that a student invested in social and academic pursuits in the college setting. His model included student characteristics such as gender, age, place of residence, and institutional characteristics such as type, location, and admission's selectivity.

Bean's Student Attrition Model (1980, 1990) is based on research on workers in the workplace. Bean suggests that employee turnover decisions mirror student departure decisions. Bean proposes that beliefs and attitudes influence student behavior. A student's beliefs about their experiences in school affect their intention to stay and subsequent persistence. This model also recognizes the influence of factors external to the institution on persistence. This model emphasizes institutional policies and practices which reward students for their involvement in the institution.

Astin's concept of involvement is similar to Tinto's research on social and academic integration. Both Astin and Tinto define and explain persistence and attrition of

students and look at individual and institutional characteristics. Historically, in the study of student retention, Tinto's model continues to be the most cited theory (Braxton, Hirschy, and McClendon, 2004).

Student Variables Related to Persistence

Descriptive and inferential statistical methods have highlighted several student variables related to persistence. Astin (1997) indicated that four variables accounted for the bulk of variance in retention: high school grades, standardized test scores, gender, and race/ethnicity. Oseguera (2005) studied degree completion rates at public and private institutions and reported differences for minorities. Several studies confirm that females are more likely to persist in college than males (Astin, 1975; Astin, Korn, and Green, 1987; Tinto, 1987).

Horn and Berger (2004) report retention and degree attainment differences by student ethnicity and gender. They studied a national sample of first-time freshman who enrolled in four-year institution in 1995-1996. Within five years of initial enrollment, 57% of the women compared to 49% of the men had earned a bachelor's degree. Within five years of initial enrollment 65% of the Asian/Pacific Islander, 57% of the White, 54% of the American Indian, 39% of the Hispanic, and 37% of the Black students had earned a bachelor's degree. One of the strengths of this study is the researcher's use of a broad national sample representing students at public and private four-year institutions. They identified important differences in retention rates for males and minorities. This is an important large-scale descriptive study of college student retention in the United States. Future researchers will need to study retention trends and see if these descriptive results continue or show significant changes.

Institutional Variables Related to Persistence

Institutions and the experiences students have while in college also impact retention. Studies have shown significant relationships between retention and where a student lives (on- and off-campus residence), amount and type of financial aid, hours worked per week, academic major, place of residence, athletic involvement, and participation in campus organizations and activities (Astin, 1975, 1993; Astin & Oseguera, 2002, 2005b; Chickering, 1974; Lau, 2003; Mangold, Bean, & Adams, 2003; Pascarella, Pierson, Wolniak, & Terenzini, 2004)

Type of institution is also related to retention. On average private institutions have higher retention and graduation rates than public institutions. Horn and Berger (2004) reported of the first-time freshman enrolling in 1995-1996 in four-year institutions, 53.3% of those in public compared to 69.8% enrolled in private had earned a degree within five years. Their study used a national sample of 9,100 students. The Beginning Postsecondary Students Longitudinal Study (BPS) is based on a sample of students who were enrolled in postsecondary education for the first time in 1995–1996.

Predicting Student Retention

As the statistical methods used by researches have increased in sophistication, newer studies have taken on the problem of predicting student attrition. It is hoped by identifying at-risk students institutions can use their limited resources on the students most needing intervention.

Astin (1997) criticizes the use degree completion rates as a quality measure of an institution as mandated by the federal requirements of The Federal Student Right-to-Know and Campus Security Act of 1991. He argues that institutional graduation rates are primarily attributable to student pre-enrollment characteristics. Institutions have widely varying retention rates because of the type of institution they are and the types of

students they enroll. Therefore, using a retention rate as a comparison measure of quality is inappropriate. Using a sample of 52,898 students drawn from 365 baccalaureate-granting colleges and universities the researcher calculated expected graduation rates. An institution's actual to predicted performance as measured by graduation rates provides a better assessment of how an institution is performing in the area of student retention.

Astin (2005) developed formulas to predict four-year and six-year degree attainment from entering freshman data. He conducted regression analysis of a national sample of 56,818 freshman entering four-year institutions in the Fall of 1994. He obtained four- and six-year retention and graduation data from the student's institutions. Four entering student characteristics proved to be significant predictors in his analysis: high school grade point average, SAT score, gender, and race/ethnicity. Astin concludes "an institution's degree completion rate is primarily a reflection of its entering student characteristics, and differences among institutions in their degree completion rates are primarily attributable to differences among their student bodies at the time of entry" (Astin, 2005, p.7).

Arredondo and Knight (2005) used prediction equations developed by the Higher Education Research Institute to estimate student retention and four-year and six-year graduation rates at their institution, Chapman University. In their study, the institution's predicted and actual four-year graduation rates differed by only 0.6 percentage points. Six-year graduation estimates varied by 6.3 percentage points from actual retention rates. Their regression model used four independent variables – high school GPA, SAT composite score, gender, and race/ethnicity. As a limitation, the authors report that these four variables can only account for 32 to 35% of the variation in degree completion. Their institutional sample included 356 of the available 376 degree-seeking first-time, full-time

freshman enrolling in Fall 1996. The 20 excluded students were missing values on one or more of the predictor variables. One of the benefits of this study is the insight it provides into subpopulations of students. The researchers observed significant differences in predicted to actual graduation rates for honors students and out-of-state students. Gaps were also reported by ethnicity/race of students.

Glynn, Sauer, and Miller (2003) reported on a quantitative research study of first-year student attrition at a private four-year college in the northeast. Researches wanted to identify pre-enrollment student characteristics that optimize predictability of student attrition. They integrated aspects of three popular retention models: Tinto's student integration model (1975), Astin's theory of involvement (1975), and Bean's student attrition model (1980). "The benefit of these models is not only that the intervention efforts can be prescribed but also that the causes of persistence and attrition can be defined" (p. 42). Study involved 5,221 students in an institutional database of entering freshman enrolling from 1988 to 1995. 95% of freshman enrolling during this timeframe are represented in database. Database contained key demographic, academic, and financial information on students. Students also completed standard surveys, with institutional questions added, during freshman orientation. There are 250 potential independent variables in the database. A logistic regression analysis helped narrow variables which were most significant. Twelve principal components accounted for 62.8% of the total variance. The researchers hoped to attain at least 80% accuracy in predictive model. The predictive model they developed yielded 83% accuracy when tested. Most relevant predictors of persistence were high school grade point average; bad academic attitude in high school, and good study habits in high school. Research study and institutional intervention led to positive retention and graduation gains. Retention increased from 74.6% in 1993 to 84.6% in 1999. Four-year graduation rates

increased from 37.3% in 1993 to 52.6% in 1997. Researchers developed a model that provided good predictive ability (83%). This allowed the college to develop initiatives customized for students most at risk of attrition. As a result, the institution realized positive gains in student retention and graduation rates. One of the primary questions that emerges from a single-institution study is can similar results be achieved at another institution. Can the same variables yield similar predictive results on another campus? This study seems to support the benefits of having a campus-wide enrollment management model. The college was able to use an extensive and nearly complete database (95% participation rate) to analyze reasons for student attrition. They then were able to improve institutional practices to improve retention and graduation rates.

In a follow-up study of their model, Glynn, Sauer, and Miller (2005) report that their model correctly predicted 80-83% of the time which students would dropout or persist. This type of accuracy has important enrollment management benefit. It allows an institution to focus time and resources on the students most needing an intervention that increases their chance at persistence. Specifically, the model provides an early warning, at the time of matriculation, and identifies which students are likely to dropout. It is this early warning that provides academic and support affairs professionals the possibility of making a positive difference with these at-risk students. In their study, the researchers sought to identify how well the model performed with subsequent populations. Their results indicate that the predictive model proved to be stable over a period of time.

DeBerard, Spelmans, and Julka (2004) conducted a quantitative study at a private comprehensive university on the west coast of the U.S. They used multiple regression to identify demographic, academic, health, social, and coping characteristics of entering freshmen. What is the academic achievement and rate of attrition for this freshman cohort and are these two variables related? What are the correlations between

the proposed risk factors with academic achievement and attrition? What percent of variance in academic achievement and attrition can be predicted by regression equations using risk factors as predictors?" (DeBerard, Spelmans, & Julka, 2004, p. 69). Researchers used standard instruments to gather psychosocial predictors of student academic achievement and retention. Instruments included the Multidimensional Perceived Social Support Scale (Dahlem, Zimet, Walker, 1990; Zimet, Dahlem, Zimet, Farley, 1988), The Ways of Coping Checklist-Revised (Folkman & Lazarus, 1988), Short-Form Health Survey-36 (Stewart & Ware, 1992; Ware, Snow, Kosinski, & Gandek, 2000). Smoking and drinking behaviors were assessed by a short survey developed by the researchers. Their sample consisted of 204 undergraduate students which completed various standard instruments during the first week of introductory sociology and psychology courses. 72% of survey respondents were female. Students participated voluntarily. Authors obtained persistence data from the institution's registrar at the beginning of the second year. Researchers developed a multiple linear regression equation to study variables. Ten predictors accounted for 56% of the variance in academic achievement. The variables significantly related to cumulative GPA were female gender, high school GPA, SAT, smoking (inversely related), binge drinking (inversely related), physical composite, total social support, acceptance coping, and escape-coping. 9 of the 10 variables were not statistically significant in predicting retention. Only high school GPA was moderately correlated with retention. The model proved useful in predicting first-year grades. It provided a stronger predictor of first-year grades than high school GPA and SAT scores alone. It was not useful for retention predictions. Model can be used to develop interventions for students predicted to struggle academically. The sample size for this study was too small and too reliant on female respondents and it was a convenience sample.

Strauss and Volkwein (2004) report on a quantitative research study of first-year students enrolled in two-year and four-year public institutions in the state of New York. They identified predictors of institutional commitment. Their sample was first-year students enrolled at 28 two-year and 23 four-year public institutions in the state of New York. They defined student commitment as “a student's overall satisfaction, sense of belonging, impression of educational quality, and willingness to attend the institution again.” (Strauss & Volkwein, 2004, pp. 203-204)

Strauss and Volkwein (2004) relied on the Integrated Model of Student Persistence developed by Cabrera, Nora, and Castaneda (1993) and the Pascarella’s (1985) General Causal Model as the conceptual perspective for their study of student institutional commitment. “The Cabrera model merged the best elements of the Tinto (1987) Student Integration Model and the Bean (1980) Student Attrition Model. Using structural equation modeling, Cabrera and his colleagues combined elements from the Tinto and Bean models and produced an Integrated Model of Student Persistence (1993). The Cabrera model proposes that institutional commitment is directly affected by academic integration and intellectual development, encouragement from significant others, financial aid, financial attitudes, and social integration. Additionally, the model proposes that precollege academic performance and college grade-point average have indirect effects on institutional commitment” (Strauss & Volkwein, 2004, p. 207). Pascarella’s (1985) retention model identifies five constructs that influence student learning, development, and retention: structural/organizational characteristics of institutions, student characteristics and background, interactions with faculty and students, college environment, and student effort.

The researchers in this study used a cross-sectional research design to analyze 1997 data in multi-campus statewide college student database. There are 8,217

responses from first-year students (2,499 at four-year institutions and 5,718 at two-year institutions). Researchers conducted multivariate analysis using hierarchical linear modeling. A regression equation limited predictors to most relevant variables. Organizational data was gathered from the Higher Education Directory and the 1997 Integrated Post-secondary Education Database System (IPEDS). Student data collected from an outcomes survey developed by institutional researchers. In the results they report that what happens to students in and out of class is more important in predicting retention than any precollege student characteristics. Academic integration (classroom experiences, student-faculty interaction, advising) and social integration (friendships and activities) were the strongest predictors of institutional commitment. Other variables that were significant to a smaller degree were financial aid and student characteristics (age, ethnicity, and marital status). Institutional commitment of first-year students was slightly higher at two-year schools than four-year schools. Academic experiences were higher predictors at two-year institutions. Social integration has more impact on student institutional commitment at four-year institutions. Combined, student academic and social experiences are almost five times more important than other student and institution variables. One of the limitations of their study was that no private institutions were included in their analysis. Questions remain if their results can be generalized for private colleges and universities. Their study confirms the importance of social and academic integration for institutional commitment first proposed by Tinto (1975). Research results suggest that "…programs focusing on the vitality of the classroom experience, such as active learning, may be especially fruitful. Additionally, faculty availability and advisement needs to be a target of programmatic efforts. Finally, institutions should facilitate opportunities for student friendship and involvement in activities and in the larger community (such as community-based learning, supportive

living-learning environments). However, from the results of this study, two-year institutions may want to target the classroom experience to a greater extent, whereas four-year institutions may focus more outside the classroom." (Strauss & Volkwein, 2004, p. 221)

More recently, Miller and colleagues (Miller & Herreid, 2009; Miller 2007; Miller & Herreid, 2008; Miller & Tyree, 2009) developed an attrition model to predict first-year student departure from a large public university and designed a targeted intervention strategy to prevent student departure. Their logistic model predicts students who are at-risk of attrition using pre-matriculation student data and survey data measuring student expectations in college. The benefit of this approach is that the model has strong predictive value and the data is readily available early in the student's academic career, thus enabling the institution to make an early and targeted intervention with the right students.

These prediction studies have strong enrollment management implications for campus leaders who want to increase student persistence in college. Efforts to promote academic and social integration by students can yield retention gains of benefit to students and institutions.

Transfer Students

The prevalence of student transfer and the increased interest in postsecondary system performance, has led many states to implement policy tools that aid transfer and degree completion. I will next turn my attention to articulation policies, and then to research on the persistence and degree completion of transfer students. Articulation agreements are important policy levers to ensure student mobility and degree completion within the state's higher education system.

Ignash and Townsend (2001) identified seven guiding principles for establishing strong statewide articulation agreements:

1. Parity among institutions - community colleges and four-year institutions are equal partners.
2. Parity of students - native and transfer students should be treated equally by receiving institutions.
3. Faculty, as the content area experts, should have primary responsibility for crafting the actual statewide articulation agreements.
4. Agreements should accommodate students who transfer without an associate's degree.
5. States should develop agreements in specific program majors and courses.
6. Private colleges and universities should be included in statewide articulation agreements.
7. States should monitor performance - data-driven evaluation of statewide articulation agreements.

The state of Florida implemented formal articulation agreements in the early 1970s. The agreement stipulates general education requirements, common course numbering system, and policies related to student transfer from public two-year to four-year institutions. The state of Florida guarantees admission to one of the state's four-year public institution for community college students who earn an A.A. degree at a Florida community college. Florida has twenty-eight community colleges and ten universities. A large number of Floridians begin their postsecondary education at a community college.

Transfer students have increasingly become a focus of research. The same benchmarks of institutional performance that were the focus of research of first-year

students have been applied to transfer students. These benchmarks include student persistence, academic achievement, and degree completion.

McCormick & Carroll (1997) authored a National Center for Education Statistics (NCES) report “Transfer behavior among beginning postsecondary students: 1989-94”. The authors tracked a cohort of students who began their postsecondary careers in 1989-1990 and later enrolled at four-year institutions. The study captured attendance patterns indicating differences for those transferring with an A.A. degree compared to those transferring without an associate’s degree. The majority of students, 78%, transferred to a four-year institution without first earning an associate’s degree. Of those following this attendance pattern, only 17% went on to earn a bachelor’s degree by 1994. Alternatively, 43% of the students transferring with an associate’s degree had earned a bachelor’s degree by 1994. In the same study, student effort was also related to transfer and degree completion. The authors reported that full-time students were twice more likely to transfer than students who attended community college part-time.

Students who complete an associate’s degree are more likely to persist to a bachelor’s degree than students who transfer without an associate’s degree and less credit hours. This seems intuitive; they have already shown success as persistors. Adelman (2005) in large-scale longitudinal study of traditional-age students and their experience at the community college and beyond, reported higher bachelor’s degree attainment for A.A. degree recipients. He reported, “bachelor’s degree attainment rates are highest (as expected) among those who earned either transferable credentials or finished careers in community colleges with transferable curricula”(p. 96).

More recent research has also focused on the attendance patterns of postsecondary students. Adelman (1999, 2005, 2006) conducted large-scale studies for NCES which analyzed transcripts of postsecondary students.

Adelman (2005) conducted a national longitudinal study based on transcript analysis of 8,900 traditional-age community college students. Adelman reports that, as of 2001, three-fourths of first-time credit-seeking community college students were under the age of 24. His analysis was based on the academic histories of students enrolling in public, two-year institutions. This transcript-based analysis does not consider other social or psychological factors that play a part in college student persistence. Adelman further specified transfer patterns. While sixty percent of traditional-age undergraduates attend more than one postsecondary institution, the amount of time spent and credits earned at the two-year institution varies widely. His analysis was limited to students who first began at a two-year institution, earned at least ten credits, transferred to a four-year institution, and then earned at least ten credits at the four-year institution.

Adelman (2006) conducted transcript-based analysis of a nationally representative cohort of students as they progressed from high school to postsecondary education. Rather than study retention or persistence, the researcher was interested in degree completion. Adelman's focus was on the student's academic history. His approach was to follow the student, not the institution. Horn and Berger (2004) report that sixty percent of students who earn a bachelors degree attend more than one institution. Given the prevalence of multiple institution attendance patterns and transfer, following the student seems like a prudent research strategy.

Adelman studied academic histories and analyzed variables that explained bachelors degree completion for high school graduates. His focus is on academic history, strength of schedule, grades, credits earned and other measures of academic performance. In regards to degree completion, academic intensity of the student's high school curriculum was more important than any other pre-college attribute. Adelman grouped students by level of academic intensity. Students in the highest level of

academic intensity completed 3.75 Carnegie Units (CU) of English, 3.75 or more CU of mathematics, highest math class was calculus, pre-calculus, or trigonometry, 2.5 or more CU of core lab sciences (biology, chemistry, physics), more than 2 CU of foreign language, more than 2 CU of history and social science, 1 or more CU of computer science, more than one AP course, and no remedial English or math. Ninety-five percent of the students in the highest level of academic intensity had completed a bachelor's degree and forty-one percent had completed a graduate degree within 8 years of their high school graduation.

The highest level of math reached in high school continues to be a strong predictor of college success and degree completion. These findings confirm the results of the initial toolbox findings reported by Adelman (1999).

Adelman (2006) also reported on the concept of *academic momentum*. Earning 20 credits prior to the end of the first year of college, bringing additive credits from high school in the form of dual enrollment or advanced placement, and earning more than four credits in the summer term were all strongly associated with degree completion. Adelman noted, "earning less than 20 credits by the end of the first calendar year of enrollment is a serious drag on degree completion" (Adelman, 2006, p.48).

Adelman (2006) reported that students who delayed college enrollment were less likely to complete a degree. The longer a student waited to begin, the less likely they were to complete a college degree. Part time enrollment, less than 12 credits in a semester, was also negatively associated with completion. Students who didn't stop out increased their probability of degree completion by 43%. Academic performance was also related to degree completion. Students placing in the top 40% for academic performance had a strong positive correlation with degree completion. Non-penalty course withdrawals and course repeats were negatively associated with degree

completion. The probability of degree completion decreased by about 50% for students who withdrew or repeated 20% of more of their courses.

A limitation of Adelman's (2006) study is the student sample. The sample only includes students who graduated with a regular high school diploma and attended a four-year institution before reaching age 26. It excludes students who earned a GED. It also excludes students who never attended baccalaureate degree-granting institutions. The researcher does not include sociological or psychological factors related to degree completion.

Summary

There are many different student and institutional variables that have been shown to influence student persistence in college. Some studies have focused on the pre-matriculation characteristics of students to relevant to retention. These variables have included measures of academic background of students such as high school curriculum, high school grades, and standardized tests scores. Other student variables have included ethnicity, social-economic status, parental educational attainment, and gender. Many studies have shown a relationship between retention and institutional characteristics. Studies have examined retention by type of institution: private or public, two-year or four-year, residential or commuter. Another set of variables that influence student retention are in the category of student interaction with the institution and members of college community including other students, faculty, and staff. Measures of social integration have studied the effects of residence status, mission of institution, faculty-student interaction in and out of class, and student-student interaction. Some studies have tried to measure student's attachment, or social connections, to the institution. Retention studies have also researched the importance of the student's academic experience in the college environment. Influences researched have included

classroom experiences, active learning, academic climate, college curriculum, and grades. Many researchers have found academic performance to be strongly correlated with persistence.

Many research studies on college student retention are descriptive studies. One of the common issues in the study of retention is the applicability of research findings. There seems to be a trend to integrate different retention theories and move toward predictive models. Predictive studies attempt to assign weight to the various variables impacting student retention. These studies have tried to identify the most significant influences on student retention. Multiple regression analysis is used in predictive studies of student retention when many potential variables are available for analysis. While there are many influences, this method allows researchers to distinguish the weight of an influence. Multiple regression continues to be the preferred method for studying the multiple-dimension problem of student attrition.

The various theories or models of student persistence continue to be tested by research studies. Researchers want to determine the accuracy of predictive retention models. Studies also test the conceptual framework of the theories for applicability to diverse institutional settings.

This literature review identifies some of the recurring themes in retention research. Because they have shown to be consistently significant predictors, and because they are readily available from institutional enrollment data, the primary variables of interest in prediction are high school GPA, SAT scores, gender, and ethnicity.

CHAPTER 3: METHODOLOGY

The literature review indicated that there were significant differences in bachelor's degree attainment levels for students who transferred with an A.A. degree when compared to students who transferred without a transfer degree. The study, for the sake of analysis, was limited to community college A.A. degree recipients. Florida's community colleges are an important starting point for many Florida residents aspiring to a four-year degree. This study analyzed the bachelor's degree attainment at one institution with a main campus and three regional campuses.

The purpose of this study was to examine if there were differences by campus on transfer student academic performance, persistence, and degree completion. Were students from local community colleges better served by attending a regional campus or main campus for similar degree programs? Specifically, was there a difference in the academic performance, persistence, and degree completion of A.A. transfer students in selected majors who enrolled in the various campuses of a multi-campus institution? This study attempted to answer the following research questions:

1. Is there a difference by campus in the academic performance, as measured by University GPA, for A.A. transfer students who enroll in the various campuses of a multi-campus institution?
2. Is there a difference by campus in the three-year rate of persistence for A.A. transfer students who enroll in the various campuses of a multi-campus institution?

3. Is there a difference by campus in the three-year rate of degree completion of A.A. transfer students who enroll in the various campuses of a multi-campus institution?
4. What is the relationship between Community College GPA and University GPA, three-year rate of persistence, and three-year rate of degree completion?

Design of the Study

Despite the national attention received, retention rates and graduation rates have remained fairly stable for the past three decades. The attrition of students from higher education has been well documented in the research literature. Much of this research has focused on student persistence from the first to second year of college. Fewer studies have examined persistence issues related to transfer students. This study analyzed historical student enrollment data on persistence, academic performance, and degree completion for a cohort of students enrolled in selected undergraduate programs at a large, urban, public, research university.

In a causal comparative study, the independent variables are not manipulated. Instead, naturally occurring variations in the presumed independent and dependent variables are observed. These variables are selected on the basis of previous research and theory. Some of the benefits of causal comparative ex post facto studies are that they can predict or control phenomena, stimulate further research, and a theory can be enlarged or modified as it explains more phenomena (Schenker and Rumrill, 2005).

The research questions were examined using institutional records of student data maintained by the Registrar's Office. No personably identifiable student information was requested. The data was obtained during the spring semester of 2010.

The study focused on the academic performance, persistence, and degree completion of A.A. transfer students. Specifically, the study assessed if there were differences in the dependent variables by campus.

Population

The site for this study was a large, urban, public, multi-campus research university in the state of Florida. The Office of Decision Support at the university reported a total enrollment of 35,100 undergraduate students for the fall 2008 term.

Campus A, the main campus for the university, has the largest enrollment with 29,913 undergraduate students. More than 39,000 undergraduate and graduate students attend classes on this large urban campus. The campus sits on more than 1,700 acres and its' 247 buildings include includes extensive health, medical, and academic facilities, residence halls, research facilities, as well as student services and recreational facilities. The original campus for the university was founded in 1956 to address the needs of a rapidly growing urban population. In 2008, the population of the county was over 1.2 million and population of the city was just fewer 340,000 residents (Bureau of Economic and Business Research, 2009a). The per capita income for the area is $36,554 (Bureau of Economic and Business Research, 2009b). It is one of the three research-intensive public universities in the state of Florida. The university participates in intercollegiate sports as a member of the Big East Athletic Conference (Facts 2009-2010).

Campus B is an upper division regional campus with an undergraduate enrollment of 1,597. This campus is located on the border of two counties south of the main campus, in a vibrant area featuring several educational and cultural institutions and near Florida's beaches. Over 711,000 residents live in the two counties served by this

campus. The city the campus is located in has a population of 55,174 (Bureau of Economic and Business Research, 2009a). The per capita income in the region is $48,255 (Bureau of Economic and Business Research, 2009b). The campus offers 44 bachelor's degree, master's degree, and certificate programs to those who have at least an associate's degree. There are 8 buildings on the 32-acre campus. The institution began offering classes in the area in 1974 and began sharing a campus with another public liberal arts institution the following year (Facts 2009-2010).

Campus C enrolls 3,373 lower and upper division undergraduates. The campus is located on a waterfront downtown district featuring many parks, shops, restaurants, art galleries, museums and performing arts and sports venues. The campus is located in a coastal community west of the main campus. Just fewer than one million people live in the county served by this campus. The city has a population of 251,459 (Bureau of Economic and Business Research, 2009a). The per capita income for the area is $42,546 (Bureau of Economic and Business Research, 2009b). There are 25 buildings on this 48-acre campus. There are numerous student life offerings including intramural sports, student organizations/clubs and waterfront activities on the harbor. This campus was founded in 1965 and was the first regional campus established in the state (Facts 2009-2010).

Campus D is an upper division regional campus with an undergraduate enrollment of 1,068. It is located in central Florida approximately an hour’s drive from the main campus. It is the most rural of the four campuses. The population of the county is 585,733. The city the campus is located in has a population of 93,508 (Bureau of Economic and Business Research, 2009a). The per capita income for the area is $31,329 (Bureau of Economic and Business Research, 2009b). The campus is located on 148 acres and has four buildings. Since 1988, this campus has been sharing space

with the local community college. This partnership provides a seamless transfer to upper division programs for community college graduates. Emphasizing applied learning and research, the campus serves students in several inland counties. About 73% of the students are from the local county. Approximately 60% of the students attend part time. The average class size is 22. The campus offers 20 undergraduate, graduate and certificate programs (Facts 2009-2010).

Institution wide, 58% of the undergraduates are female. The ethnicity of the population is 12% black, 12% Hispanic, 6% Asian, .05% American Indian, and 65% white, non-Hispanic. The university enrolls about 5,000 new transfer students each year, most graduating from one of the Florida's community colleges. Table 1 summarizes undergraduate enrollment by ethnicity and gender for each campus.

The population for this study included undergraduate students enrolled in selected majors offered on all four campuses of the institution. The study was limited to students majoring in psychology, elementary education, and general business on one of four campuses of the university. All the required courses in the major were offered annually on each campus. Course offerings allowed for timely degree completion at each campus. The population was limited to transfer students who enrolled at the university after earning an Associate in Arts degree from a Florida community college. Admissions standards remained unchanged during the timeframe of this study. Transfer students with an A.A. from a Florida community college were considered for admission if they had a 2.0 or higher postsecondary GPA or a 2.5 GPA for limited access programs in business and elementary education. Applicants with an A.A. degree from Florida public institutions are admitted as juniors and are considered to have met general education requirements. This articulation agreement between Florida community

Table 1

Gender and Ethnicity Proportions by Campus, Fall 2005

	All Campuses	Campus A	Campus B	Campus C	Campus D
Non Resident Aliens (Male)	1%	1%	1%	1%	1%
Non Resident Aliens (Female)	1%	2%	1%	1%	1%
Black (Male)	4%	4%	3%	3%	4%
Black (Female)	8%	9%	5%	5%	8%
American Indian (Male)	0%	0%	0%	0%	1%
American Indian (Female)	0%	0%	0%	0%	0%
Asian (Male)	3%	3%	1%	2%	2%
Asian (Female)	3%	3%	2%	3%	2%
Hispanic (Male)	5%	5%	2%	3%	4%
Hispanic (Female)	7%	7%	5%	4%	6%
White (Male)	27%	27%	25%	27%	25%
White (Female)	38%	36%	50%	48%	46%
Total	97%	97%	96%	97%	98%
All Females	58%	57%	63%	62%	63%
All Males	40%	41%	33%	35%	35%
Gender or Ethnicity Not Reported	3%	3%	4%	3%	2%

Source: Infocenter, Office of Decision Support and Academic Budgets, University of South Florida (January 2010)

colleges and state universities has been in effect since April 13, 1971 and has subsequently been adopted by the Florida Legislature into statue form as Florida law.

The articulation agreement has provisions related to admissions, transfer credit, limited access programs, common course numbering system, catalog year, program prerequisites, and accelerated credit mechanisms (2004-2005 Undergraduate Catalog, 2005-2006 Undergraduate Catalog, 2006-2007 Undergraduate Catalog).

Sample

The Office of Decision Support reported that 4,487 transfer students enrolled at the institution in the fall semester of 2004 after earning an A.A. degree from a Florida community college. A purposeful sampling strategy was used for this study. The sample for this study consisted of all the A.A. transfer students majoring in elementary education, psychology, or general business and first enrolling in the fall term of 2004, 2005, or 2006. The size of the sample was approximately 1,900 students. Random sampling was not possible because students self-selected their major and their campus. Demographic information on gender and ethnicity were gathered to track the representativeness of the sample. An estimate of the proposed sample is shown in Table 2. The estimate was developed using public enrollment records from the Office of Decision Support.

In a causal comparative ex post facto study the independent variables are not manipulated. Instead, naturally occurring variations in the presumed independent and dependent variables are selected on the basis of previous research and theory.

Independent Variables

Community College GPA: This is a measure of the prior academic performance of transfer students. The GPA of incoming transfer students is noted on the community college transcripts submitted to the university as part of the admission process.

Table 2

Proposed Study Sample: A.A. Transfer Students Majoring in Elementary Education, General Business, and Psychology by Campus (N = 1,902)

Home Campus	2004	2005	2006	Total
Campus A	393	364	392	1149
Campus B	53	82	83	218
Campus C	99	91	68	258
Campus D	90	103	84	277
TOTAL	635	640	627	1902

Source: Infocenter, Office of Decision Support and Academic Budgets, University of South Florida (January 2010)

Campus: Campus is defined as main campus or one of the three regional campuses. Student's home campus designation as maintained by the university's student registration database. While students may be able to complete courses on multiple campuses most students complete the majority of their coursework on their home campus. Home campus is designated by the student and is verified with course registration data by campus institutional research staff. Campus was dummy coded as a nominal categorical data.

Gender: This is a categorical measure which distinguishes between males and females. This independent variable is dichotomous. Males were coded with a value of 1 and

females with a value of 0.

Race. This is a categorical variable which designates a student's self reported race/ethnicity. Race was dummy coded as a nominal categorical data.

Dependent Variables

Graduation/Degree Completion: Three-year graduation rate was determined by following a cohort of first-time Florida community college Associate in Arts degree recipients. Completers included the percentage of A.A. transfer students in a cohort who earned a bachelor's degree within three years of initial enrollment at the four-year university. The institution maintains degree conferral data for students who have enrolled. This dependent variable is dichotomous. Students earning a four-year degree within 3 years of initial enrollment at the university were coded with a value of 2. Students still enrolled following the third year, and not earning a degree yet, were coded with a value of 1. Students who had not graduated and were no longer enrolled were coded with a value of 0.

Persistence/Retention: This study reported on persistence rates for a cohort of students by campus. This dependent variable has two possible categorical answers. At the end of the third year of enrollment, students who earned a degree or were still enrolled were coded with a value of 1. Students who were no longer enrolled or did not earn a degree within the first three years of enrollment were coded with a value of 0.

Academic Performance: This study used cumulative University GPA as a measure of academic performance at the four-year university.

Data Collection Procedures

The student demographic and academic records were obtained from the student database of the participating institution. The demographic data included age, gender,

and ethnicity. Demographic information was collected for the purpose of tracking representativeness of the sample.

The academic history included cumulative GPA, enrollment status, and degree conferral. Degree completion status for each semester and cumulative GPA was maintained by the Registrar's Office. Data collection occurred during the spring semester of 2010 once approval was obtained from the Institutional Review Board. The institution provided a spreadsheet with the requested student background information and academic history. The data were then formatted and coded for import into the statistical analysis software package. This included dummy coding of the dependent variables which indicated persistence and degree completion. In addition, yearly cohorts were combined into one cohort by major and campus. This collapsing of cohorts was necessary for sample size requirements needed for the statistical analysis. Including multiple academic years yielded sufficient subjects for the study. To protect student privacy, no identifying information was included in the data request.

Data Analysis

Descriptive statistics were reported for all the variables. Measures of central tendency were calculated as descriptive data for the continuous variables. Frequencies were reported for the categorical variables including gender, ethnicity, major, campus, graduation, and persistence. In the following section, research question are presented with corresponding data analysis procedures.

Question 1. Is there a difference by campus in the academic performance, as measured by University GPA, for A.A. transfer students who enroll in the various campuses of a multi-campus institution?

This first research question was studied using Multiple Regression (MR). University GPA was used as a measure of academic performance in this study. MR

analysis is used to predict the variance in an interval dependent variable, based on combinations of interval, dichotomous, or dummy independent variables. Nominal categories were transformed into sets of dichotomies, or dummy variables, for the analysis. MR can be used to explain the proportion of the variance in a dependent variable at a significant level and can establish the relative predictive importance of the independent variables (Pedhazur, 1997).

Question 2. Is there a difference by campus in the three-year rate of persistence for A.A. transfer students who enroll in the various campuses of a multi-campus institution?

The bivariate nature of the dependent variable degree completion lends itself to Logistic Regression (LR) analysis. LR is the appropriate test when the dependent variable is categorical and only has two possible levels. The Likelihood Ratio is the preferred statistic to assess the significance of individual independent variables or individual model parameters. Binary dependent variables are dummy coded 0 or 1 to indicate the presence or absence of the trait being studied.

Question 3. Is there a difference by campus in the three-year rate of degree completion of A.A. transfer students who enroll in the various campuses of a multi-campus institution?

Multinomial Logistic Regression can be used with a categorical dependent variable that has more than two categories. The dependent variable, persistence, was measured at three levels at the end of the third year of enrollment. Students were categorized as persistors, nonpersistors, or still enrolled.

Logistic regression and multinomial logistic regression require a continuous, unbounded dependent variable. For this reason, the dependent variable in a logistic regression is the log of the odds ratio. Although probabilities can range from 0 to 1, log

odds can range from -∞ to +∞. Logistic regression can be used to determine the percent of variance in the dependent variable explained by the independent variables. It can also be used to rank the relative importance of the independent variables and to assess interaction effects (Agresti, 2007; Pedhazur, 1997).

Question 4. What is the relationship between Community College GPA and University GPA, three-year rate of persistence, and three-year rate of degree completion?

This fourth research question was analyzed by generating a correlation index that describes the existence of a relationship and the strength and direction of the relationship. A Pearson Product Moment Correlation Coefficient is used when both variables are continuous. A Point Biserial Correlation is used when one variable is continuous and the other is dichotomous.

CHAPTER 4: RESEARCH RESULTS

The main objective of the study was to examine if there were differences by campus in the academic performance, persistence, and degree completion of community college transfer students at a four-year university. The study sought answers to four quantitative research questions by conducting statistical analysis on a sample of historical university data. Findings on each research question are discussed in the succeeding sections and are presented per question to give emphasis on the results. In addition, a descriptive analysis are presented to characterize the sample that was used for the study. A summary of all the findings conclude the chapter.

Descriptive Analysis

Descriptive statistics are used to describe the main features of a collection of data in quantitative terms. The tables and text in this section present the raw data that describe the research sample. The independent variables in this study included gender, ethnicity, major field of study, community college GPA, and home campus designation. The dependent variables in this study included university GPA, three-year rate of persistence, and three-year rate of degree completion.

For the purpose of the study, the sample included 1,898 A.A. transfer students majoring in elementary education, psychology, or general business and first enrolling in the fall term of 2004, 2005, or 2006 on one of the four campuses of a public research university. Random sampling is not possible because students self-selected their major and their campus. There were 1,251 (65.9%) females and 643 (33.9%) males. There were four participants who did not indicate their gender.

Demographic information was also gathered on student ethnicity. The largest proportion of study participants, 1338 students (70.55%), indicated they were White. There were also 215 Hispanic students (11.3%), 204 Black students (10.7), and 141 (7.3%) students who were classified as Asian, American Indian/Alaskan Native, Unknown or Non-Resident Alien.

Of the 1,898 transfer students in the sample, 999 (52.6%) students majored in business, 386 (20.35%) majored in elementary education, and 513 (27%) majored in psychology.

There were 1,034 (54.5%) students enrolled at Campus A, the main campus of the university. Regional campus enrollment included 248 students (13.1%) from Campus B, 322 (17.0%) from Campus C, and 294 (15.5%) from Campus D.

Student persistence and degree completion were assessed following three years of enrollment at the four-year university. There were 1,161 students (61.2%) who earned a degree within three years of initial enrollment at the university. The sample included 111 students (5.8%) who had not earned a degree after three years of enrollment but were still enrolled at the university. Finally, there were 626 students (33%) who discontinued enrollment from the university without earning a degree at the time of this study.

Table 3 summarizes the numerical GPA data for the study sample. The average incoming transfer student grade point average (CCGPA) was a 3.03. This measure of grades represents the academic performance of the student at the community college prior to transfer. Following enrollment at the university, students earned an average undergraduate GPA of 2.88 (UGPA). This measure of grades represents a student's academic performance at the upper division four-year university. This measure of academic performance excludes the coursework completed at the community college.

Table 3

Descriptive Statistics for Academic Performance Measures

	N	Mean	Minimum	Maximum	Std. Dev
CCGPA	1898	3.03	1.91	4.00	0.47
UGPA	1898	2.88	0.00	4.00	0.87

Descriptive Statistics by Campus

Table 4 summarizes the two measures of academic performance by campus. CCGPA refers to the grades earned at the community college while UGPA refers to the grades earned at the upper-division university. The mean incoming community college GPA for the sample was 3.03. The mean UGPA for the sample was 2.88. As is evident from the table, the highest incoming transfer GPA was reported by campus B (3.20) and the lowest was campus A (2.96). The highest university grades were reported by campus D (3.25) and the lowest by campus A (2.71).

Table 5 summarizes the proportion of students by major for each campus in the study. Just over half (52.63%) of the students in the sample majored in business. With 60.74%, Campus A had the largest proportion of students majoring in business. The campus with the smallest proportion of business majors was Campus D, where 27.89% of the students majored in business. Approximately 27% of the students in the sample majored in psychology. The proportion of psychology students was nearly twice as large at Campus A (30.08%) compared to campus D (16.67%). Students majoring in elementary education represented 20.34% of the sample. The proportion of education students was more than six times Campus D (55.44%) compared to campus A (9.19%).

Table 4

Descriptive Measures of GPA by Campus

Campus	Variable	N	Mean	Std Dev	Min	Max
Campus A	CCGPA	1034	2.96	0.47	1.91	4.00
	UGPA		2.71	0.83	0.00	4.00
Campus B	CCGPA	248	3.20	0.46	2.06	4.00
	UGPA		3.21	0.80	0.00	4.00
Campus C	CCGPA	322	3.02	0.47	2.01	4.00
	UGPA		2.85	0.98	0.00	4.00
Campus D	CCGPA	294	3.14	0.42	2.00	4.00
	UGPA		3.25	0.74	0.00	4.00
Total	CCGPA	1898	3.03	0.47	1.91	4.00
	UGPA		2.88	0.87	0.00	4.00

Table 6 summarizes the proportion of student enrollment by race for each campus. The ethnicity of the sample was 70.50% White, 11.33% Hispanic, 10.75% Black, 3.32% Asian, and 4.11% classified as Other. Overall, Campus D had the smallest proportion of minority student enrollment while Campus A had the largest proportion of minority student enrollment. Specifically, a larger proportion of Black students enrolled in Campus A (14.60%) compared to Campus D (4.08%). The proportion of Hispanic students was more than twice as large for Campus A (14.60%) than Campus B (6.85%). The proportion of White students was 85.37% at Campus D compared to 62.09% at Campus A.

Table 5

Academic Major Proportions by Campus

Frequency Percent	BUS	EDU	PSY	Total
Campus A	628 60.74	95 9.19	311 30.08	1034 54.48
Campus B	121 48.79	65 26.21	62 25.00	248 13.07
Campus C	168 52.17	63 19.57	91 28.26	322 16.97
Campus D	82 27.89	163 55.44	49 16.67	294 15.49
Total	999 52.63	386 20.34	513 27.03	1898 100.00

Table 7 summarizes the enrollment of students by gender for each campus in the sample. Overall, females represented 66.05% of the students in the sample compared to 33.95% which were males. The largest proportion of females was reported by Campus D (80%) and the smallest proportion by Campus A (59.65%).

Table 8 summarizes student persistence by campus. For the purpose of this study, students were coded as having persisted if they earned a degree or were still enrolled at the end of the third year of initial university enrollment. As is evident from the table, Campus D had the highest rate (78.91%) of student persistence while Campus A had the lowest rate (62.96%) of student persistence. The overall rate of persistence for the study sample was 67.02%.

Table 6

Race Proportions by Campus

Frequency Percent	Asian	Black	Hispanic	Other	White	Total
Campus A	44 4.26	151 14.60	151 14.60	46 4.45	642 62.09	1034 54.48
Campus B	7 2.82	13 5.24	17 6.85	12 4.84	199 80.24	248 13.07
Campus C	8 2.48	28 8.70	24 7.45	16 4.97	246 76.40	322 16.97
Campus D	4 1.36	12 4.08	23 7.82	4 1.36	251 85.37	294 15.49
Total	63 3.32	204 10.75	215 11.33	78 4.11	1338 70.50	1898 100.00

Table 9 summarizes student degree completion status by campus. For the purpose of this study, students were categorized into three distinct groups based on their status at the conclusion of their third year of university enrollment. The groups identified students who at the end of three years had earned a bachelor's degree, or were still enrolled and had not earned a degree yet, or had dropped out of the university without earning a degree at the time of this study. As is evident from the table, 74.49% of the students enrolled in Campus D earned a degree in three years compared, 66.53% from Campus B, 59.63% from Campus C, and 56.58% from Campus A. Conversely, Campus A had the highest dropout rate at 37.04% and Campus D had the lowest student dropout

Table 7

Gender Proportions by Campus

Frequency Percent	Female	Male	Total
Campus A	615 59.65	416 40.35	1031 54.44
Campus B	176 71.26	71 28.74	247 13.04
Campus C	223 69.25	99 30.75	322 17.00
Campus D	237 80.61	57 19.39	294 15.52
Total	1251 66.05	643 33.95	1894 100.00

Note: 4 students had missing information for Gender.

rate (21.09%). For comparison purposes, overall sample averages are also noted in Table 6.

Table 10 presents information of student persistence by major. At 85.49%, education students had the highest rate of persistence, followed by psychology (67.84%), and then business (59.46%). The overall persistence rate for the study sample was 67%.

Table 11 summarizes student degree completion status by major. For the purpose of this study, students were categorized into three distinct groups based on their status at the conclusion of their third year of university enrollment. The groups identified students who at the end of three years had earned a degree, were still enrolled and had not earned a degree, or dropped out of the university without earning a degree at

Table 8

Frequency Distribution and Proportions for Persistence by Campus

Frequency Percent	Non- Persistors	Persistors	Total
Campus A	383 37.04	651 62.96	1034 54.48
Campus B	73 29.44	175 70.56	248 13.07
Campus C	108 33.54	214 66.46	322 16.97
Campus D	62 21.09	232 78.91	294 15.49
Total	626 32.98	1272 67.02	1898 100.00

the time of this study. As is evident from the table, 83.16% of the students enrolled in education earned a degree in three years compared to 61.21% from psychology, and 52.65% from business. The graduation rate for the study sample was 61.17%. In contrast, business majors experienced the highest dropout rate (40.54%), followed by psychology (32.16%) and then education (14.51%). The overall dropout rate for the study sample was 32.98%.

Correlation is concerned with simple measures of relationships between two variables. It is important to note, that while measures of association may be useful in describing relationships between variables, one must be cautious to not over-interpret the relationship. There may well be another variable not being currently considered that

Table 9

Frequency Distribution and Proportions for Degree Status By Campus

Frequency Percent	No degree, Not Enrolled	No Degree, Enrolled	Earned Degree	Total
Campus A	383 37.04	66 6.38	585 56.58	1034 54.48
Campus B	73 29.44	10 4.03	165 66.53	248 13.07
Campus C	108 33.54	22 6.83	192 59.63	322 16.97
Campus D	62 21.09	13 4.42	219 74.49	294 15.49
Total	626 32.98	111 5.85	1161 61.17	1898 100.00

Note: Degree status is reported following the third year of university enrollment.

can explain or predict the relationship more meaningfully. Since the focus of this study is campus differences, the results of the correlation coefficients are presented by campus.

Table 12 presents simple correlation coefficients for degree completion, persistence, and the two measures of academic performance, CCGPA and UGPA. Campus A had a significant negative relationship with degree completion, persistence, CCGPA, and UGPA. Campus B had a significant positive relationship with CCGPA and UGPA. There were no significant relationships noted for Campus C with this group of variables. Campus D had a significant positive relationship with degree completion, persistence, CCGPA, and UGPA.

Table 10

Frequency Distribution and Proportions for Persistence by Major

Major	Persist		
Frequency Percent	**No**	**Yes**	**Total**
BUS	405 40.54	594 59.46	999 52.63
EDU	56 14.51	330 85.49	386 20.34
PSY	165 32.16	348 67.84	513 27.03
Total	626 32.98	1272 67.02	1898 100.00

Table 11

Frequency Distribution and Proportions for Degree Status By Major

Major	Degree Status at the End of Third Year			
Frequency Percent	**No degree, Not Enrolled**	**No Degree, Enrolled**	**Earned Degree**	**Total**
BUS	405 40.54	68 6.81	526 52.65	999 52.63
EDU	56 14.51	9 2.33	321 83.16	386 20.34
PSY	165 32.16	34 6.63	314 61.21	513 27.03
Total	626 32.98	111 5.85	1161 61.17	1898 100.00

Table 12

Correlation Coefficients for Campus, Degree Completion, Persistence, and Academic Performance

Pearson Correlation Coefficients, N = 1898 Prob > |r| under H0: Rho=0				
	Degree Completion	**Persist**	**CCGPA**	**UGPA**
Campus A	-.10310 <.0001	-.09444 <.0001	-.16099 <.0001	-.21363 <.0001
Campus B	.04266 0.0632	.02925 0.2028	.13712 <.0001	.14328 <.0001
Campus C	-.01430 0.5334	-.00537 0.8152	-.00793 0.7298	-.01848 0.4210
Campus D	.11701 <.0001	.10831 <.0001	.10208 <.0001	.17974 <.0001

Variable Coding and Reference Groups

The four categorical variables were dummy-coded so that they could be entered into the regression analysis. These nominal variables were coded using a scheme which assigned a value of 1 to designate group membership or a value of 0 to designate non-membership. The specific coding and selection of a reference group is now discussed.

Gender was dummy-coded with females as the reference group. Females were coded with a value of 1 and males with a value of 0. Race was dummy-coded with White/non-Hispanic students serving as the reference group. Four variables were created to denote ethnicity. Black students were coded with a value of 1 in the variable RaceB. Non black students were coded with a value of 0 for RaceB. Hispanic students were coded with a value of 1 for the variable RaceH. Asian/Pacific Islander students

were coded with a value of 1 for the variable of RaceA. Students who reported any other ethnicity not already mentioned were coded with a value of 1 for the variable RaceO. Therefore, a student coded with a value of 0 in all four ethnicity variables was categorized as belonging to the reference group, White.

Major was dummy-coded with psychology as the reference group. Business majors were coded with a value of 1 for the variable BUS. Psychology and education majors were coded with a value of 0 for the variable BUS. Education students were coded with a value of 1 for the variable EDU. As before, non-education majors were coded with a value of 0. As the reference group, psychology students had a value of 0 for the variables BUS and EDU.

Campus was dummy-coded with campus A, the main campus of the university, serving as the reference group. Students enrolled in Campus B were coded with the value of 1 for the variable CampusB. Campus C and D followed a similar coding scheme. Students coded with a value of 0 in all three campus variables were considered to be enrolled in campus A, the reference group.

Findings by Research Questions

Question 1. Is there a difference by campus in the academic performance, as measured by University GPA, for A.A. transfer students who enroll in the various campuses of a multi-campus institution?

This first research question was analyzed using multiple regression analysis. The dependent variable University GPA (UGPA) is used as a measure of academic performance in this study. The independent variables include campus, gender, ethnicity, major, and community college GPA (CCGPA). Multiple regression analysis is used to predict the variance in an interval dependent variable, based on combinations of interval, dichotomous, or dummy independent variables. Multiple regression analysis can be

used to explain the proportion of the variance in a dependent variable at a significant level and can establish the relative predictive importance of the independent variables (Pedhazur, 1997).

Overall, as noted in Table 13, the multiple regression equation is highly significant and has a significance p value <.0001. All of the variables were entered in the model to determine if there were any significant relationships with UGPA. One can gain a better understanding of phenomena by testing theory, the existence of relationships, and alternative causal explanations. Thus, given the independent variables that were included, one can predict UGPA better than what would be expected by pure chance alone. The adjusted R-squared indicates that about 30.9% of the variability of UGPA is accounted for by the model even after taking into account the number of predictor variables in the model.

In order to learn which of the independent variables are significant in explaining UGPA, an examination of the parameter estimates was necessary. Table 14 shows the parameter estimates for each of the variables entered into the regression model and whether they were significant or not. As is evident in the table, variables CCGPA, Major, Gender, and Campus are the most important predictors of UGPA and are statistically significant (p-value < 0.05). The independent variable CCGPA is numerically measured and has a positive value. Therefore, for this sample, the higher the value of CCGPA resulted in a higher value of the dependent variable UGPA. Secondly, females earned lower grades than males in this sample as measured by UGPA. Thirdly, major was related to academic performance. Business students earned lower grades than psychology students and education students earned higher grades than psychology students. Campus A, the main campus of the university, was set as the reference group for the set of three campus variables. There were significant differences by campus in

Table 13

Multiple Regression Statistics and Analysis of Variance for UGPA

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	11	450.47972	40.95270	78.08	<.0001
Error	1882	987.14143	0.52452		
Corrected Total	1893	1437.62115			

Root MSE	0.72424	R-Square	0.3134
Dependent Mean	2.88414	Adj R-Sq	0.3093
Coeff Var	25.11098		

the measure of the dependent variable UGPA. Students enrolled in campus B and campus D earned higher grades than students enrolled in campus A.

As is evident from the table, there are significant differences by campus. Therefore, we conclude that there are differences by campus in the academic performance, as measured by University GPA, for A.A. transfer students who enroll in the various campuses of a multi-campus institution.

Question 2. Is there a difference by campus in the three-year rate of persistence for A.A. transfer students who enroll in the various campuses of a multi-campus institution?

The binary nature of the dependent variable, such as persistence, lends itself to Logistic Regression (LR) analysis. Logistic regression is the appropriate test when the dependent variable is categorical and only has two possible levels (Agresti, 2007). Many

Table 14

Multiple Regression Coefficients for the UGPA Model

Variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	0.68932	0.12245	5.63	<.0001
CCGPA	1	0.72475	0.03781	19.17	<.0001
BUS	1	-0.19483	0.04108	-4.74	<.0001
EDU	1	0.43856	0.05271	8.32	<.0001
Campus B	1	0.22875	0.05269	4.34	<.0001
Campus C	1	0.03692	0.04685	0.79	0.4307
Campus D	1	0.15295	0.05273	2.90	0.0038
Female	1	-0.07961	0.03876	-2.05	0.0401
Asian	1	0.02934	0.09421	0.31	0.7555
Black	1	-0.10178	0.05633	-1.81	0.0709
Hispanic	1	0.09887	0.05416	1.83	0.0681
Other	1	0.06409	0.08530	0.75	0.4526

research phenomena in the social sciences are qualitative in nature, that is to say, they describe if an event or condition occurs or not. Typically, binary conditions can be described with a dummy or indicator variable coded with a value of 1 if the condition exists, and 0 if the condition is not present. Therefore, the mean of the indicator variable yields the proportion or probability of the sample exhibiting the condition being studied.

The study of these probabilities and associated odds form the basis of logistic regression (Pampel, 2000; Hosmer & Lemeshow, 2000).

Table 15 summarizes the results of the logistic regression model by including parameter estimates and their standard errors, the Wald Chi-Square statistic, and associated p-values. The significant chi-square statistic (p-value < 0.05) indicates that the model gives a significant improvement over the baseline intercept-only model. This signifies that the model gives better prediction than if one just guessed based on the marginal probabilities for the outcome categories. Only the independent variables Major and CCGPA were found to be statistically significant having a p-value of less than the significance level of 0.05. The Maximum Likelihood Estimates table and associated p-values show differences in persistence attributable to CCGPA and major.

The logistic model also calculates odds ratios for all the variables in the model. Probabilities are limited by their measurement scale. Therefore, probabilities are converted to odds ratios, which are not limited. Only the odds ratios which correspond with the significant parameters are reported here. The variable CCGPA was positively associated with student persistence. For every unit increase in CCGPA, students increased their odds of persistence by 2.626 times. The odds ratio indicates that as CCGPA increases so does the likelihood of persisting. In regards to major, education students are 2.308 times as likely to graduate as psychology students. The odds ratio value of 0.732 signifies the degree to which business students are less likely to graduate than psychology students. No other variables were statistically significant in the model. Therefore, in regards to the research question 2, we conclude that there is no difference by campus in the three-year rate of persistence for A.A. transfer students who enroll in the various campuses of a multi-campus institution. The analysis did not detect any association or difference between the dependent variable of campus.

Table 15

Analysis of Maximum Likelihood Estimates

Parameter	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	1	-2.1075	0.3720	32.0895	<.0001
CCGPA	1	0.9657	0.1182	66.7678	<.0001
BUS	1	-0.3121	0.1221	6.5340	0.0106
EDU	1	0.8364	0.1847	20.5038	<.0001
Campus B	1	0.0346	0.1638	0.0446	0.8328
Campus C	1	0.0541	0.1418	0.1456	0.7028
Campus D	1	0.2866	0.1741	2.7101	0.0997
Female	1	-0.1983	0.1150	2.9712	0.0848
Asian	1	0.0380	0.2748	0.0191	0.8901
Black	1	0.1807	0.1674	1.1649	0.2805
Hispanic	1	0.1728	0.1638	1.1126	0.2915
Other	1	0.0238	0.2593	0.0084	0.9268

Question 3. Is there a difference by campus in the three-year rate of degree completion of A.A. transfer students who enroll in the various campuses of a multi-campus institution?

As in research question 2, logistic regression was used to analyze research question 3. However, since the dependent variable has more than two values, multinomial logistic regression was used. Multinomial logistic regression is the appropriate statistical test when one has a categorical dependent variable with a nominal scale of measurement and more than two values. Table 16 outlines the coding scheme and the frequency counts for the dependent variable in the multinomial logistic regression.

With regard to the parameter estimates of the model, it can be seen from Table 17, CCGPA, BUS, EDU, and Black were the only independent variables that were significant as indicated by a p value <.05. Black is one of the indicator variables for race. Three of the variables were significant in regards to students who earned a bachelor's degree in three years. Students majoring in business were less likely (odds of 0.716) than students major in psychology to earn a bachelor's degree in three years. Students majoring in education were 2.481 times more likely to graduate than students majoring in psychology. Additionally, CCGPA was positively associated with degree completion. Students who performed better academically at the community college level were more likely (with odds of 2.770) to earn a bachelor's degree within three years of initial enrollment at the four-year university.

Further analysis of the model considered students who had not completed a degree within three years but were still enrolled at the university. The race category Black was positively associated with continued enrollment past three years. Black students were 1.782 more likely than white students to still be enrolled after three years.

Additionally, CCGPA was positively associated with continued enrollment past three years. Students who performed better academically at the community college level were more likely (with odds of 1.666) to still be enrolled at the four-year university past

Table 16

Coding Scheme for DegStatus Variable

Description	DegStatus	Frequency
Earned Degree in 3 years	2	1158
Still Enrolled, No Degree	1	111
Not Enrolled	0	625

Note: DegStatus=0 served as the reference category for the logistic regression model. Four observations were deleted due to missing values for the explanatory variable gender.

the third year. No other variables tested significant in the model for enrollment past year three.

Therefore, with regards to the research question, we conclude that there were no significant differences attributable to campus in the three-year rate of degree completion of A.A. transfer students who enroll in the various campuses of a multi-campus institution.

Question 4. What is the relationship between Community College GPA and University GPA, three-year rate of persistence/degree completion?

Pearson's Product Moment Correlation Coefficients are used when both variables are continuous (Community College GPA and University GPA). While a Point Biserial Correlation is used when one variable is continuous and the other is dichotomous (Community College GPA and persistence/degree completion).

Correlation is a measure of the relation between two or more variables. Correlation coefficients can range from -1.00 to +1.00. The value of -1.00 represents a perfect negative correlation while a value of +1.00 represents a perfect positive

Table 17

Maximum Likelihood Estimates for the Multinomial Logistic Regression Analysis

Parameter	DegStatus	DF	Estimate	Standard Error	Wald Chi-Square	Pr > ChiSq
Intercept	2	1	-2.3645	0.3813	38.4452	<.0001
Intercept	1	1	-3.1302	0.7460	17.6047	<.0001
CCGPA	2	1	1.0189	0.1209	71.0647	<.0001
CCGPA	1	1	0.5104	0.2355	4.6962	0.0302
BUS	2	1	-0.3344	0.1248	7.1750	0.0074
BUS	1	1	-0.1370	0.2402	0.3252	0.5685
EDU	2	1	0.9085	0.1863	23.7895	<.0001
EDU	1	1	-0.3549	0.4253	0.6966	0.4039
CampusB	2	1	0.0605	0.1664	0.1320	0.7163
CampusB	1	1	-0.2544	0.3695	0.4740	0.4911
CampusC	2	1	0.0380	0.1452	0.0687	0.7933
CampusC	1	1	0.1833	0.2739	0.4478	0.5034
CampusD	2	1	0.2921	0.1766	2.7372	0.0980
CampusD	1	1	0.2383	0.3534	0.4545	0.5002
Female	2	1	-0.2151	0.1178	3.3319	0.0679
Female	1	1	-0.0633	0.2304	0.0756	0.7834
RaceA	2	1	0.0758	0.2804	0.0732	0.7868
RaceA	1	1	-0.2983	0.6280	0.2256	0.6348
RaceB	2	1	0.1091	0.1732	0.3965	0.5289
RaceB	1	1	0.5777	0.2888	4.0009	0.0455
RaceH	2	1	0.2207	0.1667	1.7540	0.1854
RaceH	1	1	-0.2933	0.3797	0.5966	0.4399
RaceO	2	1	0.0667	0.2632	0.0642	0.7999
RaceO	1	1	-0.4302	0.6247	0.4741	0.4911

correlation. A value of 0.00 represents a lack of correlation or relationship. From the correlation values presented in Table 18, we conclude that all correlations are positive and all relationships are statistically significant at the 0.05 level of significance. Thus, when CCGPA increases, the value of UGPA also increases; and when the value of CCGPA increases, so do the chances of student persistence.

Summary

The objective of this chapter is to present the findings of the study and analyze the results using statistical techniques consistent with the research questions. This study examined if there are differences by campus in the retention, academic performance, and degree completion of community college transfer students at a four-year university.

For the first research question, the results indicate campus differences in the academic performance of students, as measured by University GPA. The variables CCGPA, Major, and Campus were significant contributors to the dependent variable, UGPA. Based on the multiple regression analysis, CCGPA was highly significant as a contributing factor for differences in UGPA. Secondly, business and psychology students earned significantly higher undergraduate GPAs compared to the reference group of psychology students. Finally, there were significant differences in the academic performance of students by campus. Specifically, students enrolled in regional campuses B and D earned higher grades than students enrolled at campus A, the reference group and main campus of the university.

The second research question tested whether there were differences by campus in the three-year rate of persistence for A.A. transfer students who enrolled in the various campuses of a multi-campus institution. Major and CCGPA were found to be statistically significant in the logistic regression analysis. The results indicate that there were no significant differences by campus in the three-year rate of persistence for

Table 18

Correlations Between GPA and Persistence

	CCGPA	UGPA	Persist
CCGPA	__	.47	.23
UGPA		__	.56
Persist			__

Note: All values are statistically significant at the 0.05 level of significance

A.A. transfer students who enroll in the various campuses of a multi-campus institution.

The third research question tested if there were differences by campus in the three-year rate of degree completion of A.A. transfer students who enroll in the various campuses of a multi-campus institution. The results indicated that the only independent variables CCGPA, BUS, EDU, and RaceB were statistically significant. Therefore, it can be concluded that there were no significant differences by campus in the three-year rate of degree completion for A.A. transfer students who enroll in the various campuses of a multi-campus institution.

The fourth research question assessed if there was a relationship between Community College GPA, University GPA, and the rate of persistence. All three variables exhibited a significant positive relationship. As CCGPA increases, UGPA increases. Likewise, decreases in CCGPA are mirrored by decreases in UGPA. In addition, increases in CCGPA are associated with increased changes of student persistence.

CHAPTER 5: FINDINGS, CONCLUSIONS, AND IMPLICATIONS

Introduction

One of the perplexing issues in American higher education is the continuing problem of student attrition despite the research attention this issue has received. Surprisingly, graduation rates have not improved substantially over time commensurate with the research attention this issue has received. Consistently, about half the students who begin post-secondary study at a four-year institution complete a baccalaureate degree. These low completion rates are of concern to multiple constituents including students, their families, educational institutions, governing boards, state and local governments, employers, and society.

Much of the research on student persistence has focused on the first year of college. This is not surprising, given the preponderance of evidence that suggests that most students who drop out of college do so in their first year of attendance. This has created a research gap in what we know about persistence in the years that follow the freshman year (Nora, Barlow, and Crisp, 2005).

Adding to the difficulty in studying the problem is the increasing frequency of student transfer. Much of the original research in student persistence was conducted at the institutional level. With the increase in multi-institution attendance patterns, researchers need to be more comprehensive in the design of their studies. Peter and Forrest Cataldi (2005) reported that nearly 60 percent of college graduates attended more than one institution prior to degree completion. Clearly researchers need to consider student transfer in the study of student persistence and degree completion.

These three conditions come together to form the context for this study. First, retention and degree completion continue to be important concerns for the various constituents of higher education. Secondly, transfer students, community colleges, and regional campuses play an increasingly important role in the postsecondary education system. Thirdly, there remains a gap in the retention research literature beyond the first year of college. Clearly there is a need to know more about the conditions that promote persistence and degree completion among transfer students.

This chapter contains a summary of the research problem and context, methodology, results and conclusions of the study, implications for practice, and recommendations for further research. This chapter summarizes the context of the problem being researched. It includes an overview of the research methods and population. It summarizes findings, suggests implications for practice, and recommendations for future research.

Problem Statement

This research explored if there were differences attributable to campus in various measures of student success. In particular, the researcher was interested in transfer students pursuing a bachelor's degree at a four-year university following the conferral of community college A.A. degree. Specifically, is there a difference in the academic performance, persistence, and degree completion for A.A. transfer students in selected majors who enrolled in the different campuses of a public research university? The study sought to answer four quantitative research questions.

1. Is there a difference by campus in the academic performance, as measured by University GPA, for A.A. transfer students who enroll in the various campuses of a multi-campus institution?

2. Is there a difference by campus in the three-year rate of persistence for A.A. transfer students who enroll in the various campuses of a multi-campus institution?
3. Is there a difference by campus in the three-year rate of degree completion of A.A. transfer students who enroll in the various campuses of a multi-campus institution?
4. What is the relationship between Community College GPA and University GPA, three-year rate of persistence, and three-year rate of degree completion?

Research Setting

The population for this study was a large urban public research university with multiple campuses. The sample was limited to transfer students enrolling after earning a Florida community college A.A. degree and declaring a major in business, psychology, or elementary education on one of the four campuses of the institution. In order to obtain an adequate sample size, the study included a cohort of students beginning in the fall semester of 2004, 2005, and 2006. This study analyzed historical student enrollment data on persistence, academic performance, and degree completion for transfer students from a large public university in the Southeast.

Campus A, the main campus for the university, has the largest enrollment with 29,913 undergraduate students. More than 39,000 undergraduate and graduate students attend classes on this large urban campus. The campus sits on more than 1,700 acres and its' 247 buildings include includes extensive health, medical, and academic facilities, residence halls, research facilities, as well as student services and recreational facilities. The original campus for the university was founded in 1956 to address the needs of a rapidly growing urban population. In 2008, the population of the

county was over 1.2 million and population of the city was just fewer 340,000 residents (Bureau of Economic and Business Research, 2009a). The per capita income for the area is $36,554 (Bureau of Economic and Business Research, 2009b). It is one of the three research-intensive public universities in the state of Florida. The university participates in intercollegiate sports as a member of the Big East Athletic Conference (Facts 2009-2010).

Campus B is an upper division regional campus with an undergraduate enrollment of 1,597. This campus is located on the border of two counties south of the main campus, in a vibrant area featuring several educational and cultural institutions and near Florida's beaches. Over 711,000 residents live in the two counties served by this campus. The city the campus is located in has a population of 55,174 (Bureau of Economic and Business Research, 2009a). The per capita income in the region is $48,255 (Bureau of Economic and Business Research, 2009b). The campus offers 44 bachelor's degree, master's degree, and certificate programs to those who have at least an associate's degree. There are 8 buildings on the 32-acre campus. The institution began offering classes in the area in 1974 and began sharing a campus with another public liberal arts institution the following year (Facts 2009-2010).

Campus C enrolls 3,373 lower and upper division undergraduates. The campus is located on a waterfront downtown district featuring many parks, shops, restaurants, art galleries, museums and performing arts and sports venues. The campus is located in a coastal community west of the main campus. Just fewer than one million people live in the county served by this campus. The city has a population of 251,459 (Bureau of Economic and Business Research, 2009a). The per capita income for the area is $42,546 (Bureau of Economic and Business Research, 2009b). There are 25 buildings on this 48-acre campus. There are numerous student life offerings including intramural

sports, student organizations/clubs and waterfront activities on the harbor. This campus was founded in 1965 and was the first regional campus established in the state (Facts 2009-2010).

Campus D is an upper division regional campus with an undergraduate enrollment of 1,068. It is located in central Florida approximately an hour's drive from the main campus. It is the most rural of the four campuses. The population of the county is 585,733. The city the campus is located in has a population of 93,508 (Bureau of Economic and Business Research, 2009a). The per capita income for the area is $31,329 (Bureau of Economic and Business Research, 2009b). The campus is located on 148 acres and has four buildings. Since 1988, this campus has been sharing space with the local community college. This partnership provides a seamless transfer to upper division programs for community college graduates. Emphasizing applied learning and research, the campus serves students in several inland counties. About 73% of the students are from the local county. Approximately 60% of the students attend part time. The average class size is 22. The campus offers 20 undergraduate, graduate and certificate programs (Facts 2009-2010).

Methodology

In a causal comparative (*ex post facto*) study, the independent variables are not manipulated. Instead, naturally occurring variations in the presumed independent and dependent variables are observed. These variables are selected on the basis of previous research and theory. Because they have shown to be consistently significant predictors, and because they are readily available from institutional enrollment data, the primary input variables of interest are community college GPA, gender, ethnicity, major field of study, and home campus.

This research used multiple regression, logistic regression, and correlation to analyze the data related to the research questions. In multiple and logistic regression the researcher can control for all the student input variables by including them in the regression model (Agresti, 2007; Pampel, 2000). Logistic regression is used when one has dichotomous dependent variables such as persistence. Multinomial logistic regression employed when degree completion was the dependent variable with three possible categories (graduated, did not graduate, still enrolled). Logistic and multinomial logistic regressions are the appropriate analytical tools for this study because they describe the relationship between a categorical dependent variable and a number of both interval and categorical independent variables (Agresti, 2007; Pampel, 2000).

This research used four research questions to determine if student academic performance, persistence, and degree completion varied by campus. A summary of the findings are presented in the next section.

Findings for Research Question One

The first research question focused on student academic performance. Is there a difference by campus in the academic performance, as measured by University GPA, for A.A. transfer students who enroll in the various campuses of a multi-campus institution?

Multiple regression was used to analyze the data in an effort to predict the significance of various student demographic variables, environmental factors, and previous GPA on future academic performance at the university. Several of the independent variables were significant ($p < .0001$). The analysis supported the research hypothesis. There were significant differences by campus. Campus A, the main campus of the university, was set as the reference group for the set of three campus variables. Students from two campuses, B and D, earned higher grades than students enrolled on campus A, while controlling for all other variables.

Other variables also tested significantly. Specifically, previous academic performance, as represented by CCGPA, was a significant predictor of UGPA, a measure of university-level academic performance. The independent variable CCGPA is numerically measured and has a positive value. Therefore, for this sample, the higher the value of CCGPA resulted in a higher value of the dependent variable UGPA. Additionally, there were significant differences by major field of study. Business students earned lower grades than psychology students and education students earned higher grades than psychology students. Interestingly, both education and business are limited access majors. Students need to have a 2.5 transfer GPA to be admitted to these programs when they transfer with an A.A. degree. Finally, females earned slightly lower grades than males in this sample as measured by UGPA.

As expected, these results for academic major mirror the correlation analysis which was reported in Chapter 4. The correlation analysis showed a positive relationship between CCGPA and Campus B and D, and a negative relationship between CCGPA and Campus A. The correlation analysis also showed significant associations between academic performance and major field of study. What can't be certain from the correlation is the meaning of such a relationship. One can't be certain if the differences one is observing in student grades are due to differences by campus or differences by major. An alternative hypothesis is that the differences the research is showing are really differences for major field of study. Since the proportion of business students enrolled is higher at Campus A (60.74%) than Campus B (48.79%) and Campus D (52.63), and business students have lower levels of student achievement as measured by UGPA, then one could conclude that the differences in achievement are due to major and not to campus.

The regression analysis reported here adds to the meaningfulness of the findings. For, when controlling for CCGPA and major, the research shows differences exist by campus. The researcher can hypothesize that these differences are due to real differences that exist by campus, or the existence of another variable that is associated with major and UGPA.

Therefore, this research showed that there were differences by campus in the academic performance, as measured by University GPA, for A.A. transfer students who enroll in the various campuses of a multi-campus institution. This is of interest given the strong evidence in prior research of the link between academic performance, persistence, and degree completion. Higher grades contribute positively and significantly to degree attainment (Adelman, 2006).

Findings for Research Question Two

The second research question focused on student persistence. Is there a difference by campus in the three-year rate of persistence for A.A. transfer students who enroll in the various campuses of a multi-campus institution?

Only the independent variables Major and CCGPA were found to be statistically significant having a p-value of less than the significance level of 0.05. Therefore, in regards to the research question, this research showed that there were no differences by campus in the three-year rate of persistence for A.A. transfer students who enrolled in the various campuses of a multi-campus institution.

The variable CCGPA was positively associated with student persistence. For every unit increase in CCGPA, students increased their odds of persistence by 2.626 times. The odds ratio indicates that as CCGPA increases so does the likelihood of persisting. Again, this mirrors previous findings, grades are positively associated with persistence (Adelman, 2006). In regards to major, education students are 2.308 times as

likely to graduate as psychology students. The odds ratio value of 0.732 signifies the degree to which business students are less likely to graduate than psychology students. Although previous researchers have reported that females are more likely to persist in college than males (Astin, 1975; Astin, Korn, and Green, 1987; Tinto, 1987) gender was not a significant predictor of persistence in this current study.

The descriptive analysis reported in Chapter 4 may lead some to conclude that campus differences exist in student persistence. Campus A had the lowest rate of student persistence (62.96%) and Campus D had the highest rate of student persistence (78.91%). Similar to the previous research question, one can't be certain if the differences one is observing in student persistence are due to differences by campus or differences by major. An alternative hypothesis is that the differences the research is showing are really differences for major field of study. Since the proportion of business students enrolled is higher at Campus A (60.74%) than Campus B (48.79%) and Campus D (52.63), and business students have lower rates of student persistence, one could conclude that the differences in persistence are due to major rather than campus. Likewise, the proportion of education students enrolled by campus varies greatly. The research sample included a lower proportion of education students in Campus A (9.19%) compared to Campus B (26.21%) and Campus D (55.44%). In addition, the persistence rate for education majors (85.49%) was higher than the rate for business students (59.46%).

The logistic regression adds meaningful findings that are not evident from simply observing frequency counts, proportions, and correlation coefficients. By entering all of the relevant independent variables into the model, including major and campus, the logistic analysis yielded no significant differences by campus. The researcher can then

infer the strong possibility that the differences in student persistence that the research showed are really differences that can be attributed to major, rather than campus.

Findings for Research Question Three

The third research question focused on student degree completion. Is there a difference by campus in the three-year rate of degree completion of A.A. transfer students who enroll in the various campuses of a multi-campus institution?

Just as in second research question, logistic regression was used to analyze Research Question 3. However, since the dependent variable has more than two values, multinomial logistic regression was used. With regard to the parameter estimates of the model, it can be seen from CCGPA, BUS, EDU, and RaceB were the only independent variables that were significant as indicated by a p value <.05. RaceB is an indicator variable designating Black students. Therefore, with regards to the research question, this research showed that there were no significant differences attributable to campus in the three-year rate of degree completion of A.A. transfer students who enrolled in the various campuses of a multi-campus institution.

Three of the variables were significant in regards to students who earned a bachelor's degree in three years. Students majoring in business were less likely (odds of 0.716) than students major in psychology to earn a bachelor's degree in three years. Students majoring in education were 2.481 times more likely to graduate than students majoring in psychology. Additionally, CCGPA was positively associated with degree completion. Students who performed better academically at the community college level were more likely (with odds of 2.770) to earn a bachelor's degree within three years of initial enrollment at the four-year university. Adelman (2005) reported a similar relationship between grades and degree attainment.

Further analysis of the model considered the class of students who had not completed a degree within three years but were still enrolled at the university. The race category Black was positively associated with continued enrollment past three years. Black students were 1.782 more likely than white students to still be enrolled after three years. Additionally, CCGPA was positively associated with continued enrollment past three years. Students who performed better academically at the community college level were more likely (with odds of 1.666) to still be enrolled at the four-year university past the third year. No other variables tested significant in the model for enrollment past year three.

Continued enrollment beyond the third year can be considered a positive and negative result. Continued enrollment is seen as a positive result, as compared to dropout. However, continued enrollment could also indicate an increase in time to degree. Students who prolong their college enrollment without earning a degree may experience increased tuition costs and delayed entry into the job market. Either case represents a cost to the student.

As in the previous two research questions, the descriptive analysis indicated the possibility of a significant relationship between campus and degree completion. Students enrolled in Campus A had a significant negative relationship with the degree completion variable. Additionally, students enrolled in Campus D had a significant positive relationship with degree completion. However, student differences in degree completion were also noted for academic major. Education students (83.16%) had the highest three-year rate of graduation, followed by psychology (61.21%), and then business (52.65%). Psychology students (61.21%) had almost an identical three-year graduation rate as the overall sample (61.17%). Just as with student persistence, the proportional differences in major by campus are creating a false impression of student completion by campus. The

logistic regression model, which simultaneously considers the impact of campus and major, showed no significant differences in degree completion by campus. The logistic regression analysis provides a fuller picture of the results. The ability to consider relevant variables simultaneously allows the researcher to make more informed choices about the results. As with persistence, one can infer the strong possibility that the differences in student persistence that the research showed are really differences that can be attributed to major, rather than campus.

Findings for Research Question Four

The fourth research question explored the relationships between previous academic performance, future academic performance, persistence, and degree attainment. What is the relationship between Community College GPA, University GPA, three-year rate of persistence, and three-year rate of degree completion?

CCGPA had a significant ($p < 05$) and positive relationship with UGPA (.47) and persistence (.23). Thus, when CCGPA increases, the value of UGPA also increased; and when the value of CCGPA increased, so did the chances of student persistence. These associations have been supported in the literature. Previous academic performance is typically a strong predictor of future academic performance. Also, academic performance is often associated with higher persistence and graduation rates (Pascarella & Terenzini, 2005; Astin & Oseguera, 2005b; Astin, 2005, 1993).

Implications for Practice

The findings of this research study suggest that institutions should assess the impact of major field of study on student success. Specifically, institutional leaders should assess how academic major promotes or hinders student academic performance, persistence, and degree completion. Tinto (1975, 1987, & 1993) has suggested that the academic integration of students in the university community can impact student

retention. University leaders should assess how the academic setting impacts student success. Campus administrators are encouraged to assess how academic programs promote or impede student academic performance. For example, do academic programs exclusively offered by cohort model, lead to better persistence and degree completion? The common program and classroom experience inherent in a cohort model may lead to higher academic integration, which Tinto (1993) theorized was related to higher persistence and degree completion.

Assessment efforts should also focus on formal and informal conditions that promote of hinder social integration of the student in the institution. The smaller campuses provide access to some of the more popular academic programs of the university but do not typically provide local access to all the academic programs offered by the institution. Furthermore, these smaller campuses typically have less comprehensive student support services. Interestingly, it is possible that these smaller campuses provide more support services informally at the academic department level. Support may be delivered by formal and informal interactions with program faculty and departmental support staff, rather than through centralized student services. Thus, it could be that academic programs, their faculty, instructional settings, and scholarly and social settings, play a much larger role than the physical campus setting as it relates to persistence and degree completion.

Institutions should assess how campus environment supports or hinders student success. Previous research has reported on institutional characteristics that are related to persistence and degree completion. For example, studies have examined retention by type of institution: private or public, two-year or four-year, residential or commuter. Researchers have reported degree attainment differences for students enrolled in two-year and four-year institutions (Brint & Karabel, 1989; Clark, 1960; Dougherty, 1992;

Pascarella & Terenzini, 2005). Other researchers report that size of institution (Astin, 1993) and selectivity (Adelman, 1999; Pascarella & Terenzini, 2005) are related to degree completion. On average, private institutions have higher retention and graduation rates than public institutions (Horn and Berger, 2004). Though, no significant campus differences were identified in this study relative to persistence and degree completion, significant differences by campus were reported for student academic performance. Given the strong correlation between student academic performance and persistence and degree completion, it reasons to continue assessment efforts which focus on campus conditions that promote student success.

Recommendations for Future Research

Realizing the limitations that are inherent in single institution studies, future researchers are encouraged to replicate this study with a multiple institution sample. Such a study could lead to greater generalizability of findings. State-level student data may be available for such research to occur. An important characteristic of statewide data is that it follows the student, not the institution. It would be interesting to conduct this study using statewide postsecondary student data. There are several universities that have multiple campuses. In addition, community colleges play an important starting point for many post secondary students. Obtain a larger sample size so that experimental control can be used to isolate analysis of one major on multiple campuses. How do our education students perform and complete system-wide. Why do business students complete at a higher rate on a particular campus. McCormick and Carroll (1997) and Adelman (1999 & 2005) used transcript analysis to assess trends in transfer, student achievement, persistence, and degree completion. These studies identified attendance patterns that were significantly associated with student success.

The results of this study indicate the possibility that major field of study has a stronger role in student persistence and degree completion than campus location. Tinto (1997) and Tinto and Russo (1994) reported that active learning strategies and learning communities promoted student persistence and degree completion. Future research efforts can focus on identifying the conditions related to academic field of study that promote or hinder student persistence and degree attainment. Research designs should consider the instructional environment, student characteristics by program area, academic rigor in the curriculum, and interaction with faculty. Researchers should study the various aspects of academic major which contribute to increases in persistence and degree completion.

Community college academic performance proved an important independent variable related to college GPA, persistence, and degree completion. It would be interesting to add some sort of assessment of curricular rigor. It may be that the rigor of courses that students take, in addition to the grades they earn, is related to student success. In his analysis of student transcripts, Adelman (1999, 2005) reported a strong link between the rigor of high school curriculum and student persistence at the bachelor's degree level. In particular, he noted that curricular rigor in science and math was positively associated to bachelor's degree attainment. It would be interesting to assess if curricular rigor continues to be of importance at the community college level. Does the rigor of the curriculum which students encounter at the community college promote student success at the university following student transfer? If so, universities and state higher education leaders may want to reconsider the science and math requirements for A.A. degree students expecting to transfer to a four-year university. Future researchers should explore the relationship of community college curriculum to university persistence and degree completion.

In Chapter 2, it was noted that there is a gap in the retention literature on student persistence beyond the first year. This study focused on student persistence at the upper division university following transfer upon completion of the associate's degree from a Florida community college. Community colleges have become an important and increasingly popular entry point for postsecondary education in Florida. Because of this, continued research should focus on the transfer role of community colleges and transfer student performance at the university level.

Summary

This study explored whether there were campus differences related to various measures of student success. In particular, the researcher was interested in A.A. transfer students pursuing a bachelor's degree at a public research university. The three measures of student success were academic performance, persistence, and degree completion. Significant differences were noted in student GPA by campus while controlling for all other independent variables in the study. However, no campus differences were detected in persistence and degree completion. Important findings were reported regarding a student's academic program. Major field of study was significantly related to all three dependent variables: undergraduate GPA, three-year rate of persistence, and three-year rate of degree completion.

The research literature provided an important theoretical backdrop for this study. One of the most cited comprehensive retention theories was developed and subsequently revised by Tinto (1975, 1987, & 1993). The student integration model explains a student's social and academic integration with the institution and takes into consideration student's pre-enrollment characteristics. The model predicts retention based on a student's initial and continuing commitment to the institution. Tinto identified important predictors of student retention. Significant variables/constructs were a

student's initial and ongoing commitment to an institution, degree aspirations, and academic and social integration with the institution. According to his theory, greater levels of academic and social integration led to greater institutional commitment and retention (Tinto, 1975, 1987, & 1993).

Numerous studies have focused on the pre-matriculation characteristics of students and their relationship to persistence and graduation. These variables have included measures of academic background of students such as high school curriculum, high school grades, and standardized tests scores, and the demographic variables of ethnicity, social-economic status, parental educational attainment, age, and gender (Astin, 1993; Astin, 1997; Astin & Oseguera, 2005a; Astin & Oseguera, 2005b; Carter, 2001; Horn and Berger, 2004, Pascarella & Terenzini, 1991; Tinto, 1993).

Student persistence and degree attainment is also influenced by student experiences within the context of the institution. A student's interaction with other students, faculty, and staff plays a role in retention. Measures of social integration focus on the formal and informal student interaction with faculty and peers. Researchers report significant findings relative to informal and semiformal interaction with peers (Astin, 1993; Eaton and Bean, 1995; Pascarella & Terenzini, 1991) and formal and informal faculty contact (Pascarella & Terenzini, 2005).

Retention studies have also researched the importance of the student's academic experience in the college environment. Influences researched have included classroom experiences, instructional methods, academic climate, college curriculum, and grades. Many researchers have found academic performance to be strongly correlated with persistence. Astin reported that a student's involvement or amount of energy expended in academic pursuits was related to persistence (Astin, 1984). Several attendance patterns are related to retention and graduation including stopout (Carroll,

1989; Horn, 1998) and transfer (Cabrera, Burkum & La Nasa, 2005; McCormick and Carroll, 1997). Peter and Forrest Cataldi (2005) reported that 59 percent of the 2001 college graduates in their national sample attended more than one institution prior to degree completion and that transfer negatively impacted degree completion. Curriculum and major are related to persistence (Adelman, 1998). Active learning strategies and learning communities promote retention and degree completion (Tinto, 1997; Tinto & Russo, 1994).

This current study found support for the importance of prior academic achievement on future academic performance. There has been consistent and fairly strong association between prior grades as a predictor of future grades. This research study reported a significant and positive relationship between community college GPA and subsequent measures of academic performance, persistence, and degree completion.

A surprising finding of this study was the significant relationship that exists between academic major and academic performance, persistence, and degree completion. The aim of this study was to ascertain if campus was related to these measures. Instead, significant findings related to major and not to campus. The campus differences that were observed in the descriptive statistics were not significant when analyzed statistically. Instead, significant differences were observed relative to major field of study and the three dependent variables of interest, namely, academic performance, persistence, and degree completion. Though initially proposed nearly two decades ago, Astin's (1991) Input-Environment-Outcome model was helpful in providing an assessment framework for this study. The model, coupled with regression analysis, allowed the researcher to simultaneously consider several input and environmental variables, both numerical and categorical, and assess their impact the dependent

variables of interest. While home campus was the independent variable of focus in this study, major field of study emerged as a significant influence on student success. This research design allowed the researcher to control student input differences, estimate the effects of college experiences and environments, and compare against student outputs.

One has to be careful in retrospective studies with regard to research conclusions. There is always a risk of misclassifying independent and dependent variables. There is also the risk of including irrelevant variables because they are readily available and of excluding relevant variables because they are difficult to obtain. Therefore, the recommendations mentioned in this chapter are tentative in nature. Nevertheless, statistical tools such as logistic regression analysis, coupled with Astin's (1991) Input-Environment-Outcome model, has yielded some thought-provoking insights related to transfer student success that can improve institutional practice and further inform the future focus of higher education research.

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