

IDENTIFICATION OF NATIONAL SURVEY OF STUDENT ENGAGEMENT  
(NSSE) SOCIALIZATION VARIABLE CLUSTERS THAT PREDICT PRIVATE  
MIDWESTERN COLLEGE PERSISTENCE

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Doctor of Education

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By

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JULY 12, 2008

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IDENTIFICATION OF NATIONAL SURVEY OF STUDENT ENGAGEMENT  
(NSSE) SOCIALIZATION VARIABLE CLUSTERS THAT PREDICT PRIVATE  
MIDWESTERN COLLEGE PERSISTENCE

Presented by Jay Johnson

A candidate for the degree of Doctor of Education

And hereby certify that in their opinion it is worthy of acceptance

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ABSTRACT

The college under study has concerns about increasing student persistence through understanding engagement activities. This study addressed the lack of information regarding identification of National Survey of Student Engagement (NSSE) socialization clusters that predict private Midwestern college persistence within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

The conceptual underpinning is engagement in context of social constructivism. Supportive literature highlights relationships among engagement, persistence, and demographic variables. This study utilized a quantitative, pre-experimental, post-post comparison methodology. Archival data were retrieved, with permission, from the college under study's database. The dependent variable is engagement measured by two NSSE Benchmarks from the NSSE instrument (NSSE, 2007). The independent variables are persistence, gender, athletic status, and legacy status. Covariates for the study are ACT or SAT standardized test scores and high school grade point averages.

Data were analyzed by using Statistical Package for the Social Sciences v. 14 for descriptive summary analysis, four-way analysis of covariance (ANCOVA), and discriminant analysis. The study found main and interaction effects of engagement and

NSSE variable clusters within four independent variables. Student interaction with faculty was found to be an indicator of persistence. The college under study must provide opportunities for faculty to be more socially involved with students.



## CHAPTER ONE

### INTRODUCTION

This study identified National Survey of Student Engagement (NSSE) socialization variable clusters that predict private Midwestern college persistence (NSSE Annual Student Report, 2006). The study identified the influence of the independent variables of student persistence, gender, athletic status, and legacy status upon the dependent variable, engagement, at a select, private Midwestern college. Archival data regarding four student cohorts, from first year students in the fall semesters of 2002, 2003, 2004, and 2005, were studied for persistence to the following respective year.

The dependent variable, engagement, includes behavior items within two of five NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. These Benchmarks were selected for examination at the request of an administrative officer of the college under study, due to the relevance of the Benchmark behavior items to institutional goals. High school grade point averages (GPAs) and ACT or Scholastic Aptitude Test (SAT) standardized test scores were utilized as covariates in statistical analysis.

The study group includes four first year student cohorts from the fall semesters of 2002, 2003, 2004, and 2005. The student cohorts were pooled and considered as a single study group.

The study methodology design answered student engagement and persistence questions put forth by the college under study for interpreting its NSSE College Report, while having broader application to similar educational institutions that also seek to improve engagement and persistence. This chapter will introduce the study background,

conceptual underpinning, problem and purpose, research questions, null hypotheses, limitations, delimitations, and key terms.

### Background

With an interest in engagement and persistence, and in response to accountability questions from government, accrediting agencies, students, and parents, NSSE established national Benchmarks for engagement (NSSE Annual Student Report, 2006). High student engagement facilitates increased persistence (Gong, Presley, & White, 2006; Gordon, Ludlum, & Hoey, 2006; Herzog 2004; Li & Killian, 1999; Liu & Liu, 2000). NSSE Benchmarks help colleges and universities improve accountability and better respond to accountability questions related to persistence (NSSE Annual Student Report, 2006). National Benchmarks are established for Level of Academic Challenge, Active and Collaborative Learning, Student-Faculty Interaction, Enriching Educational Experiences, and Supportive Campus Environment for each Carnegie 2000 Classification of Institutions of Higher Education (NSSE, 2006).

The college under study boasts a rich history having been founded on a specific religion, and formed through a merger of an all male and an all female college. Since the merger, the co-ed college has experienced great fluctuations in enrollment. Triggered by a low enrollment crisis, the college devised new ways to market the college and athletic programs. The college enjoyed gradual growth over the next decade, and now has record enrollment of 1,299 students (College Website, 2008). Given the enrollment history, the study methodology is designed to answer questions put forth by the college under study regarding the identification of the NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private

Midwestern college for behavior items within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Given the study background, the conceptual underpinning can be explored.

### Conceptual Underpinning

The conceptual underpinning for the study is engagement as it pertains to persistence within the context of social constructivism. High student engagement levels facilitate persistence (Gong, Presley, & White, 2006; Gordon, Ludlum, & Hoey, 2006; Herzog 2004; Li & Killian, 1999; Liu & Liu, 2000). Achieving increased student persistence begins with recognizing engagement activities as persistence factors. Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items. NSSE is a leading instrument helping colleges and universities understand engagement activities as persistence factors as well as identify relationships among the factors (NSSE, 2006). The instrument measures five activities believed to promote persistence; Academic Challenge, Active and Collaborative Learning, Student-Faculty Interaction, Enriching Educational Experience, and Supportive Campus Environment (NSSE, 2006). Student engagement is a learning environment wherein students are active participants, not merely passive recipients of their own education; it is widely accepted that student engagement contributes to persistence (Astin, 1993; Chickering & Gamson, 1987; NSSE, 2006; Pascarella & Terenzini, 1991; Tinto, 1993).

Social constructivism is based on a social order comprised of past human interaction (Berger & Luckmann, 1966). As a critical realist and postmodern view of human interaction, social constructivism asserts the subjectivist view “no theory neutral

language” (Coghlan & Brannick, 2005, p. 5) can exist in order to produce social order. Therefore, it is difficult for theory neutral language to exist given the subjective nature of this interaction (Coghlan & Brannick, 2005). Individuals, when interacting with others as a group will construct or create subjective, artificial, constructs and accept constructs as if they were objective, naturally-occurring reality (Berger & Luckmann).

For this study, the context of social constructivism is that students of different demographic backgrounds and engagement create a social order based on past human interaction. This study identified interaction effects and sought knowledge about past human interaction. To this end, the research by Berger and Luckmann (1966) helps interpret social order based on past human interaction, and the research by Coghlan and Brannick (2005) provides the foundation that no theory neutral language in this past human interaction is possible.

These ideas inform the data by setting a foundation for interaction of engagement, persistence, gender, athletic status, and legacy status. Each variable has its own place in the social order, thus influencing student decisions concerning engagement and persistence. Findings provide insight into how the college under study can enhance the NSSE Benchmark activity for gender, athletes, legacies, and persisters. Given the conceptual underpinning, the study’s problem and purpose is defined.

#### Problem and Purpose Overview

The purpose of this study is to address the lack of information regarding the identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when ACT or SAT standardized test scores and high school GPAs are held constant for

each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. No studies have been conducted at the college under study regarding the influence of the dependent variable, engagement upon the independent variables, persistence, gender, athletic status, and legacy status of students.

A descriptive summary statistics of students at the college under study regarding variables, persistence, gender, athletic status, legacy status, standardized test scores, and high school GPAs for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment are provided.

Second, this study describes and outlines the main and interaction effects of student engagement at the college under study among variables persistence gender, athletic status, and legacy status when standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

Third, this study determines whether clusters of behavior items describe membership of the study group exist for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

Furthermore, this study provides a model that can be used by college administration and faculty to guide implementation of measures to increase engagement, persistence, and thus, graduation rates. The review of literature highlights themes regarding engagement and persistence for various demographic variables. Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items.

*Statement of the Problem*

There is a lack of information regarding the identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when standardized test scores and high school GPAs are held constant. The dependent variable, engagement, was studied to identify engagement clusters for the independent variables, persistence, gender, athletic status, and legacy status of students for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

*Purpose of the Study*

The purpose of this study is to address the lack of information regarding the identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college. The influence of the dependent variable, engagement, upon the independent variables, persistence, gender, athletic status, and legacy status of students at the college under study when ACT or SAT standardized test scores and high school GPAs are held constant, are examined. Student archival data from school years 2002-2006 at the college under study was analyzed, including student demographic data and NSSE data. These data, categorized by four first year student cohorts from the fall semesters of 2002, 2003, 2004, and 2005, were studied as they persist to the following respective year.

In order to accomplish this purpose, this study provides descriptive summary statistics of students regarding variables, persistence, gender, athletic status, legacy status, standardized test scores and high school GPAs of first year students at the college under study for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. These Benchmarks were selected for

examination at the request of an administrative officer at the college under study due to the relevance of the Benchmark behavior items to institutional goals.

Second, this study describes main and interaction effects of student engagement at the college under study among variables, persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Third, it determines whether clusters of Benchmark behavior items describe membership of the population for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

#### *Research Questions*

Three research questions guided the study. Each question considers both the independent and dependent variables.

*Research question one.* What are the descriptive summary statistics of students regarding variables, persistence, gender, athletic status, legacy status, ACT or SAT standardized test scores, and high school GPAs (frequency, percent) for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment (mean, standard deviation)?

*Research question two.* Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Research question three.* Are there clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction (six behavior items) and 2) Supportive Campus Environment (six behavior items)?

*Null Hypothesis*

Two null hypotheses were tested. Each hypothesis considers both the independent and dependent variables.

*Null hypothesis for research question two.* There are no main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

*Null hypothesis for research question three.* There are no clusters of behavior items describing membership of the population within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

The problem and purpose overview discussed the statement of the problem, purpose of the study, research questions, and null hypothesis. Given the problem and purpose overview, the study's limitations can be outlined.

#### Limitations of the Study

The study has several limitations. The first limitation is the institution under study is a private Midwestern college with a small student population. Second, the study does not account for tuition, administrative, staffing, strategic planning, and other changes. Third, the institution under study only has one year experience with the student database,



Empower<sup>®</sup>. Fourth, only four first year student cohorts were studied. Fifth, the study does not account for students who left the college under study and then returned. Sixth, of the students chosen by NSSE to participate in the NSSE survey, participants self-selected actual participation. Seventh, ACT and SAT conversions may have distorted standardized test scores. And finally NSSE instrumentation errors may exist.

#### Delimitations of the Study

The study delimitation is that one cannot infer study results to other educational institutions of varying sizes, from varying locations, and of various types. This is due to the nature and characteristics of the college under study.

#### Definition of Key Terms

The study uses specific terminology. In order to clarify terminology, the study's six variables; persistence, gender, athletic status, legacy status, high school grade point average, and ACT or SAT standardized test score are defined. Second, the study's two computer software systems, Empower<sup>®</sup> and Statistical Package for the Social Sciences, are defined. Third, the National Survey of Student Engagement, its college definition, and its five Benchmarks are outlined. Finally, the conceptual underpinning, Social Constructivism is defined.

*Athletic status.* Athletic status is defined as college-sponsored, National Association of Intercollegiate Athletics, football, softball, baseball, basketball, cross country, soccer, spirit squad, tennis, track and field and volleyball team members and non-members.

*Empower<sup>®</sup>.* Empower<sup>®</sup> is the student database of the college under study that allows students to track grades, check schedules, and enroll through a secure web portal.

The college under study has used Empower<sup>®</sup> as the student database since 2002 for maintaining a large amount of student data in a simple, reliable format. Empower<sup>®</sup> is based on an Oracle database system, which provides a high level of user-friendliness and reliability. The database enables users to mine data and generate reports with ease. In addition to usability by administration and faculty at the college under study, students are able to track grades, check schedules, and enroll through a secure web portal on Empower<sup>®</sup>. The Director of Application Support in the Technology and Information Systems department at the college under study oversees Empower<sup>®</sup> use and support.

*Engagement.* Engagement is defined as students participating in behaviors categorized by NSSE as; 1) Student-Faculty Interaction consists of nine behavior items, 2) Active & Collaborative Learning consists of seven behavior items, 3) Enriching Educational Experience consists of twelve behavior items, 4) Student-Faculty Interaction consists of six behavior items, and 5) Supportive Campus Environment consist of six behavior items

*Gender.* Gender is defined as students who self-identify as male or female.

*High school grade point average (GPA).* High School GPA is defined as average cumulative grade point on a four point scale earned in high school.

*Legacy status.* Legacy status is defined as students reporting previous family members attending the college under study and students reporting no previous family members attending the college under study.

*Masters colleges and universities with smaller programs (Master's-S).* NSSE uses Basic Carnegie Classifications of colleges and universities. The category Master's – S is for Master's Colleges and Universities with smaller programs (NSSE, 2006).

*National Survey of Student Engagement (NSSE).* NSSE is an annual survey designed to provide estimates of student participation, or engagement, in various college programs. Survey questions are designed to reflect best practices and desired outcomes (NSSE, 2006).

*National Survey of Student Engagement (NSSE) Benchmarks.* Each behavior item within the five NSSE Benchmarks measure institutional quality for student engagement; 1) Student-Faculty Interaction (nine behavior items), 2) Active & Collaborative Learning (seven behavior items), 3) Enriching Educational Experience (12 behavior items), 4) Student-Faculty Interaction (six behavior items), and 5) Supportive Campus Environment (six behavior items). NSSE Benchmarks help colleges and universities better respond to accountability questions and accepted college and university rankings in popular print media (NSSE, 2004; NSSE, 2006).

*Persistence.* Persistence is defined as students from each of the four fall first year student cohorts; 2002, 2003, 2004, and 2005, who are still attending the college under study the fall of the following year for each respective cohort. Students who persist are referred to as persisters. Students who do not persist are referred to as non-persisters.

*Social constructivism.* Social constructivism is based on a social order comprised of past human interaction (Berger & Luckmann, 1966). It asserts the subjectivist view “no theory neutral language” (Coghlan & Brannick, 2005, p. 5) can exist in order to produce social order. Individuals, when interacting with others as a group, will construct or create subjective, artificial, constructs and accept constructs as if they were objective, naturally-occurring reality (Berger & Luckmann).

*Standardized test score.* Standardized test score is defined as either student ACT or SAT score. ACT is a standardized test generating student scores in English, Math, Reading, and Science. It is a competency-based test rather than aptitude or intelligence based test. SAT is a standardized test generating student scores in Critical Thinking, Math, and Writing. It is an assessment examination that measures critical thinking skills.

*Statistical Package for the Social Sciences (SPSS) Version 14.0.* The software SPSS was used to conduct the statistical analysis of the variables. The version was 14.0.

### Summary

Chapter one introduced the study background, conceptual underpinning, problem and purpose, research questions, null hypotheses, limitations, delimitations, and key terms. The study will identify NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college. The study determined the influence of the independent variables of student persistence, gender, athletic status, and legacy status upon the dependent variable, engagement. The conceptual underpinning for the study is engagement within the context of social constructivism.

The study purpose is to address the lack of information regarding the identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college. Several study limitations and one delimitation were outlined, and fifteen key terms were defined.

## CHAPTER TWO

### REVIEW OF RELATED LITERATURE

Achieving increased student persistence begins with identifying persistence factors. Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items. The National Survey of Student Engagement (NSSE) is a leading instrument for helping colleges and universities understand persistence factors as well as identify relationships among factors. The instrument measures five engagement factors believed to promote persistence; Academic Challenge, Active and Collaborative Learning, Student-Faculty Interaction, Enriching Educational Experience, and Supportive Campus Environment (NSSE, 2006).

This chapter outlines Social Constructivism Theory; history of college under study; college persistence; student engagement; relationships among demographic variables, engagement, and persistence; and leading standardized test instruments. The review of literature suggests college persistence can be promoted. Relationships among demographic variables and persistence can be either positive or negative.

The review of literature further suggests that relationships between engagement and demographic variables can be positive or negative. There are demographic groups benefiting most from engagement, and institutions that promote engagement. Finally, the review of literature identifies positive and negative relationships for the five NSSE Benchmarks. Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items.

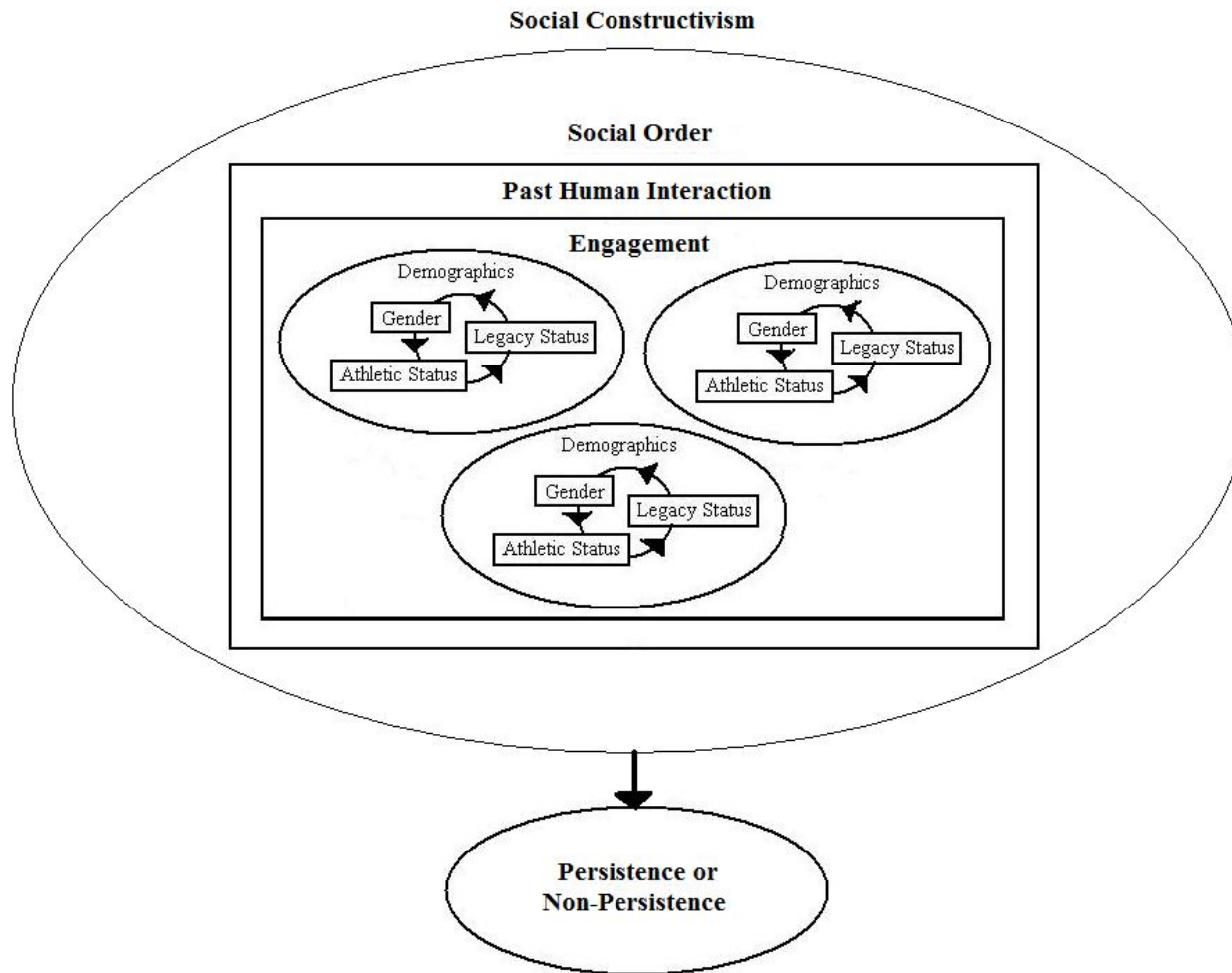
## Social Constructivism Theory

The conceptual underpinning for the study will be engagement as it pertains to social constructivism, which is a result of social interactions between students of different backgrounds and engagement at the institution under study. Berger and Luckmann (1966) assert social constructivism is based on a social order comprised of past human interaction. As a critical realist and postmodern view of human interaction, social constructivism asserts the subjectivist view no theory neutral language (Coghlan & Brannick, 2005) can exist in order to produce social order. Individuals, when interacting with others as a group, will construct or create subjective, artificial, constructs and accept constructs as if they were objective, naturally-occurring reality (Berger & Luckmann).

For this study, the context of social constructivism is that students of different demographic backgrounds and engagement create a social order based on past human interaction. This study looked for interaction effects and sought knowledge about past human interaction. To this end, the research by Berger and Luckmann (1966) helped interpret social order based on past human interaction, and the research by Coghlan and Brannick (2005) provided the foundation that “no theory neutral language” (p. 5) in this past human interaction is possible.

These ideas informed the data by setting a foundation for interaction of engagement, persistence, gender, athletic status, and legacy status. Each variable has its own place in the social order, thus influencing student decisions concerning engagement and persistence. Findings give insight into how the college under study can enhance the NSSE Benchmark activity for persisters, gender, athletes, and legacies. Therefore, social constructivism, as depicted in Figure 1, provides the lens for the study of student

engagement, persistence, gender, athletic status, and legacy status. Given the Social Constructivism Theory outlined in this section, the history of the college is explored in the next section.



*Figure 1: A conceptual model of the conceptual underpinning, engagement as it pertains to social constructivism, which is a result of social interactions between students of different backgrounds at the institution under study*



## History of College under Study

The co-ed college under study is located in a Midwestern community 45 miles from a major metropolitan area. It boasts a rich history of having formed through a merger of a male and a female college. Founded on a specific religion, the male college began in 1858 as a boarding school to prepare men for priesthood and various commercial ventures. In 1868 the college was incorporated by the state to confer degrees. For nearly 50 years, the college practiced the same philosophy until the curriculum was expanded to include more traditional liberal arts courses. In 1927 the college became accredited as a liberal arts college (College Website, 2008).

Founded on the same religion as the male college, the female academy opened in 1863 with 44 students. In 1924 a female junior college was formed, only to become a female senior college in 1932. As the male and female colleges grew, more collaboration became common among them. In 1971 the two colleges merged to form the current co-ed college under study (College Website, 2008).

Since the 1971 merger, the college has experienced great fluctuations in enrollment. At the time of the merger the college had high enrollment numbers and graduation rates. As years passed, these numbers declined slowly. In 1993 enrollment hit an all time low of 493 students. At this time the college devised new ways to market the college and athletic programs. The college enjoyed gradual growth over the next decade, and now has record enrollment of 1,299 students. Given the history of the college explored in this section, the concept of college persistence is discussed in the next section (College Website, 2008).

## College Persistence

Relationships can be explored for persistence and student engagement by several demographic variables. Students, parents, faculty, and administrators can use research to understand and develop approaches to promoting persistence to graduation. Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items. This section on college persistence outlines both the positive and negative relationships between demographic variables and persistence. The next section on student engagement outlines both the positive and negative relationships between demographic variables and engagement.

There are positive and negative relationships between demographic variables and persistence. Positive relationships include standardized test scores, high school GPAs, female gender, legacy status, and male athletes, while negative relationships to persistence exist for female athletic status. First, students with high standardized test scores persist (Antley, 1999; Ishitani & DesJardins, 2002). Second, students with high GPAs persist (Acker, Hughes, & Fendley, 2002; Berkner, He, & Cataldi, 2002; Fredda, 2000; Gifford, Briceno-Perriott, & Mianzo, 2006; Ikegulu & Barham, 1997; Ishitani & Snider, 2004; Zhu, 2002). Third, while some studies indicate female students persist (Ronco & Cahill, 2004; Zhu, 2002), some studies show no persistence relationship with gender (Gao, Hughes, O'Rear, & Fendley, 2002). Fourth, students with legacy status persist (Ishitani, 2005). Finally, some studies show males with athletic status persist (Coakley, 2004; Eitzen & Sage, 2003; Leppel, 2006). Furthermore, negative relationships to persistence exist for females with athletic status (Coakley, 2004; Leppel, 2006).

Relationships can be found for persistence and student engagement by several demographic variables. Students, parents, faculty, and administrators can use research to understand and promote persistence to graduation as well as student engagement. Given the concept of college persistence outlined in this section, the concept of student engagement will be outlined in the next section.

### Student Engagement

Student engagement is a learning environment where students are active participants in, not merely passive recipients of their own education; it is widely accepted that student engagement contributes to persistence (Astin, 1993; Chickering & Gamson, 1987; NSSE, 2006; Pascarella & Terenzini, 1991; Tinto, 1993). Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items. The next section investigates NSSE history, engagement and demographic variables, and NSSE Benchmarks. The positive relationships for persistence and student engagement by demographic variables are depicted in Table 1.

Table 1  
*Positive Relationships for Persistence and Student Engagement by Demographic Variables*

	Persistence	Student Engagement
Standardized test scores	Yes	No
High school GPA	Yes	Yes
Female gender	Yes	Yes
Legacy status	Yes	Yes
Male athletes	Yes	Yes

(Acker, Hughes, & Fendley, 2002; Antley, 1999; Astin, 1993; Chickering & Gamson, 1987; Coakley, 2004; Berkner, He, & Cataldi, 2002; Eitzen & Sage, 2003; Fredda, 2000; Gao, Hughes, O'Rear, & Fendley, 2002; Gifford, Briceno-Perriott, & Mianzo, 2006; Ikegulu & Barham, 1997; Ishitani, 2005; Ishitani & DesJardins, 2002; Ishitani & Snider, 2004; Leppel, 2006; NSSE, 2006; Pascarella & Terenzini, 1991; Ronco & Cahill, 2004; Tinto, 1993; Zhu, 2002)

### *NSSE History*

Indiana University Professor, George Kuh, established NSSE in 2000 with a \$3.3 million grant from The Pew Charitable Trusts. Today, NSSE is self-supported through

fees that range from \$1,800 to \$7,800 based on institutional enrollment (NSSE, 2006). NSSE established national Benchmarks for Level of Academic Challenge, Active and Collaborative Learning, Student-Faculty Interaction, Enriching Educational Experiences, and Supportive Campus Environment for each Carnegie 2000 Classification of Institutions of Higher Education (NSSE, 2006). Peter Ewell of The National Center for Higher Education Management Systems led the team that developed the NSSE instrument in 1998 (Ouimet, Carini, Kuh, & Bunnage, 2001).

NSSE Benchmarks help colleges and universities identify relationships and better respond to both accountability questions and print media's accepted college and university rankings (NSSE Annual Student Report, 2006). Critics assert that rankings focus on institutional resource levels (ACLS Teagle Foundation, 2007; Pike, 2003; Stoering & Lu, 2002) and admission selectivity (Astin, 1976); but, high student engagement levels facilitate student learning (Gong, Presley, & White, 2006; Gordon, Ludlum, & Hoey, 2006; Herzog 2004; Li & Killian, 1999; Liu & Liu, 2000).

### *Engagement and Demographic Variables*

Past research has found relationships between demographic variables and student engagement, and demographic variables and engagement benefits. Furthermore, there are institutions that promote engagement. First, the most engaged demographic groups include females, and those with high high school GPAs, legacy status (Hu & Kuh, 2002), and athletic status (Umbach, Palmer, Kuh, & Hannah, 2006). Second, groups benefiting most from engaging activities include students with low standardized test scores (Carini, Kuh, & Klein, 2006), and students with legacy status (Filkins & Doyle, 2002). Third, institution types that better promote engagement than their counterparts include faith-

based colleges (Kuh & Gonyea, 2006), private colleges (Gonyea & Kuh, 2006), and liberal arts colleges (Umbach & Wawrzynski, 2004). Furthermore, female institutions more effectively engage women than co-ed counterparts (Kinzie, Thomas, Palmer, Umbach, & Kuh, 2007).

#### *Five NSSE Benchmarks*

Although this study focused on only two NSSE Benchmarks, research has outlined student response to engagement activities categorized by five NSSE Benchmarks. The Benchmarks include Academic Challenge, Active and Collaborative Learning, Student-Faculty Interaction, Enriching Educational Experience and Supportive Campus Environment.

*Academic Challenge.* Research supports a positive relationship between high levels of academic challenge and persistence. . Furthermore, faculty members who emphasize academic challenge promote engagement (Ryan, 2005; Umbach & Wawrzynski, 2004) and faculty teaching general education courses place greater emphasis on academic challenge (Laird, Niskode, & Kuh, 2006). Women at single-sex colleges report high levels of academic challenge (Kinzie, Thomas, Palmer, Umbach, & Kuh, 2007). Some research indicates that females respond positively to academic challenges (Landry, 2002-2003). Other research indicates that academic stress and low self-esteem have a negative impact on female persistence (Rayle, Arredondo, & Kurpius, 2005). Students with athletic status report that they are as or more academically challenged than their counterparts report (Umbach, Palmer, Kuh, & Hannah, 2006).

*Active and Collaborative Learning.* Research supports a positive relationship between high levels of active and collaborative learning and persistence. Collaborative

learning promotes engagement (Bruffee, 1995; Umbach & Wawrzynski, 2004), women faculty members emphasize collaborative learning (Laird, Garver, & Niskode, 2007), and legacy status students benefit from collaborative learning (Filkins & Doyle, 2002). Women at single-sex colleges report high levels of active and collaborative learning (Kinzie, Thomas, Palmer, Umbach, & Kuh, 2007). Learning communities promote engagement (Zhao & Kuh, 2004), and students working in teams improve active and collaborative learning (Katzenbach & Smith, 1993).

Some research indicates that active and collaborative learning techniques are preferred by (Cabrera, Nora, Bernal, Terenzini, & Pascarella, 1998) and effective for females (Goldstein & Puntambeka, 2004; Hwang, Chen, & Hsu, 2006). Some research indicates that female-only groups respond better to active and collaborative learning techniques than co-ed groups (Hendry, Heinrich, Lyon, Barratt, Simpson, Hyde, Gonsalkorale, & Mgaieth, 2005). However, some research found females were uncomfortable with active and collaborative learning techniques (Ocker & Yaverbaum, 2004). Active and collaborative learning techniques are effective for non-legacy students (Filkins & Doyle, 2002).

*Student-Faculty Interaction.* Research supports a positive relationship between high levels of student-faculty interaction and persistence. Research supports the positive impact of small class size (Choy 2002), extended faculty office hours (Colbeck, Caffrey, Heller, Lattuca, Reason, Strauss, Terenzini, Volkweinm, & Reindl, 2003), supportive faculty environment (Gloria 1999), feelings of community (Leana, 1994), and service learning (Mundy & Eyler 2002). Research indicates that faculty interaction is particularly important to females (Noldon, Kim, & Sedlacek, 2000; Sax, Bryant, & Harper, 2005).

*Enriching Educational Experience.* Research supports a positive relationship between high levels of enriching educational experience and persistence. An enriching educational experience is created where faculty members value creating it (Umbach & Wawrzynski, 2004). Research indicates that active and collaborative learning techniques promoted student openness to diversity, which is an enriching educational experience aspect (Cabrera, Nora, Bernal, Terenzini, & Pascarella, 1998).

*Supportive Campus Environment.* Research supports a positive relationship between high levels of supportive campus environment and persistence. Freshman Seminar (Hendel, 2001), student attachment and adaptation (Kennedy, Sheckley, & Kehrhahn, 2000), and campus community (Leana, 1994) promote persistence.

Research indicates that severe home sickness adversely affects female persistence (Gold, Miller, & Rotholz, 2001). Furthermore, research indicates that responsibility for children, low income, and no career goals adversely affect female persistence (Heenan, 2002). However, other research indicates that responsibility for children has a positive effect on female persistence (Leppel, 2002). Gender equity in the classroom (Landry, 2003), as well as social support, self-beliefs, and university comfort positively affect female persistence (Rayle, Kurpius, & Arredondo, 2005-2007). Females serve as role models making persistence an important variable (Thomas, 1998).

Student engagement is a learning environment where students are active participants in, not merely passive recipients of their own education; it is widely accepted that student engagement is an effective means for promoting persistence (Astin, 1993; Chickering & Gamson, 1987; NSSE, 2006; Pascarella & Terenzini, 1991; Tinto, 1993). Increased knowledge could result in the creation of college persistence programs focused

on specific demographic variables and engagement items. Given the concept of student engagement explored in this section, the standardized test concept is explored in the next section.

### Standardized Test

The college under study accepts both ACT and Scholastic Aptitude Test (SAT) standardized test scores for admission. The ACT is a standardized test generating student scores in English, Math, Reading, and Science. It is a competency-based test rather than aptitude or intelligence based test. It was first administered in 1959 and has been a 50-state examination since 1960. The average composite score is 21.2 (CollegeBoard, 2008).

The SAT is a standardized test generating student scores in Critical Thinking, Math, and Writing. It is an assessment examination that measures critical thinking skills. It was first administered in 1901 by The College Board. The average composite score is 1511 (CollegeBoard, 2008).

### Summary

In this chapter, the review of literature suggests that achieving increased student persistence begins with identifying persistence factors. Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items. The NSSE is a leading instrument for helping colleges and universities understand persistence factors as well as identify relationships among factors. The instrument measures five engagement factors believed to promote persistence; 1) Academic Challenge, 2) Active and Collaborative Learning, 3) Student-Faculty Interaction, 4) Enriching Educational Experience, and 5) Supportive Campus Environment (NSSE, 2006).



This chapter outlined Social Constructivism Theory; history of college under study; college persistence; student engagement; relationships among demographic variables, engagement, and persistence; and leading standardized test instruments. Relationships among demographic variables and persistence can be either positive or negative. Furthermore, relationships between engagement and demographic variables can be positive or negative. There are demographic groups benefiting most from engagement, and institutions that promote engagement. Finally, the review of literature identified positive and negative relationships for the five NSSE Benchmarks. Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items.

The next chapter addresses the problem under study and its purpose. Furthermore, research questions, null hypotheses, study group, research design, and data collection are discussed.

## CHAPTER THREE

### RESEARCH DESIGN AND METHODOLOGY

Higher education institutions continually pursue ways to increase graduation and persistence rates. Many studies suggest strategies to ensure college persistence (Glynn, Sauer, & Miller, 2003; Ryan & Glenn, 2004; Stith & Russell, 1994). Despite these suggestions, there is a lack of knowledge regarding National Survey of Student Engagement (NSSE) socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college. Increased knowledge could result in higher education institutions creating college persistence programs focused on specific demographic variables and engagement items.

This study examined a private Midwestern college to compare student variables engagement, persistence, gender, athletic status, and legacy status. This chapter addresses the problem under study and its purpose. Furthermore, research questions, null hypotheses, study population, research design, and data collection are discussed.

#### Problem and Purpose Overview

The purpose of this study is to address the lack of information regarding identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college. The influence of the independent variables of student persistence, gender, athletic status, and legacy status upon the dependent variable, engagement, was studied when ACT or Scholastic Aptitude Test (SAT) standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

These two Benchmarks were selected for examination at the request of an administrative officer at the college under study due to the relevance of the Benchmark behavior items to institutional goals. No studies have been conducted at the institution under study regarding identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when ACT or SAT standardized test scores and high school GPAs are held constant.

This study provides descriptive summary statistics regarding variables persistence, gender, athletic status, legacy status, standardized test scores, and high school GPAs for each behavior item within two NSSE Benchmarks. The Benchmarks used are; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

Second, this study describes main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study. The two Benchmarks are; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

Third, this study determines whether clusters of behavior items describing membership of the population exist within two NSSE Benchmarks. The two Benchmarks to be used in the study are; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

Furthermore, this study provides a model that can be used by college administration and faculty to guide implementation of measures to increase persistence and graduation rates. The review of literature highlights themes emphasizing the need for

understanding demographic variables and engagement to determine persistence.

Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement behavior items.

#### *Statement of the Problem*

There is a lack of information regarding identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college for behavior items within two NSSE Benchmarks. The two Benchmarks are; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

#### *Purpose of the Study*

The purpose is to address the lack of information regarding identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. These Benchmarks were selected for examination at the request of an administrative officer at the college under study due to the relevance of the Benchmark behavior items to institutional goals. Student archival data from school years 2002-2006 at the institution under study was analyzed, including student demographic variables and NSSE data. Student archival data included four cohorts of first year students from fall 2002, fall 2003, fall 2004, and fall 2005 to determine their persistence to the fall of the following year for each respective cohort. The cohorts were pooled and considered as a single group.

In order to accomplish this purpose, the study provides descriptive summary statistics of students at the college under study regarding variables persistence, gender, athletic status, legacy status, standardized test scores, and high school GPAs for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

Second, this study provides main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

Third, this study determines whether clusters of behavior items describe membership of the study group exist for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

#### *Research Questions*

Three research questions guided the study. Each question considers both the independent and dependent variables.

*Research question one.* What are the descriptive summary statistics of students regarding variables persistence, gender, athletic status, legacy status, ACT or SAT standardized test scores, and high school GPAs (frequency, percent) for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment (mean, standard deviation)?

*Research question two.* Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic

status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Research question three.* Are there clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction (six behavior items) and 2) Supportive Campus Environment (six behavior items)?

#### *Null Hypotheses*

Two null hypotheses were tested. Each hypothesis considers both independent and dependent variables.

*Null hypothesis for research question two.* There are no main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

*Null hypothesis for research question three.* There are no clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

#### *Summary*

This section outlined the purpose of this study, to address the lack of information regarding identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when ACT or SAT standardized test scores and high school GPAs are held

constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

This study provides a descriptive summary statistics regarding six variables for each behavior item within two NSSE Benchmarks. It describes main and interaction effects of student engagement among six variables for each behavior item within two NSSE Benchmarks under study, and determines whether clusters of behavior items describing membership of the population exist within two NSSE Benchmarks.

Furthermore, a model will be proposed for the college administration and faculty to guide implementation of measures to increase persistence and graduation rates. Given the study's problem and purpose as outlined in this section, the methodology is explored in the next section.

### Methodology

The following methodology guided the study. It describes research design, study population, data collection, and data analysis for the study.

#### *Research Design*

The research design is a quantitative, pre-experimental, post-post comparison study (Yin, 2003). A descriptive summary statistics analysis, four-way analysis of covariance (ANCOVA), and discriminant analysis (Field, 2005) were used to examine data collected from Empower<sup>®</sup>, an archival databases at the institution under study over a period of four years.

Data collected from the archival database reflect purposive, non-probability sampling (Field, 2005) of 319 students pooled from four student cohorts, from first year students in the fall semesters of 2002, 2003, 2004, and 2005 identified NSSE

socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college

The dependent variable, engagement, was studied to identify engagement membership clusters for the independent variables, persistence, gender, athletic status, and legacy status of students. The study included two of five NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. These Benchmarks were selected for examination at the request of an administrative officer of the college under study due to the relevance of the benchmark behavior items to institutional goals.

A four-way ANCOVA was utilized to seek main and interaction effects of the independent variables, persistence, gender, athletic status, and legacy status of students, and the dependent variable, NSSE engagement behavior items. ANCOVA Covariates were ACT or SAT standardized test scores and high school GPAs.

The athletic status variable was chosen by an administrative officer at the college under study because in 1993 the college began aggressively and successfully recruiting athletes as a means of increasing enrollment. Available research is not definitive in terms of persistence of athletes (Coakley, 2004; Eitzen & Sage, 2003; Leppel, 2006; Shulman & Bowen, 2001). The college under study can gain valuable information from this study, during this time of record enrollment, to ascertain persistence of these athletes.

The legacy status variable was chosen by the college under study because the college aggressively and successfully pursues legacies. Research reveals that a negative relationship to persistence exists for students without legacy status (Ishitani, 2005), and those students with legacy status benefit from engaging activities (Filkins & Doyle, 2002).



The persistence variable was chosen because it is widely accepted that engagement contributes to persistence (Astin, 1993; Chickering & Gamson 1987; NSSE, 2006; Pascarella & Terenzini, 1991; Tinto, 1993). High school ACT or SAT standardized test scores and high school GPAs were selected as covariates for analysis of main and interaction effects. Both covariates exhibit high correlations to engagement (Kuh, 2004).

Study methodology was designed to answer student engagement and persistence questions put forth by the college under study as it interpreted its NSSE College Report, while having broader application to similar educational institutions who seek to improve engagement and persistence of students at the college under study. Given the research design, quantitative, pre-experimental study (Yin, 2003), as outlined in this section, the study group is outlined in the next section.

#### *Study Group*

The study group of 319 students for this study, depicted in Table 2, is a non-probability, purposive sample (Field, 2005) of four student cohorts from the college under study, from first year students in the fall semesters of 2002, 2003, 2004, and 2005. The sample consists of 72 fall 2002 first year students, 87 fall 2003 first year students, 78 fall 2004 first year students, and 82 fall 2005 first year students.

This sample represents 319 self selected first year students, from a pool of 400 students randomly selected by NSSE to take the NSSE instrument, from each class in 2002, 2003, 2004, and 2005. The 319 first year student participants were tracked through the fall of the following year for each respective cohort using Empower<sup>®</sup>, the student archival databases of the college under study to determine if students persisted to the following fall. Additional study group information is provided in Table 22.

Table 2  
*Study Groups by Year*

Year	NSSE Selected	Respondents
2002	100	72
2003	100	87
2004	100	78
2005	100	82
Total	400	319

(NSSE College Report, 2003; NSSE College Report 2004; NSSE College Report, 2005; NSSE College Report, 2006)

In examining whether 319 of 400 students is a representative sample, a website (<http://www.surveysystem.com/sscalc.htm>) provided a formula for calculating the Confidence Interval of 2.47. A Confidence Interval of 2.47 translates into a 97.53% confidence that the sample is representative of the population. This Confidence Level exceeds the required 95% Confidence Level (0.05 alpha level). Given the study population and confidence interval as outlined in this section, the variables are defined in the next section.

### *Variables*

The following variables were selected for this study. They include independent variables of persistence gender, athletic status, and legacy status, dependent variables of NSSE Benchmark behavior items, and covariates of high school GPAs and ACT or SAT standardized test scores.

*Athletic status.* Athletic status is defined as college-sponsored, National Association of Intercollegiate Athletics, football, softball, baseball, basketball, cross country, soccer, spirit squad, tennis, track and field and volleyball team members and non-members.

*High school grade point average.* High School GPA is defined as average cumulative grade point earned in high school on a four-point scale.

*Legacy status.* Legacy status is defined as students reporting previous family members attending the college under study and students reporting no previous family members attending the college under study.

*NSSE Active and Collaborative Learning.* Active and Collaborative Learning is based on the premise that student learning is improved, and students are better prepared for life in general when students are active and collaborative in their learning activities. Active learning requires thought and practical application of learning while collaborative learning requires communication and working with others (NSSE, 2007). The seven behaviors for this Benchmark are depicted in Table 3 (NSSE, 2007, p. 44).

Table 3

*NSSE Active and Collaborative Learning Benchmark Behavior Items*

Number	Behavior Item
1	Asked questions in class or contributed to class discussions ("CLQUEST")
2	Made a class presentation (CLPRESEN)
3	Worked with other students on projects during class (CLASSGRP)
4	Worked with classmate outside of class to prepare class assignments (OCCGRP)
5	Tutored or taught other students (TUTOR)
6	Participated in a community-based project as part of a regular course (COMMPRO)
7	Discussed ideas from your readings or classes with others outside of class (OCCIDEAS)

(National Survey of Student Engagement, 2007)

*NSSE Enriching Educational Experience.* Enriching Educational Experiences is based on the premise that student learning is improved when students apply learning within and outside the classroom, experience cultural diversity, and utilize technology (NSSE, 2007). The twelve behaviors for this Benchmark are depicted in Table 4.

Table 4  
*NSSE Enriching Educational Experiences Benchmark Behavior Items*

Number	Behavior Item
1	Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values (DIFFSTU2)
2	Had serious conversations with students of a different race or ethnicity than your own (DIVRSTUD)
3	Institutional emphasis: Encouraging contact among students from different economic, social, and racial or ethnic backgrounds (ENVDIVRS)
4	Hours per 7-day week spent participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.) (COCURR01)
5	Used an electronic medium (listserv, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment (ITACADEM)
6	Practicum, internship, field experience, co-op experience, or clinical assignment (INTER04)
7	Community service or volunteer work (LRNCOM04)
8	Participate in a learning community or some other formal program where groups of students take two or more classes together (VOLNTR04)
9	Foreign language coursework (FORLNG04)
10	Study abroad (STDABR04)
11	Independent study or self-designed major (INDSTD04)
12	Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.) (SNRX04)

(National Survey of Student Engagement, 2007)

*NSSE Level of Academic Challenge.* Level of Academic Challenge is based on the premise that student learning is improved when students are challenged and expected to meet high expectations (NSSE, 2007). The nine behaviors for this Benchmark are depicted in Table 5.

Table 5  
*NSSE Level of Academic Challenge Benchmark Behavior Items*

Number	Behavior Item
1	Number of written papers or reports of 20 pages or more (WRITEMOR)
2	Number of written papers or reports between 5 and 19 pages (WRITEMID)
3	Number of written pages or reports of fewer than 5 pages (WRITESML)
4	Coursework emphasized: Analyzing the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components (ANALYZE)
5	Coursework emphasized: 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 (EVALUATE)
6	Course emphasized: Applying theories or concepts to practical problems or in new situations (APPLYING)
7	Worked harder than you thought you could to meet an instructor's standards or expectations (WORKHARD)
8	Hours per 7-day week spent preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities) (ACADPR01)
9	Institutional emphasis: Spending significant amounts of time studying on academic work (ENVSCHOL)

(National Survey of Student Engagement, 2007)

*NSSE Student-Faculty Interaction.* Student-Faculty Interaction is based on the premise that student learning is improved when students interact with faculty both within and outside the classroom (NSSE, 2007). The six behaviors of this Benchmark are depicted in Table 6.

Table 6  
*NSSE Student-Faculty Interaction Benchmark Behavior Items*

Number	Behavior Item
1	Discussed grades or assignments with an instructor (FACGRADE)
2	Discussed ideas from your readings or classes with faculty members outside of class (FACIDEAS)
3	Talked about career plans with a faculty member or advisor (FACPLANS)
4	Received prompt written or oral feedback from faculty on your academic performance (FACFEED)
5	Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.) (FACOTHER)
6	Work on a research project with a faculty member outside of course or program requirements (RESEARCH)

(National Survey of Student Engagement, 2007)

*NSSE Supportive Campus Environment.* Supportive Campus Environment is based on the premise that student learning is improved when students feel supported by college personnel and have positive, diverse relationships on campus (NSSE, 2007, p. 49). The six behaviors for this Benchmark are depicted in Table 7.

Table 7  
*NSSE Supportive Campus Environment Benchmark Behavior Items*

Number	Behavior Item
1	Institutional emphasis: Providing the support you need to thrive socially (ENVSOCAL)
2	Institutional emphasis: Providing the support you need to help you succeed academically (ENVSUPRT)
3	Institutional emphasis: Helping you cope with your non-academic responsibilities (work, family, etc.) (ENVNACAD)
4	Quality: Your relationships with other students (ENVSTU)
5	Quality: Your relationships with faculty members (ENVFAC)
6	Quality: Your relationships with administrative personnel and offices (ENVADM)

(National Survey of Student Engagement, 2007)

*Persistence.* Persistence is defined as students from each of the four fall first year student cohorts; 2002, 2003, 2004, and 2005, who are still attending the college under study the fall of the following year for each respective cohort. Students who persist are referred to as persisters. Students who do not are referred to as non-persisters.

*Standardized test score.* Standardized Test Score is defined as either student ACT or SAT scores used by the college under study for admissions. ACT is a standardized test generating student scores in English, Math, Reading, and Science. It is a competency-based test rather than aptitude or intelligence based test. SAT is a standardized test generating student scores in Critical Thinking, Math, and Writing. It is an assessment examination that measures critical thinking skills (CollegeBoard, 2008).

#### *Data Collection*

Given the study group of 319 students of a non-probability, purposive sample (Field, 2005) of four student cohorts from first year students in the fall semesters of 2002, 2003, 2004, and 2005, the data collection is discussed. The study addressed the lack of information regarding identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Covariates for the study include high school GPAs and ACT or SAT standardized test scores.

Prior to data retrieval, an IRB was secured. Second, persistence, gender, athletic status, legacy status, high school GPA, ACT or SAT standardized test, NSSE Supportive Campus Environment Benchmark behavior items, and NSSE Student-Faculty Interaction Benchmark behavior items of 319 first year students was retrieved electronically from Empower<sup>®</sup>, an archival database at the college under study. Data were stored in Microsoft Excel spreadsheet files to minimize potential for secondary human data entry

error. Data were exported from Excel to the statistical program SPSS Version 14.0 for analysis on a laptop PC.

*ACT and SAT.* The college under study uses both ACT and SAT as the standardized test for admission. Standardized test data were converted based on The College Student Report Standardized Test Conversion Table (Appendix A) before statistical analysis.

*Empower<sup>®</sup>.* The college under study has used Empower<sup>®</sup> as the student database since 2003 to maintain a large amount of student data in a simple, reliable format. Empower<sup>®</sup> is based on an Oracle database system, which provides a high level of user-friendliness and reliability. The database enables users to mine data and generate reports with ease. In addition to usability by administration and faculty at the college under study, students are able to track grades, check schedules, and enroll through a secure web portal on Empower<sup>®</sup>. The Director of Application Support in the Technology and Information Systems department at the college under study oversees Empower<sup>®</sup> use and support.

*National Survey of Student Engagement.* NSSE is an annual survey administered to students across the United States during the Spring semester. The survey is designed to provide estimates of student participation in various programs while attending college. Data received from the survey reflect what students gain through various forms of student engagement during their college career. Questions on the survey are designed to reflect best practices in higher education, which also reflects desired outcomes of college (NSSE, 2006).

NSSE Benchmarks help colleges and universities respond to accountability questions and accepted college and university rankings in popular print media (NSSE, 2006). Information gathered from the survey can be used by institutions to design better college experiences. By providing a student-centric college experience, persistence and graduation rates should increase. In addition, prospective students and their parents can gain a better idea of average student life at various colleges. This information can assist college admissions departments recruit prospective students by leveraging favorable NSSE data.

The NSSE instrument is forty questions, available in paper or web versions, and takes approximately fifteen minutes to complete. NSSE was tested for validity and reliability and has an approximate 39% response rate (NSSE, 2006).

There are five NSSE Benchmarks; 1) Level of Academic Challenge, 2) Active and Collaborative Learning, 3) Student-Faculty Interaction, 4) Enriching Educational Experience, and 5) Supportive Campus Environment. Each NSSE Benchmark is scored on a 100-point scale. Tables 8–11 depict the college under study's first year student scores, for 2002, 2003, 2004, and 2005 cohorts, for a five NSSE Benchmarks as compared to other Master's-S and national colleges. Table 8 depicts the college under study's 2002 first year student scores for all five NSSE Benchmarks as compared to other Master's-S and national colleges (College Student Report, 2003).



Table 8  
*2002 First Year Students NSSE Benchmark Scores Comparison*

NSSE Benchmark	First Year Students 2002		
	College under Study	Master's-S	National
Level of Academic Challenge	51.8	52.7	53.9
Active and Collaborative Learning	40.5	41.1	41.8
Student-Faculty Interaction	40.9	35.7	37.2
Enriching Educational Experiences	61.6	55.4	57.7
Supportive Campus Environment	64.7	61.1	61.8

(College Student Report, 2003)

Table 9 depicts the college under study's 2003 first year student scores for all five NSSE Benchmarks as compared to other Master's-S and national colleges. (College Student Report, 2004).

Table 9  
*2003 First Year Students NSSE Benchmark Scores Comparison*

NSSE Benchmark	First Year Students 2003		
	College under Study	Master's-S	National
Level of Academic Challenge	54.1	52.6	53.6
Active and Collaborative Learning	43.3	41.6	42.3
Student-Faculty Interaction	36	32.3	33.3
Enriching Educational Experiences	28.9	25.8	26.7
Supportive Campus Environment	72.5	62.3	62.8

(College Student Report, 2004)

Table 10 depicts the college under study's 2004 first year student scores for all five NSSE Benchmarks as compared to other Master's-S and national colleges (College Student Report, 2005).

Table 10  
*2004 First Year Students NSSE Benchmark Scores Comparison*

NSSE Benchmark	First Year Students 2004		
	College under Study	Master's-S	National
Level of Academic Challenge	48.1	51.7	52.6
Active and Collaborative Learning	43.9	42.5	42.4
Student-Faculty Interaction	34.8	33.9	34.0
Enriching Educational Experiences	30.3	26.7	27.8
Supportive Campus Environment	67.0	60.1	60.1

(College Student Report, 2005)

Table 11 depicts the college under study's 2005 first year student scores for all five NSSE Benchmarks as compared to other Master's-S and national colleges (College Student Report, 2006).

Table 11  
2005 First Year Students NSSE Benchmark Scores Comparison

NSSE Benchmark	First Year Students 2005		
	College under Study	Master's-S	National
Level of Academic Challenge	51.8	53.4	51.8
Active and Collaborative Learning	41.8	43.4	41.3
Student-Faculty Interaction	35.2	35.5	32.1
Enriching Educational Experiences	29.5	27.4	26.7
Supportive Campus Environment	66.7	61.4	59.1

(College Student Report, 2006)

The Supportive Campus Environment Benchmark and Student-Faculty Interaction Benchmark were selected for examination at the request of an administrative officer at the college under study for the relevance of the behavior items to institutional goals.

*Instrument.* The NSSE instrument is forty questions, available in paper or web versions, and takes approximately 15 minutes to complete. NSSE was tested for validity and reliability and has an approximate 39% response rate (NSSE, 2006). Given the data collection as outlined in this section, the data analysis is explored in the next section.

#### *Data Analysis*

Data were analyzed with SPSS Version 14.0 computer software. Descriptive summary statistics analysis, four-way ANCOVA, and discriminant analysis, were conducted.

*Descriptive summary statistics analysis.* Descriptive summary statistics analysis was conducted on all data to gain general understanding of the sample. Descriptive summary statistics analysis provided the number and percent for the variables gender, athletic status, legacy status, and persistence, as well as the variables ACT or SAT

standardized test scores, GPA, NSSE Supportive Campus Environment, and NSSE Student-Faculty Interaction. The analysis answered research question one.

*Four-Way ANCOVA.* The four-way ANCOVA tested the main and interaction effects of student engagement upon persistence of students at the college under study among variables of gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. The four-way ANCOVA addressed research question two, as well as the null hypothesis for research question two.

*Discriminant analysis.* A discriminant analysis was conducted to find membership groups of independent variables most associated with the dependent variable (Field, 2005). Discriminant analysis addressed research question three, as well as the null hypothesis for research question three.

### Summary

This section described the study's research design, study population, data collection, instrumentation, and data analysis. The research design is a quantitative, pre-experimental, post-post comparison study (Yin, 2003). The study group of 319 students is a non-probability, purposive sample (Field, 2005) pooled from four first year student cohorts from the fall semesters of 2002, 2003, 2004, and 2005. Data collection involved retrieving, with permission, four years of data electronically from Empower<sup>®</sup>, an archival database at the college under study. Data analysis involved SPSS Version 14.0 generating a descriptive summary statistics analysis, four-way ANCOVA, and discriminant analysis (Field, 2005).

Chapter three described the study's methodology. An introduction was provided. The study's purpose is to address the lack of information regarding identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college for each behavior item within two NSSE Benchmarks. The research questions provided descriptive summary statistics regarding six variables for each behavior item within two NSSE Benchmarks; described main and interaction effects of engagement among six variables for each behavior item within these benchmarks; and determined whether clusters of behavior items describing membership of the population exist within these benchmarks. The null hypotheses were provided and the population for the study, or the purposive, non-probability sample (Field, 2005) of 319 first year students from four cohorts from 2002, 2003, 2004, and 2005 were described. The research design is a quantitative, pre-experimental, post-post comparison study (Yin, 2003).

Data collection and analysis was provided including description of variables and statistical methods for analysis. The data source was an archival database at the institution under study. The dependent variable for the study was engagement as measured by behavior items within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. The independent variables were persistence, gender, athletic status, and legacy status. Covariates for the study are mean data from high school GPA and ACT or SAT standardized test scores. Data were analyzed using descriptive summary statistics, four-way ANCOVA, and discriminant analysis (Field, 2005).

## CHAPTER FOUR

### PRESENTATION AND ANALYSIS OF DATA

This chapter provides the problem and purpose overview, study design, and data analysis. Data analysis includes descriptive statistical analysis results, four-way analysis of covariance (ANCOVA), and discriminant analysis.

#### Problem and Purpose Overview

The purpose of this study is to address the lack of information regarding the identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. No studies have been conducted at the college under study regarding the influence of the dependent variable, engagement upon the independent variables, persistence, gender, athletic status, and legacy status of students.

A descriptive summary statistics of students at the college under study regarding variables, persistence, gender, athletic status, legacy status, standardized test scores, and high school GPAs for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment are provided. This will answer research question one: What are the descriptive summary statistics of students regarding variables persistence, gender, athletic status, legacy status, ACT or SAT standardized test scores, and high school GPAs (frequency, percent) for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment (mean, standard deviation)?

Second, this study describes and outlines the main and interaction effects of student engagement at the college under study among variables persistence gender, athletic status, and legacy status when standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. This will answer research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

Third, this study determines whether clusters of behavior items describe membership of the study group exist for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Furthermore, this study provides a model that can be used by college administration and faculty to guide implementation of measures to increase engagement, persistence, and thus, graduation rates. This will answer research question three: Are there clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction (six behavior items) and 2) Supportive Campus Environment (six behavior items)?

The review of literature highlights themes regarding engagement and persistence for various demographic variables. Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement behavior items.

### *Statement of the Problem*

There is a lack of information regarding the identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when standardized test scores and high school GPAs are held constant. The dependent variable, engagement, was studied to identify engagement clusters for the independent variables, persistence, gender, athletic status, and legacy status of students for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

### *Purpose of the Study*

The purpose of this study is to address the lack of information regarding the identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college. The influence of the dependent variable, engagement, upon the independent variables, persistence, gender, athletic status, and legacy status of students at the college under study when ACT or SAT standardized test scores and high school GPAs are held constant, are examined. Student archival data from school years 2002-2006 at the college under study was analyzed, including student demographic data and NSSE data. These data, categorized by four first year student cohorts from the fall semesters of 2002, 2003, 2004, and 2005, were studied as they persist to the following respective year.

In order to accomplish this purpose, this study provides descriptive summary statistics of students regarding variables, persistence, gender, athletic status, legacy status, standardized test scores and high school GPAs of first year students at the college under study for each behavior item within two NSSE Benchmarks; 1) Student-Faculty

Interaction and 2) Supportive Campus Environment. These Benchmarks were selected for examination at the request of an administrative officer at the college under study due to the relevance of the Benchmark behavior items to institutional goals.

Second, this study describes main and interaction effects of student engagement at the college under study among variables, persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Third, it determines whether clusters of Benchmark behavior items describe membership of the population for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

#### Design of the Study

The research design is a quantitative, pre-experimental, post-post comparison study (Yin, 2003). A descriptive summary statistics analysis, four-way analysis of covariance (ANCOVA), and discriminant analysis (Field, 2005) were used to examine data collected from Empower<sup>®</sup>, an archival databases at the institution under study over a period of four years.

Data collected from the archival database reflect purposive, non-probability sampling (Field, 2005) of 319 students pooled from four student cohorts, from first year students in the fall semesters of 2002, 2003, 2004, and 2005 identified NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college



The dependent variable, engagement, was studied through discriminant analysis to identify engagement membership clusters for the independent variables, persistence, gender, athletic status, and legacy status of students. The study included two of five NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. These Benchmarks were selected for examination at the request of an administrative officer of the college under study due to the relevance of the Benchmark behavior items to institutional goals.

A four-way ANCOVA was utilized to seek main and interaction effects of the independent variables, persistence, gender, athletic status, and legacy status of students, and the dependent variable, NSSE engagement behavior items. ANCOVA Covariates were ACT or SAT standardized test scores and high school GPAs.

The athletic status variable was chosen by an administrative officer at the college under study because in 1993 the college began aggressively and successfully recruiting athletes as a means of increasing enrollment. Available research is not definitive in terms of persistence of athletes (Coakley, 2004; Eitzen & Sage, 2003; Leppel, 2006; Shulman & Bowen, 2001). The college under study can gain valuable information from this study, during this time of record enrollment, to ascertain persistence of these athletes.

The legacy status variable was chosen by the college under study because the college aggressively and successfully pursues legacies. Research reveals that a negative relationship to persistence exists for students without legacy status (Ishitani, 2005), and those students with legacy status benefit from engaging activities (Filkins & Doyle, 2002).

The persistence variable was chosen because it is widely accepted that engagement contributes to persistence (Astin, 1993; Chickering & Gamson 1987; NSSE, 2006; Pascarella & Terenzini, 1991; Tinto, 1993). High school ACT or SAT standardized test scores and high school GPAs were selected as covariates for analysis of main and interaction effects. Both covariates exhibit high correlations to engagement (Kuh, 2004).

Study methodology was designed to answer student engagement and persistence questions put forth by the college under study as it interpreted its NSSE College Report, while having broader application to similar educational institutions who seek to improve engagement and persistence of students at the college under study. Given the research design, quantitative, pre-experimental study (Yin, 2003), as outlined in this section, the study group is outlined in the next section.

#### *Study Group*

The study group of 319 students for this study, depicted in Table 12, is a non-probability, purposive sample (Field, 2005) of four student cohorts from the college under study, from first year students in the fall semesters of 2002, 2003, 2004, and 2005. The sample consists of 72 fall 2002 first year students, 87 fall 2003 first year students, 78 fall 2004 first year students, and 82 fall 2005 first year students.

This sample represents 319 randomly selected first year students from each class in 2002, 2003, 2004, and 2005, to take the NSSE instrument. The 319 first year student participants were tracked through the fall of the following year for each respective cohort using Empower<sup>®</sup>, the student archival databases of the college under study to determine if students persisted to the following fall.

Table 12  
*Study Groups by Year*

Year	NSSE Selected	Respondents
2002	100	72
2003	100	87
2004	100	78
2005	100	82
Total	400	319

(NSSE College Report, 2003; NSSE College Report 2004; NSSE College Report, 2005; NSSE College Report, 2006)

In examining whether 319 of 400 students is a representative sample, a website (<http://www.surveysystem.com/sscalc.htm>) provided a formula for calculating the Confidence Interval of 2.47. A Confidence Interval of 2.47 translates into a 97.53% confidence that the sample is representative of the population. This Confidence Level exceeds the required 95% Confidence Level (0.05 alpha level). Given the study population and confidence interval as outlined in this section, the variables are defined in the next section.

### *Variables*

Several variables were selected for this study. They include independent variables of persistence gender, athletic status, and legacy status, dependent variables of NSSE Benchmark behavior items, and covariates of high school GPAs and ACT or SAT standardized test scores.

*Athletic status.* Athletic status is defined as college-sponsored, National Association of Intercollegiate Athletics, football, softball, baseball, basketball, cross country, soccer, spirit squad, tennis, track and field and volleyball team members and non-members.

*High school grade point average.* High School GPA is defined as average cumulative grade point earned in high school on a four-point scale.

*Legacy status.* Legacy status is defined as students reporting previous family members attending the college under study and students reporting no previous family members attending the college under study.

*NSSE Active and Collaborative Learning.* Active and Collaborative Learning is based on the premise that student learning is improved, and students are better prepared for life in general when students are active and collaborative in their learning activities. Active learning requires thought and practical application of learning while collaborative learning requires communication and working with others (NSSE, 2007). The seven behavior items for this Benchmark are depicted in Table 13 (NSSE, 2007, p. 44).

Table 13

*NSSE Active and Collaborative Learning Benchmark Behavior Items*

Number	Behavior Item
1	Asked questions in class or contributed to class discussions (CLQUEST)
2	Made a class presentation (CLPRESEN)
3	Worked with other students on projects during class (CLASSGRP)
4	Worked with classmate outside of class to prepare class assignments (OCCGRP)
5	Tutored or taught other students (TUTOR)
6	Participated in a community-based project as part of a regular course (COMMPRO)
7	Discussed ideas from your readings or classes with others outside of class (OOCIDEAS)

(National Survey of Student Engagement, 2007)

*NSSE Enriching Educational Experience.* Enriching Educational Experiences is based on the premise that student learning is improved when students apply learning within and outside the classroom, experience cultural diversity, and utilize technology (NSSE, 2007). The twelve behavior items for this Benchmark are depicted in Table 14.

Table 14  
*NSSE Enriching Educational Experiences Benchmark Behavior Items*

Number	Behavior Item
1	Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values (DIFFSTU02)
2	Had serious conversations with students of a different race or ethnicity than your own (DIVRSTUD)
3	Institutional emphasis: Encouraging contact among students from different economic, social, and racial or ethnic backgrounds (ENVDIVRS)
4	Hours per 7-day week spent participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.) (COCURR01)
5	Used an electronic medium (listserv, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment (ITACADEM)
6	Practicum, internship, field experience, co-op experience, or clinical assignment (INTER04)
7	Community service or volunteer work (LMCOM04)
8	Participate in a learning community or some other formal program where groups of students take two or more classes together (VOLNTR04)
9	Foreign language coursework (FORLNG04)
10	Study abroad (STDABR04)
11	Independent study or self-designed major (INDSTD04)
12	Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.) (SNRX04)

(National Survey of Student Engagement, 2007)

*NSSE Level of Academic Challenge.* Level of Academic Challenge is based on the premise that student learning is improved when students are challenged and expected to meet high expectations (NSSE, 2007). The nine behavior items for this Benchmark are depicted in Table 15.

Table 15  
*NSSE Level of Academic Challenge Benchmark Behavior Items*

Number	Behavior Item
1	Number of written papers or reports of 20 pages or more (WRITEMOR)
2	Number of written papers or reports between 5 and 19 pages (WRITEMID)
3	Number of written pages or reports of fewer than 5 pages (WRITESML)
4	Coursework emphasized: Analyzing the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components (ANALYZE)
5	Coursework emphasized: 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 (EVALUATE)
6	Course emphasized: Applying theories or concepts to practical problems or in new situations (APPLYING)
7	Worked harder than you thought you could to meet an instructor's standards or expectations (WORKHARD)
8	Hours per 7-day week spent preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities) (ACADPR01)
9	Institutional emphasis: Spending significant amounts of time studying on academic work (ENVSCHOL)

(National Survey of Student Engagement, 2007)

*NSSE Student-Faculty Interaction.* Student-Faculty Interaction is based on the premise that student learning is improved when students interact with faculty both within and outside the classroom (NSSE, 2007). The six behavior items of this Benchmark are depicted in Table 16.

Table 16  
*NSSE Student-Faculty Interaction Benchmark Behavior Items*

Number	Behavior Item
1	Discussed grades or assignments with an instructor (FACGRADE)
2	Discussed ideas from your readings or classes with faculty members outside of class (FACIDEAS)
3	Talked about career plans with a faculty member or advisor (FACPLANS)
4	Received prompt written or oral feedback from faculty on your academic performance (FACFEED)
5	Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.) (FACOTHER)
6	Work on a research project with a faculty member outside of course or program requirements (RESEARCH)

(National Survey of Student Engagement, 2007)

*NSSE Supportive Campus Environment.* Supportive Campus Environment is based on the premise that student learning is improved when students feel supported by college personnel and have positive, diverse relationships on campus (NSSE, 2007, p. 49). The six behavior items for this Benchmark are depicted in Table 17.

Table 17  
*NSSE Supportive Campus Environment Benchmark Behavior Items*

Number	Behavior Item
1	Institutional emphasis: Providing the support you need to thrive socially (ENVSOCAL)
2	Institutional emphasis: Providing the support you need to help you succeed academically (ENVSUPRT)
3	Institutional emphasis: Helping you cope with your non-academic responsibilities (work, family, etc.) (ENVNACAD)
4	Quality: Your relationships with other students (ENVSTU)
5	Quality: Your relationships with faculty members (ENVFAC)
6	Quality: Your relationships with administrative personnel and offices (ENVADM)

(National Survey of Student Engagement, 2007)

*Persistence.* Persistence is defined as students from each of the four fall first year student cohorts; 2002, 2003, 2004, and 2005, who are still attending the college under study the fall of the following year for each respective cohort. Students who persist are referred to as persisters. Students who do not are referred to as non-persisters.

*Standardized test score.* Standardized Test Score is defined as either student ACT or SAT scores used by the college under study for admissions. ACT is a standardized test generating student scores in English, Math, Reading, and Science. It is a competency-based test rather than aptitude or intelligence based test. SAT is a standardized test generating student scores in Critical Thinking, Math, and Writing. It is an assessment examination that measures critical thinking skills (CollegeBoard, 2008).

#### *Data Collection*

Given the study group of 319 students of a non-probability, purposive sample (Field, 2005) of four student cohorts from first year students in the fall semesters of 2002, 2003, 2004, and 2005, the data collection is discussed. The study addressed the lack of information regarding identification of NSSE socialization variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Covariates for the study include high school GPAs and ACT or SAT standardized test scores.

Prior to data retrieval, an IRB was secured. Second, persistence, gender, athletic status, legacy status, high school GPA, ACT or SAT standardized test, NSSE Student-Faculty Interaction Benchmark behavior items, and NSSE Supportive Campus Environment Benchmark behavior items of 319 first year students were retrieved electronically from Empower<sup>®</sup>, an archival database at the college under study. Data were stored in Microsoft Excel spreadsheet files to minimize potential for secondary human

data entry error. Data were exported from Excel to the statistical program SPSS Version 14.0 for analysis on a laptop PC.

*ACT and SAT.* The college under study uses both ACT and SAT as the standardized test for admission. Standardized test data were converted based on The College Student Report Standardized Test Conversion Table (Appendix A) before statistical analysis.

*Empower<sup>®</sup>.* The college under study has used Empower<sup>®</sup> as the student database since 2003 to maintain a large amount of student data in a simple, reliable format. Empower<sup>®</sup> is based on an Oracle database system, which provides a high level of user-friendliness and reliability. The database enables users to mine data and generate reports with ease. In addition to usability by administration and faculty at the college under study, students are able to track grades, check schedules, and enroll through a secure web portal on Empower<sup>®</sup>. The Director of Application Support in the Technology and Information Systems department at the college under study oversees Empower<sup>®</sup> use and support.

*National Survey of Student Engagement.* NSSE is an annual survey administered to students across the United States during the Spring semester. The survey is designed to provide estimates of student participation in various programs while attending college. Data received from the survey reflect what students gain through various forms of student engagement during their college career. Questions on the survey are designed to reflect best practices in higher education, which also reflects desired outcomes of college (NSSE, 2006).



NSSE Benchmarks help colleges and universities respond to accountability questions and accepted college and university rankings in popular print media (NSSE, 2006). Information gathered from the survey can be used by institutions to design better college experiences. By providing a student-centric college experience, persistence and graduation rates should increase. In addition, prospective students and their parents can gain a better idea of average student life at various colleges. This information can assist college admissions departments recruit prospective students by leveraging favorable NSSE data.

The NSSE instrument is forty questions, available in paper or web versions, and takes approximately fifteen minutes to complete. NSSE was tested for validity and reliability and has an approximate 39% response rate (NSSE, 2006). NSSE was first administered in 2000 to 63,000 freshmen and seniors at 276 participating colleges and universities and has experienced annual increased participation (NSSE, 2006).

There are five NSSE Benchmarks; 1) Level of Academic Challenge, 2) Active and Collaborative Learning, 3) Student-Faculty Interaction, 4) Enriching Educational Experience, and 5) Supportive Campus Environment. Each NSSE Benchmark is scored on a 100-point scale. Tables 18 - 21 depict the college under study's first year student scores, for 2002, 2003, 2004, and 2005 cohorts, for a five NSSE Benchmarks as compared to other Master's-S and national colleges. Table 18 depicts the college under study's 2002 first year student scores for all five NSSE Benchmarks as compared to other Master's-S and national colleges (College Student Report, 2003).

Table 18

*2002 First Year Students NSSE Benchmark Scores Comparison*

NSSE Benchmark	First Year Students 2002		
	College under Study	Master's-S	National
Level of Academic Challenge	51.8	52.7	53.9
Active and Collaborative Learning	40.5	41.1	41.8
Student-Faculty Interaction	40.9	35.7	37.2
Enriching Educational Experiences	61.6	55.4	57.7
Supportive Campus Environment	64.7	61.1	61.8

(College Student Report, 2003)

Table 19 depicts the college under study's 2003 first year student scores for all five NSSE Benchmarks as compared to other Master's-S and national colleges. (College Student Report, 2004).

Table 19

*2003 First Year Students NSSE Benchmark Scores Comparison*

NSSE Benchmark	First Year Students 2003		
	College under Study	Master's-S	National
Level of Academic Challenge	54.1	52.6	53.6
Active and Collaborative Learning	43.3	41.6	42.3
Student-Faculty Interaction	36.0	32.3	33.3
Enriching Educational Experiences	28.9	25.8	26.7
Supportive Campus Environment	72.5	62.3	62.8

(College Student Report, 2004)

Table 20 depicts the college under study's 2004 first year student scores for all five NSSE Benchmarks as compared to other Master's-S and national colleges (College Student Report, 2005).

Table 20

*2004 First Year Students NSSE Benchmark Scores Comparison*

NSSE Benchmark	First Year Students 2004		
	College under Study	Master's-S	National
Level of Academic Challenge	48.1	51.7	52.6
Active and Collaborative Learning	43.9	42.5	42.4
Student-Faculty Interaction	34.8	33.9	34.0
Enriching Educational Experiences	30.3	26.7	27.8
Supportive Campus Environment	67.0	60.1	60.1

(College Student Report, 2005)

Table 21 depicts the college under study's 2005 first year student scores for all five NSSE Benchmarks as compared to other Master's-S and national colleges (College Student Report, 2006).

Table 21  
2005 First Year Students NSSE Benchmark Scores Comparison

NSSE Benchmark	First Year Students 2005		
	College under Study	Master's-S	National
Level of Academic Challenge	51.8	53.4	51.8
Active and Collaborative Learning	41.8	43.4	41.3
Student-Faculty Interaction	35.2	35.5	32.1
Enriching Educational Experiences	29.5	27.4	26.7
Supportive Campus Environment	66.7	61.4	59.1

(College Student Report, 2006)

The Student-Faculty Interaction Benchmark and Supportive Campus Environment Benchmark were selected for examination at the request of an administrative officer at the college under study due to the relevance of the Benchmark behavior items to institutional goals.

*Instrument.* The NSSE instrument is forty questions, available in paper or web versions, and takes approximately 15 minutes to complete. NSSE was tested for validity and reliability and has an approximate 39% response rate (NSSE, 2006). Given the data collection as outlined in this section, the data analysis is explored in the next section.

#### *Data Analysis*

Data were analyzed with SPSS Version 14.0 computer software. Descriptive summary statistics analysis, four-way ANCOVA, and discriminant analysis, were conducted.

#### Descriptive Statistical Analysis Results

Descriptive summary statistics analysis was conducted on all data to gain general understanding of the sample. Descriptive summary statistics analysis answered research

question one. Table 22 demonstrates the number and percent for the nominal variables gender, athletic status, legacy status, and persistence. The study group had a greater representation of females (N = 225) than males (N = 94), of non-athletes (N = 195) than athletes (N = 124), of non-legacies (N = 233) than legacies (N = 86), and of persisters (N = 273) than non-persisters (N = 46).

Table 22  
*Descriptive Summary Statistics for Nominal Variables*

Group	Sub-Groups	N	Percent
Gender	Male	94	29.5
	Female	225	70.5
Athletic Status	Athlete	124	38.9
	Non-Athlete	195	61.1
Legacy Status	Legacy	86	27.0
	Non-Legacy	233	73.0
Persistence	Persister	273	85.6
	Non-Persister	46	14.4

Table 23 depicts the NSSE Behavior Item Scale Key for 1) Student-Faculty Interaction, and 2) Supportive Campus Environment. This table will provided clarity for the means of scalar variables in Table 24.

Table 23  
*NSSE Behavior Item Scale Key*

Source	Scale
NSSE Student and Faculty Interaction	
FACGRADE	1=VERY OFTEN, 2=OFTEN, 3=SOMETIMES, 4=NEVER
FACIDEAS	1=VERY OFTEN, 2=OFTEN, 3=SOMETIMES, 4=NEVER
FACPLANS	1=VERY OFTEN, 2=OFTEN, 3=SOMETIMES, 4=NEVER
FACFEED	1=VERY OFTEN, 2=OFTEN, 3=SOMETIMES, 4=NEVER
FACOTHER	1=VERY OFTEN, 2=OFTEN, 3=SOMETIMES, 4=NEVER
RESEARCH	1=done, 2=plan to do, 3=do not plan to do, 4=have not decided
NSSE Supportive Campus Environment	
ENVSOCAL	1=VERY OFTEN, 2=OFTEN, 3=SOMETIMES, 4=NEVER
ENVSUPRT	1=VERY OFTEN, 2=OFTEN, 3=SOMETIMES, 4=NEVER
ENVNACAD	1=VERY OFTEN, 2=OFTEN, 3=SOMETIMES, 4=NEVER
ENVSTU	1=unfriendly/unsupportive/sense of alienation, 7=friendly./supportive/sense of belonging
ENVFAC	1=unavailable/unhelpful/unsympathetic, 7=available/helpful/sympathetic
ENVADM	1=unhelpful/inconsiderate/rigid, 7=helpful/considerate/flexible

Table 24 depicts the demonstration of the scalar variables ACT or SAT standardized test scores, high school GPA, as well each behavior item for NSSE 1) Student-Faculty Interaction and 2) Supportive Campus Environment for the study group (N = 319). The average standardized test score is 23.88 with a standard deviation of 4.14. The average high school GPA is 3.48 on a 4.0 scale with a standard deviation of 0.47.

There are six behavior items for Student-Faculty Interaction and six behavior items for Supportive Campus Environment. Of the 319 respondents, 318 responded to each behavior item. The Student-Faculty Interaction behavior items are as follows. The mean for the “FACGRADE” behavior item is 2.62 on a 4.0 scale, with a standard deviation of 0.84, meaning students often discussed grades with an instructor. The mean for the “FACIDEAS” behavior item is 1.86 on a 4.0 scale, with a standard deviation of 0.79, meaning students very often discussed ideas from readings or classes with faculty members outside of class. The mean for the “FACPLANS” behavior item is 2.30 on a 4.0

scale, with a standard deviation of 0.85, meaning students often talked about career plans with faculty members or advisors. The mean for the “FACFEED” behavior item is 2.54 on a 4.0 scale, with a standard deviation of 0.80, which means students often received prompt written or oral feedback from faculty on academic performance. The mean for the “FACOTHER” behavior item is 1.86 on a 4.0 scale, with a standard deviation of 0.86, meaning students very often worked with faculty members on activities other than coursework. The mean for the “RESEARCH” behavior item is 2.03 on a 4.0 scale, with a standard deviation of 0.96, meaning students plan to work on research projects with a faculty member outside of course or program requirements.

The Supportive Campus Environment behavior items are as follows. The mean for the “ENVSOCAL” behavior item is 2.72 on a 4.0 scale, with a standard deviation of 0.88, meaning students feel the institution often provides the support they need to thrive socially. The mean for the “ENVSUPRT” behavior item is 3.20 on a 4.0 scale, with a standard deviation of 0.71, meaning students feel the institution sometimes provides the support needed to help them succeed academically. The mean for the “ENVNACAD” behavior item is 2.39 on a 4.0 scale, with a standard deviation of 0.92, meaning students feel the institution often helps them cope with non-academic responsibilities. The mean for the “ENVSTU” behavior item is 5.97 on a 7.0 scale, with a standard deviation of 1.30, meaning students feel their relationships with other students is friendly, supportive, and inclusive. The mean for the “ENVFAC” behavior item is 5.82 on a 7.0 scale, with a standard deviation of 1.00, meaning students feel faculty are available, helpful, and sympathetic. The mean for the “ENVADM” behavior item is 5.34 on a 7.0 scale, with a

standard deviation of 1.40, meaning students feel administration is helpful, considerate, and flexible.

Table 24  
*Descriptive Summary Statistics for Scalar Variables*

Source	N	Mean	SD	Skewness Statistic	Std. Error	Kurtosis Statistic	Std. Error
Standardized Test: ACT or SAT	319	23.88	4.14	0.07	0.14	-0.71	0.27
High School GPA	319	3.48	0.47	-0.82	0.14	-0.02	0.27
NSSE Student-Faculty Interaction							
"FACEGRADE"	318	2.62	0.84	0.20	0.14	-0.72	0.27
"FACEIDEAS"	318	1.86	0.79	0.61	0.14	-0.23	0.27
"FACEPLANS"	319	2.30	0.85	0.36	0.14	-0.42	0.27
"FACEFEED"	319	2.54	0.80	0.20	0.14	-0.50	0.27
"FACEOTHER"	319	1.86	0.86	0.79	0.14	-0.06	0.27
"RESEARCH"	317	2.03	0.96	0.16	0.14	-1.51	0.27
NSSE Supportive Campus Environment							
"ENVSOCAL"	318	2.72	0.88	-0.26	0.14	-0.62	0.27
"ENVSUPRT"	318	3.20	0.71	-0.47	0.14	-0.33	0.27
"ENVNACAD"	318	2.39	0.92	0.18	0.14	-0.76	0.27
"ENVSTU"	319	5.97	1.30	-1.55	0.14	2.22	0.27
"ENVFAC"	319	5.82	1.00	-0.88	0.14	1.11	0.27
"ENVADM"	319	5.34	1.40	-0.82	0.14	0.28	0.27

For some items only 318 of the 319 responded

#### Four-Way Analysis of Covariance (ANCOVA) Results

The four-way ANCOVA tested the main and interaction effects of student engagement upon persistence of students at the college under study among variables of gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. The four-way ANCOVA addressed research question two, as well as the null hypothesis for research question two. This null hypothesis was rejected; significant main and interaction effects were found.

Tables 25 - 36 depict the four-way ANCOVA descriptive statistics and test of significance for persistence, gender, athletic status, and legacy status for each behavior item within the Student-Faculty Interaction Benchmark. Tables 37 - 48 depict the four-way ANCOVA descriptive statistics and test of significance for persistence, gender, athletic status, and legacy status for each behavior item within the Supportive Campus Environment Benchmark.

*Student-Faculty Interaction "FACGRADE"*

Table 25 depicts the four-way ANCOVA descriptive statistics and Table 26 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 4.0 scale, for the Student-Faculty Interaction "FACGRADE" behavior item, which is discussed grades or assignments with an instructor. The mean for persister, male, legacy, athlete (N = 8) is 2.38, with a standard deviation of 0.52. The mean for persister, male, legacy, non-athlete (N = 11) is 2.27, with a standard deviation of 0.79. The mean for persister, male, non-legacy, athlete (N = 35) is 2.60, with a standard deviation of 0.85. The mean for persister, male, non-legacy, non-athlete (N = 23) is 2.43, with a standard deviation of 0.66.

The mean for persister, female, legacy, athlete (N = 23) is 2.61, with a standard deviation of 0.78. The mean for persister, female, legacy, non-athlete (N = 36) is 2.53, with a standard deviation of 0.81. The mean for persister, female, non-legacy, athlete (N = 46) is 2.91, with a standard deviation of 0.92. The mean for persister, female, non-legacy, non-athlete (N = 91) is 2.70, with a standard deviation of 0.84.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 3.00, with a standard



deviation of 1.00. The mean for non-persister, male, non-legacy, athlete (N = 6) is 2.17, with a standard deviation of 0.41. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 2.63, with a standard deviation of 1.06.

The mean for non-persister, female, legacy, athlete (N = 2) is 1.00, with a standard deviation of 0.00. The mean for non-persister, female, legacy, non-athlete (N = 3) is 1.67, with a standard deviation of 0.58. The mean for non-persister, female, non-legacy, athlete (N = 4) is 3.00, with a standard deviation of 0.82. The mean for non-persister, female, non-legacy, non-athlete (N = 19) is 2.53, with a standard deviation of 0.77.

Table 25

*Four-Way ANCOVA Descriptive Statistics for NSSE Student-Faculty Interaction "FACGRADE"*

Source		N	Persister						Non-Persister					
			Male		Female		Male		Female					
			Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD	
Legacy	Athlete	8	2.38	0.52	23	2.61	0.78	0	0.00	0.00	2	1.00	0.00	
	Non-Athlete	11	2.27	0.79	36	2.53	0.81	3	3.00	1.00	3	1.67	0.58	
Non-Legacy	Athlete	35	2.60	0.85	46	2.91	0.92	6	2.17	0.41	4	3.00	0.82	
	Non-Athlete	23	2.43	0.66	91	2.70	0.84	8	2.63	1.06	19	2.53	0.77	

Table 26 depicts the four-way ANCOVA test of significance for persistence, gender, athletic status, and legacy status for the Student-Faculty Interaction "FACGRADE" behavior items, which is discussed grades or assignments with an instructor. The two significant effects found were the main effect of legacy status (sig. 0.01,  $\text{Eta}^2 = 0.02$ , Power = 0.76) and the main effect persistence (sig. 0.05,  $\text{Eta}^2 = 0.01$ , Power = 0.50). Although these main effects are significant, the effect sizes are low and the power is moderate. There are no significant interaction effects.

Table 26  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Student-Faculty  
 Interaction "FACGRADE"

Source	SS	df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	2.60	1	2.60	3.87	0.05*	0.01	0.50
Gender	0.03	1	0.03	0.05	0.83	0.00	0.06
Athletic Status	0.24	1	0.24	0.36	0.55	0.00	0.09
Legacy Status	4.83	1	4.83	7.19	0.01*	0.02	0.76
Persistence x Gender	1.24	1	1.24	1.85	0.18	0.01	0.27
Persistence x Athletic Status	1.22	1	1.22	1.82	0.18	0.01	0.27
Persistence x Legacy Status	1.76	1	1.76	2.61	0.11	0.01	0.36
Gender x Athletic Status	1.21	1	1.21	1.80	0.18	0.01	0.27
Gender x Legacy Status	1.48	1	1.48	2.20	0.14	0.01	0.32
Athletic Status x Legacy Status	0.99	1	0.99	1.48	0.23	0.01	0.23
Persistence x Gender x Athletic Status	1.21	1	1.21	1.80	0.18	0.01	0.27
Persistence x Gender x Legacy Status	1.31	1	1.31	1.95	0.16	0.01	0.29
Persistence x Athletic Status x Legacy Status	0.93	1	0.93	1.39	0.24	0.01	0.22
Gender x Athletic Status x Legacy Status	0.01	1	0.01	0.02	0.89	0.00	0.05
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance =< 0.05  $r^2 = .086$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Finding for research question two.* There are main effects for the "FACGRADE" behavior item and legacy status and persistence. Non-legacies and persisters discussed grades or assignments with an instructor more than legacies and non-persisters. Furthermore, students regardless of gender, athletic status, and persistence are reporting similar experiences for the Behavior Item "FACGRADE." This finding rejects the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Student-Faculty Interaction “FACIDEAS”*

Table 27 depicts the four-way ANCOVA descriptive statistics and Table 28 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 4.0 scale, for the Student-Faculty Interaction “FACIDEAS” behavior item, which is discussed ideas from your readings or classes with faculty members outside of class.

The mean for persister, male, legacy, athlete (N = 7) is 1.71, with a standard deviation of 1.11. The mean for persister, male, legacy, non-athlete (N = 11) is 2.18, with a standard deviation of 0.60. The mean for persister, male, non-legacy, athlete (N = 35) is 1.74, with a standard deviation of 0.89. The mean for persister, male, non-legacy, non-athlete (N = 23) is 1.78, with a standard deviation of 0.74.

The mean for persister, female, legacy, athlete (N = 23) is 1.83, with a standard deviation of 0.78. The mean for persister, female, legacy, non-athlete (N = 36) is 1.78, with a standard deviation of 0.68. The mean for persister, female, non-legacy, athlete (N = 46) is 1.98, with a standard deviation of 0.75. The mean for persister, female, non-legacy, non-athlete (N = 91) is 1.91, with a standard deviation of 0.88.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 1.33, with a standard deviation of 0.58. The mean for non-persister, male, non-legacy, athlete (N = 6) is 2.00, with a standard deviation of 0.63. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 1.75, with a standard deviation of 0.71.

The mean for non-persister, female, legacy, athlete (N = 2) is 1.00, with a standard deviation of 0.00. The mean for non-persister, female, legacy, non-athlete (N = 3) is 1.00, with a standard deviation of 0.00. The mean for non-persister, female, non-

legacy, athlete (N = 4) is 2.25, with a standard deviation of 0.50. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 1.50, with a standard deviation of 0.61.

Table 27

*Four-Way ANCOVA Descriptive Statistics for NSSE Student-Faculty Interaction "FACIDEAS"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	7	1.71	1.11	23	1.83	0.78	0	0.00	0.00	2	1.00	0.00
	Non-Athlete	11	2.18	0.60	36	1.78	0.68	3	1.33	0.58	3	1.00	0.00
Non-Legacy	Athlete	35	1.74	0.89	46	1.98	0.75	6	2.00	0.63	4	2.25	0.50
	Non-Athlete	23	1.78	0.74	91	1.99	0.88	8	1.75	0.71	20	1.50	0.61

Table 28 depicts the four-way ANCOVA test of significance for persistence, gender, athletic status, and legacy status for the Student-Faculty Interaction "FACIDEAS" behavior item, which is discussed ideas from your readings or classes with faculty members outside of class. There is one significant main effect for persistence (sig. = 0.04), with a low effect size ( $\text{Eta}^2 = 0.01$ ), and a moderate power (Power = 0.55). There is one significant interaction effect for persistence, legacy (sig. = 0.05), with a low effect size ( $\text{Eta}^2 = 0.01$ ), and moderate power (Power = 0.52).

Table 28  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Student-Faculty  
 Interaction "FACIDEAS"

Source	SS	Df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	2.68	1	2.68	4.33	0.04*	0.01	0.55
Gender	0.02	1	0.02	0.02	0.88	0.00	0.05
Athletic Status	0.03	1	0.03	0.05	0.82	0.00	0.06
Legacy Status	2.19	1	2.19	3.54	0.06	0.01	0.47
Persistence x Gender	0.00	1	0.00	0.00	0.96	0.00	0.05
Persistence x Athletic Status	0.33	1	0.33	0.53	0.47	0.00	0.11
Persistence x Legacy Status	2.52	1	2.52	4.07	0.05*	0.01	0.52
Gender x Athletic Status	1.06	1	1.06	1.71	0.19	0.01	0.26
Gender x Legacy Status	0.22	1	0.22	0.36	0.55	0.00	0.09
Athletic Status x Legacy Status	0.94	1	0.94	1.52	0.22	0.01	0.23
Persistence x Gender x Athletic Status	0.34	1	0.34	0.55	0.46	0.00	0.12
Persistence x Gender x Legacy Status	0.34	1	0.34	0.55	0.46	0.00	0.11
Persistence x Athletic Status x Legacy Status	0.51	1	0.51	0.82	0.37	0.00	0.15
Gender x Athletic Status x Legacy Status	0.60	1	0.60	0.97	0.33	0.00	0.17
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance =< 0.05  $r^2 = .066$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Finding for research question two.* Students in the study group report discussing ideas from readings or class with faculty members outside of class. There is main effect between the "FACIDEAS" behavior item and persistence. There is also an interaction effect between the "FACIDEAS" behavior item and persistence, legacy. Persisters report discussing ideas more than non-persisters. Non-persisters, legacies report discussing ideas more often than persisters, legacies; but persister, non-legacies report discussing ideas more often than non-persister, non-legacies. Furthermore, students regardless of gender and athletic status are reporting similar experiences for "FACIDEAS" This finding rejects the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables

persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Student-Faculty Interaction “FACPLANS”*

Table 29 depicts the four-way ANCOVA descriptive statistics and Table 30 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 4.0 scale, for the Student-Faculty Interaction “FACPLANS” behavior item, which is talked about career plans with a faculty member or advisor.

The mean for persister, male, legacy, athlete (N = 8) is 1.88, with a standard deviation of 0.84. The mean for persister, male, legacy, non-athlete (N = 11) is 2.18, with a standard deviation of 0.87. The mean for persister, male, non-legacy, athlete (N = 35) is 2.06, with a standard deviation of 0.77. The mean for persister, male, non-legacy, non-athlete (N = 23) is 2.35, with a standard deviation of 0.89.

The mean for persister, female, legacy, athlete (N = 23) is 2.43, with a standard deviation of 0.73. The mean for persister, female, legacy, non-athlete (N = 36) is 2.33, with a standard deviation of 0.89. The mean for persister, female, non-legacy, athlete (N = 46) is 2.57, with a standard deviation of 0.81. The mean for persister, female, non-legacy, non-athlete (N = 91) is 2.38, with a standard deviation of 0.87.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 2.67, with a standard deviation of 0.58. The mean for non-persister, male, non-legacy, athlete (N = 6) is 2.00,

with a standard deviation of 0.63. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 2.38, with a standard deviation of 1.06.

The mean for non-persister, female, legacy, athlete (N = 2) is 1.50, with a standard deviation of 0.71. The mean for non-persister, female, legacy, non-athlete (N = 3) is 2.67, with a standard deviation of 1.16. The mean for non-persister, female, non-legacy, athlete (N = 4) is 2.50, with a standard deviation of 1.00. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 1.70, with a standard deviation of 0.73.

Table 29

*Four-Way ANCOVA Descriptive Statistics for NSSE Student-Faculty Interaction "FACPLANS"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	8	1.88	0.84	23	2.43	0.73	0	0.00	0.00	2	1.50	0.71
	Non-Athlete	11	2.18	0.87	36	2.33	0.89	3	2.67	0.58	3	2.67	1.16
Non-Legacy	Athlete	35	2.06	0.77	46	2.57	0.81	6	2.00	0.63	4	2.50	1.00
	Non-Athlete	23	2.35	0.89	91	2.38	0.87	8	2.38	1.06	20	1.70	0.73

Table 30 depicts the four-way ANCOVA test of significance for persistence, gender, athletic status, and legacy status for the Student-Faculty Interaction "FACPLANS" behavior item, which is talked about career plans with a faculty member or advisor. There are no significant main effects. There are three significant interaction effects for gender, athletic status (sig. = 0.01), with a low effect size ( $\text{Eta}^2 = 0.02$ ), and moderate power (Power = 0.71); for athletic status, legacy (sig. = 0.05), with a low effect size ( $\text{Eta}^2 = 0.01$ ), and moderate power (Power = 0.49); and for persistence, athletic status, legacy status (sig. = 0.03), with a low effect size (0.02), and moderate power (Power = 0.57).

Table 30  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Student-Faculty  
 Interaction "FACPLANS"

Source	SS	Df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	0.83	1	0.83	1.20	0.28	0.00	0.19
Gender	1.46	1	1.46	2.10	0.15	0.01	0.30
Athletic Status	1.48	1	1.48	2.13	0.15	0.01	0.31
Legacy Status	0.21	1	0.21	0.31	0.58	0.00	0.09
Persistence x Gender	0.14	1	0.14	0.20	0.66	0.00	0.07
Persistence x Athletic Status	0.83	1	0.83	1.19	0.28	0.00	0.19
Persistence x Legacy Status	0.00	1	0.00	0.00	0.98	0.00	0.05
Gender x Athletic Status	4.42	1	4.42	6.37	0.01*	0.02	0.71
Gender x Legacy Status	0.73	1	0.73	1.05	0.31	0.00	0.18
Athletic Status x Legacy Status	2.63	1	2.63	3.79	0.05*	0.01	0.49
Persistence x Gender x Athletic Status	0.91	1	0.91	1.31	0.25	0.00	0.21
Persistence x Gender x Legacy Status	0.59	1	0.59	0.84	0.36	0.00	0.15
Persistence x Athletic Status x Legacy Status	3.20	1	3.20	4.62	0.03*	0.02	0.57
Gender x Athletic Status x Legacy Status	0.00	1	0.00	0.01	0.94	0.00	0.05
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance = < 0.05  $r^2 = .094$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* For the "FACPLANS" behavior item, students report talking about career plans with a faculty member or advisor. There is an interaction effect between this Behavior Item and gender, athletic status. There is also an interaction effect between this Behavior Item and athletic status, legacy status. There is also an interaction effect for persistence, athletic status, legacy status. Among all independent variables, non-persisters, legacies, non-athletes report discussing career plans with faculty most often. Among all independent variables, non-persisters, female, legacies, athletes report discussing career plans least often. This finding rejects the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic



status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Student-Faculty Interaction “FACFEED”*

Table 31 depicts the four-way ANCOVA descriptive statistics and Table 32 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 4.0 scale, for the Student-Faculty Interaction “FACFEED” behavior item, which is received prompt written or oral feedback from faculty on your academic performance.

The mean for persister, male, legacy, athlete (N = 8) is 2.50, with a standard deviation of 0.76. The mean for persister, male, legacy, non-athlete (N = 11) is 2.36, with a standard deviation of 1.03. The mean for persister, male, non-legacy, athlete (N = 35) is 2.26, with a standard deviation of 0.78. The mean for persister, male, non-legacy, non-athlete (N = 23) is 2.52, with a standard deviation of 0.79.

The mean for persister, female, legacy, athlete (N = 23) is 2.57, with a standard deviation of 0.79. The mean for persister, female, legacy, non-athlete (N = 36) is 2.44, with a standard deviation of 0.74. The mean for persister, female, non-legacy, athlete (N = 46) is 2.72, with a standard deviation of 0.81. The mean for persister, female, non-legacy, non-athlete (N = 91) is 2.73, with a standard deviation of 0.78.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 2.33, with a standard deviation of 0.58. The mean for non-persister, male, non-legacy, athlete (N = 6) is 2.50, with a standard deviation of 0.55. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 2.13, with a standard deviation of 0.99.

The mean for non-persister, female, legacy, athlete (N = 2) is 2.50, with a standard deviation of 0.71. The mean for non-persister, female, legacy, non-athlete (N = 3) is 2.33, with a standard deviation of 1.16. The mean for non-persister, female, non-legacy, athlete (N = 4) is 3.00, with a standard deviation of 0.82. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 2.25, with a standard deviation of 0.79.

Table 31

*Four-Way ANCOVA Descriptive Statistics for NSSE Student-Faculty Interaction "FACFEED"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	8	2.50	0.76	23	2.57	0.79	0	0.00	0.00	2	2.50	0.71
	Non-Athlete	11	2.36	1.03	36	2.44	0.74	3	2.33	0.58	3	2.33	1.16
Non-Legacy	Athlete	35	2.26	0.78	46	2.72	0.81	6	2.50	0.55	4	3.00	0.82
	Non-Athlete	23	2.52	0.79	91	2.73	0.78	8	2.13	0.99	20	2.25	0.79

Table 32 depicts the four-way ANCOVA test of significance for persistence, gender, athletic status, and legacy status for the Student-Faculty Interaction "FACFEED" behavior item, which is received prompt written or oral feedback from faculty on your academic performance. There are no significant main or interaction effects.

Table 32

*Summary of Four-Way ANCOVA Test of Significance for NSSE Student-Faculty Interaction "FACFEED"*

Source	SS	df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	0.02	1	0.02	0.03	0.87	0.00	0.05
Gender	0.62	1	0.62	1.03	0.31	0.00	0.17
Athletic Status	0.97	1	0.97	1.58	0.21	0.01	0.24
Legacy Status	0.02	1	0.02	0.03	0.88	0.00	0.05
Persistence x Gender	7.01E-005	1	7.01E-005	0.00	0.99	0.00	0.05
Persistence x Athletic Status	1.02	1	1.02	1.68	0.20	0.01	0.25
Persistence x Legacy Status	0.20	1	0.20	0.32	0.57	0.00	0.09
Gender x Athletic Status	0.03	1	0.03	0.06	0.81	0.00	0.06
Gender x Legacy Status	0.42	1	0.42	0.70	0.41	0.00	0.13
Athletic Status x Legacy Status	0.05	1	0.05	0.09	0.77	0.00	0.06
Persistence x Gender x Athletic Status	0.00	1	0.00	0.00	0.96	0.00	0.05
Persistence x Gender x Legacy Status	0.02	1	0.02	0.04	0.84	0.00	0.06
Persistence x Athletic Status x Legacy Status	0.24	1	0.24	0.39	0.53	0.00	0.10
Gender x Athletic Status x Legacy Status	0.18	1	0.18	0.29	0.59	0.00	0.08
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance =< 0.05       $r^2 = .094$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* Although students report receiving prompt written or oral feedback from faculty on academic performance, there are no main or interaction effect between the "FACFEED" behavior item and any independent variable. This finding supports the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Student-Faculty Interaction “FACOTHER”*

Table 33 depicts the four-way ANCOVA descriptive statistics and Table 34 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 4.0 scale, for the Student-Faculty Interaction “FACOTHER” behavior item, which is worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.).

The mean for persister, male, legacy, athlete (N = 8) is 1.75, with a standard deviation of 0.71. The mean for persister, male, legacy, non-athlete (N = 11) is 1.73, with a standard deviation of 0.65. The mean for persister, male, non-legacy, athlete (N = 35) is 1.77, with a standard deviation of 0.84. The mean for persister, male, non-legacy, non-athlete (N = 23) is 1.78, with a standard deviation of 0.85.

The mean for persister, female, legacy, athlete (N = 23) is 2.17, with a standard deviation of 0.83. The mean for persister, female, legacy, non-athlete (N = 36) is 2.00, with a standard deviation of 0.76. The mean for persister, female, non-legacy, athlete (N = 46) is 1.91, with a standard deviation of 1.03. The mean for persister, female, non-legacy, non-athlete (N = 91) is 1.95, with a standard deviation of 0.92.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 2.00, with a standard deviation of 0.76. The mean for non-persister, male, non-legacy, athlete (N = 6) is 1.50, with a standard deviation of 0.84. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 1.75, with a standard deviation of 0.71.

The mean for non-persister, female, legacy, athlete (N = 2) is 1.00, with a standard deviation of 0.00. The mean for non-persister, female, legacy, non-athlete (N =

3) is 1.00, with a standard deviation of 0.00. The mean for non-persister, female, non-legacy, athlete (N = 4) is 2.00, with a standard deviation of 0.00. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 1.35, with a standard deviation of 0.49.

Table 33

*Four-Way ANCOVA Descriptive Statistics for NSSE Student-Faculty Interaction "FACOTHER"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	8	1.75	0.71	23	2.17	0.83	0	0.00	0.00	2	1.00	0.00
	Non-Athlete	11	1.73	0.65	36	2.00	0.76	3	2.00	1.00	3	1.00	0.00
Non-Legacy	Athlete	35	1.77	0.84	46	1.91	1.03	6	1.50	0.84	4	2.00	0.00
	Non-Athlete	23	1.78	0.85	91	1.95	0.92	8	1.75	0.71	20	1.35	0.49

Table 34 depicts the four-way ANCOVA test of significance for persistence, gender, athletic status, and legacy status for the Student-Faculty Interaction "FACOTHER" behavior item, which is worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.). There are no significant main or interaction effects.

Table 34  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Student-Faculty Interaction  
 "FACOTHER"

Source	SS	df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	2.22	1	2.22	3.08	0.08	0.01	0.42
Gender	0.00	1	0.00	0.00	0.99	0.00	0.05
Athletic Status	0.06	1	0.06	0.08	0.78	0.00	0.06
Legacy Status	0.28	1	0.28	0.39	0.53	0.00	0.10
Persistence x Gender	1.00	1	1.00	1.39	0.24	0.01	0.22
Persistence x Athletic Status	2.43E-07	1	2.43E-07	0.00	1.00	0.00	0.05
Persistence x Legacy Status	0.57	1	0.57	0.79	0.38	0.00	0.14
Gender x Athletic Status	0.77	1	0.77	1.07	0.30	0.00	0.18
Gender x Legacy Status	0.10	1	0.10	0.14	0.71	0.00	0.07
Athletic Status x Legacy Status	0.26	1	0.26	0.36	0.55	0.00	0.09
Persistence x Gender x Athletic Status	1.07	1	1.07	1.48	0.22	0.01	0.23
Persistence x Gender x Legacy Status	0.64	1	0.64	0.88	0.35	0.00	0.16
Persistence x Athletic Status x Legacy Status	0.45	1	0.45	0.62	0.43	0.00	0.12
Gender x Athletic Status x Legacy Status	0.08	1	0.08	0.11	0.74	0.00	0.06
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance =< 0.05       $r^2 = .073$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* For the "FACOTHER" behavior item, there are no main or interaction effects between this Behavior Item and any independent variable. The finding supports the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Student-Faculty Interaction “RESEARCH”*

Table 35 depicts the four-way ANCOVA descriptive statistics and Table 36 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 4.0 scale, for the Student-Faculty Interaction “RESEARCH” behavior item, which is course emphasized: applying theories or concepts to practical problems or in new situations.

The mean for persister, male, legacy, athlete (N = 8) is 2.50, with a standard deviation of 0.93. The mean for persister, male, legacy, non-athlete (N = 11) is 2.27, with a standard deviation of 0.91. The mean for persister, male, non-legacy, athlete (N = 35) is 2.23, with a standard deviation of 1.06. The mean for persister, male, non-legacy, non-athlete (N = 23) is 2.26, with a standard deviation of 1.05.

The mean for persister, female, legacy, athlete (N = 23) is 2.13, with a standard deviation of 0.92. The mean for persister, female, legacy, non-athlete (N = 36) is 1.97, with a standard deviation of 0.94. The mean for persister, female, non-legacy, athlete (N = 46) is 1.80, with a standard deviation of 0.91. The mean for persister, female, non-legacy, non-athlete (N = 89) is 1.98, with a standard deviation of 0.94.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 2.33, with a standard deviation of 1.16. The mean for non-persister, male, non-legacy, athlete (N = 6) is 1.67, with a standard deviation of 0.82. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 2.63, with a standard deviation of 1.06.

The mean for non-persister, female, legacy, athlete (N = 2) is 2.00, with a standard deviation of 0.00. The mean for non-persister, female, legacy, non-athlete (N =

3) is 1.00, with a standard deviation of 0.00. The mean for non-persister, female, non-legacy, athlete (N = 4) is 3.00, with a standard deviation of 0.82. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 1.56, with a standard deviation of 0.83.

Table 35

*Four-Way ANCOVA Descriptive Statistics for NSSE Student-Faculty Interaction "RESEARCH"*

Source		Persister						Non-Persister					
		N	Male Mean	SD	N	Female Mean	SD	N	Male Mean	SD	N	Female Mean	SD
Legacy	Athlete	8	2.50	0.93	23	2.13	0.92	0	0.00	0.00	2	2.00	0.00
	Non-Athlete	11	2.27	0.91	36	1.97	0.94	3	2.33	1.16	3	1.00	0.00
Non-Legacy	Athlete	35	2.23	1.06	46	1.80	0.91	6	1.67	0.82	4	3.00	0.82
	Non-Athlete	23	2.26	1.05	89	1.98	0.94	8	2.63	1.06	20	1.55	0.83

Table 36 depicts the four-way ANCOVA test of significance for persistence, gender, athletic status, and legacy status for the Student-Faculty Interaction "RESEARCH" behavior item, which is course emphasized: applying theories or concepts to practical problems or in new situations. There are no significant main effects. There is two significant interaction effects. The first is for gender, athletic status (sig. = 0.03), with a low effect size (0.02), and moderate power (0.60). The second is for persistence, gender, athletic status (sig. = 0.00), with a low effect size ( $\text{Eta}^2 = 0.03$ ), and a high power (Power = 0.89).



Table 36  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Student-Faculty  
 Interaction "RESEARCH"

Source	SS	df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	0.02	1	0.02	0.02	0.88	0.00	0.05
Gender	1.44	1	1.44	1.64	0.20	0.01	0.25
Athletic Status	0.92	1	0.92	1.05	0.31	0.00	0.18
Legacy Status	0.46	1	0.46	0.52	0.47	0.00	0.11
Persistence x Gender	0.16	1	0.16	0.19	0.67	0.00	0.07
Persistence x Athletic Status	0.54	1	0.54	0.62	0.43	0.00	0.12
Persistence x Legacy Status	1.52	1	1.52	1.74	0.19	0.01	0.26
Gender x Athletic Status	4.28	1	4.28	4.88	0.03*	0.02	0.60
Gender x Legacy Status	0.07	1	0.07	0.08	0.77	0.00	0.06
Athletic Status x Legacy Status	0.03	1	0.03	0.03	0.87	0.00	0.05
Persistence x Gender x Athletic Status	8.83	1	8.83	10.06	0.00*	0.03	0.89
Persistence x Gender x Legacy Status	0.10	1	0.10	0.12	0.73	0.00	0.06
Persistence x Athletic Status x Legacy Status	0.31	1	0.31	0.35	0.55	0.00	0.09
Gender x Athletic Status x Legacy Status	0.02	1	0.02	0.02	0.88	0.00	0.05
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance = < 0.05  $r^2 = .104$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* Students in the study group report working on research projects with faculty members outside of course or program requirements. There is an interaction effect between the "RESEARCH" Behavior Item and gender, athletic status, as well as the interaction effect persistence, gender, athletic status. Male, non-persisters, non-athletes are most likely, among the independent variable groups, to work on research projects with faculty members. The female, non-persisters, non-athletes are least likely to work on research projects with faculty members. Furthermore, students regardless of legacy status are reporting similar experiences for Behavior Item "RESEARCH." This finding rejects the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study

among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Student-Faculty Interaction “ENVSOCAL”*

Tables 37 - 48 depict the four-way ANCOVA descriptive statistics and test of significance for persistence, gender, athletic status, and legacy status for each behavior item within the Supportive Campus Environment Benchmark. Table 37 depicts the four-way ANCOVA descriptive statistics and Table 38 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 4.0 scale, for the Supportive Campus Environment “ENVSOCAL” behavior item, which is institutional emphasis: providing the support you need to thrive socially.

The mean for persister, male, legacy, athlete (N = 8) is 2.63, with a standard deviation of 0.92. The mean for persister, male, legacy, non-athlete (N = 11) is 2.64, with a standard deviation of 0.92. The mean for persister, male, non-legacy, athlete (N = 35) is 2.66, with a standard deviation of 0.84. The mean for persister, male, non-legacy, non-athlete (N = 23) is 2.43, with a standard deviation of 0.99.

The mean for persister, female, legacy, athlete (N = 23) is 2.78, with a standard deviation of 0.80. The mean for persister, female, legacy, non-athlete (N = 36) is 2.92, with a standard deviation of 0.81. The mean for persister, female, non-legacy, athlete (N = 46) is 2.67, with a standard deviation of 0.87. The mean for persister, female, non-legacy, non-athlete (N = 90) is 2.92, with a standard deviation of 0.88.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 3.00, with a standard deviation of 1.00. The mean for non-persister, male, non-legacy, athlete (N = 6) is 2.33, with a standard deviation of 0.52. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 2.38, with a standard deviation of 1.06.

The mean for non-persister, female, legacy, athlete (N = 2) is 2.00, with a standard deviation of 0.00. The mean for non-persister, female, legacy, non-athlete (N = 3) is 2.67, with a standard deviation of 1.53. The mean for non-persister, female, non-legacy, athlete (N = 4) is 2.50, with a standard deviation of 0.58. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 2.35, with a standard deviation of 0.93.

Table 37

*Four-Way ANCOVA Descriptive Statistics for NSSE Supportive Campus Environment "ENVSOCAL"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	8	2.63	0.92	23	2.78	0.80	0	0.00	0.00	2	2.00	0.00
	Non-Athlete	11	2.64	0.92	36	2.92	0.81	3	3.00	1.00	3	2.67	1.53
Non-Legacy	Athlete	35	2.66	0.84	46	2.67	0.87	6	2.33	0.52	4	2.50	0.58
	Non-Athlete	23	2.43	0.99	90	2.92	0.88	8	2.38	1.06	20	2.35	0.93

Table 38 depicts the four-way ANCOVA test of significance for persistence, gender, athletic status, and legacy status for Supportive Campus Environment "ENVSOCAL" behavior item, which institutional emphasis: providing the support you need to thrive socially. There are no significant main or interaction effects.

Table 38  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Supportive Campus Environment “ENVSOCAL”

Source	SS	Df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	1.40	1	1.40	1.81	0.18	0.01	0.27
Gender	0.05	1	0.05	0.07	0.80	0.00	0.06
Athletic Status	0.44	1	0.44	0.57	0.45	0.00	0.12
Legacy Status	0.07	1	0.07	0.08	0.77	0.00	0.06
Persistence x Gender	0.49	1	0.49	0.64	0.42	0.00	0.13
Persistence x Athletic Status	0.29	1	0.29	0.37	0.54	0.00	0.09
Persistence x Legacy Status	0.00	1	0.00	0.00	0.96	0.00	0.05
Gender x Athletic Status	0.05	1	0.05	0.06	0.81	0.00	0.06
Gender x Legacy Status	0.09	1	0.09	0.12	0.73	0.00	0.06
Athletic Status x Legacy Status	0.68	1	0.68	0.88	0.35	0.00	0.15
Persistence x Gender x Athletic Status	0.56	1	0.56	0.72	0.40	0.00	0.14
Persistence x Gender x Legacy Status	0.04	1	0.04	0.05	0.82	0.00	0.06
Persistence x Athletic Status x Legacy Status	0.67	1	0.67	0.87	0.35	0.00	0.15
Gender x Athletic Status x Legacy Status	0.28	1	0.28	0.36	0.55	0.00	0.09
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance = < 0.05  $r^2 = .059$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* Although students in the study group report the institution provides the support needed to thrive socially, there are no main or interaction effects between the “ENVSOCAL” Behavior Item and any independent variable. This finding supports the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Supportive Campus Environment “ENVSUPRT”*

Table 39 depicts the four-way ANCOVA descriptive statistics and Table 40 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 4.0 scale, for the Supportive Campus Environment “ENVSUPRT” behavior item, which is institutional emphasis: providing the support you need to help you succeed academically.

The mean for persister, male, legacy, athlete (N = 8) is 3.00, with a standard deviation of 0.76. The mean for persister, male, legacy, non-athlete (N = 11) is 2.91, with a standard deviation of 0.54. The mean for persister, male, non-legacy, athlete (N = 35) is 3.06, with a standard deviation of 0.59. The mean for persister, male, non-legacy, non-athlete (N = 23) is 3.17, with a standard deviation of 0.78.

The mean for persister, female, legacy, athlete (N = 23) is 3.26, with a standard deviation of 0.69. The mean for persister, female, legacy, non-athlete (N = 36) is 3.33, with a standard deviation of 0.76. The mean for persister, female, non-legacy, athlete (N = 46) is 3.24, with a standard deviation of 0.64. The mean for persister, female, non-legacy, non-athlete (N = 90) is 3.37, with a standard deviation of 0.68.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 3.67, with a standard deviation of 0.58. The mean for non-persister, male, non-legacy, athlete (N = 6) is 3.00, with a standard deviation of 0.89. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 2.88, with a standard deviation of 0.99.

The mean for non-persister, female, legacy, athlete (N = 2) is 3.00, with a standard deviation of 0.00. The mean for non-persister, female, legacy, non-athlete (N =

3) is 1.00, with a standard deviation of 0.00. The mean for non-persister, female, non-legacy, athlete (N = 4) is 2.50, with a standard deviation of 0.58. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 2.90, with a standard deviation of 0.79.

Table 39

*Four-Way ANCOVA Descriptive Statistics for NSSE Supportive Campus Environment "ENVSUPRT"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	8	3.00	0.76	23	3.26	0.69	0	0.00	0.00	2	3.00	0.00
	Non-Athlete	11	2.91	0.54	36	3.33	0.76	3	3.67	0.58	3	3.00	1.00
Non-Legacy	Athlete	35	3.06	0.59	46	3.24	0.64	6	3.00	0.89	4	2.50	0.58
	Non-Athlete	23	3.17	0.78	90	3.37	0.68	8	2.88	0.99	20	2.90	0.79

Table 40 depicts the four-way ANCOVA test of significance for persistence, gender, athletic status, and legacy status for the Supportive Campus Environment "ENVSUPRT" behavior item, which is institutional emphasis: providing the support you need to help you succeed academically. There are no significant main effects. There is one significant interaction effect for persistence, gender (sig. = 0.02), with a low effect size ( $\text{Eta}^2 = 0.02$ ), and moderate power (0.65).

Table 40  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Supportive Campus  
 Environment "ENVSUPRT"

Source	SS	Df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	0.27	1	0.27	0.55	0.46	0.00	0.12
Gender	0.21	1	0.21	0.42	0.52	0.00	0.10
Athletic Status	0.03	1	0.03	0.05	0.82	0.00	0.06
Legacy Status	0.77	1	0.77	1.56	0.21	0.01	0.24
Persistence x Gender	2.74	1	2.74	5.56	0.02*	0.02	0.65
Persistence x Athletic Status	0.02	1	0.02	0.04	0.84	0.00	0.05
Persistence x Legacy Status	1.61	1	1.61	3.27	0.07	0.01	0.44
Gender x Athletic Status	0.52	1	0.52	1.07	0.30	0.00	0.18
Gender x Legacy Status	0.24	1	0.24	0.48	0.49	0.00	0.11
Athletic Status x Legacy Status	0.29	1	0.29	0.58	0.45	0.00	0.12
Persistence x Gender x Athletic Status	0.40	1	0.40	0.81	0.37	0.00	0.15
Persistence x Gender x Legacy Status	0.90	1	0.90	1.83	0.18	0.01	0.27
Persistence x Athletic Status x Legacy Status	0.10	1	0.10	0.20	0.66	0.00	0.07
Gender x Athletic Status x Legacy Status	0.07	1	0.07	0.13	0.71	0.00	0.07
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance = < 0.05  $r^2 = .070$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* Students in the study group report the institution provides the necessary support helpful for succeeding academically. There is an interaction effect between the "ENVSUPRT" Behavior Item and persistence, gender. Male, non-persisters report the institution provides the necessary support helpful for succeeding academically more often than for any other independent variable. Female, non-persisters report the institution provides the necessary support helpful for succeeding academically least often than for any other independent variable. This finding rejects the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high

school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Supportive Campus Environment “ENVNACAD”*

Table 41 depicts the four-way ANCOVA descriptive statistics and Table 42 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 4.0 scale, for the Supportive Campus Environment “ENVNACAD” behavior item, which is institutional emphasis: helping you cope with your non-academic responsibilities (work, family, etc.).

The mean for persister, male, legacy, athlete (N = 8) is 2.50, with a standard deviation of 1.07. The mean for persister, male, legacy, non-athlete (N = 11) is 2.27, with a standard deviation of 1.01. The mean for persister, male, non-legacy, athlete (N = 35) is 2.31, with a standard deviation of 0.90. The mean for persister, male, non-legacy, non-athlete (N = 23) is 2.17, with a standard deviation of 0.98.

The mean for persister, female, legacy, athlete (N = 23) is 2.52, with a standard deviation of 0.85. The mean for persister, female, legacy, non-athlete (N = 36) is 2.42, with a standard deviation of 0.91. The mean for persister, female, non-legacy, athlete (N = 46) is 2.33, with a standard deviation of 0.90. The mean for persister, female, non-legacy, non-athlete (N = 90) is 2.51, with a standard deviation of 0.93.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 3.00, with a standard deviation of 1.00. The mean for non-persister, male, non-legacy, athlete (N = 6) is 2.67, with a standard deviation of 0.82. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 2.00, with a standard deviation of 1.07.



The mean for non-persister, female, legacy, athlete (N = 2) is 2.00, with a standard deviation of 0.00. The mean for non-persister, female, legacy, non-athlete (N = 3) is 2.33, with a standard deviation of 1.16. The mean for non-persister, female, non-legacy, athlete (N = 4) is 2.25, with a standard deviation of 0.96. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 2.30, with a standard deviation of 0.92.

Table 41

*Four-Way ANCOVA Descriptive Statistics for NSSE Supportive Campus Environment "ENVNACAD"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	8	2.50	1.07	23	2.52	0.85	0	0.00	0.00	2	2.00	0.00
	Non-Athlete	11	2.27	1.01	36	2.42	0.91	3	3.00	1.00	3	2.33	1.16
Non-Legacy	Athlete	35	2.31	0.90	46	2.33	0.90	6	2.67	0.82	4	2.25	0.96
	Non-Athlete	23	2.17	0.98	90	2.51	0.93	8	2.00	1.07	20	2.30	0.92

Table 42 depicts the four-way ANCOVA test of significance for the Supportive Campus Environment "ENVNACAD" behavior item, which is institutional emphasis: helping you cope with your non-academic responsibilities (work, family, etc.). There are no significant main or interaction effects.

Table 42  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Supportive Campus Environment "ENVNACAD"

Source	SS	df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	0.02	1	0.02	0.02	0.89	0.00	0.05
Gender	0.31	1	0.31	0.37	0.55	0.00	0.09
Athletic Status	0.15	1	0.15	0.18	0.68	0.00	0.07
Legacy Status	0.58	1	0.58	0.68	0.41	0.00	0.13
Persistence x Gender	1.30	1	1.30	1.52	0.22	0.01	0.23
Persistence x Athletic Status	0.01	1	0.01	0.01	0.91	0.00	0.05
Persistence x Legacy Status	0.13	1	0.13	0.15	0.70	0.00	0.07
Gender x Athletic Status	1.02	1	1.02	1.18	0.28	0.00	0.19
Gender x Legacy Status	1.01	1	1.01	1.18	0.28	0.00	0.19
Athletic Status x Legacy Status	0.00	1	0.00	0.00	0.98	0.00	0.05
Persistence x Gender x Athletic Status	0.22	1	0.22	0.26	0.61	0.00	0.08
Persistence x Gender x Legacy Status	0.62	1	0.62	0.72	0.40	0.00	0.14
Persistence x Athletic Status x Legacy Status	0.28	1	0.28	0.33	0.57	0.00	0.09
Gender x Athletic Status x Legacy Status	0.10	1	0.10	0.11	0.74	0.00	0.06
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance = < 0.05  $r^2 = .027$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* Students in the study group report often receiving help coping with non-academic responsibilities. However, there are no main or interaction effects between the "ENVNACAD" Behavior Item and any independent variable. This finding supports the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Supportive Campus Environment “ENVSTU”*

Table 43 depicts the four-way ANCOVA descriptive statistics and Table 44 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 7.0 scale, for the Supportive Campus Environment “ENVSTU” behavior item, which is quality: your relationships with other students.

The mean for persister, male, legacy, athlete (N = 8) is 5.63, with a standard deviation of 1.51. The mean for persister, male, legacy, non-athlete (N = 11) is 5.91, with a standard deviation of 1.04. The mean for persister, male, non-legacy, athlete (N = 35) is 6.06, with a standard deviation of 1.14. The mean for persister, male, non-legacy, non-athlete (N = 23) is 5.65, with a standard deviation of 1.75.

The mean for persister, female, legacy, athlete (N = 23) is 6.26, with a standard deviation of 1.21. The mean for persister, female, legacy, non-athlete (N = 36) is 6.06, with a standard deviation of 0.98. The mean for persister, female, non-legacy, athlete (N = 46) is 6.24, with a standard deviation of 1.18. The mean for persister, female, non-legacy, non-athlete (N = 91) is 6.10, with a standard deviation of 1.24.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 6.33, with a standard deviation of 0.58. The mean for non-persister, male, non-legacy, athlete (N = 6) is 5.50, with a standard deviation of 0.84. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 5.13, with a standard deviation of 1.46.

The mean for non-persister, female, legacy, athlete (N = 2) is 7.00, with a standard deviation of 0.00. The mean for non-persister, female, legacy, non-athlete (N = 3) is 4.67, with a standard deviation of 2.08. The mean for non-persister, female, non-

legacy, athlete (N = 4) is 6.75, with a standard deviation of 0.50. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 5.10, with a standard deviation of 1.80.

Table 43

*Four-Way ANCOVA Descriptive Statistics for NSSE Supportive Campus Environment "ENVSTU"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	8	5.63	1.51	23	6.26	1.21	0	0.00	0.00	2	7.00	0.00
	Non-Athlete	11	5.91	1.04	36	6.06	0.98	3	6.33	0.58	3	4.67	2.08
Non-Legacy	Athlete	35	6.06	1.14	46	6.24	1.18	6	5.50	0.84	4	6.75	0.50
	Non-Athlete	23	5.65	1.75	91	6.10	1.24	8	5.13	1.46	20	5.10	1.80

Table 44 depicts the four-way ANCOVA test of significance for the Supportive Campus Environment "ENVSTU" behavior item, which is quality: your relationships with other students. There is one significant main effect for athletic status (sig. = 0.02), with a low effect size ( $\text{Eta}^2 = 0.02$ ), and moderate power (Power = 0.65). There are no significant interaction effects.

Table 44  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Supportive Campus Environment "ENVSTU"

Source	SS	df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	0.52	1	0.52	0.32	0.57	0.00	0.09
Gender	0.34	1	0.34	0.21	0.65	0.00	0.07
Athletic Status	9.01	1	9.01	5.50	0.02*	0.02	0.65
Legacy Status	0.52	1	0.52	0.32	0.57	0.00	0.09
Persistence x Gender	0.75	1	0.75	0.46	0.50	0.00	0.10
Persistence x Athletic Status	5.98	1	5.98	3.65	0.06	0.01	0.48
Persistence x Legacy Status	0.61	1	0.61	0.37	0.54	0.00	0.09
Gender x Athletic Status	2.93	1	2.93	1.79	0.18	0.01	0.27
Gender x Legacy Status	1.62	1	1.62	0.99	0.32	0.00	0.17
Athletic Status x Legacy Status	0.00	1	0.00	0.00	0.98	0.00	0.05
Persistence x Gender x Athletic Status	3.39	1	3.39	2.07	0.15	0.01	0.30
Persistence x Gender x Legacy Status	1.76	1	1.76	1.07	0.30	0.00	0.18
Persistence x Athletic Status x Legacy Status	0.30	1	0.30	0.18	0.67	0.00	0.07
Gender x Athletic Status x Legacy Status	1.44	1	1.44	0.88	0.35	0.00	0.16
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance = < 0.05  $r^2 = .080$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* Students in the study group report their relationships with other students as friendly, supportive, and a sense of belonging. There is a main effect between the "ENVSTU" Behavior Item and athletic status. While athletes report a quality relationship with other students more than any other variable group, non-athletes report a quality relationship with other students less than any other variable group. Furthermore, students regardless of gender, legacy status, and persistence are reporting similar experiences for "ENVSTU." This finding rejects the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held

constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Supportive Campus Environment “ENVFAC”*

Table 45 depicts the four-way ANCOVA descriptive statistics and Table 46 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 7.0 scale, for the Supportive Campus Environment “ENVFAC” behavior item, which is quality: your relationships with faculty members.

The mean for persister, male, legacy, athlete (N = 8) is 5.38, with a standard deviation of 1.19. The mean for persister, male, legacy, non-athlete (N = 11) is 5.45, with a standard deviation of 0.69. The mean for persister, male, non-legacy, athlete (N = 35) is 5.66, with a standard deviation of 0.94. The mean for persister, male, non-legacy, non-athlete (N = 23) is 5.78, with a standard deviation of 1.24.

The mean for persister, female, legacy, athlete (N = 23) is 5.96, with a standard deviation of 0.77. The mean for persister, female, legacy, non-athlete (N = 36) is 5.75, with a standard deviation of 1.20. The mean for persister, female, non-legacy, athlete (N = 46) is 6.07, with a standard deviation of 0.85. The mean for persister, female, non-legacy, non-athlete (N = 91) is 6.02, with a standard deviation of 0.88.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 5.67, with a standard deviation of 1.16. The mean for non-persister, male, non-legacy, athlete (N = 6) is 5.00, with a standard deviation of 0.89. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 5.50, with a standard deviation of 0.76.

The mean for non-persister, female, legacy, athlete (N = 2) is 6.00, with a standard deviation of 1.41. The mean for non-persister, female, legacy, non-athlete (N = 3) is 5.33, with a standard deviation of 0.58. The mean for non-persister, female, non-legacy, athlete (N = 4) is 5.50, with a standard deviation of 1.29. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 5.55, with a standard deviation of 1.36.

Table 45

*Four-Way ANCOVA Descriptive Statistics for NSSE Supportive Campus Environment "ENVFAC"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	8	5.38	1.19	23	5.96	0.77	0	0.00	0.00	2	6.00	1.41
	Non-Athlete	11	5.45	0.69	36	5.75	1.20	3	5.67	1.16	3	5.33	0.58
Non-Legacy	Athlete	35	5.66	0.94	46	6.07	0.85	6	5.00	0.89	4	5.50	1.29
	Non-Athlete	23	5.78	1.24	91	6.02	0.88	8	5.50	0.76	20	5.55	1.36

Table 46 depicts the four-way ANCOVA test of significance for the Supportive Campus Environment "ENVFAC" behavior item, which is quality: your relationships with faculty members. There are no significant main or interaction effects.

Table 46  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Supportive Campus Environment "ENVFAC"

Source	SS	Df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	0.96	1	0.96	0.99	0.32	0.00	0.17
Gender	0.74	1	0.74	0.76	0.38	0.00	0.14
Athletic Status	0.03	1	0.03	0.03	0.86	0.00	0.05
Legacy Status	0.01	1	0.01	0.01	0.91	0.00	0.05
Persistence x Gender	0.36	1	0.36	0.37	0.55	0.00	0.09
Persistence x Athletic Status	0.00	1	0.00	0.00	0.96	0.00	0.05
Persistence x Legacy Status	1.03	1	1.03	1.05	0.31	0.00	0.18
Gender x Athletic Status	0.45	1	0.45	0.46	0.50	0.00	0.10
Gender x Legacy Status	0.07	1	0.07	0.07	0.79	0.00	0.06
Athletic Status x Legacy Status	0.41	1	0.41	0.42	0.52	0.00	0.10
Persistence x Gender x Athletic Status	0.06	1	0.06	0.06	0.81	0.00	0.06
Persistence x Gender x Legacy Status	0.37	1	0.37	0.38	0.54	0.00	0.09
Persistence x Athletic Status x Legacy Status	0.34	1	0.34	0.35	0.56	0.00	0.09
Gender x Athletic Status x Legacy Status	0.03	1	0.03	0.03	0.87	0.00	0.05
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance = < 0.05  $r^2 = .067$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* Students in the study group report their relationships with faculty as available, helpful, and sympathetic. However, there are no main or interaction effects between the "ENVFAC" Behavior Item and any independent variable. This finding supports the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?



*Supportive Campus Environment “ENVADM”*

Table 47 depicts the four-way ANCOVA descriptive statistics and Table 48 depicts the test of significance for persistence, gender, athletic status, and legacy status on a 7.0 scale, for the Supportive Campus Environment “ENVADM” behavior item, which is quality: your relationships with administrative personnel and offices.

The mean for persister, male, legacy, athlete (N = 8) is 4.88, with a standard deviation of 1.55. The mean for persister, male, legacy, non-athlete (N = 11) is 5.09, with a standard deviation of 0.83. The mean for persister, male, non-legacy, athlete (N = 35) is 5.49, with a standard deviation of 1.27. The mean for persister, male, non-legacy, non-athlete (N = 23) is 5.52, with a standard deviation of 1.47.

The mean for persister, female, legacy, athlete (N = 23) is 5.91, with a standard deviation of 1.20. The mean for persister, female, legacy, non-athlete (N = 36) is 5.28, with a standard deviation of 1.47. The mean for persister, female, non-legacy, athlete (N = 46) is 5.37, with a standard deviation of 1.45. The mean for persister, female, non-legacy, non-athlete (N = 91) is 5.45, with a standard deviation of 1.28.

The study group did not include non-persister, male, legacy, athlete (N = 0). The mean for non-persister, male, legacy, non-athlete (N = 3) is 6.33, with a standard deviation of 0.58. The mean for non-persister, male, non-legacy, athlete (N = 6) is 4.17, with a standard deviation of 1.60. The mean for non-persister, male, non-legacy, non-athlete (N = 8) is 5.00, with a standard deviation of 1.85.

The mean for non-persister, female, legacy, athlete (N = 2) is 5.00, with a standard deviation of 2.83. The mean for non-persister, female, legacy, non-athlete (N = 3) is 3.67, with a standard deviation of 1.53. The mean for non-persister, female, non-

legacy, athlete (N = 4) is 5.50, with a standard deviation of 1.00. The mean for non-persister, female, non-legacy, non-athlete (N = 20) is 4.70, with a standard deviation of 1.72.

Table 47

*Four-Way ANCOVA Descriptive Statistics for NSSE Supportive Campus Environment "ENVADM"*

Source		Persister						Non-Persister					
		Male			Female			Male			Female		
		N	Mean	SD	N	Mean	SD	N	Mean	SD	N	Mean	SD
Legacy	Athlete	8	4.88	1.55	23	5.91	1.20	0	0.00	0.00	2	5.00	2.83
	Non-Athlete	11	5.09	0.83	36	5.28	1.47	3	6.33	0.58	3	3.67	1.53
Non-Legacy	Athlete	35	5.49	1.27	46	5.37	1.45	6	4.17	1.60	4	5.50	1.00
	Non-Athlete	23	5.52	1.47	91	5.45	1.28	8	5.00	1.85	20	4.70	1.72

Table 48 depicts the four-way ANCOVA for Supportive Campus Environment "ENVADM" behavior item, which is quality: your relationships with administrative personnel and offices. There are no significant main effects. There is one significant interaction effects for gender, legacy status (sig. = 0.04), with a low size effect ( $\eta^2 = 0.01$ ), and moderate power (Power = 0.52).

Table 48  
 Summary of Four-Way ANCOVA Test of Significance for NSSE Supportive Campus Environment "ENVADM"

Source	SS	df	MS	F	sig.	Eta <sup>2</sup>	Power
Persistence	6.15	1	6.15	3.21	0.07	0.01	0.43
Gender	0.27	1	0.27	0.14	0.71	0.00	0.07
Athletic Status	0.34	1	0.34	0.18	0.67	0.00	0.07
Legacy Status	0.27	1	0.27	0.14	0.71	0.00	0.07
Persistence x Gender	2.13	1	2.13	1.11	0.29	0.00	0.18
Persistence x Athletic Status	0.04	1	0.04	0.02	0.89	0.00	0.05
Persistence x Legacy Status	0.00	1	0.00	0.00	0.98	0.00	0.05
Gender x Athletic Status	7.83	1	7.83	4.09	0.04*	0.01	0.52
Gender x Legacy Status	0.99	1	0.99	0.52	0.47	0.00	0.11
Athletic Status x Legacy Status	0.50	1	0.50	0.26	0.61	0.00	0.08
Persistence x Gender x Athletic Status	4.18	1	4.18	2.18	0.14	0.01	0.31
Persistence x Gender x Legacy Status	6.61	1	6.61	3.45	0.06	0.01	0.46
Persistence x Athletic Status x Legacy Status	0.08	1	0.08	0.04	0.84	0.00	0.06
Gender x Athletic Status x Legacy Status	1.93	1	1.93	1.01	0.32	0.00	0.17
Persistence x Gender x Athletic Status x Legacy Status	0.00	0	-	-	-	0.00	-

Note: \*Significance = < 0.05  $r^2 = .076$

SS = Sum of Squares

MS = Mean Squared

Covariate Standardized Test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean = 3.48

*Findings for research question two.* Students in the study group report their relationships with administrative personnel and offices as helpful, considerate, and flexible. There is an interaction effect between the "ENVADM" Behavior Item and gender, legacy status. Male legacies report a quality relationship with administrative personnel and offices more than female legacies. Furthermore, students regardless of athletic status and persistence are reporting similar experiences for the "ENVADM" Behavior Item. This finding rejects the null hypothesis for research question two: Are there main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item

within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment?

*Summary*

Table 49 provides a summary of the significant four-way ANCOVA findings. There are seven findings. First, there is a main effect for the “FACGRADE” behavior item and legacy status. Non-legacies and persisters discussed grades or assignments with an instructor more than legacies and non-persisters. Furthermore, students regardless of gender and athletic status are reporting similar experiences for the Behavior Item “FACGRADE.” This finding rejects the null hypothesis for research question two.

Second, students in the study group report discussing ideas from readings or class with faculty members outside of class. There is main effect between the “FACIDEAS” behavior item and persistence. There is also an interaction effect between the “FACIDEAS” behavior item and persistence, legacy. Persisters report discussing ideas more than non-persisters. Non-persisters, legacies report discussing ideas more often than persisters, legacies, but persister, non-legacies report discussing ideas more often than non-persister, non-legacies. Furthermore, students regardless of gender and athletic status are reporting similar experiences for “FACIDEAS” This finding rejects the null hypothesis for research question two.

Third, for the “FACPLANS” behavior item, students report talking about career plans with a faculty member or advisor. There is an interaction effect between this Behavior Item and gender, athletic status. There is also an interaction effect between this Behavior Item and athletic status, legacy status. There is also an interaction effect for persistence, athletic status, legacy status. Among all independent variables, non-

persisters, legacies, non-athletes report discussing career plans with faculty most often. Among all independent variables, non-persisters, female, legacies, athletes report discussing career plans least often. This finding rejects the null hypothesis for research question two.

Fourth, students in the study group report working on research projects with faculty members outside of course or program requirements. There is an interaction effect between the “RESEARCH” Behavior Item and gender, athletic status, as well as the interaction effect persistence, gender, athletic status. Male, non-persisters, non-athletes are most likely, among the independent variable groups, to work on research projects with faculty members. The female, non-persisters, non-athletes are least likely to work on research projects with faculty members. Furthermore, students regardless of legacy status are reporting similar experiences for Behavior Item “RESEARCH.” This finding rejects the null hypothesis for research question two.

Fifth, students in the study group report the institution provides the necessary support helpful for succeeding academically. There is an interaction effect between the “ENVSUPRT” Behavior Item and persistence, gender. Male, non-persisters report the institution provides the necessary support helpful for succeeding academically more often than for any other independent variable. Female, non-persisters report the institution provides the necessary support helpful for succeeding academically least often than for any other independent variable. This finding rejects the null hypothesis for research question two.

Sixth, students in the study group report their relationships with other students as friendly, supportive, and a sense of belonging. There is a main effect between the

“ENVSTU” Behavior Item and athletic status. While athletes report a quality relationship with other students more than any other variable group, non-athletes report a quality relationship with other students less than any other variable group. Furthermore, students regardless of gender, legacy status, and persistence are reporting similar experiences for “ENVSTU.” This finding rejects the null hypothesis for research question two.

Seventh, students in the study group report their relationships with administrative personnel and offices as helpful, considerate, and flexible. There is an interaction effect between the “ENVADM” Behavior Item and gender, legacy status. Male legacies report a quality relationship with administrative personnel and offices more than female legacies. Furthermore, students regardless of athletic status and persistence are reporting similar experiences for the “ENVADM” Behavior Item. This finding rejects the null hypothesis for research question two.

Table 49  
*Summary of Significant Four-Way ANCOVA Findings*

Behavior Item	Independent Variable	Effect	sig.	Eta <sup>2</sup>	Power
<b>Student-Faculty Interaction</b>					
FACGRADE	Legacy Status	Main	0.01*	0.02	0.76
FACGRADE	Persistence	Main	0.05*	0.01	0.50
FACIDEAS	Persistence	Main	0.04*	0.01	0.55
FACIDEAS	Persistence x Legacy Status	Interaction	0.05*	0.01	0.52
FACPLANS	Gender x Athletic Status	Interaction	0.01*	0.02	0.71
FACPLANS	Athletic Status x Legacy Status	Interaction	0.05*	0.01	0.49
FACPLANS	Persistence x Athletic Status x Legacy Status	Interaction	0.03*	0.02	0.57
RESEARCH	Gender x Athletic Status	Interaction	0.03*	0.02	0.6
RESEARCH	Persistence x Gender x Athletic Status	Interaction	0.00*	0.03	0.89
<b>Supportive Campus Environment</b>					
ENVSUPRT	Persistence x Gender	Interaction	0.02*	0.02	0.65
ENVSTU	Athletic Status	Main	0.02*	0.02	0.65
ENVADM	Gender x Legacy Status	Interaction	0.04*	0.01	0.52

Note: \*Significance  $\leq 0.05$

Covariate Standardized test was held constant with a mean = 23.88

Covariate High School GPA was held constant with a mean 3.48

The four-way ANCOVA outlined in this section tested the main and interaction effects of student engagement upon persistence of students at the college under study among variables of gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study: 1) Student-Faculty Interaction and 2) Supportive Campus Environment. The four-way ANCOVA addressed research question two, as well as the null hypothesis for research question two. Tables depicted the four-way ANCOVA descriptive statistics and test of significance for persistence, gender, athletic status, and legacy status for each behavior item for the NSSE Student-Faculty

Interaction Benchmarks. Tables also depicted the four-way ANCOVA descriptive statistics and test of significance for persistence, gender, athletic status, and legacy status for each behavior item for the NSSE Supportive Campus Environment Benchmarks. The discriminant analysis is outlined in the next section

### Discriminant Analysis Results

A discriminant analysis was conducted to find membership groups of independent variables most associated with the dependent variable (Field, 2005). Discriminant analysis addressed research question three, as well as the null hypothesis for research question three. This null hypothesis was rejected; significant clusters of behavior items were found describing membership of the population within two NSSE Benchmarks; 1) Supportive Campus Environment and 2) Student-Faculty Interaction. Tables 50 - 57 and Figures 2 – 5 depict the Discriminant analysis for each of the independent variables: gender, athletic status, legacy status, and persistence.

#### *Independent Variable Gender*

Table 50 represents the discriminant analysis for gender. Two NSSE Student-Faculty Interaction behavior items, “RESEARCH” (sig. = 0.006, Wilk’s Lambda = 0.968) and “FACFEED” (sig. = 0.000, Wilk’s Lambda = 0.946) and one NSSE Supportive Campus Environment behavior item “ENVFAC” (sig. = 0.000, Wilk’s Lambda = 22.275) were selected for the Faculty Relations membership group. “RESEARCH” is work on a research project with a faculty member outside of course or program requirements. “FACFEED” is received prompt written or oral feedback from faculty on your academic performance. “ENVFAC” is quality: your relationships with faculty members.



Table 50

*Discriminant Analysis for Gender*

Factor	Eigen Value	% Variance	Wilk's Lambda	Chi Square	sig.
"RESEARCH"	0.074	100	0.968	22.275	0.006
"FACFEED"	0.074	100	0.946	22.275	0.000
"ENVFAC"	0.074	100	0.946	22.275	0.000

Note: Significance =< 0.05

Table 51 demonstrates the centroids for gender for the Faculty Relations membership group. The centroid for males is -0.419 and the centroid for females is 0.176.

Table 51

*Gender Engagement Centroids*

Variable	Centroids
Male	-0.419
Female	0.176

*Finding for research question three.* Figure 2 illustrates the centroids for gender for the Study Habits membership group. Therefore, males are less likely to work on a research project with a faculty member outside of course or program (RESEARCH), receive prompt written or oral academic feedback from faculty (FACFEED) and to have a quality relationship with faculty (ENVFAC). This finding rejects the null hypothesis for research question three: Are there clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction (six behavior items) and 2) Supportive Campus Environment (six behavior items)?

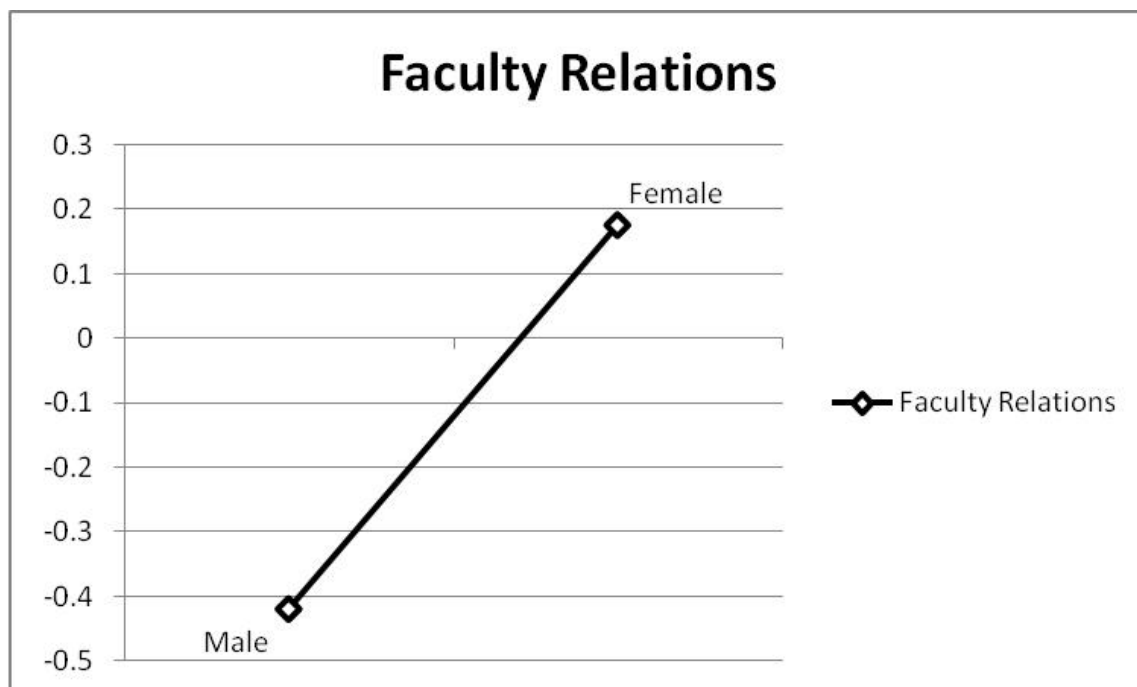


Figure 2: Illustration of gender centroids for the Faculty Relations membership group.

#### Independent Variable Athletic Status

Table 52 represents the discriminant analysis for athletic status. Two NSSE Supportive Campus Environment behavior items “ENVSOCAL” (sig. = 0.047, Wilk’s Lambda = 0.987) and “ENVSTU” (sig. = 0.017, Wilk’s Lambda = 0.974) were selected for the Social membership group. “ENVSOCAL” is institutional emphasis: providing the support you need to thrive socially. “ENVSTU” is quality: your relationships with other students.

Table 52

#### Discriminant Analysis for Athletic Status

Factor	Eigen Value	% Variance	Wilk's Lambda	Chi Square	sig.
“ENVSOCAL”	0.027	100	0.987	8.196	0.047
“ENVSTU”	0.027	100	0.974	8.196	0.017

Note: Significance =< 0.05

Table 53 represents the centroids for athletic status Social group membership. The centroid for non-athlete is -0.131 and the centroid for athlete is 0.203.

Table 53

*Athletic Status Engagement Centroids*

Variable	Centroids
Non-Athlete	-0.131
Athlete	0.203

*Finding for research question three.* Figure 3 illustrates the centroids for athletic status Social membership group. Therefore, non-athletes are less likely than athletes to report the institution provided the necessary support to thrive socially (ENVSOCAL) and less likely than athletes to report quality relationships with other students (ENVSTU). This finding rejects the null hypothesis for research question three: Are there clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction (six behavior items) and 2) Supportive Campus Environment (six behavior items)?

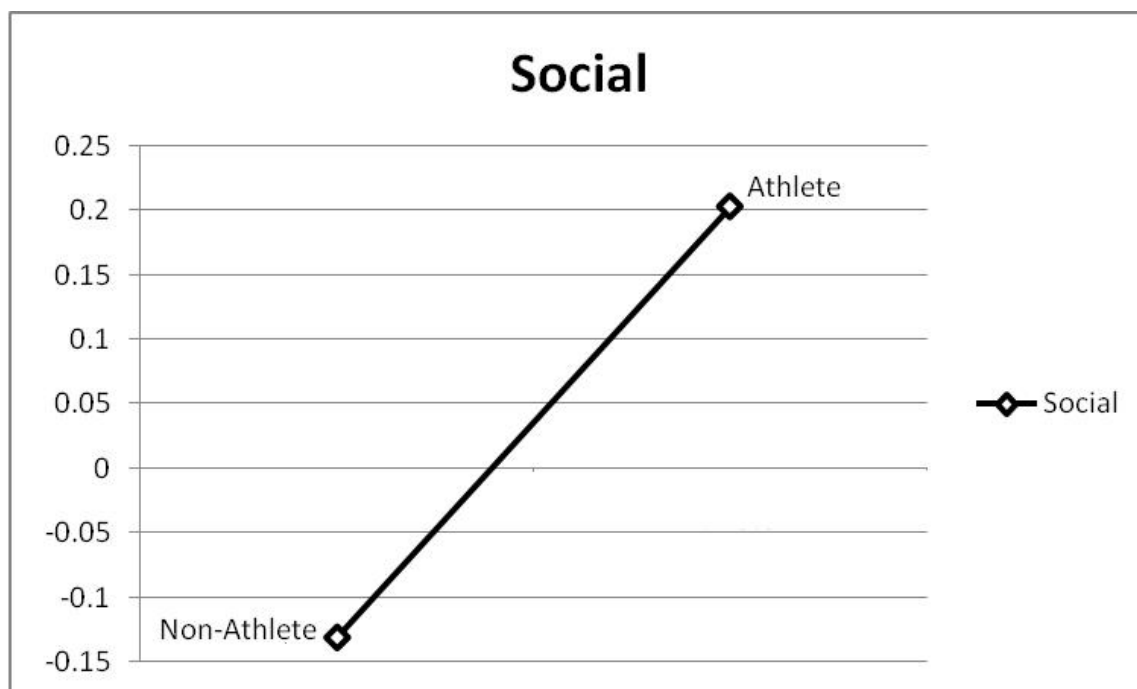


Figure 3: Illustration of athletic status centroids for the Social membership group.

*Independent Variable Legacy Status*

Table 54 represents the discriminant analysis for legacy status. One NSSE Student-Faculty Interaction behavior item “FACGRADE” (sig. = 0.036, Wilk’s Lambda = 0.986) was selected for the Discuss Grades membership group. “FACGRADE” is discussed grades or assignments with an instructor.

Table 54

*Discriminant Analysis for Legacy Status*

Factor	Eigen Value	% Variance	Wilk's Lambda	Chi Square	sig.
“FACGRADE”	0.014	100	0.986	4.374	0.036

Note: Significance =< 0.05

Table 55 demonstrates the centroids for legacy status Grades membership group. The centroid for non-legacy is 0.072 and the centroid for legacy is -0.195.

Table 55

*Legacy Status Engagement Centroids*

Variable	Centroids
Non-Legacy	0.072
Legacy	-0.195

*Finding for research question three.* Figure 4 illustrates the centroids for legacy status for Discuss Grades membership group. Therefore, legacies report they are less likely than non-legacies to discuss grades or assignments with an instructor (FACGRADE). This finding rejects the null hypothesis for research question three: Are there clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction (six behavior items) and 2) Supportive Campus Environment (six behavior items)?

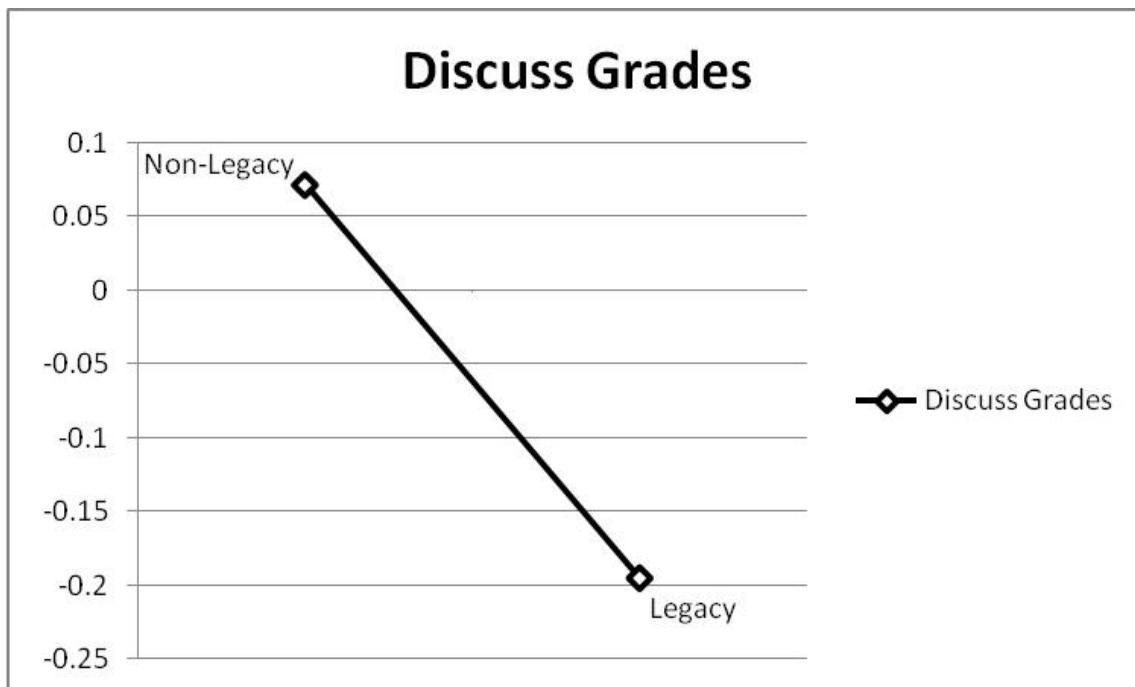


Figure 4: Illustration of legacy status centroids for the Discuss Grades membership group.

#### *Independent Variable Persistence*

Table 56 represents the discriminant analysis for persistence. One Student-Faculty Interaction behavior item “FACOTHER” (sig. = 0.002, Wilk’s Lambda = 0.969) and one Supportive Campus Environment behavior item “ENVSTU” (sig. = 0.000, Wilk’s Lambda = 0.969) were selected for the Campus Interaction membership group.

“FACOTHER” is worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.). “ENVSTU” is quality: your relationships with other students.

Table 56

#### *Discriminant Analysis for Persistence*

Factor	Eigen Value	% Variance	Wilk's Lambda	Chi Square	sig.
“FACOTHER”	0.06	100	0.969	18.211	0.002
“ENVSTU”	0.06	100	0.969	18.211	0.000

Note: Significance  $\leq 0.05$

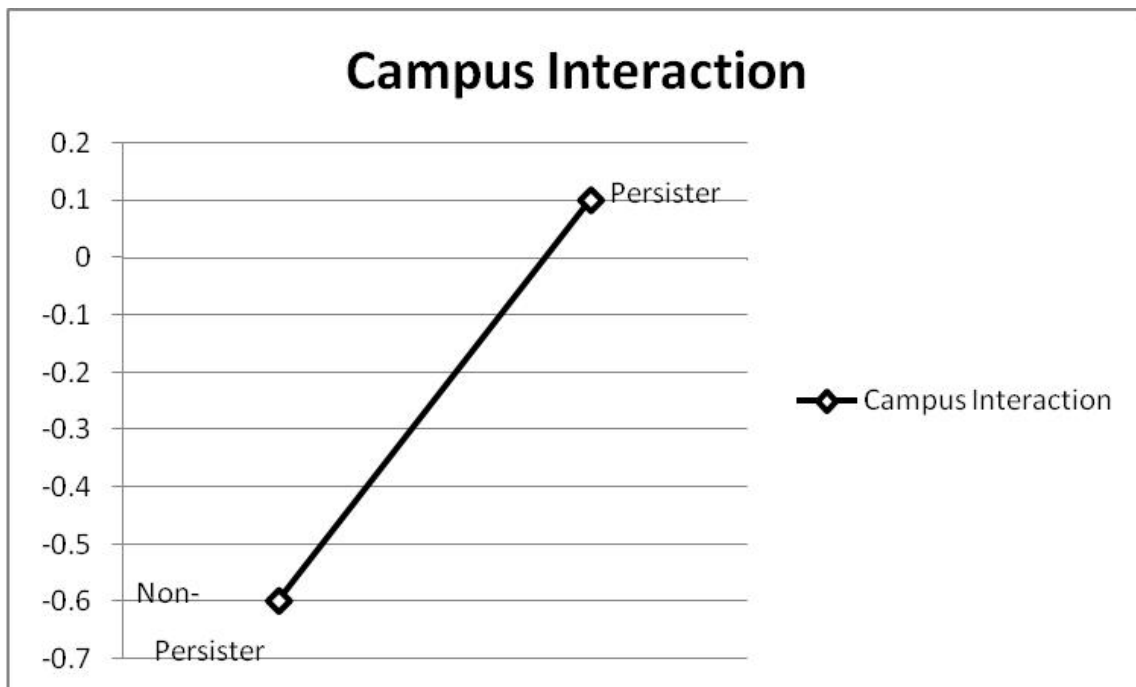
Table 57 demonstrates the centroids for persistence for the Campus Interaction membership group. The centroid for non-persisters is -0.598 and the centroid for persisters is 0.100.

Table 57

*Persistence Engagement Centroids*

Variable	Centroids
Non-Persister	-0.598
Persister	0.100

*Finding for research question three.* Figure 5 illustrates the centroids for persisters for the Campus Interaction membership group. Therefore, non-persisters are less likely than persisters to work with faculty members on activities other than coursework (FACOTHER) or to report a quality relationship with other students (ENVSTU). This finding rejects the null hypothesis for research question three: Are there clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction (six behavior items) and 2) Supportive Campus Environment (six behavior items)?



*Figure 5: Illustration of persistence centroids for the Campus Interaction membership group.*

#### *Summary*

A discriminant analysis was conducted to find membership groups of independent variables most associated with the dependent variable (Field, 2005). The Discriminant Analysis findings are summarized in Table 58. Four membership groups were identified; Faculty Relations, Social, Discuss Grades, Campus Interaction. For the Faculty Relations membership group for Gender, males are less likely than females to work on a research project with a faculty member outside of course or program (RESEARCH), receive prompt written or oral academic feedback from faculty (FACFEED) and to have a quality relationship with faculty (ENVFAC). For the Social membership group for Athletic Status, non-athletes are less likely than athletes to report the institution provided the necessary support to thrive socially (ENVSOCAL) and less likely than athletes to report quality relationships with other students (ENVSTU). For the Discuss Grades membership

group for Legacy Status, legacies report they are less likely than non-legacies to discuss grades or assignments with an instructor (FACGRADE). For the Campus Interaction membership group for Persistence, non-persisters are less likely than persisters to work with faculty members on activities other than coursework (FACOTHER) or to report a quality relationship with other students (ENVSTU).

Table 58

*Summary of Significant Discriminant Analysis Findings*

Independent Variable	Membership Group	Behavior Item	sig.	Wilk's Lambda
Gender	Faculty Relations	RESEARCH	0.006	0.968
		FACFEED	0.000	0.946
		ENVFAC	0.000	0.946
Athletic Status	Social	ENVSOCAL	0.047	0.987
		ENVSTU	0.017	0.974
Legacy Status	Discuss Grades	FACGRADE	0.036	0.986
Persistence	Campus Interaction	FACOTHER	0.002	0.969
		ENVSTU	0.000	0.969

Note: \*Significance  $\leq 0.05$

This section outlined the discriminant analysis conducted to find membership groups of independent variables most associated with the dependent variable (Field, 2005). Discriminant analysis addressed research question three, as well as the null hypothesis for research question three. Tables and Figures depicted the discriminant analysis for each of the independent variables; gender, athletic status, legacy status, and persistence.

### Summary

This chapter provided the presentation and analysis of data, to include the problem and purpose overview, study design, and data analysis. A descriptive summary statistics analysis, four-way analysis of covariance (ANCOVA), and discriminant analysis (Field, 2005) were used to examine archival data. The dependent variable,



engagement, was studied to identify engagement membership clusters for the independent variables, persistence, gender, athletic status, and legacy status of students. A four-way ANCOVA was utilized to seek main and interaction effects of the independent variables, persistence, gender, athletic status, and legacy status of students, and the dependent variable, NSSE engagement behavior items. ANCOVA Covariates were ACT or SAT standardized test scores and high school GPAs. At the 95% Confidence Level (0.05 alpha level), the Confidence Interval is 2.47. This Confidence Interval translates into 97.53% and exceeds the 95% standard, thereby giving confidence that this sample is representative of the population.

Descriptive summary statistics analysis answered research question one. The four-way ANCOVA tested the main and interaction effects of student engagement upon persistence of students at the college under study among variables of gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. The four-way ANCOVA addressed research question two, as well as the null hypothesis for research question two. This chapter provided the four-way ANCOVA descriptive statistics and test of significance for persistence, gender, athletic status, and legacy status for each behavior item for the NSSE Benchmarks 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

A discriminant analysis was conducted to find membership groups of independent variables, gender, athletic status, and legacy status most associated with the dependent variable (Field, 2005). Discriminant analysis addressed research question three, as well as

the null hypothesis for research question three. Four membership groups were identified; 1) Faculty Relations, 2) Social, 3) Discuss Grades, and 4) Campus Interaction. Three NSSE behavior items were selected for the Faculty Relations membership group. They include Student-Faculty Interaction “RESEARCH” (sig. = 0.006, Wilk’s Lambda = 0.968), Student-Faculty Interaction “FACFEED” (sig. = 0.000, Wilk’s Lambda = 22.275), and Supportive Campus Environment “ENVFAC” (sig. = 0.000, Wilk’s Lambda = 0.946). The centroid for males is -0.419 and the centroid for females is 0.176. Therefore, females are more likely to work on research projects with faculty members outside of course or program requirements (RESEARCH), report receiving prompt written or oral feedback from faculty on academic performance (FACFEED), and report having a quality relationship with faculty members (ENVFAC).

Two NSSE behavior items were selected for the Social membership group. They include Supportive Campus Environment “ENVSOCAL” (sig. = 0.047, Wilk’s Lambda = 0.987) and Supportive Campus Environment “ENVSTU” (sig. = 0.017, Wilk’s Lambda = 0.974). The centroid for non-athletes is -0.131 and the centroid for athletes is 0.203. Therefore, non-athletes are less likely than athletes to report the institution provided the necessary support to thrive socially (ENVSOCAL) and less likely than athletes to report quality relationships with other students (ENVSTU).

One NSSE Student-Faculty Interaction behavior item “FACGRADE” (sig. = 0.036, Wilk’s Lambda = 0.986) was selected for the Discuss Grades membership group. “FACGRADE” is discussed grades or assignments with an instructor. The centroid for non-legacy is 0.072 and the centroid for legacy is -0.195. Therefore, non-legacies report

they are more likely than legacies to discuss grades or assignments with an instructor (FACGRADE).

One Student-Faculty Interaction behavior item “FACOTHER” (sig. = 0.002, Wilk’s Lambda = 0.969) and one Supportive Campus Environment behavior item “ENVSTU” (sig. = 0.000, Wilk’s Lambda = 0.969) were selected for the Campus Interaction membership group. “FACOTHER” is worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.). “ENVSTU” is quality: your relationships with other students. The centroid for non-persisters is -0.598 and the centroid for persisters is 0.100. Therefore, non-persisters are less likely to persisters to work with faculty members on activities other than coursework (FACOTHER) or to report a quality relationship with other students (ENVSTU).

## CHAPTER FIVE

### FINDINGS, CONCLUSIONS, AND RECOMMENDATIONS

#### Problem and Purpose Overview

The purpose of this study is to address the lack of information regarding the identification of NSSE academic variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. No studies have been conducted at the college under study regarding the influence of the dependent variable, engagement upon the independent variables, persistence, gender, athletic status, and legacy status of students.

First, descriptive summary statistics of students at the college under study regarding variables, persistence, gender, athletic status, legacy status, standardized test scores, and high school GPAs for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment are provided.

Second, this study described and outlined the main and interaction effects of student engagement at the college under study among variables persistence gender, athletic status, and legacy status when standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

Third, this study determined whether clusters of behavior items describe membership of the study group exist for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

Furthermore, this study provided a model that can be used by college administration and faculty to guide implementation of measures to increase engagement, persistence, and thus, graduation rates. The review of literature highlights themes regarding engagement and persistence for various demographic variables. Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items.

#### *Statement of the Problem*

There is a lack of information regarding the identification of NSSE academic variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college when standardized test scores and high school GPAs are held constant. The dependent variable, engagement, was studied to identify engagement clusters for the independent variables, persistence, gender, athletic status, and legacy status of students for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

#### *Purpose of the Study*

The purpose of this study is to address the lack of information regarding the identification of NSSE academic variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private Midwestern college. The influence of the dependent variable, engagement, upon the independent variables, persistence, gender, athletic status, and legacy status of students at the college under study when ACT or SAT standardized test scores and high school GPAs are held constant, are examined. Student archival data from school years 2002-2006 at the college under study was analyzed, including student demographic data and NSSE data. These

data, categorized by four first year student cohorts from the fall semesters of 2002, 2003, 2004, and 2005, were studied as they persist to the following respective year.

In order to accomplish this purpose, this study provided descriptive summary statistics of students regarding variables, persistence, gender, athletic status, legacy status, standardized test scores and high school GPAs of first year students at the college under study for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. These Benchmarks were selected for examination at the request of an administrative officer at the college under study due to the relevance of the Benchmark behavior items to institutional goals.

Second, this study described main and interaction effects of student engagement at the college under study among variables, persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Third, it determines whether clusters of Benchmark behavior items describe membership of the population for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment.

#### Study Group

The study group of 319 students for this study, depicted in Table 59, is a non-probability, purposive sample (Field, 2005) of four student cohorts from the college under study, from first year students in the fall semesters of 2002, 2003, 2004, and 2005. The sample consists of 72 fall 2002 first year students, 87 fall 2003 first year students, 78 fall 2004 first year students, and 82 fall 2005 first year students.

This sample represents 319 randomly selected first year students from each class in 2002, 2003, 2004, and 2005, to take the NSSE instrument. The 319 first year student participants were tracked through the fall of the following year for each respective cohort using Empower<sup>®</sup>, the student archival databases of the college under study to determine if students persisted to the following fall.

Table 59  
*Study Groups by Year*

Year	NSSE Selected	N
2002	100	72
2003	100	87
2004	100	78
2005	100	82

(NSSE College Report, 2003; NSSE College Report 2004; NSSE College Report, 2005; NSSE College Report, 2006)

In examining whether 319 of 400 students is a representative sample, a website (<http://www.surveysystem.com/sscalc.htm>) provided a formula for calculating the Confidence Interval of 2.47. A Confidence Interval of 2.47 translates into a 97.53% confidence that the sample is representative of the population. This Confidence Level exceeds the required 95% Confidence Level (0.05 alpha level). Given the study population and confidence interval as outlined in this section, the variables are defined in the next section.

### Statistical Methods

Data were analyzed with SPSS Version 14.0 computer software. Descriptive summary statistics analysis, four-way ANCOVA, and discriminant analysis were conducted.

### Variables

The following variables were selected for this study. They include independent variables of persistence gender, athletic status, and legacy status, dependent variables of

NSSE Benchmark behavior items, and covariates of high school GPAs and ACT or SAT standardized test scores.

*Athletic status.* Athletic status is defined as college-sponsored, National Association of Intercollegiate Athletics, football, softball, baseball, basketball, cross country, soccer, spirit squad, tennis, track and field and volleyball team members and non-members.

*High school grade point average.* High School GPA is defined as average cumulative grade point earned in high school on a four-point scale.

*Legacy status.* Legacy status is defined as students reporting previous family members attending the college under study and students reporting no previous family members attending the college under study.

*NSSE Active and Collaborative Learning.* Active and Collaborative Learning is based on the premise that student learning is improved, and students are better prepared for life in general when students are active and collaborative in their learning activities. Active learning requires thought and practical application of learning while collaborative learning requires communication and working with others (NSSE, 2007).

*NSSE Enriching Educational Experience.* Enriching Educational Experiences is based on the premise that student learning is improved when students apply learning within and outside the classroom, experience cultural diversity, and utilize technology (NSSE, 2007).

*NSSE Level of Academic Challenge.* Level of Academic Challenge is based on the premise that student learning is improved when students are challenged and expected to meet high expectations (NSSE, 2007).



*NSSE Student-Faculty Interaction.* Student-Faculty Interaction is based on the premise that student learning is improved when students interact with faculty both within and outside the classroom (NSSE, 2007).

*NSSE Supportive Campus Environment.* Supportive Campus Environment is based on the premise that student learning is improved when students feel supported by college personnel and have positive, diverse relationships on campus (NSSE, 2007, p. 49).

*Persistence.* Persistence is defined as students from each of the four fall first year student cohorts; 2002, 2003, 2004, and 2005, who are still attending the college under study the fall of the following year for each respective cohort. Students who persist are referred to as persisters. Students who do not are referred to as non-persisters.

*Standardized test score.* Standardized Test Score is defined as either student ACT or SAT scores used by the college under study for admissions. ACT is a standardized test generating student scores in English, Math, Reading, and Science. It is a competency-based test rather than aptitude or intelligence based test. SAT is a standardized test generating student scores in Critical Thinking, Math, and Writing. It is an assessment examination that measures critical thinking skills (CollegeBoard, 2008).

#### *Data Collection*

Given the study group of 319 students of a non-probability, purposive sample (Field, 2005) of four student cohorts from first year students in the fall semesters of 2002, 2003, 2004, and 2005, the data collection is discussed. The study addressed the lack of information regarding identification of NSSE academic variable clusters that predict student persistence, gender, athletic status, and legacy status membership at a private

Midwestern college when ACT or SAT standardized test scores and high school GPAs are held constant for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Covariates for the study include high school GPAs and ACT or SAT standardized test scores.

Prior to data retrieval, an IRB was secured. Second, persistence, gender, athletic status, legacy status, high school GPA, ACT or SAT standardized test, NSSE Active and Collaborative Learning Benchmark behavior items, and NSSE Level of Academic Challenge Benchmark behavior items of 319 first year students was retrieved electronically from Empower<sup>®</sup>, an archival database at the college under study. Data were stored in Microsoft Excel spreadsheet files to minimize potential for secondary human data entry error. Data were exported from Excel to the statistical program SPSS Version 14.0 for analysis on a laptop PC.

*ACT and SAT.* The college under study uses both ACT and SAT as the standardized test for admission. Standardized test data were converted based on The College Student Report Standardized Test Conversion Table (Appendix A) before statistical analysis.

*Empower<sup>®</sup>.* The college under study has used Empower<sup>®</sup> as the student database since 2003 to maintain a large amount of student data in a simple, reliable format. Empower<sup>®</sup> is based on an Oracle database system, which provides a high level of user-friendliness and reliability. The database enables users to mine data and generate reports with ease. In addition to usability by administration and faculty at the college under study, students are able to track grades, check schedules, and enroll through a secure web portal on Empower<sup>®</sup>. The Director of Application Support in the Technology and

Information Systems department at the college under study oversees Empower<sup>®</sup> use and support.

*National Survey of Student Engagement.* NSSE is an annual survey administered to students across the United States during the Spring semester. The survey is designed to provide estimates of student participation in various programs while attending college. Data received from the survey reflect what students gain through various forms of student engagement during their college career. Questions on the survey are designed to reflect best practices in higher education, which also reflects desired outcomes of college (NSSE, 2006).

NSSE Benchmarks help colleges and universities respond to accountability questions and accepted college and university rankings in popular print media (NSSE, 2006). Information gathered from the survey can be used by institutions to design better college experiences. By providing a student-centric college experience, persistence and graduation rates should increase. In addition, prospective students and their parents can gain a better idea of average student life at various colleges. This information can assist college admissions departments recruit prospective students by leveraging favorable NSSE data.

The NSSE instrument is forty questions, available in paper or web versions, and takes approximately fifteen minutes to complete. NSSE was tested for validity and reliability and has an approximate 39% response rate (NSSE, 2006). NSSE was first administered in 2000 to 63,000 freshmen and seniors at 276 participating colleges and universities and has experienced annual increased participation (NSSE, 2006).

*Instrument.* The NSSE instrument is forty questions, available in paper or web versions, and takes approximately 15 minutes to complete. NSSE was tested for validity and reliability and has an approximate 39% response rate (NSSE, 2006). Given the data collection as outlined in this section, the data analysis is explored in the next section.

### Findings

Three research questions were proposed to study engagement as it pertains to social constructivism within the NSSE academic behavior items. This section includes findings for each research question.

#### *Research Question One*

Research Question One addressed the nominal and scalar descriptive summary statistics of students regarding variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant, for each behavior item within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Descriptive summary statistics for nominal variables revealed that the study group had a greater representation of females than males, of athletes than non-athletes, of non-legacies than legacies, and of persisters than non-persisters. Interpretation of descriptive summary statistics for scalar variables, as noted in Table 60, suggest that the study group's ACT or SAT standardized test scores are high and their high school GPAs are above average (B Average).

Table 60 also summarizes data for the Student-Faculty Interaction Benchmark and Supportive Campus Environment Benchmark. For the Student-Faculty Interaction Benchmark, students in the study group reported often discussing grades or assignments with an instructor (FACGRADE). They very often discussed ideas from readings or

classes with faculty members outside of class (FACIDEAS). They often discussed career plans with a faculty member or advisor (FACPLANS). They often received prompt written or oral feedback from faculty on academic performance (FACFEED). They very often worked with faculty members on activities other than coursework (FACOTHER). They plan to do research projects with a faculty member outside of course or program requirements (RESEARCH).

For the Supportive Campus Environment Benchmark Item, students in the study group report often receiving support needed to thrive socially (ENVSOCAL). They sometimes receive the support needed to succeed academically (ENVSUPRT). They often receive help coping with non-academic responsibilities (ENVNACAD). They report their relationships with other students as friendly, supportive, and sense of belonging (ENVSTU). They report their relationships with faculty as available, helpful, and sympathetic (ENVFAC). They report their relationships with administrative personnel and offices as helpful, considerate, and flexible (ENVADM).

Table 60

*Descriptive Summary Statistics for Scalar Variables Interpretation*

Source	Mean	Scale	Interpretation
Standardized Test: ACT or SAT	23.88		
High School GPA	3.48	4.00	High School Grade Point Average is a B
NSSE Student-Faculty Interaction			
“FACGRADE”	2.62	4.00	Often
“FACIDEAS”	1.86	4.00	Very Often
“FACPLANS”	2.3	4.00	Often
“FACFEED”	2.54	4.00	Often
“FACOTHER”	1.86	4.00	Very Often
“RESEARCH”	2.03	4.00	Plan to do
NSSE Supportive Campus Environment			
“ENVSOCAL”	2.72	4.00	Often
“ENVSUPRT”	3.2	4.00	Sometimes
“ENVNACAD”	2.39	4.00	Often
“ENVSTU”	5.97	7.00	Friendly, supportive, sense of belonging
“ENVFAC”	5.82	7.00	Available, helpful, sympathetic
“ENVADM”	5.34	7.00	Helpful, considerate, flexible

*Research Question Two*

Research Question Two addressed whether there are main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant, for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. Several main and interaction effects for student engagement at the college under study were found. There were four main effects for “FACGRADE”, “FACIDEAS”, and “ENVSTU”. Discussing grades or assignments with an instructor (Student-Faculty Interaction FACGRADE) is a main effect of student engagement for legacy status and for persistence. Discussing ideas from readings or classes with faculty members outside of class (Student-Faculty Interaction FACIDEAS) is a main effect of student engagement

for persistence. A quality relationship with other students (Supportive Campus Environment ENVSTU) is a main effect of student engagement for athletic status.

There were eight interaction effects for “FACIDEAS”, “FACPLANS”, “RESEARCH”, “ENVSUPRT”, and “ENVADM”. Discussing ideas from readings or classes with faculty members outside of class (Student-Faculty Interaction FACIDEAS) is an interaction effect of student engagement for persistence, legacy status. Talking about career plans with a faculty member or advisor (Student-Faculty Interaction FACPLANS) is an interaction effect of student engagement for athletic status, legacy status. It is also an interaction effect for persistence, athletic status, legacy status. Working on a research project with a faculty member outside of course or program requirements (Student-Faculty Interaction RESEARCH) is an interaction effect of student engagement for gender, athletic status. It is also an interaction effect of student engagement for persistence, gender, athletic status. Receiving support needed to help succeed academically (Supportive Campus Environment ENVSUPRT) is an interaction effect of student engagement for persistence, gender. A quality relationship with administrative personnel and offices (Supportive Campus Environment ENVADM) is an interaction effect of student engagement for gender, legacy status.

### *Research Question Three*

Research Question Three addressed whether there are clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction (six behavior items) and 2) Supportive Campus Environment (six behavior items). Clusters of behavior items were found to describe four membership groups of the population within the NSSE Benchmarks. 1) Faculty Relations, 2) Social, 3) Discuss

Grades, and 4) Campus Interaction. Females, athletes, non-legacies, and persisters are more likely to exhibit NSSE behavior items found to promote social engagement.

Behavior item clusters were found to describe the Faculty Relations membership group for the independent variable gender. The three behavior items are working on a research project with a faculty member outside of course or program requirements (RESEARCH), receiving prompt written or oral feedback from faculty on academic performance (FACFEED), and a quality relationship with faculty members (ENVFAC). Females are more likely to engage in these faculty relations than males.

Behavior item clusters were found to describe the Social membership group for the independent variable athletic status. The two behavior items are receiving the necessary institutional support to thrive socially (ENVSOCAL) and a quality relationship with other students (ENVSTU). Athletes were more likely to receive the necessary institutional support to thrive socially and report a quality relationship with other students.

Behavior item clusters were found to describe the Discuss Grades membership group for the independent variable legacy. The Behavior item is discuss grades or assignments with an instructor (FACGRADE). Non-legacies were more likely to exhibit this behavior than legacies.

Behavior item clusters were found to describe the Campus Interaction membership group for the independent variable persistence. The two behavior items are working with faculty members on activities other than coursework (FACOTHER) and a quality relationship with other students (ENVSTU). Persisters are more likely to engage in these behaviors than non-persisters.



## Null Hypotheses

Two null hypotheses were tested. Both null hypotheses were rejected.

### *Null Hypothesis for Research Question Two*

The null hypothesis for research question two is that there are no main and interaction effects of student engagement at the college under study among variables persistence, gender, athletic status, and legacy status when ACT or SAT standardized test scores and high school GPAs are held constant, for each behavior item within two NSSE Benchmarks under study; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. The null hypothesis for research question two is rejected for the independent variables. For Student-Faculty Interaction, there are three main effects and five interaction effects of student engagement at the college under study, involving the behavior items “FACGRADE”, “FACIDEAS”, “FACPLANS”, and “RESEARCH”. Discussing grades or assignments with an instructor (Student-Faculty Interaction FACGRADE) is a main effect of student engagement for legacy status and for persistence. Discussing ideas from readings or classes with faculty members outside of class (Student-Faculty Interaction FACIDEAS) is a main effect of student engagement for persistence.

Discussing ideas from readings or classes with faculty members outside of class (Student-Faculty Interaction FACIDEAS) is an interaction effect of student engagement for persistence, legacy status. Talking about career plans with a faculty member or advisor (Student-Faculty Interaction FACPLANS) is an interaction effect of student engagement for athletic status, legacy status. It is also an interaction effect for persistence, athletic status, legacy status. Working on a research project with a faculty

member outside of course or program requirements (Student-Faculty Interaction RESEARCH) is an interaction effect of student engagement for gender, athletic status. It is also an interaction effect of student engagement for persistence, gender, athletic status.

For Supportive Campus Environment, there is one main effect and two interaction effects of student engagement at the college understudy involving the Behavior items “ENVSUPRT”, “ENVSTU”, and “ENVADM.”

Receiving support needed to help succeed academically (Supportive Campus Environment ENVSUPRT) is an interaction effect of student engagement for persistence, gender. A quality relationship with other students (Supportive Campus Environment ENVSTU) is a main effect of student engagement for athletic status. A quality relationship with administrative personnel and offices (Supportive Campus Environment ENVADM) is an interaction effect of student engagement for gender, legacy status.

*Null Hypothesis for Research Question Three*

The Null Hypothesis for research question three is that there are no clusters of behavior items describing membership of the population for two NSSE Benchmarks; 1) Student-Faculty Interaction (six behavior items) and 2) Supportive Campus Environment (six behavior items). This null hypothesis is rejected because clusters of behavior items were found to describe four membership groups of the population within the NSSE Benchmarks; 1) Faculty Relations, 2) Social, 3) Discuss Grades, and 4) Campus Interaction. Females, athletes, non-legacies, and persisters are more likely to exhibit NSSE behavior items found to promote social engagement.

Behavior item clusters were found to describe the Faculty Relations membership group for the independent variable gender. The three behavior items are working on a

research project with a faculty member outside of course or program requirements (RESEARCH), receiving prompt written or oral feedback from faculty on academic performance (FACFEED), and a quality relationship with faculty members (ENVFAC). Females are more likely to engage in these faculty relations than males.

Behavior item clusters were found to describe the Social membership group for the independent variable athletic status. The two behavior items are receiving the necessary institutional support to thrive socially (ENVSOCAL) and a quality relationship with other students (ENVSTU). Athletes were more likely to receive the necessary institutional support to thrive socially and report a quality relationship with other students.

Behavior item clusters were found to describe the Discuss Grades membership group for the independent variable legacy. The Behavior item is discuss grades or assignments with an instructor (FACGRADE). Non-legacies were more likely to exhibit this behavior than legacies.

Behavior item clusters were found to describe the Campus Interaction membership group for the independent variable persistence. The two behavior items are working with faculty members on activities other than coursework (FACOTHER) and a quality relationship with other students (ENVSTU). Persisters are more likely to engage in these behaviors than non-persisters.

### Summary of Findings

Based on the conceptual underpinning of engagement as it pertains to social constructivism, findings support a social order based on past human interaction (Berger

& Luckmann, 1966), and the idea of “no theory neutral language” (Coghlan & Brannick, 2005, p. 5). Table 61 provides a guide to the Behavior Item descriptions.

Table 61

*NSSE Behavior Items Found in Figure 6*

Behavior Item	Definition
<b>Student-Faculty Interaction</b>	
FACGRADE	Discussed grades or assignments with an instructor
FACIDEAS	Discussed ideas from your readings or classes with faculty members outside of class
FACPLANS	Talked about career plans with a faculty member or advisor
RESEARCH	Work on a research project with a faculty member outside of course or program requirements
<b>Supportive Campus Environment</b>	
ENVSUPRT	Institutional emphasis: Providing the support you need to help you succeed academically
ENVSTU	Quality: Your relationships with other students
ENVADM	Quality: Your relationships with administrative personnel and offices

Figure 6 provides a conceptual model of the findings using the conceptual underpinning. There are significant main effects and significant interaction effects among the independent variables. The interaction of these behavior items suggests a social order is present through different academic engagement behaviors.

For each of the two NSSE Benchmark Behavior Items 1) Student-Faculty Interaction and 2) Supportive Campus Environment, main and interaction effects occurred within the four independent variables. During an engagement activity, the college under study should consider the four independent variables identified in the study to design programs promoting engagement.

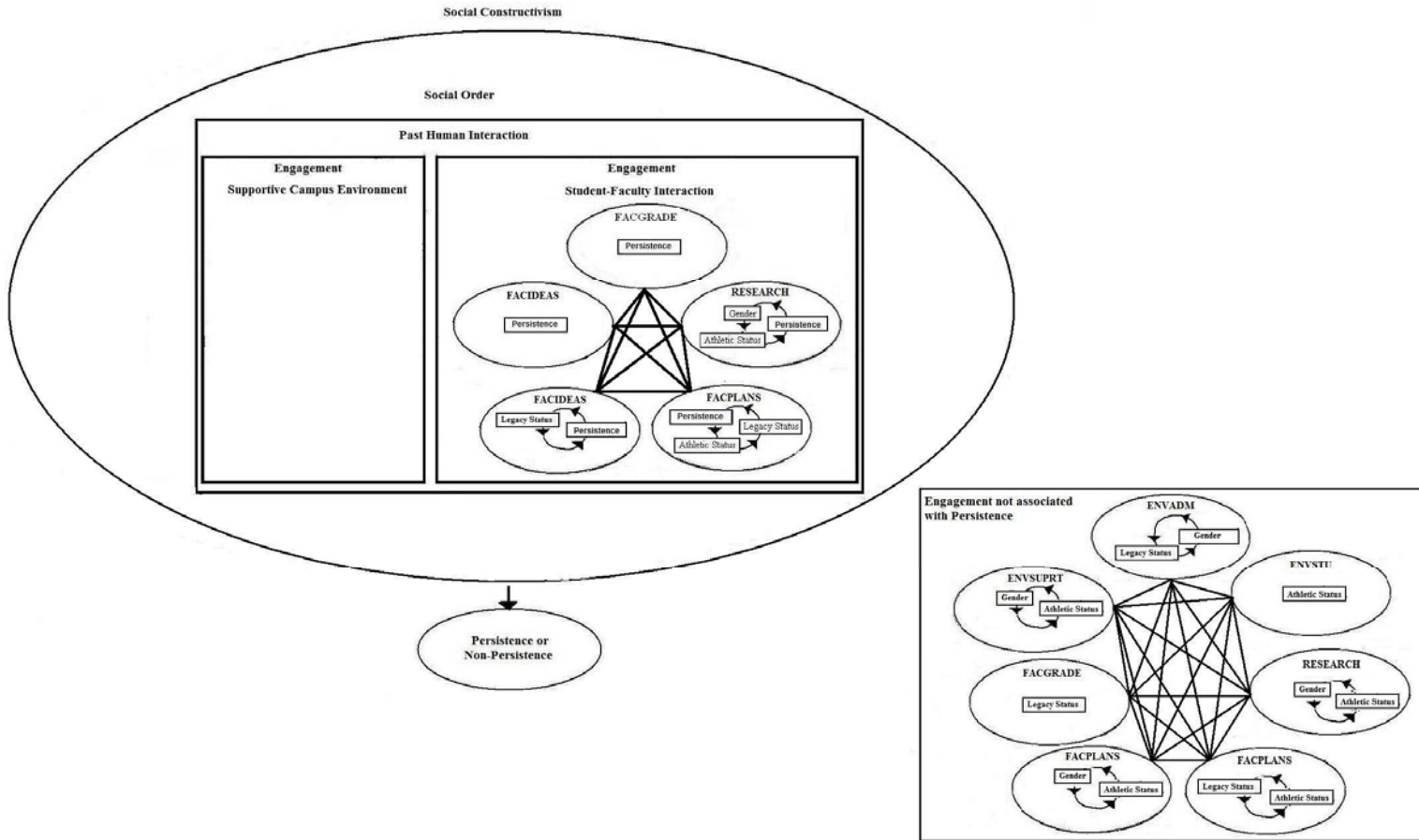


Figure 6: A conceptual model of the findings using the conceptual underpinning, engagement as it pertains to social constructivism, which is a result of social interactions between students of different backgrounds at the institution under study.

In addition to the interaction effect of these academic engagement behavior items defining a social order, discriminant analysis identified clusters of academic engagement behavior items based on each of the four independent variables, persistence, gender, athletic status, and legacy status. These clusters support the conceptual underpinning by asserting a group of behaviors common among various independent variable groups, thus defining behaviors within a specific social order. Females are engaged more than males in terms of faculty relations, athletes are more engaged than non-athletes in terms of social, non-legacies are more engaged than legacies in terms of discussing grades, and persisters are more engaged than non-persisters in terms of campus interaction. During an engagement activity, the college under study should consider the impact of these identified clusters on the four independent variables to design programs promoting engagement.

#### *College Persistence and Student Engagement*

Student engagement is a learning environment where students are active participants in, not merely passive recipients of their own education; it is widely accepted that student engagement contributes to persistence (Astin, 1993; Chickering & Gamson, 1987; NSSE, 2006; Pascarella & Terenzini, 1991; Tinto, 1993). Increased knowledge could result in the creation of college persistence programs focused on specific demographic variables and engagement items.

Table 62 illustrates positive relationships for persistence and student engagement by demographic variables found in the review of literature. NSSE Student Engagement Behavior item clusters were found in this study to describe the Campus Interaction membership group for the independent variable persistence. The two behavior items are

worked with faculty members on activities other than coursework (FACOTHER) and a quality relationship with other students (ENVSTU).

Table 62

*Positive Relationships for Persistence and Student Engagement by Demographic Variables*

	Persistence	Student Engagement
Female gender	Yes	Yes
Legacy status	Yes	Yes
Male athletes	Yes	Yes

(Acker, Hughes, & Fendley, 2002; Antley, 1999; Astin, 1993; Chickering & Gamson, 1987; Coakley, 2004; Berkner, He, & Cataldi, 2002; Eitzen & Sage, 2003; Fredda, 2000; Gao, Hughes, O'Rear, & Fendley, 2002; Gifford, Briceno-Perriott, & Mianzo, 2006; Ikegulu & Barham, 1997; Ishitani, 2005; Ishitani & DesJardins, 2002; Ishitani & Snider, 2004; Leppel, 2006; NSSE, 2006; Pascarella & Terenzini, 1991; Ronco & Cahill, 2004; Tinto, 1993; Zhu, 2002)

First, the review of literature suggests female gender has a positive relationship with persistence and student engagement. NSSE Student Engagement Behavior item clusters were found to describe the Faculty Relations membership group for the independent variable gender in this study. The three behavior items are working on a research project with a faculty member outside of course or program (RESEARCH), receiving prompt written or oral academic feedback from faculty (FACFEED) and a quality relationship with faculty (ENVFAC). Females are more likely to work on a research project with a faculty member outside of course or program, receive prompt written or oral academic feedback from faculty, and have a quality relationship with faculty.

Second, the review of literature suggests legacy status has a positive relationship with persistence and student engagement. NSSE Student Engagement Behavior item clusters were found to describe the Discuss Grades membership group for the independent variable legacy status in this study. The behavior item is discussing grades or assignments with an instructor (FACGRADE). Non-legacies and persisters are more likely to discuss grades or assignments with an instructor.

Third, the review of literature suggests male athletic status has a positive relationship with persistence and student engagement. One NSSE Student Engagement Behavior item was found to describe the Social membership group for the independent variable athletic status in this study. The two behavior items are reporting that the institution provided the necessary support to thrive socially (ENVSOCAL) and a quality relationship with other students (ENVSTU). Athletes report the institution provided necessary support to thrive socially, as well as having quality relationships with other students.

The null hypothesis for research question three is that there are no clusters of behavior items describing membership of the population within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. This null hypothesis is rejected because clusters of behavior items were found to describe four membership groups of the population within the NSSE Benchmarks, Faculty Relations, Social, Discuss Grades, and Campus Interaction.

### Conclusions

New knowledge was gained from this study and supported by previously discussed findings. Conclusions will be reported in the following sections.

#### *Conclusion One*

Non-legacies and persisters are more likely to engage in discussing grades, assignments, or ideas with an instructor than legacies and non-persisters. Legacies, in particular males, report a good relationship with administrators. In other words, legacies have more relationships with upper level college officials and may not feel the need to engage with faculty. Legacies, already somewhat in the social group, may feel a sense of



entitlement as they perceive entrance into the college as a birth right, and may not seek new social groups. On the other hand, non-legacies enter the college looking for new social groups and embrace opportunities to feel involved in the college community. However, persisters exhibit a tendency to seek social groups, much like non-legacies, while non-persisters may have feelings of social exclusion.

#### *Conclusion Two*

Non-athletes are more likely to engage in a discussion of career plans with faculty than athletes. Non-athletes do not receive the same kind of mentoring, nor do they experience the same kind of peer groups as athletes at the college under study. Non-athletes seek social inclusion from community members, and thus will be more likely to speak with faculty concerning their future plans. Athletes report having quality relationships with other students, which suggests athletes receive the social satisfaction of discussing career plans in their predetermined social groups.

#### *Conclusion Three*

Males are more engaged than females when working on research projects with faculty members. However, when combined with giving prompt feedback on assignments and student relationships with faculty, females are more engaged than males. The finding supports the idea that it is important for students to engage in research with faculty members.

#### *Conclusion Four*

Males report receiving the most support from the college under study. Surprisingly, this is not an indicator of persistence. Non-persisters report receiving more

support than persists. The support being received by students at the college is not fulfilling the needs of students, thus not having any effect on a student's decision to stay.

#### *Conclusion Five*

Five NSSE Benchmark Items were found to exhibit behavior regarding persistence. All five are within the Student-Faculty Interaction Benchmark. The students engaging in activities with faculty members are the students most likely to persist to graduation.

#### Recommendations and Discussion

With regards to findings and conclusions, the following recommendations are made. One set of recommendations is for future study, while the other is for practitioners.

#### *Recommendations for Future Study*

The purpose of this study was to address the lack of information regarding identification of NSSE social variable clusters that predict private Midwestern college persistence within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. The recommendations for future research that follow are based on the study's findings and conclusions.

*Recommendation one.* A future study could involve creating a survey highlighting themes found in this study to see if the NSSE Benchmark behavior items contributed to engagement later in the college career of the study group members. This instrument should be validated to the specific college under study rather than using a nationally-normed instrument.

*Recommendation two.* A future study could involve this study's methodology involving the freshmen in 2002 through 2005 to participate in NSSE as seniors to seek

information regarding NSSE Benchmark behavior item engagement at the end of their college career.. A study limitation would be the college under study only uses NSSE every-other year.

*Recommendation three.* A future study could employ a qualitative approach. Utilization of focus groups and depth interviews to learn more about the psyche of an entering class of freshmen could provide deeper reasoning for various engagement behaviors. This study could also track any behavior changes over a four year period at the college under study.

*Recommendation four.* A future study could involve an investigation into more specific types of students at the college under study. The study would break down specific subgroups of the current study independent variable, such as a specific sport, specific college organization, or specific degree sought, to identify similar or different findings from this study.

*Recommendation five.* A future study could involve the utilization of another nationally-normed instrument to compare student engagement to student satisfaction. Noel-Levitz is a nationally-normed instrument to test student satisfaction currently administered by the college under study.

*Recommendation six.* Future studies could involve replicating this study at both similar colleges (private, Midwestern colleges) and different colleges (public, Eastern, Western, or two-year colleges) and compare findings to those of this study. Limitations and delimitations would have to be considered during replication of this study.

*Recommendation seven.* A future study could involve the use of the Faculty Survey of Student Engagement, a sister product to NSSE, to analyze the faculty and staff

to see their perceptions of engagement and how they encourage engagement. The college under study currently administers the Faculty Survey of Student Engagement.

### *Recommendations for Practitioners*

The following section provides recommendations for practitioners. First, there is a list of five recommendations related to the study conclusions. Second, there is a list of four recommendations specific to the four independent variables studied. Though this study examined one specific institution, the model can be utilized by other similar institutions.

There are five recommendations related to the study conclusions. Practitioners can accept these recommendations to promote student engagement and persistence.

*Recommendation one.* Instructors should provide structure for discussing grades, assignments, and ideas with students of all backgrounds. Instructors need to seek strategies to do so that are appropriate for each background in and out of the classroom setting.

*Recommendation two.* Faculty members should be more involved in student career planning. Athletes need to receive more attention in this area than in previous semesters.

*Recommendation three.* The curriculum should encourage student research with faculty members. Students engaged in research typically persist at the college under study.

*Recommendation four.* Strategic planning should involve discussion and implementation of an institution-wide supportive environment. Students may not receive the support they need in order to persist.

*Recommendation five.* Opportunities for student interaction with faculty and other students must be encouraged by residence halls, student organizations, and athletic programs. Student life needs to find ways to encourage faculty involvement in their programs. Persisting students are typically involved in campus activities with other community members.

There are four recommendations specific to the four independent variables studied. Practitioners can accept these recommendations to promote student engagement and persistence.

*Recommendation for gender.* Faculty and staff should encourage females to engage in the following activities to promote student engagement. First, females should be encouraged to work on a research project with a faculty member outside of course or program requirements, solicit prompt written or oral feedback from faculty on academic performance, and develop quality relationships with faculty members. College administrators should encourage their faculty to work on a research project with students outside of course or program requirements, give prompt written or oral feedback from faculty on academic performance, and build quality relationships with students. Quality relationships should include availability, helpfulness, and sympathy.

*Recommendation for athletes.* Faculty and staff should encourage athletes to communicate the types of support needed to thrive socially, and to develop quality relationships with other students. College administrators should encourage their faculty to provide athletes with the support needed to thrive socially and to encourage students to develop quality relationships with other students..

*Recommendation for legacies.* Faculty and foundation or alumni staff members should encourage legacies to discuss grades or assignments with an instructor. College administrators should encourage faculty to encourage open communications with legacies regarding grades or assignments with students.

*Recommendation for persisters.* College personnel should encourage all students to engage in the following activities to promote student engagement. First, students should be encouraged to work with faculty members on activities other than coursework. Second, students should build quality relationships with other students that are perceived as friendly, supportive, and have a sense of belonging. College Administrators should encourage faculty to provide both formal and informal opportunities for students to work with faculty members on activities other than coursework. College Administrators should encourage faculty to help students build quality relationships with other students.

### *Discussion*

Given the recommendations, the college under study should adjust procedures to promote student engagement and persistence. Differences were found for each independent variable, suggesting room for improvement.

An area to examine for the college is the athletic program. As the college looked to the athletic program to increase enrollment in the early nineties, they could look once again to the athletic program to increase engagement and persistence. Athletes exhibited behaviors conducive to engagement and persistence, which goes back to the conceptual underpinning of engagement as it pertains to social constructivism. The athletic program apparently provides a means for students to be socially involved in the campus, leading to engagement and persistence. This does not mean all students at the college need to be

athletes, but more that the athletic program could be emulated for non-athletic students. A freshman program with a social and academic focus utilizing a similar method as the athletic program may result in increased engagement and persistence.

The importance of the involvement of faculty in student life is vital. Typically faculty at higher education institutions are somewhat introverted and do not socialize with the student body. Most faculty typically socialize with peers within their department. This is not the desired behavior for the college under study. If the traditional socialization patterns of faculty exist at the college under study, the role of faculty must change in order for the community to succeed. More faculty must involve themselves in a variety of student activities. Faculty members already involving themselves are contributing to the graduation rate and should be commended. Student behavior is not the same in relationships with administrators. While students reported they had good relationships with administration, which is excellent, that relationship does not necessarily promote persistence. A relationship with faculty promotes engagement and persistence.

Faculty can consider alternative teaching and learning strategies to promote student engagement. Table 63 outlines Chickering and Gamson (1987) suggestions for practitioners interested in increased student engagement. These suggestions could also be utilized in a freshman program.

Table 63  
*Seven Principles of Good Practice*

Principles	Examples
Encourages contact between students and faculty	Freshman seminars
Develops reciprocity and cooperation among students	Learning groups
Encourages active learning	Learning communities
	Structured exercises
	Challenging discussions
	Team projects
	Peer critiques
	Internships
	Independent study
	Cooperative job programs
	Design and teach courses
	Conduct research with faculty
Gives prompt feedback	Assessments
	Portfolios
	Multiple submissions and revisions of drafts
Emphasizes time on task	Mastery learning
	Contract learning
	Computer-assisted instruction
	College prep in high school
	Workshops
	Intensive residential programs
	Combinations of televised instruction, correspondence study, and learning centers
Communicates high expectations	Workshops for underprepared students
	Involves parents and high school counselors
	Honors programs
Respects diverse talents and ways of learning	Individualized degree programs
	Personalized systems of instruction
	Mastery learning
	Contract learning
	Orientation course on learning styles
	Choice of lecture or computer-based courses

(Chickering & Gamson, 1987)

### Summary of the Study

The purpose of this study was to address the lack of information regarding identification of NSSE academic variable clusters that predict private Midwestern college persistence within two NSSE Benchmarks; 1) Student-Faculty Interaction and 2) Supportive Campus Environment. The conceptual underpinning is engagement in context of social constructivism. Supportive literature highlights relationships among engagement, persistence, and demographic variables. This study utilized a quantitative,



pre-experimental, post-post comparison methodology. Archival data were retrieved, with permission, from the college under study's database. The dependent variable is engagement measured by two NSSE Benchmarks from the NSSE instrument (NSSE, 2007). The independent variables are persistence, gender, athletic status, and legacy status. Covariates for the study are ACT or SAT standardized test scores and high school grade point averages.

Data were analyzed using the following statistical analysis procedures using Statistical Package for the Social Sciences v. 14; descriptive summary analysis, four-way analysis of covariance (ANCOVA), and discriminant analysis. The study found significant main and interaction effects of engagement and identified NSSE variable clusters that predict membership in four demographic variables. The findings were used to provide suggestions for future implementation of NSSE Benchmark activities. Based on the findings, this study also provided recommendations for future study and recommendations for practitioner.

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## VITA

Jay Johnson was born in St. Joseph, Missouri on June 28, 1974. He grew up in Gallatin, Missouri, on the family farm. Upon graduation from Gallatin High School in 1992, Jay went on to Truman State University in Kirksville, Missouri where he earned a Bachelor's degree in Business with an emphasis in Marketing in 1996. After his undergraduate studies, Jay returned to Gallatin to operate the family farm. In Fall 2001, Jay was selected to represent the Rotary District 6040 in Northwest Missouri for a Group Study Exchange to Australia. This selection changed Jay's career path.

After his tour of Australia, Jay decided to go back to college to earn an MBA. In December, 2003, Jay earned his MBA from William Woods University. Jay decided to use his degree by becoming a college instructor. In his first academic position, Jay served as the Business Management Department Chair for North Central Missouri College in Trenton, Missouri from 2004-2006. In 2005, Jay began pursuit of an Ed.D. in Educational Leadership through the University of Missouri statewide cooperative cohort. In 2006, Jay changed jobs to become an Assistant Professor of Business/Marketing at Benedictine College in Atchison, Kansas. Jay was promoted to be the Director of Graduate Business Programs at Benedictine College in 2008.

## Appendix A

*SAT-ACT Scores Comparisons*

SAT Scores for Combined Critical Reading and Math	ACT Composite Scores	ACT Composite Scores	SAT Scores for Combined Critical Reading and Math
1600	36	36	1600
1560 – 1590	35	35	1580
1510 – 1550	34	34	1520
1460 – 1500	33	33	1470
1410 – 1450	32	32	1420
1360 – 1400	31	31	1380
1320 – 1350	30	30	1340
1280 – 1310	29	29	1300
1240 – 1270	28	28	1260
1210 – 1230	27	27	1220
1170 – 1200	26	26	1180
1130 – 1160	25	25	1140
1090 – 1120	24	24	1110
1060 – 1080	23	23	1070
1020 – 1050	22	22	1030
980 – 1010	21	21	990
940 – 970	20	20	950
900 – 930	19	19	910
860 – 890	18	18	870
810 – 850	17	17	830
760 – 800	16	16	780
710 – 750	15	15	740
660 – 700	14	14	680
590 – 650	13	13	620
520 – 580	12	12	560
500 - 510	11	11	500