AN EXPLORATION OF THE EFFECTS OF STUDENT CHARACTERISTICS AND ENGAGEMENT PRACTICES ON ACADEMIC SUCCESS FOR LOW-INCOME COLLEGE STUDENTS

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ABSTRACT

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This study explored the academic success of low-income students in relation to engagement variables to determine an engagement model best suited for low-income students. Specifically, Astin’s Input-Environment-Outcome (I-E-O) model was used to investigate the differences among the stated variables. The input variables for this study were gender, student of color status, income level, first-generation status, and high school GPA. The environmental variables were comprised of the five benchmarks from the National Survey for Student Engagement (NSSE) and two campus variables specific to Bowling Green State University (participation in a residential learning community and a first-year course). The outcome variable for this study was academic success. The sample was 349 first-year students who had completed the Free Application for Federal Student Aid and the NSSE instrument in 2000, 2001, or 2003.

To address the research questions t-tests, chi-squares, correlations, and a path analysis were conducted. The results indicated that the differences in the input variable of student of color status were significantly related to the environmental variables of enriching educational experiences and participation in a first-year course. The input variable of high school GPA was related to the environmental variable of active and collaborative learning, and the outcome variable of academic success. The input variable of first-generation status was related to the environmental variable of participation in a residential learning community. The environmental variable of supportive campus environments was related to the outcome variable of academic success. Finally, the adjusted model created by these results was tested but demonstrated an
overall poor fit to explain academic success. Based on the input and environmental variables tested, this data set did not explain academic success at Bowling Green State University.

This research does not support previous literature findings that indicated low-income students, students of color, and first-generation students struggle with academic success. Consideration of this phenomenon is discussed along with specific implications for Bowling Green State University. Broader policy recommendations are presented in relation to the retention and graduation of low-income students.
I dedicate this dissertation to those who believe that
higher education is a right, and not a privilege
and who fight to ensure that all students
have the opportunity to pursue a college degree
by working tirelessly to make the system more open and accessible.

May each of you find joy in knowing that
you are helping students make their dreams a reality.
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CHAPTER I: INTRODUCTION AND STATEMENT OF THE PROBLEM

Statement of the Problem

On April 7, 2006 *The Chronicle of Higher Education* reported on the growing gap between rich and poor college students in the United States’ system of higher education. In 1987 58% of bachelor’s degrees were granted to students in the top family income quartile; this number rose to 71% in 2004, while students from the bottom family income quartile rose from 5% to 10% in the same time period (Selingo & Brainard, 2006). The article’s authors attributed this to increasing tuition costs coupled with decreasing state support which has “discouraged the college plans of many students on the lowest rungs of the economic ladder” (Selingo & Brainard, 2006, p. A1). Currently, in the United States, the economic gap between the rich and the poor is growing wider and this fact is reflected in higher education as well.

A growing share of our country’s future adults are today low income and minorities. Their ability to afford higher education will have a great deal to say about how prosperous, how safe, how unified we are as a country in future decades. (Mortenson, 2006a, p. 16)

The fundamental issue for higher education can be summarized into three points: (a) the rate of higher education attainment has become more unequal since 1980; (b) minority and low-income students are being driven toward community colleges and struggle to graduate; and (c) college participation rates have become flat since the early 1990s (Kahlenberg, 2004; Mortenson, 2007a).

Increased access to higher education for low-income students occurred during the latter half of the 20th century through financial aid policies specifically aimed toward increasing enrollment. “During the 2003-04 academic year undergraduate students faced $31.9 billion in
unmet financial need, 86 percent of which was from the bottom half of the parental income distribution” (Mortenson, 2006a, p. 2). The Pell Grant, a federal financial aid program, has long been viewed as the means of helping low-income students meet the expenses associated with attending college. However, the Pell Grant has failed to keep pace with inflation since 2002 (Baum, 2007) and its overall economic benefit has diminished over time. In 1985 the Pell Grant covered almost 60% of tuition and costs at a public four-year institution. This number decreased to 33% in the 2005-06 academic year (Newman & Che, 2007). In the early months of 2007 the federal government pledged to raise the Pell Grant allotment, but to fund this increase unfortunately sacrifices other programs geared toward low-income students. Specifically, the Supplemental Educational Opportunity Grant (SEOG) program would be eliminated (Brainard, 2007). The SEOG is used to augment grants for low-income students and its loss would not equal the proposed increase in Pell Grant awards.

In addition to changes in the Pell Grant allotment, overall financial aid packaging continues to shift and fails to benefit low-income students.

Average student-aid packages for the top quartile of families, ranked by income, more than tripled from 1990 to 2004, growing by $4,555 after adjusting for inflation. But for families in the bottom quartile, the packages rose by just 55 percent, or $3,328. At the same time, average unmet financial need for families in the bottom quartile — with incomes of less than $34,000 — grew by 80 percent, to $5,527. Unmet need was effectively zero for the top quartile, in which families earned more than $95,007 in 2004. (Selingo & Brainard, 2006, p. A1)

Furthermore, significant budget cuts are occurring at the state level resulting in detrimental repercussions for low-income students. Historically, state and local governments
have been the primary funding source for higher education but these funds continue to diminish and the financial burden is now placed on students and their families. For fiscal year 2007 states appropriated $72.2 billion dollars toward higher education. The average state appropriation for higher education was $7.08 per $1000 in personal income (Mortenson, 2007a).

This study examined a single institution in the state of Ohio where budget cuts have been even more pronounced. For fiscal year 2007 the state of Ohio ranked 39th in state allocations for higher education with an appropriation of $5.96 per $1000 in personal income. Furthermore, since 1980 Ohio has seen a decline in state appropriations of $1.53 per $1000 of personal income with the largest decline beginning with fiscal year 2000. Since 2000, Ohio has cut its appropriations by $1.05 per $1000 in personal income (Mortenson, 2007a). Overall, these decreases in funding have resulted in an “affordability crisis limited almost entirely to students from families in the bottom half of the parental income distribution, below $62,240” (Mortenson, 2006a, p. 2). In fact, the annual state report card on higher education (Measuring Up) gave the state of Ohio an ‘F’ for affordability (National Center for Public Policy and Higher Education, 2006).

Low-income students continue to struggle within the academy and their success in college is dramatically at-risk compared to higher income peers (Kahlenberg, 2004; Mortenson, 2006c). Recently, Sacks (2007) reported that graduation rates, by the age of 24 for low-income students, have remained stagnant at 6% over a 22-year period. The share of all 18 to 24-year-olds enrolled in college in 2004-05 was 38.9%. But the proportion of 18 to 24-year-old students from low income families enrolled in college was a 25.4%, or 13.5% less than the population rate (Mortenson, 2007b). Low-income students enroll at about two-thirds the rate of
all 18 to 24-year-olds in higher education (Mortenson, 2007b) and their graduation rates continue to lag behind higher income peers (Kahlenberg, 2004).

Significance of the Study

The low income population represents a growing share of our country’s future workers and producers, taxpayers, citizens, voters, consumers and parents. How well this population is higher educated today will have a great deal to say about our country’s future social, civic and economic welfare and security.

(Mortenson, 2007b, p. 1)

Our future as a nation depends on how well we educate all of our population. In January 2007 the Policy Evaluation and Research Center for the Educational Testing Service released a report titled *America’s Perfect Storm: Three Forces Changing Our Nation’s Future*. This report’s title does not exaggerate the implications for our future and attributed this to the growing illiteracy and innumeracy rates, changes in the world’s economy, and the expected population growth in the next 25 years (Kirsch, Braun, Yamamoto, & Sum, 2007). These same concepts were the premise for the formation of the Commission on Higher Education by the United States Secretary of Education, Margaret Spellings. In its final report, *A Test of Leadership: Charting the Future of US Higher Education*, the commission articulated a concern about the growing influence of global competitiveness and the need for intellectual capital. The report set forth the primary areas of concern as (a) access as determined by cost and affordability, and financial aid; (b) learning; and (c) transparency and accountability (US Department of Education, 2006). Despite the ongoing debate about the recommendations set forth by the Commission, this group has identified a problem in the academy. “Where once the United States led the world in educational attainment, recent data from the Organization of Economic Cooperation and
Development [OECD] indicate that our nation is now ranked 12th among major industrialized countries in higher education attainment” (US Department of Education, 2006, p. ix). The OECD released its report, *Education at a Glance: OECD Indicators*, in September 2006. While the United States remains first in its overall educated population, the gap between the number of students who enter college and eventually graduate continues to grow. The OECD report projected this decline to increase over the next 10 years from a 41% degree attainment rate to 36% (Woo, 2006). This led the Commission to question the practices of US colleges and universities considering the significant financial resources allocated toward higher education.

In the Fall of 2005 over 17 million students participated in some form of higher education (Almanac Issue, 2007b). To support these endeavors over $152 billion were allocated in some form of federal, state, or institutional financial aid (Almanac Issue, 2007a). With such a large economic investment the measure of success is often articulated in economic terms. Yet the benefits of higher education extend beyond simple economic terms. The second update to *Education Pays 2004: The Benefits of Higher Education for Individuals and Society* reported that “earning a college degree leads to higher levels of voting, volunteering, and other civic behaviors, as well as improved health outcomes observed among individuals with a college education” (College Board, 2006a, p. 1). In addition, this report demonstrated a “direct budgetary correlation between higher taxes paid and lower public subsidies received by individuals who have continued their education beyond high school” (p. 1). Attending college is directly tied to increases in socio-economic status (Pascarella & Terenzini, 2005). As this country has moved into a human capital economy, living standards have begun to reflect educational attainment (Mortenson, 2007b).
The literature related to low-income students can be categorized into access and persistence studies. College access refers to the ability of a student to pursue postsecondary education (Garcia, 2002). Access studies have focused on prior academic achievement (Gladieux & Swail, 1998), enrollment trends (Boulard, 2004), and financial resources (Berkner & Chavez, 1997; The Pell Institute, 2004). These studies have shown that low-income students (56%) are less likely to participate in higher education compared to equally qualified higher income students (86%) (Baum, 2007; Berkner & Chavez, 1997; Choy, 1999; Haycock, 2006; US Department of Education, 2006).

College persistence studies have examined degree attainment across income groups and consistently shown a significant gap between low and high income students. Seventy-five percent of students in the top income quartile earn a bachelor’s degree as compared to only 9% of low-income students (Mortenson, 2006b). Because low-income students are more likely to attend community colleges (Davies & Guppy, 1997), a majority of persistence studies examine this phenomenon without explaining why the transfer to a four-year institution fails to occur.

These bodies of research have helped us understand the barriers and benefits of degree attainment for low-income students. However, a clear gap exists in the literature as it relates to retaining low-income students. Very few studies have examined the experience of low-income students or methods for increasing their retention. A significant body of literature exists on what is important to student retention, but few studies have examined this issue in relation to low-income students.
Research Questions and Definitions

Research Questions

This study explored the academic success of low-income students in relation to engagement variables to determine an engagement model best suited for low-income students. The following research questions examined a variety of variables to establish the tested model:

1. What statistically significant differences exist in academic success based on gender, student of color status, income level, first-generation status, and high school GPA?
2. What statistically significant differences exist in the engagement benchmarks based on gender, student of color status, income level, first-generation status, and high school GPA?
3. What statistically significant differences exist in academic success based on the engagement benchmarks?
4. Which engagement model best describes the causal effects among the variables of income level and academic success?
5. What are the estimated direct, indirect, and total casual effects among the variables?

Definitions

The following definitions were stipulated:

- The 2007 eligibility requirements for the federal TRIO program were used to determine low-income status.
- Academic success was defined as graduation or continued enrollment at Bowling Green State University. This definition was derived from the fact it takes the average student at Bowling Green State University 4.5 years to graduate. The data used in this study included examining NSSE data completed in 2003 and thus continued enrollment was
defined as successful in light of this average graduation rate. It should be noted, the U.S. Department of Education uses a 6 year time frame to measure academic success (Retrieved on March 1, 2008 from http://www.ed.gov/about/offices/list/ope/policy.html).

- Seven engagement benchmarks were used and defined as the five items measured by the National Survey for Student Engagement (NSSE): (a) level of academic challenge; (b) academic and collaborative learning; (c) student-faculty interaction; (d) enriching educational experiences; and (e) supportive campus environments, and two Bowling Green State University specific variables: (f) participation in a residential learning community; and (g) participation in a first-year course.

- Engagement model was defined as the sequence of benchmarks students should have engaged in based on the results of the statistical testing.

Conceptual Framework and Method Overview

To help frame this research study Astin’s Input-Environment-Outcome (I-E-O) model was used as the overarching conceptual framework. The I-E-O model addresses the complexities of research in higher education by highlighting the interdependence between the individual and the environment. Inputs and outputs relate to the individual and are examined at two different points through the understanding of environmental influences (Astin, 1993a). For the purpose of this study the input variables were gender, student of color status, income status, first-generation status, and high school GPA. The outcome variable was academic success as previously defined. The environmental variables included student engagement as enumerated by the NSSE benchmarks, participation in a residential learning community, and participation in a first-year course.
Institutional data gathered by NSSE from Bowling Green State University (BGSU) was used. BGSU is located in a rural town in Ohio. Undergraduate enrollment for the fall of 2005 was approximately 16,500 students with an average retention rate of 76%. BGSU students are predominately in-state residents and approximately 40% are first-generation college students. A series of statistical analyses were conducted to examine the research questions and the corresponding results add to the current literature on low-income students. Recommendations for increasing the retention and degree attainment of low-income students are provided.
CHAPTER II: REVIEW OF LITERATURE

Introduction

Student success, student persistence, and student retention are three research areas that are growing at exponential rates in higher education under the umbrella of college impact studies (Pascarella, 2006). Understanding what contributes to student success has grown into a research area that encompasses specific groups of students, specific types of institutions, and specific best practices used on various campuses. All of this information is vital in understanding how students learn and what contributes to their overall academic success. To help frame this research study Astin’s Input-Environment-Outcome (I-E-O) model was used to examine academic success.

Astin’s Input-Environment-Outcome Model

Astin’s Input-Environment-Outcome (I-E-O) model addresses the complexities of research in higher education by highlighting the interdependence between inputs, environments, and outputs. Inputs and outputs relate to the individual and through the model they are examined at two different points in time. The role and influence of the environment becomes the vehicle by which changes are identified and explained (Astin, 1993a). Astin believed natural experiments were enhanced by the I-E-O model because of its focus on realistic experiences versus artificially created experimental environments. Furthermore, Astin (1993a) asserted that natural experiments allow the researcher to examine multiple effects simultaneously. These advantages are hindered by the lack of random assignment to educational environments and present a significant design trade-off. Despite this design trade-off, the I-E-O model is an assessment tool that allows researchers to examine phenomena holistically.
Student Input Characteristics

Astin (1993a) defined inputs as the characteristics inherent to a student and are most commonly demographic descriptors or personal qualities present at the time of enrollment. These qualities are categorized into fixed attributes and characteristics that change over time. This study examined five student input characteristics (gender, student of color status, income status, first-generation status, high school GPA). Specifically, the attribute of income status is the primary focus of this dissertation.

Gender

In the general population, ages 20-29, men represent 51% of the population while women represent about 49% (Mortenson, 2007c). College enrollment figures for the 18-to-24-year-old age group indicate that women are the majority of college students and earn bachelor’s degrees at significantly higher rates than men (Kuh et al., 2007; Mortenson, 2007c). This trend has been growing since the late 1950s and in the subsequent 50 years, participation in college by women has grown 29% compared to only an 8% gain for men during the same time period (Mortenson, 2003). Since 1982 men have continually earned fewer degrees than women and this difference continues to grow. In 2004-05, men earned 42.6% of bachelor’s degrees as compared to women who earned 57.4% (Mortenson, 2007c). Higher education has provided significant gains for access and graduation of women while the rate of degree attainment has declined for men.

In addition to variance in degree attainment the effects of college vary slightly by gender. Pascarella and Terenzini (2005) reported that during college women develop more cognitive skills than men, gender had no significant influence on identity development but women gained more in self-esteem than men, and social attitudes change at about the same rate for both men and women. The gender differences in degree attainment and benefits of college are a result of
higher high school graduation rates for women that are manifested through higher high school grades, higher standardized test scores, and increased participation in college preparatory work (Kuh et al., 2007). Finally, gender imbalances in bachelor’s degree attainment were more pronounced when examined by race/ethnicity with Black males receiving 33.7%, Hispanic males receiving 39.1%, Asian/Pacific Islander males receiving 45.0%, and American Indian/Alaskan Native males receiving 40.2% of bachelor’s degrees within each specific racial/ethnic group (Mortenson, 2007c).

**Student of Color Status**

Underrepresented populations have lower odds of completing high school and enrolling in college (Carter & Wilson, 1997; Social Science Research Council Project, 2005). Between 1990 and 2000 the college readiness gap by race remained constant (Braswell et al., 2001) and only 21% of African American high school graduates, and 33% of Hispanic high school graduates had college-level reading skills (American College Testing Program, 2006). Degree completion rates vary greatly by student of color status. For those students between the ages of 25 and 29 who started college, 53.4% of White students, 35.8% of Black students, 75.9% of Asian students, and 34.1% of Hispanic students had completed a bachelor’s degree by 2005 (Mortenson, 2006b).

College outcomes studies have revealed that students of color do better and gain more cognitive skills in cooperative learning environments (Pascarella & Terenzini, 2005). Students of color have greater self-esteem gains and openness to diversity than their White peers. Campus environments that support diversity help to facilitate learning for students of color. Finally, African American students who participate in living-learning communities are more likely to persist compared to other racial groups (Pascarella & Terenzini, 2005).
First-Generation Status

A first-generation college student is defined as a student who comes from a family where neither parent has attended postsecondary education (Kuh et al., 2007). These students represent approximately one out of three college students (National Survey of Student Engagement, 2005b). First-generation college students are predominately women, disproportionately from underrepresented racial/ethnic groups (Nunez & Cuccaro-Alamin, 1998), and come from families with lower incomes (National Survey of Student Engagement, 2005b). First-generation students are less prepared for college, have less knowledge of how to navigate the complex environment (Kuh et al., 2007), and are less likely to transfer from community college to a four-year institution (Bailey et al., 2005).

Educational aspirations of first-generation students and parental support are significant influences on persistence (Bank, Slavings, & Biddle, 1990). Other persistence factors include the type of financial aid the student receives, and student perceptions of academic rigor (Kuh et al., 2007). First-generation status had a negative effect on degree completion (Kuh et al., 2007; Pascarella & Terenzini, 2005), and first-generation students were more likely to delay enrollment, attend community colleges, attend part-time while working full-time, and live off campus (Kuh et al., 2007).

For those students who do enroll and persist, first generation students derived “greater benefits than other students in internal locus of attribution for academic success including coursework in various areas, academic effort, and extracurricular involvement” (Pascarella & Terenzini, 2005, p. 625). First-generation students had greater benefits in learning and general cognitive development from full-time enrollment but the number of hours worked and doing
volunteer work had negative effects on academic success for first-generation college students (Pascarella & Terenzini, 2005).

**High School Grade Point Average (GPA)**

Hundred of studies have documented the fact that high school GPA is an important predictor of a student’s college grades, persistence, and graduation (Adelman, 2004; Astin, 1993b; Geiser & Santellices, 2007; Gladieux & Swail, 1998; Pascarella & Terenzini, 2005). High school students who complete rigorous college preparatory courses including four years of math, science, and English have an 87% graduation rate compared to a 62% graduation rate for students without such coursework (Kuh et al., 2007). Rigorous college preparatory coursework is not equally distributed, and students of color and low-income students have varying degrees of academic success despite their high school GPA (Geiser & Santelices, 2007; Kuh et al., 2007). This is attributed to a lack of course offerings in poor, urban school districts where these students are more highly concentrated (Hoffman, Llagas, & Snyder, 2003).

**Income Status**

To fully examine the impact of income status on academic success, college access and persistence literature were reviewed. Before examining this literature more fully, it is important to understand how access to higher education has evolved in American higher education for its poorest students. A brief review of the historical influences on access to higher education helps to frame the on-going struggle for low-income students in American colleges and universities in the United States.

Is public higher education a right or a privilege? This question has been debated throughout the evolution of higher education in the United States and has been influenced by the social and political movements most affecting the country at the time. The colonial colleges were
significant to the evolution of higher education in the United States. Originally, colleges were established with the goal of creating educated clergy and leaders (Brubacher & Rudy, 1997; Cohen, 1998; Rudolph, 1990). Specifically, the colonies needed educated clergy and leaders to help create order (Rudolph, 1990). Thus, the colonial colleges had a narrow purpose and did not consider educating the masses and this resulted in the perpetuation of higher education as a privilege.

The Morrill Acts of 1862 and 1890 helped shift the nation’s philosophy and moved the country toward viewing public higher education as more of a right rather than a privilege. Passed during the Civil War, the first Morrill Act permitted every state to select 30,000 acres of federal land per its number of congressmen. It specified that that the funds from the sale of the land were to be used to endow at least one college where its leading objective would be to teach agricultural and mechanical arts. This act officially created land-grant colleges and was the beginning of a major expansion in public higher education (Brubacher & Rudy, 1997; Cohen, 1998; Rudolph, 1990; Thelin, 2004). The second Morrill Act provided appropriations that resulted in the creation of the historically black colleges and universities because it stipulated that no appropriations could go to states that denied admission to college on the grounds of race, unless there were separate but equal facilities available to those students (Brubacher & Rudy, 1997; Cohen, 1998; Rudolph, 1990; Thelin, 2004). With the passage of the Morrill Acts the expansion of higher education accelerated; simultaneously, the federal government turned its attention to other matters (WWI, the Great Depression, WWII) and did not initiate significant changes in higher education for almost 60 years.

The Serviceman’s Readjustment Act of 1944 ushered in the era of mass higher education in the United States (Cohen, 1998). Passed by Congress to avoid significant unemployment at the
conclusion of WWII, this act provided the following benefits for veterans: a year of unemployment insurance, medical care, counseling services, tuition, books, and living expenses while attending any educational program (Brubacher & Rudy, 1997; Cohen, 1998; Rudolph, 1990; Thelin, 2004). Each veteran was entitled to one year of schooling as a full-time student plus an additional month for each month served in the armed forces (Cohen, 1998).

The National Defense Education Act (NDEA) was passed by Congress in 1958 in response to the launching of Sputnik. In addition to funding for science research, NDEA established low interest loans for qualified students. This was the first piece of legislation to provide funding, at the federal level, directly to students. Today, the NDEA loan is known as the Perkins loan (Murray, 1994).

In 1965 the Higher Education Act (HEA) was passed and the organized federal financial aid system was created. The HEA authorized programs and activities that fall into four main categories: (a) student financial aid; (b) support services to help students complete high school and enter and succeed in postsecondary education; (c) aid to strengthen institutions; and (d) aid to improve K-12 teacher training at postsecondary institutions (Archibald, 2002). The HEA and its subsequent reauthorizations have had a profound effect on the “massification” of higher education by removing financial barriers for millions of students via governmental influence (Cohen, 1998).

These pieces of legislation set the foundation for a higher education system intended for open access.

Originally, federal financial aid policies were meant to focus on the problems of the poor for a very simple reason. Because college offers potential financial rewards to individuals
who have the opportunity to attend, and because a relatively small proportion (one-quarter) of Americans have four-year degrees, publicly supported financial aid was justified mainly as a way to encourage students who would not otherwise be able to attend. (Khalenberg, 2004, pp. 3-4)

However, today higher education remains a privilege that most low-income students cannot obtain. Boulard (2004) asserted that income is the most important factor in determining college access. Enrollment trends continue to be the best indicator that low-income students cannot gain access to higher education because of cost. In a recent study released by The Pell Institute (2004), low-income students were less likely to participate in college. Only 50% of college qualified low-income students enter a four-year institution as compared to over 80% of equally qualified students from high-income families (Berkner & Chavez, 1997). Enrollment and pricing are directly linked and the 2006 *Trends in College Pricing* reported a 35% increase in tuition since 2001-02 for students attending in-state, four-year colleges. This was the largest increase in tuition within the past 30 years (College Board, 2006b).

Shrinking state budgets and increases in student aid to middle and upper-income families have also had a detrimental effect on state financial aid to low-income students (Baum, 2007; Haycock, 2006). At the state level, 18-to-24-year-old low-income students in Ohio are three times less likely to attend college versus high-income students. Ohio has one of the largest enrollment gaps based on income status in the nation (National Center for Public Policy in Higher Education, 2006).

While low-income students continue to receive a large part of institutional aid, the overall ratio of aid has actually declined resulting in the biggest increases in financial aid for affluent families. Enrollment demands and competitiveness have also altered institutional methods of
Financial aid has been one of the largest public policies to impact higher education by increasing access and college attendance. However, these policies have not eliminated many income barriers for low-income students (Alexander, 2001). Gaining access to higher education is just one factor impeding low-income students from obtaining a college degree. Matriculating these students is an equally formidable problem.

Academic success is influenced by prior academic achievement, high school course sequence, family and cultural attitudes, and student motivation (Gladieux & Swail, 1998). Since 1980, the rate of educational attainment by income group has grown more unequally distributed (Mortenson, 2006c). Seventy-five percent of students in the top income quartile earn a bachelor’s degree by the age of 24 as compared to only 9% of low-income students (Mortenson, 2006c). Persistence of low-income students is directly related to their initial enrollment at two-year community colleges (Kahlenberg, 2004). Low-income students are more likely to attend community colleges because of their low cost and convenience (Davies & Guppy, 1997). Almost half of all college bound low-income students will enroll at a two-year community college as compared to one in ten high-income students (Kahlenberg, 2004). Despite the more affordable tuition, and convenient locations, low-income students are more likely to drop-out of college before completing their degree. “[L]ess than one-tenth of community college students ultimately receive a bachelor’s degree” (Kahlenberg, 2004, p. 2). Furthermore, only 6% of students from the poorest quartile earn a bachelor’s degree within five years as compared to 41% from the richest quartile (Kahlenberg, 2004).
Davies and Guppy (1997) asserted that students from disadvantaged origins have lower probabilities of survival in advanced stages of the education system. The United States is generally much more successful at getting students into college than graduating them – less than half who enroll in a higher education program receive a degree in that program – and the college dropout problem is particularly prevalent for students from poorer backgrounds. (Kahlenberg, 2004, p. 7)

Very few studies have examined why this phenomenon occurs, but some suggest that low-income students are more likely to struggle with assimilating into the culture of higher education. “The variety of institutions, programs, and degrees has created an elaborate system of selection and ports of entry requiring a certain savior faire from students” (Davies & Guppy, 1997, p. 1420). Students must learn how the system operates and such knowledge is related to socioeconomic background (Davies & Guppy, 1997). Yorke and Longden (2004) asserted that cultural capital is vital to a successful transition from high school to college. Low-income students are at a disadvantage with this cultural capital as compared to their wealthier peers who often have family members who have earned a college degree (Yorke & Longden, 2004).

Environment Characteristics

“In the broadest sense, the environment encompasses everything that happens to a student during the course of an educational program that might conceivably influence the outcomes under consideration” (Astin, 1993a, p. 81). Astin identified two types of environmental measures: characteristics of the total institution, and particular educational experiences within an institution. The goal of the National Survey on Student Engagement (NSSE) is to measure the environmental practices central to student success to assist individual institutions in improving student learning (National Survey on Student Engagement, 2005).
NSSE is the result of research conducted by Robert Pace (1979) on student effort and perception. Pace concluded that increased student engagement in the collegiate environment results in larger learning gains. From his research the College Student Experiences Questionnaire (CSEQ) was developed to measure satisfaction, persistence, and the quality of effort students expend utilizing campus resources and learning opportunities (Retrieved from http://cseq.iub.edu/cseq_generalinfo.cfm on December 1, 2007, ¶ 1-2). Subsequent research has demonstrated that involvement in educationally purposeful activities results in the desired outcomes of college including better grades, higher satisfaction, and greater persistence (Kuh, n.d.). These concepts are central to NSSE and have resulted in five benchmarks for educational practice: (a) level of academic challenge; (b) active and collaborative learning; (c) student-faculty interaction; (d) enriching educational experiences; and (e) supportive campus environment.

The first NSSE benchmark is the level of academic challenge and encompasses the quality of work students are engaged with in the classroom. The level of academic challenge includes three components: nature and amount of assigned work, complexity of cognitive tasks, and evaluation standards used by faculty (Kuh et al., 2005). This is accomplished by institutions promoting high student achievement via classroom expectations that promote effort and performance (Kuh et al., 2005).

The second NSSE benchmark is active and collaborative learning and assesses the intensity level by which students are engaged in their education and are able to make practical applications of their learning. This is demonstrated via active participation in classroom settings, working with groups on class projects, tutoring or teaching other students, community-based projects, and discussing readings and course material with others (Kuh et al., 2005). Astin
(1993b) asserted the importance of active learning as a positive influence on student learning and can be accomplished in a variety of formats.

Third, the NSSE measures the amount of student interaction, both formally and informally, with faculty members. These opportunities help students learn key skills from experts that can be applied to all facets of their learning (Kuh et al., 2005). Astin (1993b) reported faculty represent the second most powerful group, next to their peers, in a student’s development. Finally, Pascarella and Terenzini (2005) confirmed that student and faculty interaction is positively correlated to student persistence and educational attainment.

Enriching educational experiences is the fourth NSSE benchmark and reflects the quality of the curricular and co-curricular opportunities available for students that complement their academic experience (Kuh et al., 2005). These are manifested via diversity programming, involvement opportunities, leadership development, technology, internships, community service, and capstone courses.

The level of support a student receives on campus is the fifth NSSE benchmark. Students who were satisfied with the relationships they form on campus were more likely to persist and were more committed to their academic success (Kuh et al., 2005). Yorke and Longden (2004) found similar results in their retention study involving six UK universities. Specifically, students were more likely to persist when they perceived the institution to be supportive both academically and socially. This benchmark is especially important when working with first-generation college students and students of color whose perception of campus climate directly affects their persistence (Pascarella & Terenzini, 2005).

Residential learning communities are a growing phenomenon that encompasses a plethora of variations dependent on the specific campus. Traditionally, learning communities
involve scheduling groups of students, normally who live in the same residence hall, into courses linked by theme or content (Pascarella & Terenzini, 2005). Tinto and Russo (1994) found that participation in a learning community was statistically significant to persistence into the second semester for first-year students. However, very few studies have examined the overall effect of learning communities on student graduation rates (Pascarella & Terenzini, 2005).

At the heart of the learning community concept is the practice of collaborative and connected learning (Pascarella & Terenzini, 2005). Research on the cooperative learning nature of learning communities suggests that these environments provide academic and social engagement and success through the integration of the curricular and co-curricular experience, and the development of peer relationships (Johnson & Smith, 1998a). Student self-reports indicated that learning communities increased problem-solving skills, reading ability, and writing ability (Walker, 2002). Furthermore, students who participated in a learning community reported higher general education gains through participation in a variety of on-campus involvement and peer interactions (Pike, 1999a).

First-year courses were first developed in 1972 by James Gardner at the University of South Carolina as a method of increasing academic performance and retention. In the past 35 years the idea of first-year courses has grown and taken a variety of shapes depending on the specific institution. Most of the literature on the success of these courses has focused on first-to second-year persistence indicating that participation in a first-year course increased retention rates into the second year of college (Pascarella & Terenzini, 2005). Strumpf and Hunt (1993) found that two years after taking a first-year course those students were more likely to have stayed in school. Furthermore, persistence rates were consistent across student characteristics; students benefited regardless of their gender, student of color status, age, major, residence, and
at-risk factors (Pascarella & Terenzini, 2005). Students who participated in first-year courses reported being more academically challenged, participating in higher levels of active and collaborative learning activities, interacting more with faculty, perceiving their campus environments as supportive, gaining more from their first year of college, making greater use of campus services (Kuh et al., 2007), being more active in extracurricular activities, having higher levels of positive self-perceptions, and being more satisfied with the college experience (Pascarella & Terenzini, 2005).

**Outcome Characteristics**

“Outcomes are the desired aims and objectives of the educational program…” (Astin, 1993a, p. 38). Astin (1993a) classified outcomes as either cognitive or affective in nature. As previously defined, the output characteristic for this study was academic success as measured by graduation or continued enrollment.

Ishitani and DesJardins (2002) examined the causes for student dropout via longitudinal data from the National Center for Educational Statistics; specifically, the Beginning Postsecondary Student Longitudinal Study: Second Follow-up. Several contributing variables, including income status, were examined. The researchers used a time-varying model to determine the “time-varying effects of the explanatory and time-dependent variables” (Ishitani & DesJardins, 2002, p. 16). They focused on the timing of student departure and revealed that low-income students are more likely to depart college compared to their higher income peers, and the third year of college is when the greatest departure risk exists. However, it should be noted that no explanation is provided by the researchers as to why this phenomenon occurs. Other variables examined included educational aspiration, mother’s educational attainment, academic performance, institutional type, financial aid, and academic and social integration. The
researchers made no correlations between these variables and thus it is unclear why the third year of college resulted in high dropout rates for low-income students. While this information is important for enrollment managers, Ishitani and DesJardins (2002) defined student departure as it related to the institution of initial enrollment. This definition did account for student transfer patterns and a majority of low-income students begin their academic careers at two-year community colleges. (Kahlenberg, 2004) Thus, the longitudinal data used do not track enrollment patterns of students and do not account for the difference between dropout and eventual graduation from another college or university.

In 2001 the Institute for Higher Education Policy funded a study of student success for low-income and minority students at four-year institutions in New England. O’Brien and Shedd (2001) used three methods of data collection (pre-existing national data, telephone survey, and telephone interview) to investigate three research questions:

1. How do low-income and minority students pay for college and deal with the array of academic and personal choices and challenges that they face?

2. What are the barriers to success that these students face in terms of financing options, academic support, and feeling connected to their institutions?

3. What helps these students persist to a degree? (p. 13)

Four primary areas that affect low-income students were identified: “pre-college preparation; financial aid; involvement at and/or feeling connected to their institutions; and attendance patterns” (O’Brien & Shedd, 2001, p. 23). These findings were consistent with the concepts of academic and social integration in Tinto’s (1993) theory on student departure. This study examined student departure in a one-dimensional fashion. Results were presented for each of the
identified areas of concern but this study failed to address the potential interaction of these variables on student attrition, or discuss how these four factors can be used to enhance retention.

Understanding the experiences of low-income students is important to understanding their low retention and graduation rates. Giblin (2004) studied the socio-cultural factors that affect academic success and retention using a three-phase qualitative research method. In phase one, she examined institutional documents, conducted archival research, reviewed university access and retention data, and conducted interviews with university staff to better understand the documents reviewed in phase one.

Phase two consisted of examining journal entries from a sub-set of students enrolled in a university study skills class. Thirty-one students were chosen randomly, seven of whom did not meet the researcher’s criteria. These journal entries pertained to students’ adjustment to college, their university experience, and any related academic concerns and issues. The researcher examined these journals for common themes related to cultural models impacting the students’ education and behavior.

Phase three encompassed one-on-one interviews with six participants; four from the aforementioned study skills course and two from a previous pilot study. Of the six participants, all were first-generation college students but only two met the researcher’s definition of low-income. The findings from this study are presented below within each phase of the study:

**Phase One**

1. Students who are not proficient in traditional essayist models of composition are at a disadvantage.

2. The campus support program that targets low-income and first-generation students has limited effect.
3. Campus retention initiatives focus on student satisfaction rather than on student success.

Phase Two

1. Financial need did not correlate with academic failure as strongly as first-generation standing.
2. Working class cultural models negatively impacted student retention.
3. Under-preparedness and unrealistic expectations negatively impact student retention and success.
4. Apprenticing in the discourses of the academy is essential for success.

Phase Three

1. Working class students are aware of their social class status in the academy.
2. Performance is linked to the body [self-efficacy].
3. Faculty non-recognition of beginner status is essential.
4. Working class students must be bi-cultural. (Giblin, 2004, pp. 187-203)

This study revealed information about the experience of first-generation and low-income students that can result in better retention efforts. However, as previously mentioned, only two of the participants in phase three were considered low-income. The recommendations presented by Giblin would be enhanced if they were examined on a larger scale to determine their overall applicability.

Lobo (2001) conducted a qualitative study to identify structures that disempowered and marginalized first-generation, low-income students. Five participants were chosen based on their participation in the Student Support Services program, a part of the federally funded TRIO program geared toward assisting first-generation and low-income students. Interviews were
conducted with each participant and transcripts were member-checked. In addition to the interviews, participants were asked to create an autobiography (Lobo, 2001). These documents were triangulated with the interviews and the following themes were identified:

1. Creating conditions for learning. Differences between academic culture and the participant’s culture.
   a. Lack of preparation and perceived options.
   b. Lack of community.
   c. Inappropriate support.
   d. Inability of faculty and staff to work with diverse populations.

2. Silencing the voice and spirit
   a. Lack of safety.
   b. Loss of voice and sense of self.

3. Resilience, persistence, and hope.
   a. The importance of support.
   b. Understanding the importance of education in their lives.
   c. The imperative to share their knowledge.

Lobo’s results were similar to the NSSE benchmarks and reflect the importance of engaging low-income students in their academic success. However, she failed to provide a model that can comprehensively assist institutions with their retention of low-income students.

Conclusion

The literature reviewed in this chapter demonstrates how the research on low-income students is segmented into two separate areas: those studies related to how students get to college
and those studies that examine their departure. This information is crucial but what remains unknown is how to translate it into models that will help retain and graduate low-income students. Experts agree that engagement is important to academic success, but what engagement benchmarks are important to low-income students’ academic success? Furthermore, which engagement model best describes academic success for low-income students?
CHAPTER III: METHOD

Introduction

The design used in this study is described in this chapter. A brief review and description of the instrumentation and data collection procedures is presented followed by participant demographics. The validity and reliability of the NSSE instrument is discussed followed by a review of the major variables via Astin’s I-E-O model. The chapter concludes with the method used for each specific research question.

Data Sources and Instrumentation

Two data sources were utilized for this study: the National Survey for Student Engagement (NSSE) and institutional data from Bowling Green State University. The NSSE is administered by the Indiana University Center for Postsecondary Research to students at colleges and universities in a consortium that varies from year to year. The NSSE is a 100-item survey that “asks students to report the frequency with which they engage in dozens of activities that represent good educational practice…” (Kuh, n.d., p. 2). The survey is administered to freshmen and seniors who are randomly selected by the participating institution and contacted by NSSE. Students can take the survey via the web or complete a paper survey. Results are compiled into five national benchmark scores to which institutions can compare their mean scores. A copy of the 2005 NSSE instrument, The College Student Report, can be found in the appendix.

Overall, NSSE examines the quality of undergraduate education by measuring student behaviors and institutional factors common to student learning and success (National Survey of Student Engagement Viewpoint, 2005). These factors are consolidated into the NSSE benchmarks: level of academic challenge, active and collaborative learning, student-faculty
interaction, enriching educational experiences, and supportive campus environments (National Survey of Student Engagement, 2005b).

The NSSE assesses these benchmarks through a variety of questions scored on a traditional Likert scale. The number of questions and Likert scale responses vary amongst the five benchmarks. A copy of the 2005 NSSE instrument can be found in the appendix. Eleven survey questions are used to determine the level of academic challenge. The national mean average for the level of academic challenge is 52.6%. Seven survey questions are used to determine active and collaborative learning. The national mean average is 42.4%. Six survey questions are used to determine the level of student and faculty interaction with a national mean average of 34%. Twelve questions are used to assess the level of enriching educational experiences with a national mean average of 27.8%. Finally, 6 survey questions address the level of supportive campus environment with a national mean average of 60.1% (National Survey of Student Engagement, 2005a).

The second data source was participant information gathered by Bowling Green State University. Students who completed the NSSE survey were asked to provide their student identification number. This number was cross-referenced with financial aid information gathered by the Free Application for Federal Student Aid (FAFSA) to determine students’ income status. First-generation status, participation in a residential learning community and first-year course, and academic success, as measured by graduation or continued enrollment at Bowling Green State University, were gathered from institutional enrollment records.

Participants

Bowling Green State University participated in the NSSE study in 2000, 2001, 2003, 2005, and 2007. For the purpose of this study only freshman participants who took the survey in
2000, 2001, and 2003 were examined. The total sample population was 899 first-year students. The gender and race/ethnicity breakdown of participants from these survey administrations is listed in Table 1.

Validity and Reliability

The value of quantitative research is predicated on the ability to draw inferences from data and make generalizations from the results. This process is dependent on the quality of the data source(s) and is determined by reliability and validity. Reliability refers to the consistent measurement of scores over repeated administrations of an instrument. Reliable data are mostly free from measurement error and are consistent over time (Creswell, 2002). To determine the reliability of the NSSE instrument the researchers used a three step method that combined empirical analysis and theory (Kuh, n.d.). “Initially we conducted principal component analyses with oblique rotations. Then theory was employed to crystallize the item groupings into their respective groups. Finally, a randomly sampled population was used” (Kuh, n.d., p. 5). Cronbach's alpha is an important measure of reliability because it indicates the extent to which a set of test items estimates generalizability. Cronbach alpha levels of .7 or above indicate a good measure of internal consistency and enhance an instrument’s reliability (Creswell, 2002). Cronbach alpha levels for the 2005 NSSE were reported for the combined populations of first-year and senior students, in each of the five benchmark areas: (a) academic challenge (.75); (b) active and collaborative learning (.67); (c) student-faculty interaction (.75); (d) enriching educational experiences (.66); and (e) supportive campus environments (.77) (National Survey of Student Engagement, 2006).
Table 1

Demographic Characteristics of Participants

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>n</th>
<th>%</th>
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</thead>
<tbody>
<tr>
<td>Gender</td>
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<td></td>
</tr>
<tr>
<td>Male</td>
<td>288</td>
<td>32%</td>
</tr>
<tr>
<td>Female</td>
<td>610</td>
<td>68%</td>
</tr>
<tr>
<td>Race/Ethnicity</td>
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<td></td>
</tr>
<tr>
<td>Native American</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>African-American/Black</td>
<td>90</td>
<td>10%</td>
</tr>
<tr>
<td>Asian American/Pacific Islander</td>
<td>4</td>
<td>.004%</td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>770</td>
<td>86%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>24</td>
<td>3%</td>
</tr>
<tr>
<td>Multiracial</td>
<td>0</td>
<td>0%</td>
</tr>
<tr>
<td>Other</td>
<td>7</td>
<td>.007%</td>
</tr>
</tbody>
</table>

To ensure the validity of the NSSE instrument, researchers paid careful attention to the construction of the survey to ensure content validity. Content validity measures “how well the questions represent all of the possibilities of questions available” (Creswell, 2002, p. 183). Over time the NSSE survey has proven to be valid as demonstrated through a normal distribution and consistent patterns of responses (Kuh, n.d.).

The NSSE survey uses student self-reports to determine the quality of undergraduate education. The credibility of self-reports has been researched and proven to be an effective assessment method (Pace, 1985; Pike, 1995). Self-reports can be affected by a student’s lack of knowledge (Wentland & Smith, 1993) or unwillingness to respond truthfully (Aaker, Kumar, &
Day, 1998). The NSSE survey was designed to meet the five criteria (Bradburn & Sudman, 1988; Converse & Presser, 1989; DeNisi & Shaw, 1977; Hansford & Hattie, 1982; Laing, Swayer & Noble 1989; Lowman & Williams, 1987; Pace, 1985; Pike, 1995) for valid self-reporting:

1. when the information requested is known to the respondents;
2. the questions are phrased clearly and unambiguously;
3. the questions refer to recent activities;
4. the respondents think the questions merit a serious and thoughtful response;
5. answering the questions does not threaten, embarrass, or violate the privacy of the respondent or encourage the respondent to respond in socially desirable ways. (Kuh, n.d., p. 4)

To meet these criteria the NSSE survey was administered to randomly selected first-year and senior students enrolled in the previous term. The survey was administered in the spring term and asked participants to reflect on their experience over the past six months. “To eliminate the variability in week-to-week fluctuations, students report the number of hours spent in each of six activities during a typical week, which also allows an accuracy check on the total number of hours students report” (Kuh, n.d. p. 4).

Finally, a majority of survey items in the NSSE instrument have been assessed in other long-standing surveys including the Cooperative Institutional Research Program (Astin, 1993b; Sax, Astin, Korn, & Mahoney, 1997) and the College Student Experiences Questionnaire Research Program (Kuh, Vesper, Connolly, & Pace, 1997). Over time these surveys have proven to measure what they are intended to measure.
Major Variables

Input Variables

Astin (1993a) defined inputs as personal characteristics that are either fixed or change over time. This study examined five input variables: gender, student of color status, income status, first-generation status, and high school GPA. A key to successfully using Astin’s I-E-O model is controlling for student inputs to avoid unrelated interactions on the outcome and environment variables. Furthermore, controlling for inputs minimizes errors in assessing the environmental effects on the outcomes being studied.

Gender was defined as male and female and was coded as a bivariate variable. Gender information was gathered from student self-reports as gathered by NSSE. Student of color status was coded using two groups: White students and non-White students. Student of color status was determined from student self-reports as gathered by NSSE.

To determine low-income status the 2007 eligibility requirements for the federal TRIO program were used as seen in Table 2.

The term "low-income individual" means an individual whose family's taxable income for the preceding year did not exceed 150 percent of the poverty level amount. The figures shown under family income represent amounts equal to 150 percent of the family income levels established by the Census Bureau for determining poverty status…The poverty guidelines were published by the U.S. Department of Health and Human Services in the Federal Register, Vol. 72, No. 15, January 24, 2007, pp. 3147-3148. (Retrieved on March 2, 2007 from http://www.ed.gov/about/offices/list/ope/trio/incomelevels.html, ¶ 2-3)
Table 2

2007 Federal Trio Program Eligibility Requirements

<table>
<thead>
<tr>
<th>Size of Family Unit</th>
<th>Income Level for 48 Contiguous States</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>$15,315</td>
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<tr>
<td>2</td>
<td>$20,535</td>
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<td>3</td>
<td>$25,755</td>
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<td>7</td>
<td>$46,635</td>
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<tr>
<td>8</td>
<td>$51,855</td>
</tr>
</tbody>
</table>

This information was gathered from institutional records as reported on the Free Application for Federal Student Aid (FAFSA) for the 2006-2007 academic year. Participants were coded as either low or non low-income per the stipulated definition.

First-generation status was coded as a bivariate variable and the status was determined per the guidelines of Bowling Green State University. A student who had neither parent pursue any form of higher education was coded as a first-generation college student. Finally, high school GPA was coded as a continuous variable and was determined by institutional records as reported from high school transcripts.

*Environmental Variables*

Astin (1993a) identified two types of environmental measures: characteristics of the total institution and particular educational experiences within an institution. The goal of the National
Survey on Student Engagement (NSSE) is to measure the outcomes central to academic success to assist individual institutions in improving student learning (Kuh, n.d.). To achieve this goal NSSE identifies five benchmarks for educational practice. Individual scores for each participant on each of the five benchmarks were examined.

In addition, two environmental variables specific to Bowling Green State University (BGSU) were examined to assess environmental influences on academic success. Since BGSU is noted for its reputation with successful residential learning communities and first-year programs, these two variables were examined independently. Participation in these programs was coded bivariately. These seven engagement benchmarks served as the environmental variables and were central to the model proposed in this study

*Outcome Variable*

Astin (1993a) classified outcomes as either cognitive or affective in nature. As previously defined, the output characteristic for this study was academic success, as measured by graduation or continued enrollment at Bowling Green State University, and was coded bivariately. On average, it takes students at Bowling Green State University 4.5 years to graduate. Thus, students who had not graduated and were enrolled for the spring or summer term in 2007 were coded as academically successful.

Research Questions and Analysis

*Research Question #1*

What significant differences exist in academic success based on gender, student of color status, income level, first-generation status, and high school GPA?

To examine this research question, chi-squares were conducted on the independent variables of gender, student of color status, income level, and first-generation status and the
dependent variable of academic success. A *t*-test was conducted on the independent variable of high school GPA and the dependent variable of academic success.

The chi-square test is used to assess the statistical significance of the relationship between categorical variables by measuring “the difference between the observed counts and corresponding expected counts” (Utts & Heckard, 2002, p. 530. The *t*-test is used to compare the means of groups and determine if they are statistically different by examining if the variables are related (Creswell, 2002).

Research Question #2

What significant differences exist in engagement benchmarks based on gender, student of color status, income level, first-generation status, and high school GPA?

To address this research question *t*-tests were conducted with the independent variables (gender, student of color status, income level, and first-generation status) and each individual NSSE engagement benchmark served as the dependent variable. The engagement benchmarks of residential learning communities and first-year courses were assessed with chi-squares using the same independent variables. In addition, a *t*-test was conducted between the engagement variables of participation in a residential learning community or first-year course and the continuous variable of high school GPA. A correlation was conducted between the variable of high school GPA serving as the independent variable and the NSSE engagement benchmarks as the dependent variables.

Correlation measures the mutually shared relationship between two continuous variables (Coughlin, 2005). Relationships are based on the strength and direction between the variables. The strength of a correlation is determined by its magnitude and its direction is either positive or negative, ranging from +1 to -1 (Utts & Heckland, 2004).
Research Question #3

What significant differences exist in academic success based on the engagement benchmarks?

Each engagement benchmark served as an independent variable and the variable of academic success was the dependent variable. The continuous engagement benchmarks of the NSSE were assessed using $t$-tests. The engagement benchmarks of residential learning communities and first-year courses were assessed using chi-squares.

Research Questions #4 and #5

Which engagement model best describes the causal effects among the variables of income level and academic success? What are the estimated direct, indirect, and total causal effects among the variables?

To address these research questions a path analysis was conducted. Path analysis is a type of causal modeling that determines intercorrelations among variables based on the researcher’s theory of relationships (Coughlin, 2005; Mertler & Vanatta, 2005; Schumacker & Lomax, 2004). Path analysis is grounded in multiple regression which provides estimates of the magnitude and significance of hypothesized causal connections between sets of variables (Coughlin, 2005; Mertler & Vanatta, 2005; Schumacker & Lomax, 2004). All the relationships in the path diagram must be capable of being tested by straightforward multiple regression which determines cause-and-effect relationships (Coughlin, 2005; Mertler & Vanatta, 2005). Thus, path analysis allows the researcher to use multiple predictor variables to test effects within a group of variables (Coughlin, 2005; Schumacker & Lomax, 2004) based on “hypothesized relationships specified by theory” (Wolfe, 1985, p. 381). A path diagram is then developed by the researcher to represent the model being tested.
The path diagram displays the observed variables and the proposed relationships between the variables. Observed variables are those variables that are observed or measured by the researcher. These variables are displayed in squares on the path diagram and arrows display the relationship between the variables. (Coughlin, 2005, p.170)

Using path analysis requires a change in variable identification. Dependent variables are known as endogenous variables because these are the variables the path model is attempting to predict or explain (Coughlin, 2005). In a path diagram, arrows are used to identify endogenous variables. Conversely, independent variables are known as exogenous variables and the path model does not attempt to predict or explain these variables but instead they serve as predictors (Coughlin, 2005).

Because path analysis is an extension of multiple regression, the associated assumptions of multiple regression must be met (Coughlin, 2005; Mertler & Vanatta, 2005) with the following additional assumptions:

1. The model must accurately reflect the causal sequence.
2. The structural equation for each endogenous variable includes all variables that are direct causes of that particular endogenous variable.
3. There is a one-way causal flow in the model.
4. The relationships among variables are assumed to be linear, additive, and causal in nature.
5. All exogenous variables are measured without error. (Mertler, & Vanatta, 2005, p. 205)

Assessing the assumptions for path analysis differs greatly and involves no statistical method or empirical test. Because model specification is so important to path analysis it is important to focus on model credibility, reasonableness, and utility. To help determine these criteria it is
recommended that the model be plausible, the model results be consistent with the current research, and the model should be predictive (Mertler & Vanatta, 2005).

There are three concepts central to path analysis: sample size, error, and direct and indirect effects. Path analysis is subject to issues of validity if the sample size is too small. Most require a minimum of 200 to 300 cases. However, for a more accurate method of determining sample size it is suggested that the researcher use five to ten observations per variable (Coughlin, 2005).

Error is especially important in path analysis because it allows the researcher to account for variation not reflected in the model (Knight & Coperthwaite, 2000). “As is the case in any prediction model, errors in prediction exist. The errors in prediction are normally indicated on the path diagram as circles that contain an “e” as they are estimates of the errors in predication and not observed variables” (Coughlin, 2005, p. 171).

Because of its predictive utility path analysis identifies direct, indirect, and total effects within the specified model. “Direct effects are those parameters or coefficients that estimate the ‘direct’ influence one variable has on another” (Coughlin, 2005, p. 171). “The indirect effects are those influences that a variable has on an endogenous variable that are mediated through other variables in the model (Coughlin, 2005, p. 174). Total effects are simply the sum of the direct and indirect effects (Knight & Coperthwaite, 2000). The only effects represented on the path diagram are the direct effects.

Finally, the key in interpreting the result of a path analysis is determining if the model reflects the observed data (Coughlin, 2005; Hu & Bentler, 1995; Schumacker & Lomax, 2004). Path models with good fit are supported by the sample data. Conversely, path models with poor fit are not supported by the sample data (Schumacker & Lomax, 2004). The fit of a model is
determined by goodness-of-fit indices. The traditional goodness-of-fit measure is the chi-square ($\chi^2$) goodness-of-fit statistic which “assesses the magnitude of discrepancy between the sample and fitted covariance matrices, and it is the product of the sample size minus one and the minimum fitting function” (Hu & Bentler, 2000, p. 2). To determine goodness-of-fit it is recommended that the ratio of the $\chi^2$ statistic to the degrees of freedom be lower than 5:1 (Knight & Coperthwaite, 2000).

The $\chi^2$ statistic is sensitive to sample size and should not be the sole determinant of model fit (Hu & Bentler, 1995). The additional indices used in this study included the Root Mean Squared Error of Approximation, the Comparative Fit Index, and the Tucker-Lewis Index. These indices suggest that a model has good fit if the index has a value greater than 0.90 (Hu & Bentler, 1999; Knight & Coperthwaite, 2000).

The results for each of the five previously described research questions are presented in the subsequent chapter.
CHAPTER IV: RESULTS

This chapter reports the findings of this study in the sequence of the five research questions. First, what significant differences exist in academic success based on gender, student of color status, income level, first generation status, and high school GPA? Second, what significant differences exist in engagement benchmarks based on gender, student of color status, income level, first-generation status, and high school GPA? Third, what significant differences exist in academic success based on the engagement benchmarks? Fourth, which engagement model best describes the causal effects among the variables of income level and academic success? Finally, what are the estimated direct, indirect, and total casual effects among the variables?

Derivation and Description of the Sample

Two data sources were utilized for this study: the National Survey for Student Engagement (NSSE) administered in 2000, 2001, and 2003 at Bowling Green State University, and student information as gathered by Bowling Green State University. Students who completed the NSSE survey were asked to provide their student identification number. This number was cross-referenced with financial aid information as gathered by the Free Application for Federal Student Aid (FAFSA) to determine the student’s income status. Academic success as measured by graduation, or continued enrollment, was gathered from institutional enrollment records. Based on these criteria 349 records out of 899 were eligible for data analysis. The considerable decrease in records was attributed to students either not providing a student identification number when completing the NSSE, or not completing the FAFSA. Demographic information for this sample is presented in Table 3. The percentage of first-generation college students (35.2%) in the sample was similar to the overall population. Women students were
overrepresented in the sample (72.8%) and students of color were underrepresented (8.3%) compared to the overall student population at Bowling Green State University.

The data were screened for missing information and outliers using frequency distributions, histograms, and box plots. They were also screened for normality (skewness and kurtosis), linearity (residuals), and homoscedasticity (Levene’s test). No unusual patterns were identified and thus no data transformations were necessary.

Table 3

Demographic Characteristics of Sample (N = 349)

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Sample</th>
<th></th>
<th>Fall 2003 Population</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>%</td>
<td></td>
</tr>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>95</td>
<td>27.2</td>
<td>41.7</td>
</tr>
<tr>
<td>Female</td>
<td>254</td>
<td>72.8</td>
<td>58.3</td>
</tr>
<tr>
<td>Students of Color</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>310</td>
<td>88.8</td>
<td>85.4</td>
</tr>
<tr>
<td>Non-white</td>
<td>28</td>
<td>8.3</td>
<td>14.6</td>
</tr>
<tr>
<td>First-Generation Status</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-generation</td>
<td>123</td>
<td>35.2</td>
<td>39.3</td>
</tr>
<tr>
<td>Non first-generation</td>
<td>213</td>
<td>61.0</td>
<td>60.7</td>
</tr>
<tr>
<td>Low-Income</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Low-income</td>
<td>77</td>
<td>22.1</td>
<td>Unavailable</td>
</tr>
<tr>
<td>Non low-income</td>
<td>269</td>
<td>77.1</td>
<td>Unavailable</td>
</tr>
</tbody>
</table>
Table 4 lists frequency distributions for the remaining variables: high school GPA, active and collaborative learning, supportive campus environments, student and faculty interaction, enriching educational experiences, academic challenge, first-year course participation, residential learning community participation, and academic success.

Table 4

Frequency Distributions (N = 349)

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School GPA</td>
<td>346</td>
<td>99.1</td>
</tr>
<tr>
<td>Active and Collaborative Learning</td>
<td>349</td>
<td>100</td>
</tr>
<tr>
<td>Supportive Campus Environments</td>
<td>349</td>
<td>100</td>
</tr>
<tr>
<td>Student and Faculty Interaction</td>
<td>349</td>
<td>100</td>
</tr>
<tr>
<td>Enriching Educational Experience</td>
<td>349</td>
<td>100</td>
</tr>
<tr>
<td>Academic Challenge</td>
<td>349</td>
<td>100</td>
</tr>
<tr>
<td>First Year Class Participation</td>
<td>156</td>
<td>44.7</td>
</tr>
<tr>
<td>Residential Learning Community Participation</td>
<td>62</td>
<td>17.8</td>
</tr>
<tr>
<td>Academic Success</td>
<td>260</td>
<td>74.5</td>
</tr>
</tbody>
</table>

Student Characteristics on Academic Success

The first research question sought to determine what significant differences existed in academic success based on gender, student of color status, income level, first-generation status, and high school GPA. To address this question, bivariate variables were tested via chi-square of independence (Table 5). The statistical significance of high school GPA on academic success was tested by a t-test of independent samples.
There were no statistically significant differences in academic success based on gender, student of color status, first-generation status, and income status. However, the $t$-test conducted on the high school GPA variable was found to be statistically significant ($p = -.002$) on academic success. Students with a higher high school GPA were more likely to graduate ($M=3.31$) than students with lower high school GPAs ($M=3.13$).

Table 5

Summary of Chi-Square Tests for Input Variables by Academic Success

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Successful ($n = 260$)</th>
<th>Unsuccessful ($n = 89$)</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td>0.114</td>
<td>.735</td>
</tr>
<tr>
<td>Men</td>
<td>72</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Women</td>
<td>188</td>
<td>66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students of Color Status</td>
<td></td>
<td></td>
<td>0.894</td>
<td>.640</td>
</tr>
<tr>
<td>White</td>
<td>233</td>
<td>77</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-White</td>
<td>20</td>
<td>8</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-Generation Status</td>
<td></td>
<td></td>
<td>0.001</td>
<td>.976</td>
</tr>
<tr>
<td>First-generation</td>
<td>92</td>
<td>31</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non first-generation</td>
<td>159</td>
<td>54</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Income Status</td>
<td></td>
<td></td>
<td>1.718</td>
<td>.190</td>
</tr>
<tr>
<td>Low-income</td>
<td>53</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non low-income</td>
<td>205</td>
<td>64</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Student Characteristics and Environmental Variables

The second research question sought to determine what significant differences exist in engagement benchmarks based on gender, student of color status, income level, first-generation status, and high school GPA. To address this question, \( t \)-tests, chi-squares, and a correlation were conducted. Tables 6 and 7 report group differences for the environmental variables based on gender. No statistically significant differences were found.

Table 6

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Male</th>
<th>SD</th>
<th>Female</th>
<th>SD</th>
<th>( t )</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active and Collaborative Learning</td>
<td>14.98</td>
<td>3.278</td>
<td>15.17</td>
<td>3.553</td>
<td>0.481</td>
</tr>
<tr>
<td>Supportive Campus Environments</td>
<td>22.88</td>
<td>4.285</td>
<td>22.63</td>
<td>4.549</td>
<td>-0.493</td>
</tr>
<tr>
<td>Student and Faculty Interaction</td>
<td>11.42</td>
<td>2.842</td>
<td>11.53</td>
<td>3.013</td>
<td>0.306</td>
</tr>
<tr>
<td>Enriching Educational Experiences</td>
<td>24.33</td>
<td>4.241</td>
<td>24.48</td>
<td>4.984</td>
<td>0.287</td>
</tr>
<tr>
<td>Academic Challenge</td>
<td>28.22</td>
<td>6.609</td>
<td>28.27</td>
<td>7.103</td>
<td>0.062</td>
</tr>
</tbody>
</table>

Tables 8 and 9 report group differences for the environmental variables based on student of color status. The only significant differences found on the engagement benchmarks were the variables of enriching educational experience \( (p < .001) \) and participation in a first-year course \( (p < .001) \). The differences in the remaining variables were not statistically significant based on student of color status.
Table 7

Summary of Chi-Square Tests for Environmental Variables by Gender

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Male (n = 95)</th>
<th>Female (n = 254)</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Learning Community</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participated</td>
<td>11</td>
<td>51</td>
<td>3.472</td>
<td>.062</td>
</tr>
<tr>
<td>Did not participate</td>
<td>84</td>
<td>202</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-Year Course</td>
<td></td>
<td></td>
<td>1.231</td>
<td>.267</td>
</tr>
<tr>
<td>Participated</td>
<td>38</td>
<td>118</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not participate</td>
<td>57</td>
<td>135</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 8

Group Differences for Students of Color Based on Environmental Variables

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>White Students</th>
<th>Students of Color</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active and Collaborative Learning</td>
<td>15.04 3.372</td>
<td>15.29 4.285</td>
<td>-0.293</td>
</tr>
<tr>
<td>Supportive Campus Environments</td>
<td>22.60 4.314</td>
<td>24.00 4.154</td>
<td>-1.702</td>
</tr>
<tr>
<td>Student and Faculty Interaction</td>
<td>11.46 2.811</td>
<td>11.82 3.945</td>
<td>-0.620</td>
</tr>
<tr>
<td>Enriching Educational Experiences</td>
<td>24.19 4.655</td>
<td>27.68 3.267</td>
<td>-5.189***</td>
</tr>
<tr>
<td>Academic Challenge</td>
<td>28.29 6.781</td>
<td>28.46 7.886</td>
<td>-0.111</td>
</tr>
</tbody>
</table>

***p < .001.

Tables 10 and 11 report significant differences on the environmental variables based on income status. No statistically significant differences were found on any of the benchmark variables.
Table 9
Summary of Chi-Square Tests for Environmental Variables by Students of Color

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>White Students (n = 310)</th>
<th>Students of Color (n = 28)</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Learning Community</td>
<td></td>
<td></td>
<td>2.469</td>
<td>.291</td>
</tr>
<tr>
<td>Participated</td>
<td>57</td>
<td>5</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not participate</td>
<td>252</td>
<td>23</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-Year Course</td>
<td></td>
<td></td>
<td>22.890</td>
<td>.000</td>
</tr>
<tr>
<td>Participated</td>
<td>125</td>
<td>24</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Did not participate</td>
<td>184</td>
<td>4</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 10
Group Differences for Income Status Based on Environmental Variables

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Low-Income</th>
<th>Non Low-Income</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M</td>
<td>SD</td>
</tr>
<tr>
<td>Active and Collaborative Learning</td>
<td>14.99</td>
<td>3.189</td>
</tr>
<tr>
<td>Supportive Campus Environments</td>
<td>22.19</td>
<td>4.502</td>
</tr>
<tr>
<td>Student and Faculty Interaction</td>
<td>11.42</td>
<td>2.602</td>
</tr>
<tr>
<td>Enriching Educational Experiences</td>
<td>24.38</td>
<td>4.338</td>
</tr>
<tr>
<td>Academic Challenge</td>
<td>27.34</td>
<td>7.533</td>
</tr>
</tbody>
</table>
Table 11

Summary of Chi-Square Tests for Environmental Variables by Income Status

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Low-Income (n = 77)</th>
<th>Non Low-Income (n = 269)</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Learning Community</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participated</td>
<td>12</td>
<td>50</td>
<td>0.383</td>
<td>.536</td>
</tr>
<tr>
<td>Did not participate</td>
<td>65</td>
<td>218</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-Year Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participated</td>
<td>32</td>
<td>123</td>
<td>0.455</td>
<td>.500</td>
</tr>
<tr>
<td>Did not participate</td>
<td>45</td>
<td>145</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tables 12 and 13 report significant differences among the environmental variables based on first-generation status. The only statistically significant variable was participation in a residential learning community ($p = .014$). The remaining variables were not statistically significant.

Table 12

Group Differences for First-Generation Status Based on Environmental Variables

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>First-Generation</th>
<th>Non First-Generation</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active and Collaborative Learning</td>
<td>14.86</td>
<td>15.23</td>
<td>0.914</td>
</tr>
<tr>
<td>Supportive Campus Environments</td>
<td>23.02</td>
<td>22.50</td>
<td>-1.078</td>
</tr>
<tr>
<td>Student and Faculty Interaction</td>
<td>11.30</td>
<td>11.65</td>
<td>1.104</td>
</tr>
<tr>
<td>Enriching Educational Experiences</td>
<td>24.48</td>
<td>24.49</td>
<td>0.016</td>
</tr>
<tr>
<td>Academic Challenge</td>
<td>28.38</td>
<td>28.46</td>
<td>0.098</td>
</tr>
</tbody>
</table>
Table 13

Summary of Chi-Square Tests for Environmental Variables by First-Generation Status

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>First Generation</th>
<th>Non First-Generation</th>
<th>$\chi^2$</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Learning Community</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participated</td>
<td>14</td>
<td>47</td>
<td>5.990</td>
<td>.014</td>
</tr>
<tr>
<td>Did not participate</td>
<td>109</td>
<td>166</td>
<td></td>
<td></td>
</tr>
<tr>
<td>First-Year Course</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Participated</td>
<td>59</td>
<td>90</td>
<td>1.032</td>
<td>.310</td>
</tr>
<tr>
<td>Did not participate</td>
<td>64</td>
<td>123</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Tables 14 and 15 report significant differences on the environmental variables based on high school GPA. Based on the correlation conducted between high school GPA and the five NSSE benchmarks, only active and collaborative learning ($p = .034$) was statistically significant.

Furthermore, the $t$-tests conducted (Table 13) on participation in residential learning communities and first-year courses were not statistically significant based on high school GPA.

Table 14

Summary of Correlation between Engagement Variables and High School GPA

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>ACL</th>
<th>SCE</th>
<th>SFI</th>
<th>EEE</th>
<th>AC</th>
</tr>
</thead>
<tbody>
<tr>
<td>High School GPA</td>
<td>.114*</td>
<td>.060</td>
<td>-.036</td>
<td>.017</td>
<td>.027</td>
</tr>
</tbody>
</table>

*Correlation is significant at the 0.05 level.
Table 15

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Participated</th>
<th>Did Not Participate</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Learning Communities</td>
<td>3.5344</td>
<td>.53746</td>
<td>3.2075</td>
</tr>
<tr>
<td>First-Year Course</td>
<td>3.2031</td>
<td>.48550</td>
<td>3.3154</td>
</tr>
</tbody>
</table>

Engagement Benchmarks and Academic Success

The third research question sought to determine what significant differences exist in academic success based on the engagement benchmarks. To address this question $t$-tests and chi-squares and were conducted. Table 16 reports group differences for the engagement benchmarks on academic success. Only the variable supportive campus environments ($p = .002$) was statistically significant. Those students who were academically successful perceived the campus to be more supportive ($M=23.48$) versus those students who were not successful ($M=21.29$). Furthermore, Table 17 reflects that neither the differences in participation in a residential learning community nor a first-year course were statistically significant on academic success.
Table 16

Group Differences for Academic Success Based on Engagement Characteristics

<table>
<thead>
<tr>
<th>Engagement Characteristic</th>
<th>Successful</th>
<th>Not Successful</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active and Collaborative Learning</td>
<td>15.28, 3.595</td>
<td>14.65, 3.079</td>
<td>-1.592</td>
</tr>
<tr>
<td>Supportive Campus Environments</td>
<td>23.18, 4.141</td>
<td>21.29, 5.099</td>
<td>-3.149**</td>
</tr>
<tr>
<td>Student and Faculty Interaction</td>
<td>11.51, 3.040</td>
<td>11.47, 2.747</td>
<td>-0.103</td>
</tr>
<tr>
<td>Enriching Educational Experiences</td>
<td>24.60, 4.633</td>
<td>23.97, 5.212</td>
<td>-1.018</td>
</tr>
<tr>
<td>Academic Challenge</td>
<td>28.31, 6.917</td>
<td>28.11, 7.133</td>
<td>-0.225</td>
</tr>
</tbody>
</table>

**p < .01.

Table 17

Summary of Chi-Square Tests for Environmental Variables by Academic Success

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Successful (n = 286)</th>
<th>Not Successful (n = 62)</th>
<th>χ²</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Residential Learning Community</td>
<td>44</td>
<td>18</td>
<td>0.560</td>
<td>.454</td>
</tr>
<tr>
<td>First-Year Course</td>
<td>119</td>
<td>37</td>
<td>1.032</td>
<td>.310</td>
</tr>
</tbody>
</table>

Paths to Academic Success

The fourth and fifth research questions sought to identify an engagement model that best described the causal effects on academic success through estimated direct, indirect, and total casual effects among the variables. A path analysis was conducted to determine these effects. The initial model, presented in Figure 1, represents the results from the previously discussed three research questions. Each arrow depicts a relationship that was significant in the bivariate analysis. Non-significant paths were removed and a revised model was generated by eliminating
two input variables (gender and low-income status) and two environmental variables (student/faculty interaction and academic challenge). The revised model is presented in Figure 2. This adjusted model was tested and the results, presented in Figure 3, indicated that the research model did not provide an acceptable fit with the data. The chi-square value ($\chi^2 = 118.5, df = 30$) was significant at $p < .05$, and the chi-square-to-degrees-of-freedom-ratio (3.95) was between 2.0 and 5.0 (indicating a marginal goodness-of-fit). Further goodness of fit tests confirmed the poor fit of this model with a Root Mean Square Error of Approximation value (.092) greater than .05, and the Comparative Fit Index (.375) and Tucker Lewis Index (.063) values were each less than .90.
Figure 2: Adjusted Model
Squared multiple correlations and the standardized direct, indirect, and total effects for the final model are presented in Table 18. Supportive campus environments and high school GPA had a direct effect on academic success. However, no indirect effects were found. Overall, the research model did not explain well the tested effects on academic success (squared multiple correlation of 0.05).
Table 18

Decomposition of Standardized Effects on Student Success (R²=0.05)

<table>
<thead>
<tr>
<th>Predictor Variables</th>
<th>Direct Effects</th>
<th>Indirect Effects</th>
<th>Total Effects</th>
<th>Rank</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supportive Campus Environments</td>
<td>.175</td>
<td>.175</td>
<td>.175</td>
<td>1</td>
</tr>
<tr>
<td>High School GPA</td>
<td>.152</td>
<td>.152</td>
<td>.152</td>
<td>2</td>
</tr>
</tbody>
</table>

Overall

In summary, based on Astin’s I-E-O model, the input variable of student of color status was significantly related to the environmental variables of enriching educational experiences, and participation in a first-year course. The input variable of high school GPA was significantly related to the environmental variable of active and collaborative learning, and the outcome variable of academic success. The input variable of first-generation status was significantly related to the environmental variable of participation in a residential learning community. Finally, the environmental variable of supportive campus environments was significantly related to the outcome variable of academic success. The adjusted model created by these results was tested but demonstrated an overall poor fit to explain academic success.
CHAPTER V: DISCUSSION, IMPLICATIONS, AND RECOMMENDATIONS

The purpose of this study was to examine the academic success of low-income students in relation to engagement variables to determine an engagement model best suited for low-income students. Previous research studies have demonstrated that low-income students are less likely to enroll in higher education and are at a greater risk of not graduating with a bachelor’s degree (Kahlenberg, 2004; Mortenson, 2006a; Sacks, 2007). Most of the literature related to low-income students can be categorized into access and persistence studies.

College access refers to the ability of a student to pursue postsecondary education (Garcia, 2002). Access studies have focused on prior academic achievement (Gladieux & Swail, 1998), enrollment trends (Boulard, 2004), and financial resources (Berkner & Chavez, 1997; Pell Institute, 2004). Overwhelmingly these studies have shown that low-income students are less likely to participate in higher education compared to equally qualified higher income students (Baum, 2007; Berkner & Chavez, 1997; Haycock, 2006; US Department of Education, 2006).

College persistence studies have examined degree attainment across income groups and consistently shown a significant gap between low- and high-income students. Seventy-five percent of students in the top income quartile earn a bachelor’s degree as compared to only 9% of low-income students (Mortenson, 2005). Because low-income students are more likely to attend community colleges (Davies & Guppy, 1997), a majority of persistence studies examine this phenomenon without explaining why the transfer to a four-year institution fails to occur.

Each of these bodies of research has helped higher education understand the barriers to and benefits of degree attainment for low-income students. However, a clear gap exists in the literature as it relates to retaining low-income students. Very few studies have examined the experience of low-income students or methods for increasing their retention. A significant body
of literature exists on what is important to student retention, but these concepts are rarely examined in relation to low-income students.

To help frame this research study Astin’s Input-Environment-Outcome (I-E-O) model was used to address five research questions. First, what significant differences existed in academic success based on gender, student of color status, income level, first-generation status, and high school GPA? Second, what significant differences existed in engagement benchmarks based on gender, student of color status, income level, first-generation status, and high school GPA? Third, what significant differences existed in academic success based on the engagement benchmarks? Fourth, which engagement model best described the causal effects among the variables of income level and academic success? Finally, what were the estimated direct, indirect, and total causal effects among the variables?

To address these research questions t-tests, chi-squares, correlations, and a path analysis were conducted. The results indicated that the input variable of student of color status was significantly related to the environmental variable of enriching educational experiences and participation in a first-year course. Students of color were significantly more likely to participate in first-year courses compared to their White peers. Furthermore, enriching educational experiences had a significantly greater effect on engagement for students of color. The input variable of high school GPA was related to the environmental variable of active and collaborative learning, and the outcome variable of academic success. Students with higher high school GPAs were significantly more likely to persist toward graduation and preferred environments that promoted active learning compared to students with lower high school GPAs. The input variable of first-generation status was related the environmental variable of participation in a residential learning community. At Bowling Green State University first-
generation students were significantly more likely to participate in a residential learning community as compared to their peers. The environmental variable of supportive campus environments was significantly related to the outcome variable of academic success. Students at Bowling Green State University who have persisted toward graduation perceived the campus to be a supportive environment that is contributing to their success. Finally, the adjusted model created by these results was tested but demonstrated an overall poor fit to explain academic success. Based on the input and environmental variables tested this data set does not explain academic success at Bowling Green State University.

Discussion of Results and Future Research

Student Input Characteristics

In this study the input variable of gender was found to be not significantly related to academic success. Both men and women were equally likely to graduate from Bowling Green State University. This contradicts previous research that indicated degree attainment for men is on the decline (Mortenson, 2007c). Researchers have not provided a specific reason for this decline and it is unclear what specific measures Bowling Green State University is employing to ensure male student graduation in this sample.

None of the educational practices implicit in the engagement benchmarks were related to a student’s gender. The sample population was not equally distributed and women respondents outnumbered men. While this is reflective of overall enrollment demographics, and typical of NSSE respondents, the gender imbalance was larger in this sample. Thus the results may not be an accurate reflection of what role gender plays for students as it relates to their engagement on campus.
These findings may be viewed in a positive manner in that there is no difference in persistence toward graduation for men and women. However, these findings also suggest that none of the documented best practices for engagement are important to academic success when examined by gender. Bowling Green State University needs to examine this phenomenon more closely by investigating the academic and involvement practices of its students based on their gender. Every semester students complete course evaluations that are used to evaluate the instructor and the course. These instruments are a good opportunity to assess students’ academic practices and engagement. Examining the questions asked on the course evaluation and including items that can be used in this fashion will shed more light on student learning. This recommendation extends beyond gender and applies to all of the input variables in this study (student of color status, income status, first-generation status, and high school GPA). Finally, Bowling Green State University has made a financial investment by participating in the NSSE study but only participates on a biennial basis. Utilizing similar assessment questions through course evaluations will expand the number of student responses and give BGSU more frequent data to analyze. Currently, the course evaluation process is governed by each individual college and the results are mostly applied to faculty tenure and promotion decisions. Expanding the purpose and use of these evaluations would expand the knowledge BGSU has about classroom learning.

Student of color status was not related to academic success. This result contradicts previous research that indicated racially and ethnically underrepresented students have lower persistence and graduation rates (Braswell et al., 2001; Carter & Wilson, 1997; Mortenson, 2006b; Social Science Research Council Project, 2005). The sample population was not equally
distributed and all students of color were grouped into one category, so it is unclear what effect a specific race/ethnicity would have on academic success.

Of the seven engagement benchmarks, students of color were only more likely to thrive when participating in enriching educational experiences and were more likely to participate in first-year courses. Previous research indicated that students of color were more likely to persist when they participate in residential learning communities. This finding was not supported in this study. It is unclear why students of color at Bowling Green State University prefer first-year courses over participating in a residential learning community. Certain sections of first-year courses are geared toward students of color, and students receiving funding from Student Support Services are required to take a first-year course as well. These two interventions may explain this phenomenon. The students in this sample were more likely to participate in first-year courses but the lack of significance between these courses and academic success suggests that their participation does not increase the likelihood of graduation. Further assessment of the academic success of students of color is needed to better understand what strategies should be employed for these students.

Finally, previous research indicated students of color who perceive the campus environment to be supportive are more likely to persist (Pascarella & Terenzini, 2005). This study does not support this finding. Supportive campus environments often include an element of peer mentoring and at Bowling Green State University, students of color can have up to three mentors in their first-year. If a student qualifies for an underrepresented student scholarship and funding from Student Support Services, the student will receive a mentor for participating in each program. In addition, a separate program exists specifically for students of color. These three mentoring programs provide a vital service to new students, but their lack of coordination results
in a redundancy of service for some students instead of extending the programs to all students. Retention rates for all students in mentoring programs should be examined to determine effectiveness with the goal of extending services to a larger percentage of first-year students.

A student’s income status was found to be not significantly related to academic success. This finding contradicts all of the previous research on low-income students who consistently have lower graduation rates (Kahlenberg, 2004; Mortenson, 2006b, 2007b; Pascarella & Terenzini, 2005). This finding suggests that Bowling Green State University is equally successful at graduating low-income students. However, this finding should be seen in light of the low number of students in the sample. Furthermore, the educational practices implicit in the engagement benchmarks were not related to a student’s income status. This finding is consistent with previous research which has found that higher income level students were more engaged in their coursework (Terenzini, Cabrera, & Bernal, 2001). However, the lack of statistical significance between income status and the engagement benchmarks may be related to the fact that low-income students struggle to assimilate into the culture of higher education (Davis & Guppy, 1997; Yorke & Longden, 2004). Bowling Green State University needs to assess this phenomenon to better understand the overall engagement and academic success of its low-income students. Furthermore, better demographic information is needed about the low-income students at Bowling Green State University to better understand their academic experience.

First-generation student status was found to be not significantly related to academic success. This result is inconsistent with previous research that indicated first-generation students were less likely to graduate. However, considering most first-generation students are women, and from underrepresented racial/ethnic groups, it is consistent that first-generation student status would mirror the results previously discussed. Furthermore, this study showed first-generation
students were more likely to participate in a residential learning community. The literature indicated that participation in these environments benefited first-generation students the most (Pascarella & Terenzini, 2005) and may explain why Bowling Green State University is successfully graduating these students. However, in this study, participation in a residential learning community was not related to academic success. This finding simply suggests first-generation students were more likely to participate in a residential learning community.

Consistent with previous research, the effect of this participation is unclear as it relates to the academic success of first-generation students. Bowling Green State University needs to better assess the long-term effect of participating in its residential learning communities. Longitudinal studies need to be conducted that document academic progress, and cognitive and non-cognitive development.

Students with higher high school GPAs were more likely to persist and graduate from Bowling Green State University. This finding is consistent with previous research that confirms high school GPA is a key predictor for academic success (Adelman, 2004; Astin, 1993b; Gladieux & Swail, 1998; Pascarella & Terenzini, 2005). However, previous research has demonstrated that students of color, and low-income students have varying degrees of success regardless of high school GPA. This was not supported by the data in this study. Furthermore, students with higher high school GPAs were more likely to prefer environments that involve active and collaborative learning, a key component of student engagement. Students who have done well academically were more academically engaged and preferred the active component of learning, including more frequent interaction with peers.
Environmental Variables

The five engagement variables assessed by NSSE included: (a) level of academic challenge; (b) active and collaborative learning; (c) student and faculty interaction; (d) enriching educational experiences; and (e) supportive campus environments. Of these five benchmarks, enriching educational experiences was related to student of color status, and active and collaborative learning was related to high school GPA. These two findings support previous research as previously discussed.

The variable of supportive campus environments was related to academic success. Students who perceived their campus as supportive were more likely to persist and graduate. This finding is supported by previous research (Kuh et al., 2005; Yorke & Longden, 2004), but does not support other studies that demonstrated supportive campus environments were more important for first-generation students and students of color (Pascarella & Terenzini, 2005).

The learning environment associated with a residential learning community is the essence of the five NSSE benchmarks in action: the high faculty/student contact, the nature of the active and collaborative learning environment, the increased level of academic challenge, the associated mandatory enriching educational experience, and the overall support provided to these students via student services. Students who participated in a residential learning community did not have higher success rates compared to their peers who did not participate in these communities. This is consistent with previous research on residential learning communities as it relates to their overall nebulous effect on academic success. Most of the studies conducted on these learning environments have focused on first-to-second-year persistence and thus it is unclear if residential learning communities contribute to academic success (Pascarella & Terenzini, 2005).
Bowling Green State University markets itself on its reputation for residential learning communities yet this study did not demonstrate a relationship between participation in these communities and academic success. Considering the financial commitment the institution has in creating and sustaining these programs, BGSU obviously believes in their importance and therefore needs to assess their cognitive and non-cognitive impact. Persistence and graduation cannot be the sole measures used to determine the value and importance of residential learning communities. All of the engagement practices enumerated by NSSE are employed in these environments and, therefore, careful examination of learning needs to take place by independently examining each NSSE benchmark. Furthermore, participation in residential learning communities is voluntary. More information is needed about the students who choose to enroll in residential learning communities and what barriers exist for those students who do not participate. Specifically, as it relates to this study, participating in a residential learning community costs a student more money and this may be enough of a deterrent to keep low-income students from participating in a program that may be integral to their academic success.

The engagement variable of participation in a first-year course was found to be related to student of color status but not significant to any other input variable (gender, income status, first-generation status, high school GPA). This contradicts previous research that indicated persistence rates are consistent across student characteristics (Pascarella & Terenzini, 2005). Furthermore, first-year courses were found to be not related to the output variable of academic success. The students from this sample, who participated in these courses, were no more likely to persist toward graduation from Bowling Green State University. This finding runs counter to previous research that demonstrated a link between persistence and first-year courses (Pascarella & Terenzini, 2005; Strumpf & Hunt, 1993).
Finally, the benefits of first-year courses have been well documented and include students being more academically challenged, higher levels of active and collaborative learning activities, more interaction with faculty, perceptions of a supportive campus environment, (Kuh et al., 2007), more involvement with extracurricular activities, gains in positive self-perceptions, and satisfaction with the college experience (Pascarella & Terenzini, 2005). All of these indicators are correlated to academic success, but the sample from this study did not support these findings.

Bowling Green State University has a variety of programs that encompass first-year courses. These programs are fragmented between the divisions of academic and student affairs with no cohesive coordinating department. Furthermore, the curriculum in these courses is disjointed and does not allow for comparison between the variance in course content. The only element common to these programs is their delineation as a first-year course. This disconnect may explain the results from this study and it certainly highlights an area for further discussion and research. Assessment of these programs needs to move beyond simple persistence studies and examine the overall effect of course participation on learning, academic and social integration, and student development. Bowling Green State University needs to look beyond its own programs and seek assistance from the Policy Center on the First-Year of College. Furthermore, Pennsylvania State University is conducting a cross-institutional study on first-year programs. Evaluating and applying the research from this project may help BGSU in identifying common themes that can be integrated into a comprehensive, campus-wide first-year program.

Limitations of the Study

Overall this study was limited by the sample demographics, its single institution design, and the overall definition used to determine low-income status. The sample population for this
study encompassed 349 participants from an eligible 899 records. Compared to enrollment demographics at Bowling Green State University female students were overrepresented in the sample (72.8%) and students of color were underrepresented (8.3%). This disproportion may have affected the results and limits the findings. Replication of the study with more proportionally distributed participants is suggested.

The 2007 Federal TRIO program guidelines were used to determine a student’s low-income status which includes using a family’s taxable income to determine eligibility. When the data set was constructed for this study the reported adjusted gross income from the FAFSA was used. Adjusted Gross Income is “income (including wages, interest, capital gains, income from retirement accounts, alimony paid to you) adjusted downward by specific deductions (including contributions to deductible retirement accounts, alimony paid by you); but not including standard and itemized deductions”. (Retrieved from http://www.moneychimp.com/ glossary/agi.htm on December 2, 2007, ¶ 1) These deductions are accounted for in a family’s taxable income which lowers the adjusted gross income. Hence, the number of low-income participants represented in the data set (77) would have been larger if taxable income had been used, and does not accurately represent the demographics of this population. Replication of this study using taxable income instead of adjusted gross income is recommended.

This research study provided a great deal of description specific to one institution and thus its generalizability is limited. However, this study allows Bowling Green State University to understand the role and influence the engagement benchmarks have on academic success. Conversely, it also dictated that the information provided was based on the experience of a small percentage of students. The biggest trade-off for this study was generalizability versus thick description. Overall, this study had the strength of providing detailed information about a small
percentage of participants at a single institution. Based on these factors the data gathered may not fully illuminate all of the research questions. It is important to note this project was exploratory in nature and should be used as a springboard to other investigations related to income level and academic success.

This study examined a series of variables to determine how best to engage low-income students in the college experience with the intention of finding methods to increase their overall graduation rates. Limited by its single institution design this study merits replication if conducted on a larger scale, involving multiple institutions. Specifically, a focus should include an examination of engagement practices at community colleges due to the higher enrollment rates of low-income students at these institutions. Furthermore, a cross-institution study by institutional type would be of benefit by examining the practices of selective institutions.

Finally, quantitative data provide only a glimpse into the reasons why low-income students struggle to graduate. Qualitative studies may help us better understand the environmental influences that impact these students. Academic success can best be understood by examining the issue from two angles: from those who have succeeded, and from those who have not. Simply stated, the best way to understand successful measures is to discuss not only what a campus did well, but to hear from students what environmental influences impeded their success.

Implications for Policy and Practice

Bowling Green State University is a residential campus with first-generation students comprising almost 40% of the population. The implications from this study pertain not only to the work of this specific campus but serve as recommendations for how to best meet the needs of low-income students for all of higher education. The ideas set forth in this section are organized
around the recommendations put forth by the Transitions to College Project conducted by the Social Science Research Council and the Lumina Foundation for Education (2005). This project identified four areas of continued research: preparation (social and academic knowledge, skills, and attitudes); access (identifying barriers, enrollment patterns, and dropout decision-making); financing (individual costs and society’s investment); and retention and success (course completion, degree attainment, increases in overall knowledge).

**Preparation**

It has been well documented that low-income students tend to be academically underprepared for higher education (Gladieux & Swail, 1998; Terenzini, Cabrera & Bernal, 2001). The basic component of academic preparation is the strength and rigor of the high school curriculum. Higher education needs to reach out into the K-12 system to help enhance classroom teaching, curricular development, and student learning. Furthermore, higher education needs to be a part of the accountability measures and help government agencies recognize that these measures are inadequate for a successful transition into higher education.

Preparation extends beyond the high school curriculum and academic achievements. In this process higher education needs to recognize the importance of parental influence and support (O’Brien & Shedd, 2001) and find ways to maximize this influence early in a child’s life. Outreach programs need to begin during fifth and sixth grade (Terenzini et al., 2001), when goal aspirations can be formed and proper decision-making about high school curriculum can begin.

Furthermore, the sooner interventions are implemented the better parents and students will understand the complicated admissions and financial aid processes (McSwain & Davis, 2007). Through proper preparation low-income students may be more likely to attend college.
Access

Proper preparation at the high school level is the first step to increasing access to higher education for low-income students. This is not possible without strong reliance on high school counselors who serve as knowledge gatekeepers (Terenzini et al., 2001). Outreach to this specific group of counselors is imperative, but it needs to go beyond glossy brochures, and luncheons where colleges and universities highlight their most successful programs. Higher education is in a unique position because it is responsible for educating and graduating high school counselors. The curriculum in these programs needs to be assessed and include tangible skills that can be used by counselors to better assist students with college admissions and financial aid processes.

In 1999 the State of Ohio initiated the Ohio College Access Network, a program geared toward increasing the enrollment of low-income students from urban cities in the state of Ohio. Volunteers assisted low-income students with completing college applications, financial aid forms, and provided counsel on the admissions process. The success of this program has led the Ohio Board of Regents to partially fund it resulting in expansion of advisors to all parts of the state. Leaders of the Ohio College Access Network advocate for early access to low-income students beginning in middle school coupled with strong relationships with guidance counselors at the high school level (Lumina Foundation, 2007a).

Recently a national project known as the KnowHow2Go campaign was launched. Funded through the American Council on Education and the Advertising Council, this campaign is a national effort aimed at helping students untangle the complicated web of college admissions (Lumina Foundation, 2007b). The key with both of these recommendations is early intervention and increasing knowledge about how to access higher education.
Financing

Student financial aid has a direct impact on student enrollment for low-income students (St. John et al., n.d.). None of the issues related to financial aid can be examined in a vacuum; instead, a three-pronged evaluation encompassing the three primary forms of financial aid (federal, state, and institutional) is needed. Baum (2007) advocated for changing the financial aid system in three fundamental ways. First, making the system simpler by alleviating complicated laws that change students’ eligibility and tax credit depending on the program. O’Brien and Shedd (2001) were more specific and recommended increasing financial aid packaging for part-time enrollment considering the enrollment trends for low-income students. McSwain and Davis (2007) also recommended special tax relief for the working poor who are more financially at risk because of financial aid cutoffs. Second, Baum (2007) suggested targeting aid more effectively by increasing need-based aid versus aid that is tied to academic performance. Furthermore, she recommended an income-contingent loan repayment plan based on future earnings. The last recommendation made by Baum (2007) is that financial aid should look past enrollment and be tied to academic preparation and persistence to degree. This last recommendation is perhaps the most controversial as students who are less academically prepared would receive more aid and that aid would increase as progress is made toward degree completion.

At the state level support of higher education has traditionally focused on aid to institutions based on enrollment. This method of support becomes contingent upon state economic health and competing state interests which deplete state funds. In the research report *Expanding College Access: The Impact of State Finance Strategies*, published by the Lumina Foundation for Education, the authors asserted that to maintain and increase access for low-income students states must raise funding for need-based grants (St. John et al., n.d.). This idea
was echoed in a report published by the American Association of State Colleges and University, in conjunction with the National Association of State Universities and Land-Grant Colleges (2005) that stated student aid at the state level continues to lag behind increasing costs to attend college. Increases at the state level to student aid have focused less and less on need-based aid. If this trend continues students with stronger academic preparation will continue to benefit in a merit-based system thus perpetuating the economic difficulties of attending college for low-income students.

At the institutional level recent arguments from state legislatures, to explain the declining state support of higher education, have included the notion of alumni giving and private donors. While these are two significant revenue streams for higher education, they are not reliable sources of income and changes in giving patterns can be detrimental when such monies are being used to support operating budgets (Reindl, 2007).

In addition to specific changes to the financial aid system, it is necessary to examine how the low-income definition impacts students’ ability to afford higher education. This study used a preexisting definition for the federal TRIO program to determine income status, a definition which fails to capture the economic hardships for many Americans. Today more than 37 million Americans live below the poverty line (Newman & Chen, 2007). While this number is alarming, it fails to encompass the 57 million Americans who live just above the poverty line. Families whose income range is $20,000-$40,000 for a family of four are not considered poor (Newman & Chen, 2007). The financial distinction between poor and working poor is minute but it has tremendous implications for working poor students in higher education. In a recent study published by the Institute for Higher Education Policy, financial aid had significant effects for the working poor with an average unmet need of $4,000 (McSwain & Davis, 2007). The
demographics of the working poor are more closely aligned with low-income students than their higher income peers. However, the unmet financial needs for this group of students is significantly larger because they fall into a category where their expected family contribution is significantly large enough to deter enrollment, or result in higher drop-out rates (McSwain & Davis, 2007).

Retention and Success

This study focused on how increases in access to higher education for low-income students is not enough and more needs to be done to increase their retention and success. Low-income students continually have lower levels of involvement and engagement on campus (Terenzini, Cabrera & Bernal, 2001). Programmatic efforts to increase academic success for low-income students need to be comprehensive and encompass the entire campus. Suggestions include mentoring and study skills assistance (Duffy, 2007; Gladieux & Swail, 1998; Haring, 1999; Levine & Nidiffer, 1996). Specifically these programs are most effective for students with at-risk factors: first-generation, low-income, and students of color benefit from these programs greater than their peers (Duffy, 2007). However, most institutions continue to use these programs in an elective manner instead of assigning at-risk students into required programs proven to contribute to their success. Furthermore, programs like Student Support Services, encompass these vital aids but normally have enrollment caps based on funding. Higher education needs to identify at-risk students and enroll them in mandatory interventions with proven success.

Research has demonstrated that students who enroll full-time have higher success rates (McSwain & Davis, 2007; O’Brien & Shedd, 2001; Pascarella & Terenzini, 2005), yet most low-income students enroll part-time to fund their education through supplemental work. Research further indicated that working over 20 hours per week is detrimental to academic success but that
on-campus work study increased success (Pascarella & Terenzini, 2005). O’Brien & Shedd (2001) advocated for creating comprehensive work-study programs that are more closely aligned with a student’s academic major or career choice. Instead of simply giving students money for working, this form of financial aid should be used to harness resources and help low-income students create career networks which Duffy (2007) found to be an important factor to student success.

The concept of social integration as a retention factor was first introduced by Tinto in 1975. Integrating students into the social culture of a campus continues to affect student retention and includes finding ways to help students become involved on campus, create relationships with faculty and peers, and teach ways to access the plethora of resources vital to student success (Tinto, 1993). At the heart of successful social integration is the idea of social capital. Coleman (1998) asserted that there are three forms of social capital: obligations and expectations, information channels, and social norms. Building social capital in students builds social integration. This becomes especially important for low-income students who are less likely to understand academic obligations and expectations of college, lack the knowledge on how to access information, and struggle with assimilating into new social norms (Davis & Guppy, 1997; Yorke & Longden, 2004).

A key to understanding student success is knowing what is meant by the term, how it is being used, and what it specifically defines. Researchers have defined student success in terms of learning outcomes, personal satisfaction and goal attainment, job placement and career advancement, civic and life skills, social and economic well-being, and commitment to lifelong learning (Ewell & Wellman, 2007, p. 6). Perna and Thomas (2006) defined student success in terms of four transitions: (a) readiness (aspirations and expectations); (b) enrollment (access and
choice); (c) achievement (performance and persistence); and (d) post-college attainment. In November 2006 the National Postsecondary Education Cooperative held a national symposium on student success. The salient theme from the symposium was the lack of a consistent definition of student success and the summary report from the symposium called on higher education and government to identify a clear definition that can be used through research to develop more comprehensive programs.

All of the previous recommendations have focused on specific ideas aimed at increasing student success for low-income students. A consistent theme that unites these recommendations is that researchers have begun advocating, and some states have begun implementing, a comprehensive K-20 education system. Perna and Thomas (2006) advocated that federal and state policymakers in conjunction with K-12 and higher education leaders need to stop working in a vacuum and creating programs that address individual issues. These leaders need to see individual programs in light of bigger issues and begin to centralize and produce comprehensive results that address student success more globally. The State Higher Education Executive Officers (2007), in response to increasing demands for degree production and quality, put forth a comprehensive model to address the changing needs of higher education. This encompassed six areas directly tied to low-income student success: early outreach programs, curriculum and assessment systems, high quality teaching, student financial assistance, data and accountability systems, and postsecondary program designed to increase student success. Terenzini, Cabrera, and Bernal (2001) advocated for closer and better-integrated arrangements between state agencies, colleges and universities, school teachers and administrators, parents, and students across the entire K-20 system. Wyner, Bridgeland, and Diulio (n.d.) recommended higher K-12
standards; better information at K-12 level, stronger engagement at local level, improved access and success, better data at the higher education level, and greater attention to academic research.

Some states are answering the call for more comprehensive programs. The Twenty-First Century Scholars Program (Indiana) began in 1990 and longitudinal assessment of the program has demonstrated increased access and success in college for low-income students. Originally intended to increase access to postsecondary education, the program targets low-income students during their eighth grade year. At that time students pledge to: complete high school, maintain at least a C average, remain drug– and crime– free, apply for college and financial aid, and enroll in an Indiana college within two years of high school. If these criteria are met participants are guaranteed tuition for four years at a public college or university in Indiana. Equivalent amounts are available for private and proprietary schools based on a cost scale (St. John et al., 2005).

In 2002 the Lumina Foundation for Education examined methods of increasing persistence for underserved students in the state of Indiana. Fifteen universities participated in this program and the report published in 2007 indicated the following practices as the most effective: summer intention programs, goal orientation, mentoring, K-12 outreach, active and collaborative learning, faculty development, technology, learning communities, and service learning. In 1997 the state of Kentucky began its public agenda for postsecondary and adult education. Focusing on preparedness, affordability, graduation rates, career preparation, and economic development the state set forth an aggressive agenda to address these issues. Aligning government, K-12 education, and higher education the Kentucky higher education public agenda and the work of the Lumina Foundation in Indiana have gained national attention and are being recognized as models for other states by addressing the challenges facing higher education, individual states, and our nation.
Concluding Thoughts

Is public higher education a right or a privilege? This has been a fundamental question throughout this study, but the time has come to put this question to rest and realize that our future in this world now rests on how well we educate our citizens. The importance of completing the bachelor’s degree has never been more important in American history as it relates to a changing workforce and greater economic benefits both to the individual and society (O’Brien & Shedd, 2001).

In 2005, the earnings difference between those with a college degree and those with a high school diploma was greater than it has been at any point since 1915, when going to college was reserved for the relatively elite segment of the population. (Wyner, Bridgeland, & Diulio, n.d., p. 29)

This degree gap has significant implications for the continued viability of the United States. Higher education remains a cornerstone upon which American society was built and now, more than ever in its history, colleges and universities have a responsibility to find ways to improve the academic success of all students.
REFERENCES


APPENDIX: 2005 NSSE INSTRUMENT
National Survey of Student Engagement 2005
The College Student Report

1. In your experience at your institution during the current school year, about how often have you done each of the following? Mark your answers in the boxes. Examples: X or ☐

- a. Asked questions in class or contributed to class discussions
- b. Made a class presentation
- c. Prepared two or more drafts of a paper or assignment before turning it in
- d. Worked on a paper or project that required integrating ideas or information from various sources
- e. Included diverse perspectives (different races, religious, gender, political beliefs, etc.) in class discussions or writing assignments
- f. Came to class without completing readings or assignments
- g. Worked with other students on projects during class
- h. Worked with classmates outside of class to prepare class assignments
- i. Put together ideas or concepts from different courses when completing assignments or during class discussions
- j. Tutored or taught other students (paid or voluntary)
- k. Participated in a community-based project (e.g., service learning) as part of a regular course
- l. Used an electronic medium (listening, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment
- m. Used e-mail to communicate with an instructor
- n. Discussed grades or assignments with an instructor
- o. Talked about career plans with a faculty member or advisor
- p. Discussed ideas from your readings or classes with faculty members outside of class
- q. Received prompt feedback from faculty on your academic performance (written or oral)

- r. Worked harder than you thought you could to meet an instructor's standards or expectations
- s. Worked with faculty members on activities other than coursework (committees, orientation, extracurricular activities, etc.)
- t. Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)
- u. Had serious conversations with students of a different race or ethnicity than your own
- v. Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values

2. During the current school year, how much has your coursework emphasized the following mental activities?

- a. Memorizing facts, ideas, or methods from your courses and readings so you can repeat them in pretty much the same form
- b. Analyzing the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components
- c. Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships
- d. Making judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions
- e. Applying theories or concepts to practical problems or in new situations
### 3. During the current school year, about how much reading and writing have you done?
- a. Number of assigned textbooks, books, or book-length packs of course readings
- b. Number of books read on your own (not assigned) for personal enjoyment or academic enrichment
- c. Number of written papers or reports of 20 pages or more
- d. Number of written papers or reports between 5 and 19 pages
- e. Number of written papers or reports of fewer than 5 pages

### 4. In a typical week, how many homework problem sets do you complete?
- a. Number of problem sets that take you more than an hour to complete
- b. Number of problem sets that take you less than an hour to complete

### 5. Mark the box that best represents the extent to which your examinations during the current school year have challenged you to do your best work.
- Very little
- Occasional
- Sometimes
- Often
- Very much

### 6. During the current school year, about how often have you done each of the following?
- a. Attended an art exhibit, gallery, play, dance, or other theater performance
- b. Exercised or participated in physical fitness activities
- c. Participated in activities to enhance your spirituality (worship, meditation, prayer, etc.)
- d. Examined the strengths and weaknesses of your own views on a topic or issue
- e. Tried to better understand someone else’s views by imagining how an issue looks from his or her perspective
- f. Learned something that changed the way you understand an issue or concept

### 7. Which of the following have you done or do you plan to do before you graduate from your institution?
- a. Practicum, internship, field experience, co-op, experience, or clinical assignment
- b. Community service or volunteer work
- c. Participate in a learning community or some other formal program where groups of students take two or more classes together
- d. Work on a research project with a faculty member outside of course or program requirements
- e. Foreign language coursework
- f. Study abroad
- g. Independent study or self-designed major
- h. Culminating senior experience (capstone course, thesis, project, comprehensive exam, etc.)

### 8. Mark the box that best represents the quality of your relationships with people at your institution.
- a. Other Students
- b. Faculty Members
- c. Administrative Personnel and Offices

<table>
<thead>
<tr>
<th>Friendly, Supportive, Sense of Belonging</th>
<th>Available, Helpful, Sympathetic</th>
<th>Helpful, Considerate, Flexible</th>
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<tr>
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</table>

<table>
<thead>
<tr>
<th>Unfriendly, Unsupportive, Sense of Alienation</th>
<th>Unavailable, Unhelpful, Unsympathetic</th>
<th>Unhelpful, Inconsiderate, Rigid</th>
</tr>
</thead>
</table>
### Question 9: About how many hours do you spend in a typical 7-day week doing each of the following?

<table>
<thead>
<tr>
<th># of hours per week</th>
<th>0</th>
<th>1-5</th>
<th>6-10</th>
<th>11-15</th>
<th>16-20</th>
<th>21-25</th>
<th>26-30</th>
<th>More than 30</th>
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</thead>
<tbody>
<tr>
<td>a. Preparing for class</td>
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<td>(studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)</td>
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<td>b. Working for pay</td>
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<td>c. Working for pay</td>
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<td>off campus</td>
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<tr>
<td>d. Participating in co-curricular activities (organizations, campus publications, student government, social fraternity or sorority, intercollegiate or intramural sports, etc.)</td>
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<td>e. Relaxing and socializing (watching TV, partying, etc.)</td>
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<td>f. Providing care for dependents living with you (parents, children, spouse, etc.)</td>
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<td>g. Commuting to class (driving, walking, etc.)</td>
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</table>

### Question 11: To what extent has your experience at this institution contributed to your knowledge, skills, and personal development in the following areas?

<table>
<thead>
<tr>
<th>Very much</th>
<th>Quite a bit</th>
<th>Some</th>
<th>Very little</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Acquiring a broad general education</td>
<td>❌</td>
<td>❏</td>
<td>❏</td>
</tr>
<tr>
<td>b. Acquiring job or work-related knowledge and skills</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
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<tr>
<td>c. Writing clearly and effectively</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
</tr>
<tr>
<td>d. Speaking clearly and effectively</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
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<tr>
<td>e. Thinking critically and analytically</td>
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<td>❏</td>
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<tr>
<td>f. Analyzing quantitative problems</td>
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<td>❏</td>
<td>❏</td>
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<tr>
<td>g. Using computing and information technology</td>
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<td>❏</td>
<td>❏</td>
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<tr>
<td>h. Working effectively with others</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
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<tr>
<td>i. Voting in local, state, or national elections</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
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<tr>
<td>j. Learning effectively on your own</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
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<tr>
<td>k. Understanding yourself</td>
<td>❏</td>
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<tr>
<td>l. Understanding people of other racial and ethnic backgrounds</td>
<td>❏</td>
<td>❏</td>
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<tr>
<td>m. Solving complex real-world problems</td>
<td>❏</td>
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<td>n. Developing a personal code of values and ethics</td>
<td>❏</td>
<td>❏</td>
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<tr>
<td>o. Contributing to the welfare of your community</td>
<td>❏</td>
<td>❏</td>
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<tr>
<td>p. Developing a deepened sense of spirituality</td>
<td>❏</td>
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</tbody>
</table>

### Question 10: To what extent does your institution emphasize each of the following?

<table>
<thead>
<tr>
<th>Very much</th>
<th>Quite a bit</th>
<th>Some</th>
<th>Very little</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Spending significant amounts of time studying and on academic work</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
</tr>
<tr>
<td>b. Providing the support you need to help you succeed academically</td>
<td>❏</td>
<td>❏</td>
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<tr>
<td>c. Encouraging contact among students from different economic, social, and racial or ethnic backgrounds</td>
<td>❏</td>
<td>❏</td>
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</tr>
<tr>
<td>d. Helping you cope with your non-academic responsibilities (work, family, etc.)</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
</tr>
<tr>
<td>e. Providing the support you need to thrive socially</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
</tr>
<tr>
<td>f. Attending campus events and activities (special speakers, cultural performances, athletic events, etc.)</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
</tr>
<tr>
<td>g. Using computers in academic work</td>
<td>❏</td>
<td>❏</td>
<td>❏</td>
</tr>
</tbody>
</table>

### Question 12: Overall, how would you evaluate the quality of academic advising you have received at your institution?

- Excellent
- Good
- Fair
- Poor

### Question 13: How would you evaluate your entire educational experience at this institution?

- Excellent
- Good
- Fair
- Poor

### Question 14: If you could start over again, would you go to the same institution you are now attending?

- Definitely yes
- Probably yes
- Probably no
- Definitely no
15 Write in your year of birth: 19

16 Your sex
[ ] Male  [ ] Female

17 Are you an international student or foreign national?
[ ] Yes  [ ] No

18 What is your racial or ethnic identification? (Mark only one.)
[ ] American Indian or other Native American
[ ] Asian American or Pacific Islander
[ ] Black or African American
[ ] White (non-Hispanic)
[ ] Mexican or Hispanic American
[ ] Puerto Rican
[ ] Other Hispanic or Latino
[ ] Multiracial
[ ] Other
[ ] I prefer not to respond

19 What is your current classification in college?
[ ] Freshman/First Year  [ ] Senior
[ ] Sophomore  [ ] Unclassified
[ ] Junior

20 Did you begin college at your current institution or elsewhere?
[ ] Started here  [ ] Started elsewhere

21 Since graduating from high school, which of the following types of schools have you attended other than the one you are attending now? (Mark all that apply.)
[ ] Vocational or technical school
[ ] Community or junior college
[ ] 4-year college other than this one
[ ] None
[ ] Other, specify:

22 Thinking about this current academic term, how would you characterize your enrollment?
[ ] Full-time  [ ] Less than full-time

23 Are you a member of a social fraternity or sorority?
[ ] Yes  [ ] No

24 Are you a student-athlete on a team sponsored by your institution's athletics department?
[ ] Yes  [ ] No (go to question 25)

On what team(s) are you an athlete (e.g., football, swimming)? Please answer below:

25 What have most of your grades been up to now at this institution?
[ ] A  [ ] B+
[ ] B  [ ] C+
[ ] C  [ ] D+ or lower

26 Which of the following best describes where you are living now while attending college?
[ ] Dormitory or other campus housing (not fraternity/sorority house)
[ ] Residence (house, apartment, etc.) within walking distance of the institution
[ ] Residence (house, apartment, etc.) within driving distance
[ ] Fraternity or sorority house

27 What is the highest level of education that your parent(s) completed? (Mark one box per column.)

Father  Mother

[ ] Did not finish high school
[ ] Graduated from high school
[ ] Attended college but did not complete degree
[ ] Completed an associate's degree (A.A., A.S., etc.)
[ ] Completed a bachelor's degree (B.A., B.S., etc.)
[ ] Completed a master's degree (M.A., M.S., etc.)
[ ] Completed a doctoral degree (Ph.D., J.D., M.D., etc.)

28 Please print your primary major or your expected primary major.

29 If applicable, please print your second major or your expected second major (not minor, concentration, etc.).