Examining the construct validity and reliability of student engagement among adult students

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Examining the construct validity and reliability of student engagement among adult students

by

Kip Bottenfield

A dissertation submitted to the graduate faculty in partial fulfillment of the requirements for the degree of

DOCTOR OF PHILOSOPHY

Major: Education (Educational Leadership)

Program of Study Committee:
Soko Starobin, Major Professor
  Larry Ebbers
  Dan Robinson
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Iowa State University
Ames, Iowa
2013

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DEDICATION

This research paper signifies a major milestone in my academic career that started 25 years ago at Iowa State University. It’s almost ironic that I finish my classes at the university in which I left after one year with a feeling that college education was not for me. It was only after a lively discussion with my wife Von that I decided to re-enter college and pursue a bachelor’s degree twelve years later. I was 32 years old and had a full awareness of all the adult student barriers and challenges that are documented in this paper. I had family responsibilities, work responsibilities, financial constraints as well as a sense of trepidation when it came to re-entering the classroom. During my time at Upper Iowa University I had the support of my wife and family in completing my degree. If it weren’t for them and the initial success in the classroom, I would not have continued on in my academic journey.

After graduating with a bachelor’s degree in Business Management, I decided to enter the University of Iowa MBA program. I came to this decision, in part to, my desire to teach business in higher education. I realized that I enjoyed being in the classroom, even if it was only part-time. As I was completing my degree, Karin Dunn, then Director of Upper Iowa University, introduced me to Dr. Graeme Armstrong with the goal of helping me to understand the requirements of being an adjunct instructor and preparing me to teach my first class. It was with the help of Dr. Armstrong that I came to teach my first few classes and begin my teaching career. To both of you, I am grateful for your help and giving me the opportunity to realize my dream.

My next academic decision came when I started at Grand View University. I want to thank Dr. Patty Williams, who I believe, took a chance and hired me for a one year, full time teacher at Grand View University. Realizing that I had reached a position that I desired to grow and prosper in, I was guided into the Educational Leadership and Policy Studies (ELPS) program, thanks in part to Dr. Williams, she is the main reason I entered the program. I am truly grateful to Grand View University and the Business Department for the support and encouragement in finishing my doctorate degree.

Thank you Vonnie, Tyger and Trinity. I do understand the sacrifice you made to get Daddy to this point – for that I will always be grateful. Finally, I thank the Lord for his guidance and his patience with me, all while granting me the gifts that have helped me achieve my goals. I am truly blessed.

Keep away from people who try to belittle your ambitions. Small people always try to do that, but the really great make you feel that you, too, can become great.

– Mark Twain
# TABLE OF CONTENTS

LIST OF FIGURES .................................................................................................................. v

LIST OF TABLES ....................................................................................................................... vi

ACKNOWLEDGEMENTS ........................................................................................................ viii

ABSTRACT ............................................................................................................................... ix

CHAPTER 1. INTRODUCTION ............................................................................................. 1
  Statement of the Problem .............................................................................................. 8
  Purpose of the Study ................................................................................................... 13
  Research Questions ..................................................................................................... 14
  Methodological Approach .......................................................................................... 14
  Conceptual Framework ............................................................................................... 15
    Adult Students ................................................................................................. 16
    Andragogy....................................................................................................... 17
    Student Engagement ....................................................................................... 18
    National Survey of Student Engagement (NSSE) .......................................... 19
  Significance of the Study ............................................................................................ 20
  Definition of Terms..................................................................................................... 21
  Summary ..................................................................................................................... 21

CHAPTER 2. LITERATURE REVIEW ................................................................................ 23
  Adult Students ............................................................................................................. 23
    Definition of Adult Student ............................................................................ 23
    Characteristics of Adult Students.................................................................... 28
    Barriers to Adult Students ............................................................................... 33
    Adult Learning Models ................................................................................... 39
    Effective Practices for Facilitating Learning of Adult Students ..................... 43
  Andragogy................................................................................................................... 47
    Critiques of Andragogy................................................................................... 50
  Student Engagement ................................................................................................... 53
    Adult Engagement Challenges ........................................................................ 57
  National Survey of Student Engagement (NSSE) ...................................................... 59
    Benchmarks of Effective Educational Practice ............................................... 61
    Critiques of the NSSE Survey Instrument and Response ............................... 66
  Summary ..................................................................................................................... 70

CHAPTER 3. METHODOLOGY .......................................................................................... 71
  Overview ..................................................................................................................... 71
  Research Questions ................................................................................................... 71
  Epistemology and Theoretical Perspective ................................................................... 72
  Research Design ......................................................................................................... 73
  Population and Sample ............................................................................................... 74
Data Collection Methods ................................................................. 75
Instrumentation ............................................................................. 76
Variables in the Study ..................................................................... 78
  Dependent Variables ................................................................... 78
  Independent Variables .................................................................. 82
Data Analysis .................................................................................. 82
Method of Analysis ......................................................................... 83
Reliability and Validity of the Instrument ....................................... 98
Ethical Issues .................................................................................. 99
Limitations and Delimitations ......................................................... 99
Summary ......................................................................................... 100

CHAPTER 4. RESULTS ................................................................................. 101
  Demographic Descriptive Analysis ................................................. 102
  Differences Among Demographic Variables ................................. 104
  Differences in the Five NSSE Benchmarks ................................. 115
  NSSE Model Fit for Adult Students .............................................. 120
  Proposed Model of Engagement for Adult Students .................... 129
  Validity and Reliability of the Proposed Eight Construct Model .... 135
Summary ......................................................................................... 136

CHAPTER 5. DISCUSSION AND CONCLUSION ........................................... 138
  Discussion .................................................................................. 138
    Demographic Descriptive Analysis ............................................ 140
    Differences among Demographic Variables ............................ 141
    Differences in the Five NSSE Benchmarks .............................. 148
    NSSE Model Fit for Adult Students .......................................... 153
    Proposed Model of Engagement for Adult Students ................ 158
  Implications for Practice and Policy ............................................ 160
  Recommendations for Future Research ..................................... 164
  Conclusion ................................................................................... 166

APPENDIX A. 2008 NSSE SURVEY ......................................................... 168

APPENDIX B. NSSE BENCHMARKS ....................................................... 172

APPENDIX C. NSSE DATA SHARING AGREEMENT .............................. 174

APPENDIX D. 2008 NSSE PROFILE OF SAMPLE DATA ......................... 177

APPENDIX E. 2008 NSSE CODEBOOK ................................................. 178

APPENDIX F. IRB APPROVAL LETTER ............................................... 189

REFERENCES .................................................................................... 191
LIST OF FIGURES

Figure 1.1. Enrollment in degree-granting institutions, by age ................................................2
Figure 1.2. NSSE institutional participation, 2000 -2008.................................................................12
Figure 4.1. Five benchmark model of (adults only) student engagement.................................127
Figure 4.2. Proposed eight factor model of student engagement for adult students.............134
LIST OF TABLES

Table 3.1  NSSE’s Five Benchmarks and Component Constructs ........................................80
Table 3.2  NSSE Benchmark Components and Corresponding Questions ...........................81
Table 3.3  Descriptive Statistics of the Ordinal Variables ....................................................86
Table 3.4  Levene’s Test for Equality of Variances of Ordinal Values ...............................88
Table 3.5  Levene’s Test for Equality of Variances of NSSE Five Benchmarks ..................90
Table 4.1  Demographic Descriptive Analysis ................................................................104
Table 4.2  Descriptive Statistics of the Ordinal Variables ..................................................107
Table 4.3  Gender Cross-tabulation ..................................................................................107
Table 4.4  Ethnicity Cross-tabulation ..............................................................................108
Table 4.5  Enrollment Status Cross-tabulation ................................................................109
Table 4.6  Transfer Status Cross-tabulation ....................................................................110
Table 4.7  STEM Degree Cross-tabulation ......................................................................110
Table 4.8  Levene’s Test of Ordinal Values ......................................................................111
Table 4.9  Comparison of Nonadult and Adult Students on Hours Spent Preparing for Class ..............................................................................................................113
Table 4.10 Comparison of Nonadult and Adult Students on Hours Spent Working for Pay ON Campus ........................................................................................................113
Table 4.11 Comparison of Nonadult and Adult Students on Hours Spent Working for Pay OFF Campus ............................................................................................114
Table 4.12 Comparison of Nonadult and Adult Students on Hours Spent in Cocurricular Activities ...............................................................................................114
Table 4.13 Comparison of Nonadult and Adult Students on Hours Spent Providing Care for Dependents Living with Them .............................................................115
Table 4.14 Comparison of Nonadult and Adult Students on Hours Spent Commuting to Class ...............................................................................................................115
Table 4.15 Comparison of Nonadult and Adult Students on the Highest Level of Education That Their Father Completed .............................................................115
Table 4.16 Comparison of Nonadult and Adult Students on the Highest Level of Education That Their Mother Completed ...........................................................116
Table 4.17 Levene’s Test of NSSE Five Benchmarks .................................................117
Table 4.18 Comparison of Nonadult and Adult Students on Benchmark #1: Academic Challenge ............................................................................................................118
Table 4.19 Comparison of Nonadult and Adult Students on Benchmark #2: Active and Collaborative Learning .................................................................119
Table 4.20 Comparison of Nonadult and Adult Students on Benchmark #3: Student–Faculty Interaction ........................................................................119
Table 4.21 Comparison of Nonadult and Adult Students on Benchmark #4: Enriching Educational Experiences ............................................................120
Table 4.22 Comparison of Nonadult and Adult Students on Benchmark #5: Supportive Campus Environment ..............................................................120
Table 4.23 Variables Used in the Confirmatory Factors Analysis ..............................121
Table 4.24 Cronbach’s Alpha Values for Benchmark Scales ......................................124
Table 4.25 Loadings and Variances Accounted for in the NSSE Five Benchmark Model ..................................................................................................................128
Table 4.26 Goodness of Fit Indicators for the NSSE Five Benchmark Model ............130
Table 4.27 Loadings and Variances Accounted for in the Proposed Eight Factor Model of Student Engagement for Adult Students ........................................135
Table 4.28 Goodness of Fit Indicators for the Proposed Eight-Construct Model ..........137
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ABSTRACT

Adult students are an important subgroup in higher education. They are returning to school in numbers at higher percentage rates than their traditional counterparts. Between 2000 and 2010, the enrollment of students under age 25 increased by 34%; however, enrollment of students 25 and over rose 42% during the same period. From 2010 to 2020, the U.S. Department of Education projects a rise of 11% in enrollments of students under 25 and a rise of 20% in enrollments of students 25 and over (NCES, 2012). As adult students are enrolling in institutions of higher education for myriad reasons, they are often characterized by the responsibilities they carry outside of the classroom; they have family responsibilities and they have jobs. These responsibilities directly relate to adult students having less opportunity to be engaged in learning activities with the academic institution. Adults don’t always have the time to put into their studies and other activities on campus because of responsibilities at home and time spent at work or commuting. One of the ways that institutions gauge how well they are doing with student engagement is with the National Survey of Student Engagement (NSSE). NSSE is an instrument used to capture the impact of the institution on students and their educational activities. Given the growing number of adult students, it is important to know how valid the NSSE instrument is when reporting benchmark measures. This research sought to examine the constructs of the NSSE benchmarks and to determine if they are valid and reliable when applied to adult students. The knowledge, experiences, skills, and attitudes of adult students are different than those of traditional-age students, and institutions that are designing effective practices to serve adult students rely on the NSSE benchmark system to guide their efforts. Faculty and administrators are more apt to take responsibility for student learning and improve the quality
of undergraduate education if they believe the assessment data to be true and valid. The
outcome of the construct validity measure will aid faculty and administrators when
examining their current practices and help to improve services and policies for adult students.
CHAPTER 1. INTRODUCTION

Looking back over the last 40 years, college enrollments are on the rise. The U.S. Department of Education’s National Center for Education Statistics (NCES; 2012) projects that the trend will continue in the coming years. Along with overall enrollment increases, the demographics of students attending colleges and universities also are changing. The traditional image of the college student as one who is 18–23 years old in residential, full-time study is being challenged by a new reality of an increase of nontraditional students entering academic institutions. The traditional undergraduate, who has a high school diploma and enrolls into full-time academic program immediately after high school, made up only 27% of undergraduates in 1999–2000 (Brock, 2010). More recent studies have estimated that over 60% of students in U.S. higher education can be characterized as nontraditional. Using the simpler and more common criterion of age to define the adult student, the Council for Adult and Experiential Learning (CAEL; 2000) estimated that 43% (or 14 million) of students in U.S. higher education are 25 years of age or older.

In recent years, the percentage increase in the number of students age 25 and over has been larger than the percentage increase in the number of younger students, and this pattern is expected to continue (Figure 1.1). Between 2000 and 2010, the enrollment of students under age 25 increased by 34%; however, enrollment of students 25 years of age and over rose 42% during the same period. From 2010 to 2020, NCES (2012) has projected a rise of 11% in enrollments of students under 25 years of age and a rise of 20% in enrollments of students age 25 and over.

One current factor that will be a motivator for many adults is the anticipation of financial help from the federal government. After World War II, the returning veterans received assistance for education costs through the federal program called the GI Bill, which helped to increase the presence of adult students in higher education (Kasworm, 2003b). The GI Bill also helped spur the growth of adult education later by significantly enhancing participation rates of Korean and Vietnam veterans (Kasworm, 1990). Currently, there are a number of military actions that are ending, including Operation Noble Eagle, Operation Enduring Freedom, and Operation Iraqi Freedom, which have involved large numbers of National Guard and reserve unit activations. Many of the National Guard and reserve personnel were in college at the time of their activation, and subsequent deployments have interrupted their college enrollment for a year or longer (Rumann & Hamrick, 2009). Now colleges throughout the country are bracing for a large influx of returning veterans over the next couple of years, and the question is whether they can meet the needs of this population
Along with the return of student veterans President Obama stated recently that America is committed to having the highest proportion of students graduating from college in the world by 2020 (U.S. Department of Education, Office of Vocational and Adult Education [U.S. Dept. of Ed.], 2012a). According to the White House (2012) website, the president believes that, regardless of educational path after high school, all Americans should be prepared to enroll in at least one year of higher education or job training to better prepare the workforce. In a panel discussion held on Capitol Hill in January of 2010, government officials and higher education experts discussed the considerations needed for success. Experts used the federal TRIO programs for disadvantaged students as examples of efforts that have succeeded in getting more students to enroll in college and persist toward a degree. The federal TRIO Programs are federal outreach and student services programs designed to identify and provide services for individuals from disadvantaged backgrounds. According to the panelist, in order to graduate more adult students, colleges must take their needs and lifestyles into account (Nelson, 2010).

The U.S. Department of Education is addressing the new goal by simplifying the federal student aid application process; increasing funds for Pell Grants; and providing funds to states, postsecondary institutions, and organizations serving disadvantaged populations. Other support for adult students includes a variety of programs and initiatives supported by the Department’s Office of Vocational and Adult Education to help adult education state administrators and local practitioners better prepare their students for postsecondary education and training (U.S. Dept. of Ed., 2012a). These federal programs will be important for adults who need financial support, and adults will need to enroll in college for the United
States to meet President Obama’s goal of having the world’s largest share of college graduates by 2020 (Nelson, 2010).

Along with the commitment to growing the proportion of Americans with a higher education, the Obama administration has committed $500 million to develop programs that provide pathways for individuals to secure quality jobs in high-wage, science, technology, engineering and mathematics (STEM) fields. The administration also has promised an additional $1 billion in this initiative over the next two years (The White House, 2012). As the national economy expands in the STEM areas, the teaching of this content has become vital for adults to succeed in the workplace. Many adults return to school to learn a new discipline in order to enter the workforce or to advance their career (Kasworm, 2003b). This new focus on STEM initiatives will have an impact on colleges and universities that enroll adult students. The U.S. Department of Education’s Office of Vocational and Adult Education also is investing in accelerating the teaching and learning of STEM competencies through high-quality open educational resources and high quality adult education instruction of STEM to help inform college administrators for the expected increase in STEM majors by adult students (U.S. Dept. of Ed., 2012b).

The recent federal initiatives promoting higher education coupled with the return of student veterans is a relatively new phenomenon for higher education. Student veterans will be looking for jobs in the civilian market and will need to have higher education classes in order to compete. It will be important for institutions to prepare and implement services geared for adult learners in order to help meet the new initiatives.

Whatever the reason is for the decision to enter college, the adult student is usually faced with a major life-changing event. This decision, when joined by the stress of raising a
family, working a job, and navigating through the academic bureaucracy, often creates a disoriented student. While adjusting to the challenges and rigors of college, many adult students are creating new identities in all the areas of their lives (Hardin, 2008). CAEL (2000) found that “many colleges and universities have struggled to adapt to this changing student marketplace, often finding themselves burdened by traditions and practices that prove ill-suited for adults” (p. 4). Adults have unique needs, especially when they are employed or when they are raising children. The adult student’s “nontraditional” characteristics—part-time enrollment, full-time employment, financial independence, and parental responsibilities—create needs and priorities that differ from traditional students. In particular, they need institutional flexibility in curricular and support services, academic and motivational advising supportive of their life and career goals, and recognition of experience and work-based learning already obtained.

By implementing key strategies designed to engage adult students, colleges and universities can enhance desired student outcomes. Those institutions that more fully engage their students in the variety of activities that contribute to valued outcomes of college can claim to be of higher quality compared with other colleges and universities where students are less engaged (Kuh, 2003). The concept of student engagement is nothing new; the engagement premise has been in the literature for more than 70 years, with the meaning of the construct evolving over time (Kuh, 2009). However, the concept of adult student engagement is a fairly new phenomenon in higher education. Donaldson and Townsend (2007) argued that very little research has been performed on adult students, noting that several studies have documented the lack of attention to adult students in U.S. higher education research. Kasworm (2003a) agreed, observing that although adult students
represent a large portion of students in higher education, there is still a lack of empirical evidence of the adult learning experience in an undergraduate classroom setting.

One of the ways that institutions gauge how well they are doing with student engagement is with the National Survey of Student Engagement (NSSE). The NSSE is an instrument used to capture the impact of the institution on students and their educational activities (LaNasa, Cabrera, & Transgrud, 2009). It was created in 1998 as a new approach to gathering information about college quality and piloted in 1999 in collaboration with the National Center for Higher Education Management Systems. This organization conducted two field tests, one with 12 schools and a second with 68 institutions, before launching the first NSSE national administration in 2000 with 276 fee-paying colleges and universities (Kuh, 2009). According to Kuh (2009), the NSSE project was founded on three core purposes. The first and most important purpose is to provide high quality, actionable data that institutions can use to improve the undergraduate experience. The second purpose is to discover more about and document effective educational practice in postsecondary settings. The final purpose is to advocate for public acceptance and use of empirically derived conceptions of collegiate quality.

Kuh (2001) stated that the process indicators of student engagement are based in part on Chickering and Gamson’s (1987) seven principles of good practice in which effective educational practice includes: (a) student-faculty contact, (b) cooperation among students, (c) active learning, (d) receiving prompt feedback, (e) student time on task, (f) communication of high expectations, and (g) respect for diverse talents and ways of learning. These process indicators often point to areas that schools can do something about to improve student and institutional performance (Kuh, 2001).
A major component of the way NSSE results are reported is through its benchmark scales. These scales are informed partially by an empirically derived grouping of survey items as well as an intuitive understanding of concepts proposed by Astin’s (1984) theory of student involvement and by Chickering and Gamson’s (1987) seven principles of good practice (Gordon, Ludlum, & Hoey, 2008; Kuh, Hayek, et al., 2001). The five NSSE benchmarks—level of academic challenge, active and collaborative learning, student faculty interaction, enriching educational experiences, and supportive campus environment—serve as the framework around which the NSSE annual reports are created. The benchmarks are intended to be a useful tool for internal evaluation and are also used to facilitate comparisons among other institutions and institutional types (Gordon et al., 2008; Kuh, 2001).

Engagement has two key components. The first is the amount of time and effort students put into their studies and other activities that lead to the experiences and outcomes that constitute student success. The second is the ways the institution allocates its human and other resources and organizes learning opportunities and services to encourage students to participate in and benefit from such activities (Kuh, Kinzie, Schuh, & Whitt, 2005, p. 4).

C. Robert Pace has performed extensive studies on the concept of student effort. Pace (1980) noted that all learning and development requires an investment of time and effort by the student. However, adult students are characterized by the responsibilities they have and, more importantly, the lack of time they have to engage in academic activities due to their responsibilities. The U.S. Department of Education (NCES, 1998) identified four major barriers for adults who want to enroll in a formal education program: time, lack of money, child care concerns, and transportation (or location of the program). “We have seen that time is usually listed as a major barrier to more participation in a variety of worthwhile
endeavors” (NCES, 1998, p. 52). Employment commitments and raising children have historically been viewed as obligations that distract adult students from being fully engaged or involved in their education (Astin, 1993). “For many students who have families, work full-time, and own their own homes, attending college is not the top priority in their lives” (Kuh, Schuh, Whitt, & Associates, 1991, p. 15). It is important to understand that if the concept of student engagement is based on time and effort, to what extent does a lack of time and a different priority of effort (which are characteristics of adult students) affect student engagement? If NSSE measures student engagement, then how applicable is it for the realities of the adult student?

**Statement of the Problem**

Adult students are often characterized by the responsibilities they carry outside of the classroom; they have family responsibilities and they have jobs. These responsibilities directly relate to having less opportunity for the adult student to be engaged with the academic institution in learning activities and create priorities different from traditional students. In other words, they have competing demands on their time because of work or family commitments. As a result they aren’t as involved as other students. This is problematic because what students gain from their college experience depends a lot on how much time and effort students put into their studies and other educationally purposeful activities (Kuh, Gonyea, & Palmer, 2001). The concept of student engagement includes activities that are traditionally associated with learning, such as reading and writing, preparing for class, and interacting with instructors about various matters (Kuh, 2001). The engagement concept also encompasses some other key activities that more recently have come to the fore as being important, such as collaborating with peers on projects, problem-
solving tasks, and community service (Kuh, 2001). Adult students need institutional flexibility in curricular and support services, academic and motivational advising supportive of their life and career goals, and recognition of experience and work-based learning already obtained.

Even though adults have a significant presence in undergraduate higher education, there is limited knowledge of their unique learning differences in the undergraduate collegiate classroom. Research suggests that adult students bring more complex and varied backgrounds of life experiences and prior knowledge and skills; complex educational histories; wide-ranging maturity levels, motivations, and attitudes; and limited time, resources, and access for collegiate engagement (Cross, 1981; Kasworm, 2003a; Knowles, 1969).

Adults are an important part of school enrollment numbers. More and more colleges are competing for adult students and the college tuition they bring to an institution. In fact, adult students are one of the groups that can be identified and marketed to easily, because they share similar traits and have special considerations different than traditional-age students. An important factor in the growth of for-profit institutions is their ability to cater to the needs of adults (Morey, 2001). Tremendous growth in for-profit higher education has occurred because it taps into the income stream that the growing adult student market represents (Sperling & Tucker, 1997). For-profit institutions view students as customers and design services for them that minimize the amount of paper work through which a student must navigate. Many adults enrolled in for-profit institutions recognize that they are not receiving a degree from a traditional university, but the convenience and ability to reduce time to the degree attract them. Their objective is to enter into the workforce and or to
advance their career. Adults need courses that are offered in the evenings and on weekends in order for them to attend class. For-profit institutions serve their career objectives, and the cost of attendance, although higher than that of the public institutions, is usually lower than traditional private universities and colleges in their region (Morey, 2001).

Strosnider (1998) stated that postsecondary proprietary education has been transformed from a relatively small sector of the economy, to a $3.5-billion-per-year business that is increasingly dominated by companies building regional and even national franchises. One reason for this is the concept of identifying students as customers and designing a business plan to compete with traditional colleges and universities for those customers. For-profits focus on “outstanding service, flexible schedules that fit the students’ lifestyles, strong faculty members who combine theory with practical experience and who know how to teach, as well as quality, market-driven programs, [which] are what lure students to the for-profit university” (Seiden, 2009, para. 19). According to NCES (2012), in 2010, the two postsecondary institutions with the highest enrollment were for-profit universities: University of Phoenix, Online Campus, with 308,000 students and Kaplan University, Davenport Campus, with 78,000 students.

Although not the focus of this study, it is important to note that the strategies employed by for-profit colleges to attract adult students has substantially increased their enrollment due to the changes implemented to cater to adult needs. For-profits have been successful by identifying new ways the institution allocates its resources and organizes learning opportunities for adults; or in other words, the second part of the “engagement” definition. By changing the policies and practices to induce adult students to take part in the learning activities, they have seen a large increase in enrollment. Enrollment, more precisely
tuition dollars that come from enrollment, is important for colleges and universities, and the emphasis on student engagement is extremely important student success.

As institutions seek to promote student engagement on campus, the NSSE is increasingly being used to capture the impact of the institution on students and their educational activities and to chart progress and compare results using the five benchmark scores (LaNasa et al., 2009). Overall, the benchmarks are intended to “Steer the public conversation about collegiate quality toward aspects of colleges and universities that are central to student learning” (NSSE, 2000, p. 25). Survey administrators have claimed that the NSSE’s results, including the benchmarks, can be used to compare the quality of education at different institutions. Kuh (2003) claimed that institutions that more fully engage their students in the variety of activities that contribute to valued outcomes of college can claim to be of higher quality compared with other colleges and universities where students are less engaged. The popularity of the NSSE is illustrated by the increased number of students and institutions participating in the annual survey (see Figure 1.2). When first introduced in 2000, 276 colleges and universities, which included slightly more than 60,000 students, participated in the NSSE survey. By 2008, the number of institutions participating in the NSSE survey had grown to 772 (Kuh, 2009). Since its inception a combined total of 1,500 four-year colleges and universities in the United States and Canada have participated in the NSSE, with 683 U.S. and 68 Canadian institutions participating in 2011 alone (NSSE, 2011a).

Given the NSSE’s broad-based national use, it is important to know whether the good practices in undergraduate education that it measures actually do predict important educational outcomes. Many institutions assess how well they are doing by gauging themselves against the five benchmarks. NSSE is an instrument used to capture the impact of the institution on students and their educational activities. The validity and reliability of the NSSE benchmarks are essential. NSSE results are oriented toward practical use, as campuses use their NSSE results in innovative ways to improve the undergraduate experience. Institutions that are designing effective practices to serve adult students rely on the NSSE benchmark system to guide their efforts. As institutions attempt to enhance student engagement and foster adult students, it is important to examine the construct validity and reliability of NSSE as an instrument to measure student engagement among adult students.
Purpose of the Study

The administrators of NSSE have argued that the results from the five benchmarks produce a standard of good educational practices for colleges and universities to estimate the efficacy of their engagement efforts. Adult students and traditional students have different objectives and different needs. The purpose of this study was two fold. First, this study sought to examine national student engagement data and identify whether there is a significant difference between adult students and nonadult students. The literature review of adult students guided the formulation of the research questions. The scholarly research has indicated that adult students and traditional students differ in participation by demographic variables such as gender and race. Adults tend to be part-time versus full-time students and transfer from other academic institutions. Adult students also have more work and family responsibilities and subsequently less time for overall curricular participation and classroom preparation. Adults tend to live off campus and commute to classes, and the level of education of their father and mother has been shown to be lower than those of traditional-age students. The first part of this study sought to review and synthesize the scholarly literature and to look at the variables identified in the research to understand if they are significantly different or not.

Second, this study compared engagement results (represented by the five NSSE benchmarks and other variables) and performed a confirmatory factor analysis to test the construct validity of the five NSSE benchmarks when applied to adult students. LaNasa et al. noted in their 2009 NSSE benchmark study that recent research has begun to decompose the five benchmarks in a variety of ways; but only a few research studies have sought to explore the underlying structure of these five benchmarks. The results of this study provide
relevant information to institutions with adult students on the practicality and applicability of NSSE data.

**Research Questions**

The following research questions guided this study:

1. What are the demographic characteristics of the adult and nonadult students who responded to the 2008 NSSE survey used in this research study?

2. Are there significant differences among the demographic variables, such as gender, race, enrollment status, transfer status, and STEM major along with time spent on work, curricular participation, classroom preparation, dependent care, commuting and level of education of father and mother, between nonadult and adult students?

3. Are there significant differences in engagement using the five NSSE engagement benchmarks between adult and nonadult students?

4. Does the NSSE five benchmark model fit for adult students? If not, is there a factor structure model that better captures the student engagement of adult students?

**Methodological Approach**

This quantitative study is grounded in an objectivist epistemology using a postpositivism theoretical perspective. Postpositivism is grounded in the belief that scientific knowledge is both accurate and certain. The methodology is survey research in which the methods of analysis will include descriptive statistics to describe the members of the sample from which the data were collected and a comparative analysis to compare and test the significance of the relationship among different variables within the data. A confirmatory
factors analysis (CFA) was used to measure how well the NSSE five benchmark construct model fit the data.

**Conceptual Framework**

A conceptual framework serves to organize and articulate the phenomena that this study sought to understand. At its basic level, a theoretical framework is the set of terms and relationships within which the problem is formulated and solved. Creswell (2009) provided a definition conceived by Fred Kerlinger (1979), who described theory as “a set of interrelated constructs (variables), definitions, and propositions that presents a systematic view of phenomena by specifying relation among variables, with the purpose of explaining natural phenomena” (p. 51). Other definitions of theoretical framework have been a bit broader. Mouly (1978) stated that “theory is a convenience—a necessity really, organizing a whole slough of facts, laws concepts, constructs, principles, into a meaningful and manageable form” (p. 15). Gary Thomas (1997) expressed that the definitions of Kerlinger and Mouly not only lack congruence “but are as different as chalk and cheese” (p. 78). The terminology is far from consistent; however, the term theory is based in its predictive nature.

For this research, a conceptual framework was chosen, rather than a theoretical framework, as each of the bodies of literature does not put forth a theory. The body of literature on adult students describes the different characteristics of adults only and is intended to gain a better concept of students of adult age. Student engagement is largely put forth as a group of constructs, such as quality of effort and student involvement (Kuh, 2009), which Kuh referred to as a *concept* (Kuh, 2001; Kuh, Gonyea, et al., 2001). Knowles (1980) presented his model of andragogy as a set of assumptions and not an ideology. He went on to state, “Andragogy is simply another model of assumptions about students to be used
alongside the pedagogical model of assumptions, thereby providing two alternative models for testing the assumptions as to their fit in particular situation” (p. 43). Knowles himself came to concur that andragogy is less a theory of adult learning than “a model of assumptions about learning or a conceptual framework that serves as a basis for an emergent theory” (Merriam, 2001, p. 87). It is with this understanding, that the research questions were explored through a conceptual framework instead of theoretical framework.

For this study’s purpose, a conceptual framework served to organize and articulate the phenomena that the research questions sought to understand. The intent of the conceptual framework was to link concepts from the bodies of literature to establish evidence to support the understanding of the research questions. This study explored four bodies of literature to seek understanding of the research questions: adult student characteristics, the andragogical model of adult learning developed by Malcolm Knowles, college student engagement, and the NSSE survey instrument (see Appendix A).

**Adult Students**

Adult students are commonly defined as undergraduate students who are 25 years or older and enrolled in credited academic programs (Compton, Cox, & Laanan, 2006; CAEL, 2008; Kasworm, 1990; Merriam, Caffarella, & Baumgartner, 2007). Although this definition does not encompass all nontraditional students, it does seek to identify students who have acquired a status of age, the status of maturity, and the status of responsibility (Kasworm, 2003b). Here, identifying adult students by age acts as a surrogate variable that captures a large, heterogeneous population of adult students who often have family and work responsibilities as well as other life circumstances that can interfere with successful
completion of educational objectives (NCES, 1996). This definition helps simplify a complex and sometime confusing way to classify adult students.

Adults are seeking college degrees in greater numbers. Their “nontraditional” characteristics, such as part-time enrollment, full-time employment, financial independence, and family responsibilities, create needs and priorities that differ from traditional students (Frey, 2007). As the number of adult students continues to grow, it is essential for higher education administrators to understand if and how older students become and remain engaged in their education.

Andragogy

One of the most commonly applied frameworks of adult learning is andragogy, which is described as the art and science of helping adult students (Knowles, 1980). The concept of andragogy is credited to Malcolm Knowles. Knowles (1990) believed that adults do not learn the same way as children and thus should not be taught as children are. He developed four assumptions about adult students and compared and contrasted his theory with pedagogy. Later, he added a fifth and, finally, a sixth assumption (Knowles, 1990).

The six assumptions underlying andragogy describe adult learners as individuals who (a) need to know why they need to learn something before undertaking to learn it, (b) have an independent self-concept and are capable of self-directing their learning, (c) have learning needs that value their experiences (or who they are), (d) come ready to learn those things they need to know and are able to do in order to cope with their real-life situations, (e) are problem-centered and interested in immediate application of knowledge, and (f) are motivated to learn by internal rather than external factors (Knowles, 1990). From these assumptions Knowles (1990) proposed a model for planning and conducting programs of
adult education and human resource development. Andragogy is an enduring model and continues to be influential among practitioners and researchers (Merriam et al., 2007).

**Student Engagement**

Student engagement, according to George Kuh, is a straightforward premise:

The more students study a subject, the more they learn about it. Similarly, the more students practice and get feedback from the faculty and staff members on their writing, speaking, and collaborative problem solving, the more adept they become at those skills. (Harper & Quaye, 2009, p. 313)

The importance of engagement has been researched and written about for a long period of time, and the large body of research on student learning has concluded that students who are actively involved in educationally purposeful activities gain more from their college experience than do students who are not as involved (Astin 1993; Gordon et al., 2008; Kuh, 2003; Pace, 1980; Pascarella & Terenzini, 1991).

A commonly used definition of engagement in higher education is one by Kuh (2003), who described engagement as “the time and energy students devote to educationally sound activities inside and outside the classroom, and the policies and practices that institutions use to induce students to take part in these activities” (pp. 24–25). The importance of student engagement to academic institutions is significant. According to Kuh (2003):

Emphasizing good educational practice helps focus faculty, staff, students, and others on the tasks and activities that are associated with higher yields in terms of desired student outcomes. Toward these ends, faculty and administrators would do well to arrange the curriculum and other aspects of the college experience in accord with these good practices,
thereby encouraging students to put forth more effort (e.g., write more papers, read more books, meet more frequently with faculty and peers, use information technology appropriately) which will result in greater gains in such areas as critical thinking, problem solving, effective communication, and responsible citizenship (p. 1).

With the understanding that certain institutional practices are known to lead to high levels of student engagement, the NSSE was specifically designed to assess the extent to which students are engaged in empirically derived good educational practices and what they gain from their college experience (Kuh, 2001).

**National Survey of Student Engagement (NSSE)**

The NSSE was originally developed under the guidance of a design team made up of scholars and practitioners including Alexander Astin, Gary Barnes, Arthur Chickering, Peter Ewell, John Gardner, Richard Light, and Ted Marchese, with input from C. Robert Pace (Wolfe-Wendel, Ward, & Kinzie, 2009). According to Kuh (2009), the engagement construct consists of several concepts that have evolved over time. These concepts include (a) the positive effects of time on task on learning by Ralph Tyler, (b) quality of effort by C. Robert Pace, (c) student involvement by Alexander Astin, (d) social and academic integration by Vincent Tinto, (e) Chickering and Gameson’s seven good practices in undergraduate education, (f) desired outcomes of college by Ernest Pascarella, and (g) student engagement dimensions by George Kuh and other scholars. These concepts have evolved into what student engagement means and what the NSSE seeks to measure in order to aid colleges and universities in making improvements in teaching and learning. According to Kuh (2003), the introduction and widespread use of the NSSE has helped cement student engagement in the
higher education lexicon by demonstrating that student engagement can be reliably measured across a large number of institutions.

The NSSE instrument is not without its critics. The LaNasa, et al. (2009) study (in which the research study is modeled after) examined the NSSE instrument’s construct validity by submitting a single, first-time freshman cohort’s NSSE responses to a confirmatory factor analysis, and proposed an alternative, eight construct model of student engagement that fit their institutional needs. They concluded that although the value of engagement is well documented, the underlying constructs and the items measuring it remain somewhat challenging, particularly for institutions that attempt to document impact on students’ development and learning (LaNasa et al., 2009). Kuh, himself, noted that the constructs of engagement can be “misused and misinterpreted” and a “one size fits all mentality” can be problematic when analyzing NSSE data (Harper & Quaye, 2009, p. 314).

**Significance of the Study**

The significance of the study is to aid institutions in developing services to better engage the adult students. By understanding the adult students and their characteristics, institutions can identify areas on which to focus better engagement practices. This study sought to examine the construct validity and reliability of the NSSE instrument’s benchmarks when applied to adult students. Results will have practical implications for institutions utilizing NSSE. This study sought to add to the body of scholarly knowledge that has been researched and written about student engagement and compare the findings with others. Finally, the significance of the study is to contribute to a methodological approach in examining the construct validity and reliability of the benchmarks for subgroups of students.
**Definition of Terms**

*Adult student (learner):* an undergraduate student who is 25 years or older and enrolled in credited academic programs (Kasworm, 1990).

*Andragogy:* the art and science of helping adults learn (Knowles, 1980).

*Construct:* a set of interrelated concepts or variables (Creswell, 2009).

*Nonadult learner:* an undergraduate student who is 24 years or younger and enrolled in credited academic programs.

*NSSE:* an acronym for the National Survey of Student Engagement.

*STEM:* an acronym for science, technology, engineering, and mathematics.

*Student engagement:* the time and energy students devote to educationally sound activities inside and outside the classroom, and the policies and practices that institutions use to induce students to take part in these activities (Kuh, 2003).

*Student involvement:* the quantity and quality of the physical and physiological energy that students invest in college experience (Astin, 1999).

**Summary**

Adult students are an important part of higher education. They are a growing segment of the population of students who are entering colleges and have many specialized needs and different expectations than do traditional-age students. Recent federal initiatives promoting higher education coupled with the return of student veterans will be a driver of adult students returning to higher education. The knowledge, experiences, skills, and attitudes of adult students are different than those of traditional-age students, and institutions that are designing effective practices to serve adult students rely on the NSSE benchmark system to guide their efforts. As institutions attempt to enhance student engagement and
foster adult students, it is important to examine the construct validity and reliability of NSSE as an instrument to measure student engagement among adult students. This study attempted to build upon existing research in student engagement to add new knowledge of adult student engagement.
CHAPTER 2. LITERATURE REVIEW

The purpose of this study was twofold. First, this study sought to examine national student engagement data and identify whether there is a significant difference between adult students and nonadult students. Second, this study compared engagement results (represented by the five NSSE benchmarks and other variables) and performed CFA to test the construct validity reliability of the five NSSE benchmarks when applied to adult students.

This chapter will review the literature, providing an integrative perspective of the broad themes of adult learning, andragogy assumptions, student engagement, and the NSSE.

Adult Students

Definition of Adult Student

Research on undergraduate higher education has been based predominantly on the traditional student who is 17–22 years old. This undergraduate student was an on-campus residential student who was focused solely upon academic pursuits related to future career and life goals and primarily concerned with the key developmental tasks of identity and intimacy formation (Kasworm, 1990). However, a more contemporary approach to research in higher education has focused more on a lifelong education concept that stresses the importance of transitioning the existing educational system to include more nontraditional students (Cross, 1981). A century ago, nontraditional students would have been identified by race, gender, or socioeconomic status (Ogren, 2003). Brookfield (1986), in conducting surveys of literature from 1983 and before, profiled adult students as relatively affluent, White, well educated, employed, and engaged in professional work. Cross (1981) exhibited a similar profile of participants in organized learning activities that reflected the socioeconomic elitism of adult education. Cross noted that the elderly, Blacks, those who
failed to graduate high school, and those with annual incomes less than $10,000 were seriously underrepresented. Bean and Metzner (1985) further concurred with the socioeconomic premise, noting that women too were underrepresented.

There is an overlap with usage of the terms adult students and nontraditional students. The term “nontraditional” often has been used to identify adult students. K. Patricia Cross (1981) wrote, “American colleges and universities offered degree programs that were considered nontraditional in the sense that they served nontraditional students” (p. 36). She noted that majority of those colleges and universities offering nontraditional programs were trying to attract adult students. In particular, Metzner and Bean (1987) identified a nontraditional student as one who “is older than 24, or does not live in a campus residence (e.g., is a commuter), or is a part-time student, or some combination of these three factors; is not greatly influenced by the social environment of the institution; and is chiefly concerned with the institution’s academic offerings (p. 18). Christine Ogren (2003) summarized the commonly used term “nontraditional” to describe students who are either older than typical college students, work because of financial necessity, belong to the first generation in their family to attend college, do not live on campus, attend part time, or are members of minority racial groups.

More recently, a definition of “nontraditional” developed by the U.S. Department of Education has appeared in the literature. The U.S. Department of Education’s NCES (1996) identified a nontraditional student by the presence of one or more of the following seven characteristics:

- delayed enrollment into postsecondary education,
- attended part time,
A nontraditional student is further characterized as minimally nontraditional when one characteristic is identified, moderately nontraditional when two or three characteristics are identified, or highly nontraditional when four or more characteristics are identified. This definition of nontraditional can include traditional-age students who share common characteristics with adults but may not have other adult status characteristics such as biological, legal, social, or psychological factors. Using this NCES classification system, nontraditional students comprise almost three-quarters of all U.S. undergraduates (NCES, 2002). This classification term does not take into account the age or maturity of the student. The Council for Adult and Experiential Learning (CAEL) acknowledged that adult students have similarities with the “nontraditional” definition but suggests they are separate. CAEL stated that adult students have a variety of nontraditional characteristics including part-time enrollment, full-time employment, financial independence, and parental responsibilities, which create needs that differ from those of a traditional student (Flint, 2005). However, the nontraditional term does not take into account age, experience, and learning capabilities of adults. Adult students bring more complex and varied backgrounds of life experiences and prior knowledge and skills; complex educational histories; wide-ranging maturity levels, motivations, and attitudes; and limited time, resources, and access for collegiate engagement (Kasworm, 2003a). It is important to understand that, although the terms are sometimes used
interchangeably; adult students can be looked at as a defined subset of the nontraditional

group with separate characteristics. Given the lack of clarity and precision, the terms

“nontraditional” and “nontraditional student” are considered problematic by both scholars

and practitioners (Levine, 2007).

The premise that adults learn differently than children do suggests that adult students

be in a separate category from the nontraditional definition. “Adults aren’t like children and
teaching adults isn’t like teaching children; adult learning has its own characteristics,

methods, and approaches” (Lawler, 1991, p. 7). Merriam et al. (2007) found that learning in

adulthood is a function of social roles and developmental issues that aren’t necessarily that of

a younger nontraditional student. Knowles (1990) suggested there are four definitions of

adult including biological—reaching an age in which a person can reproduce; legal—

reaching the age at which a person can vote, drink, serve in the military, and the like;

social—in which a person performs adult roles such as full-time worker, spouse, parent, etc.;

and psychological—developing a self-concept of being responsible for one’s own life and

capable of being self-directed. Knowles (1990) stated “from the viewpoint of learning, it is

the psychological definition that is most critical” (p. 57).

Adult students are commonly defined as undergraduate students who are 25 years or

older and enrolled in credited academic programs (Compton et al., 2006; CAEL, 2008;

Kasworm, 1990; Merriam et al., 2007; Ogren, 2003). Using a cutoff value of 25 years or

older allows researchers to segregate populations when researching using institutional data.

Many researchers and scholars on adult students cite statistics using 25 years or older when

describing adult learning (Chen, Gonyea, & Kuh, 2008; Kasworm, 1990, 2003a, 2010;

Merriam et al., 2007; Pascarella & Tenrenzini, 1998). In particular, Chen et al. (2008), when
researching distance learning using NSSE, distinguished between adult students and traditional-age students by age:

To distinguish traditional-age distance students from adult students, student age was derived from the self-reported birth year given in the survey. Almost two-thirds of distance students (64%) were 25 years of age or older and labeled adults in the study; about a third (35%) was 24 years old or younger, falling in the traditional age range. (p. 2)

However, a problem remains with the definition of 25 and over, as it does not include 18- to 24-year-old students who may share the same adult situations, such as commuting, family, work, etc., or who have matured quicker than normal. The 25 years or older definition also would include 25-year-old students who may have little financial independence from parents, have no other responsibilities or commitments, and have little experience with work and life. Although this definition by age does not encompass all nontraditional students, it does seek to identify students who have acquired a status of age, the status of maturity, and the status of responsibility (Kasworm, 2003b). Here, identifying adult students by age acts as a surrogate variable that captures a large, heterogeneous population of adult students who often have family and work responsibilities as well as other life circumstances that can interfere with successful completion of educational objectives (NCES, 1996). According to Rachel (2002),

For future andragogy research, adult should refer to students who have assumed the social and culturally-defined roles characteristic of adulthood and who perceive themselves to be adult, or, if those qualities are not ascertainable, students who have
achieved an age, such as 25, which would be regarded as adult irrelevant of social circumstances. (p. 220)

Defining adult by using an achieved age of 25 helps simplify a complex and sometime confusing way to classify adult students. CAEL (2008) expressed understanding the complexity of defining by adults by age but acknowledged that “due to how data on students are currently collected in the United States and at the state level, most of the measures used in this report rest on the age-based definition (25 years and older)” (p. 19).

Characteristics of Adult Students

Career oriented. Adult students enter educational institutions for a variety of reasons. Each year, millions of American adults enroll in some type of formal educational programs. The classes they take can range from an ESL class to a vocational class to a business course. Adults’ objectives and motivations for participating are just as diverse as the classes they take. Some want to improve their skills or develop new ones, others want to obtain a diploma or credential, and still others are simply interested in learning new things (Frey, 2007). However, Compton et al. (2006) noted that adult students are more likely to pursue a vocational certificate or degree and have a focused outlook on their education typically to enhance work skills. The literature suggests that adults are less likely to enter into STEM programs. A recent study by NCES (2009a) found that percentages of students entering STEM fields were higher for younger (age 19 or younger) and dependent students than for older (age 24 or older) and independent students.

Most adult students (85%) reported that career reasons are their key college enrollment goal (Aslanian, 2001).
A 2003 NCES report titled *Work First, Study Second* indicated that at least 56 percent of students over age twenty-four who were included in the 1999–2000 National Postsecondary Student Aid Study saw themselves as workers first and students second, while 26 percent identified themselves as students who work. (Ross-Gordon, 2011, p. 26)

Adults continue to be predominantly part-time students, 69% compared with 27% of younger undergraduate students (NCES, 1995). The part-time status indicates that adults are focused on other responsibilities and have a limited time commitment to academic involvement (Kasworm, 2003b). Factors such as family and employment obligation compete with the rigors of the course load and limit the many out-of-class opportunities, such as student organizations, internships and social activities, in which their traditional student counterparts can participate (Silverman Sarvenaz, & Stiles, 2009). In a study performed by Kasworm and Pike (1994), it was found that younger students were more likely to be enrolled full time than were older students.

Obviously, work roles are a major barrier to adult participation. In a 1989–90 study, more than 46% of adult students worked full time (over 40 hours a week), and an additional 25% worked more than 20 hours a week. Furthermore, adult collegiate participation appears to be influenced by employer support and the flexibility of work roles (Kasworm, 2003b). Financial factors of adult students play an import role. Adult student college funding was more likely to come from limited discretionary family income, possibly from college financial aid, and sometimes from employer tuition plans. Adult students reported that their most important issue and most stressful concern was their financial fragility to support
college attendance (Kasworm, 2003b). Astin (1998) noted that working full time increases the likelihood that students will drop out of college.

Hammer, Grigsby, and Woods (1998) found that adult students are focused on completing academic requirements in a minimum amount of time and are primarily concerned with the institution’s proximity to home and work; availability of night, weekend and online courses; and college services such as faculty office hours, accurate academic advisement, and quality instruction. Kasworm (2003b) stated that adult students “typically enroll in a college that is readily accessible, relevant to current life needs, cost-effective, flexible in course scheduling, and supportive of adult lifestyle commitments” (p. 7). “A key characteristic distinguishing reentry adults from other college students is the high likelihood that they are juggling other life roles while attending school, including those of worker, spouse or partner, parent, caregiver, and community member” (Ross-Gordon, 2011, p. 26).

Demographics. In a 2000 study, Kasworm (2003b) found the increase in older students has brought with it an increase in student diversity, although minorities were still underrepresented. Kasworm (2003b) reported that minority adult students represented about 24% of the adult student population according to a 1995 NCES report. She also noted that women make up a larger percentage of adult students than do men and their number is growing at a faster rate. Vaccaro and Lovell (2010), however, reported that several studies have suggested that there is a high probability of adult students who are women dropping out because of the burdens associated with work, school, and family. They went on to report that “a number of research studies done with nontraditional-age female students have described family and employment responsibilities as stressors that distract adult women students “(p. 162). Compton et al. (2006) recognized that women returning to higher education have led to
the increase number of adult students. They attributed the changing norms in society as an important contributor for the number of women returning to school. It is no longer the norm for women to stay in the home. “Many families would not be able to support that notion economically even if they wanted to. Today, women are the majority population in postsecondary education” (p. 70).

Bean and Metzner (1985) concluded that students age 25 years or older were more likely to be married, have greater family responsibilities, and have lower parental educational attainment. In a report on older undergraduates, NCES (1995) found that older students (24 years or older) tended to have less educated parents than their younger counterparts. Older students were much less likely than younger students to have a parent with a bachelor’s degree (25% compared with 43%). About two-thirds of all students in their 40s or older came from families in which the parents had a high school education or less, compared with only one-third of students who were less than 24 years old.

Although many older students’ parents belong to a generation that was less likely to complete high school or attend college, it is noteworthy that even those aged 24–29 were less likely to have parents with a bachelor’s degree and more likely to have parents with only a high school education or less. (NCES, 1995, p. 9).

Metzner and Bean (1987) found that many adults are commuters having to travel to and from the campus. Commuters have life circumstances that are diverse and may indicate a student who is married, in a long-term relationship, having to care for a child or other dependent, or supporting a family (Silverman et al., 2009). Kasworm (1990) noted that adults make up a major portion of the commuter population on a traditional campus.
Unique pathways. Another characteristic is that adult students are more apt to return to college after a significant break, either from high school or from taking other college courses previously. Kasworm (2005) found that many adults are enrolled in community colleges. She noted that the community college environment has historically offered a dominant collegiate place for adult students by reflecting classroom settings with a significant representation of adult students (25 years of age or older). Studies have reported that 60% of enrolled college adults in higher education institutions are studying at 2-year institutions and that approximately 44% of community college students are 25 years of age or older (Aslanian, 2001). Eggleston and Laanan (2001) found that nearly 50% of transfer students actually come from community college technical programs. With adults making up a large portion of community college students, it makes sense that a higher portion of adult students would be transfer students. A study performed by Kasworm and Pike (1994) conferred that older students were more likely than are younger students to be transfer students.

In reviewing the literature, there are several characteristics that differentiate adult students from the traditional-age student. Adult students tend to enter college for work-related reasons and are more likely to be self-directed than are nonadult students. Women make up a larger portion of adult students, whereas minorities are still underrepresented in the adult student population. In comparison to traditional-age students, adult students are more likely to be employed more hours in a given week, have a higher level of family responsibility, are more likely to be less than full time status, and have less educated parents. Finally, adult students are more likely to be a transfer student and commute to campus. With
the understanding of these different characteristics it is important to better understand the barriers that adult students face when trying to enter a formal education program.

**Barriers to Adult Students**

Although there are many adult students entering college, many more do not participate in any formal adult education activities. These adults’ reasons for not participating can also be seen as highly diverse. Some may not know about available courses; others may be unable to take a desired course because of time or transportation constraints; and still others are simply not interested. Unlike children and teenagers, adults have many responsibilities that they must balance against the demands of learning. Because of these responsibilities, adults have barriers against participating in learning.

The U.S. Department of Education identified four major barriers for adults who want to enroll in a formal education program: (a) time constraints, (b) lack of money, (c) child care concerns, and (d) transportation or location of the program (NCES, 1998). A 2008 report from the CAEL, called *Adult Learning in Focus*, acknowledged these four barriers and offered a fifth barrier of aspiration: knowing that postsecondary learning is desirable and within reach.

Other literature has suggested that barriers fall into four broad categories: institutional, situational, psychological, and educational (Compton et al., 2006; Hammer et al., 1998; Hardin, 2008; Kerka, 1989). Institutional barriers represent the barriers of bureaucracy that hinder the adult student. Hammer et al. found that adult students are focused on completing academic requirements in a minimum amount of time and are primarily concerned with (a) the institution’s proximity to home and work; (b) availability of night, weekend, and online courses; (c) extended faculty office hours; (d) quality day care;
(e) accurate academic advisement; and (f) quality instruction. Situation barriers are barriers that cannot be removed by the institution because they are unique to the adult student. According to Kerka (1989), situation barriers include role conflicts, time management issues, family and work problems, economics, and logistics. Psychological barriers include inadequate coping skills, lack of self-confidence and poor self-image, anxiety about schooling based on prior experience, and negative beliefs or expectations about outcomes (Hardin, 2008; Kerka, 1989). According to Hardin (2008), educational barriers include adult students who are unprepared academically. These include student who may have made poor choices academically in the past, such as not taking college preparation courses, to students who may have forgotten the skills they used in high school. Still other adults may face language barriers that cause them to struggle. Finally, educational barriers include physical and learning disabilities that make the classroom a challenge.

Adult students have a subjective view of time, and it often relates to income potential. “We have seen that time is usually listed as a major barrier to more participation in a variety of worthwhile endeavors” (NCES, 1998, p 52). Opportunity costs are just too high for some adults. Time away from work, from family, and even from leisure becomes a barrier to entry. According to CAEL (2008), limited time (availability) is a major barrier to adult participation. There are competing priorities for adult students, and higher education opportunities need to be delivered at a time and in a manner that allows adults to participate given the commitments of adult students.

Money, or more precisely the lack of it, is another hurdle an adult student has to overcome. Some of the concerns reported by the Department of Education include the amount of tuition and fees for classes, the cost of books and supplies for classes, the cost of
child care, and the cost of transportation (NCES, 1998). Lack of financial support, for example, may prevent an adult student from entering or remaining enrolled at the college or university. Eifler and Potthoff (1998) found that finances were a crucial concern of older students. Generally, these students are financially independent and have responsibility for others as well. In addition, the financial needs of adult students differ from those of traditional students because of the added costs of housing and child care. Genzuk and Baca (1998) found that adult students are often in low-paying jobs at the time they enter programs and are afraid of incurring additional debt. Therefore, they might fail to seek the student loans and financial aid available to them. In order to meet these expenses, adult students often continue to work full time while carrying a full course load (Hardin, 2008). Kasworm (2003b) agreed, as adult students reported that their most important issue and most stressful concern is their financial fragility to support college attendance.

Another barrier of adult students given by the Department of Education was looking after children or family responsibilities (NCES, 1998). Adults are challenged by family and work responsibilities, frequently needing child care if they are to attend classes (CAEL, 2008). Students with children have to divide their time between providing for their child’s welfare and their own. In order to provide for their families these students often have to hold a part-time or full-time job. The role as caregiver results in competition for adult students’ time and attention, forcing them to prioritize according to their own perceptions of the return on time invested for each demand in their lives (Silverman et al., 2009).

According to CAEL (2008), accessibility is a challenge for the adult student. Adults are concerned with the flexibility of the academic institution. The time and manner in which classes are delivered allow them to participate and interact with the people (such as academic
counselors) they need to be successful. The Department of Education (NCES, 1998) listed transportation as a major barrier to higher education. Transportation problems include: not having adequate transportation to travel to and from class (they may not have a car), cost of transportation being prohibitive (they can’t afford it), and travel time to and from classes restricting the student from meeting class times (school is not located near the home). Physical location is also a challenge because many adults must access learning opportunities in the communities in which they live and work. Some may be constrained by rural or suburban environments with few postsecondary options (CAEL, 2008). Metzner and Bean (1987) noted that many adults are commuters. Commuter students represent 70% of the undergraduate student population with adult students as a major subset (Kasworm, 1990). Commuter students are often expected to function in an environment where policies are created with the traditional student in mind (Silverman et al., 2009). Hammer et al. (1998) found that adult students are focused on completing academic requirements in a minimum amount of time and are primarily concerned with the institutions proximity to home and work; availability of night, weekend, and online courses; and college services such as faculty office hours, accurate academic advisement, and quality instruction.

Lack of aspiration to seek out postsecondary education is another barrier for adult students. Many were raised in families with little or no experience of learning beyond high school, so they may find it an alien environment. According to CAEL (2008), adults who performed poorly in high school are often fearful about returning to school to complete high school credentials, see no economic advantage to gaining additional education, believe that the cost of education is out of their reach, or believe that they cannot afford the time away from work or family to pursue their studies. Adult students may in fact be unprepared for
college level studies. This is not isolated to 2- or 4-year institutions. Brock (2010) cited data provided by the Department of Education indicating that 42% of freshman at community colleges enroll in at least one remedial reading, writing, or mathematics course. At private and public 4-year institutions, that statistic ranges from 12% to 24%. This is significant, as research has suggested that many students who are assigned to remedial education drop out of the classes and even out of the college itself. The data provided by the National Educational Longitudinal Study, which is a project of the U.S. Department of Education’s NCES shows that only 28% of remedial students at 2-year colleges attain a degree within 8 years of entry, compared with 43% of nonremedial students, and that 52% of remedial students at 4-year institutions finish a bachelor’s degree, compared to 78% without remedial coursework. Although the sample used is representative of a single nationwide cohort of high school students who went on to college during the roughly 8 years following high school, not nontraditional students, the study is still relevant to show that remedial education acts as a gatekeeper and a quality control in higher education and that students who can successfully pass these courses continue into regular college-level courses, and those who can’t drop out (Attewell, Lavin, Domina, & Levey, 2006). Woodham (1998) indicated that remedial education is more common among older nontraditional students. In Marion Bowl’s (2001) REACHOUT study, he identified that adult students could become frustrated participants. Students “had been active educationally, but unable fully to use their education and skills they had gained to win themselves a more satisfying job, better pay and better lifestyle,” as though the system had not provided them enough guidance and support. They were left with a feeling “that higher education was not for them” (Bowl, 2001, p. 154).
Cross’s (1981) classification of barriers to participation in learning activities is cited often in the literature for nontraditional students and provides a strong framework for categorizing barriers. Recently, it was the foundation for a 2012 report by the Advisory Committee on Student Financial Assistance to the U.S. Congress on college completion rates. Cross stated that are three main obstacles for adult students that can be classified under three headings: (a) situational, (b) institutional, and (c) dispositional.

According to Cross (1981), situational barriers are those arising from the student’s position in life at a given time. They include such barriers as cost, time, home responsibilities, job responsibilities, lack of child care, lack of transportation, no place to study, and lack of support from friends and family. “Lack of time due to a job and home responsibilities deters large numbers of potential students in the 25–45 year old age group” (p. 98).

Institutional barriers consist of practices and procedures that may discourage or exclude students from pursuing postsecondary education. Barriers include scheduling problems; problems with location or transportation; lack of courses that are interesting, practical or relevant; time requirements; and lack of information about the program and procedures. According to Cross (1981), institutional barriers “consists of all those practices and procedures that exclude or discourage working adults from participating in educational activities” (p. 98).

Cross (1981) explained that dispositional barriers are those related to attitudes about oneself as a learner. Many older adults have negative perceptions of their ability to learn new things. Students with poor educational backgrounds frequently lack interest in learning activities. Adult students, especially low-income adults, may experience low self-esteem,
have a low confidence level, and become concerned about how other students and faculty may perceive them. In addition, many adults returning to complete college experience anxiety and fear because they have not engaged in postsecondary study for a period of time.

All the research on barriers to adult students provides a slightly different perspective depending on the method of study used. The important thing to note is that each analysis of obstacles helps aid in the understanding of the adult student.

**Adult Learning Models**

In researching adult students, it is important to understand the central question of how adults learn. Merriam (2001) stated that this subject has occupied the attention of scholars and practitioners since the founding of adult education and “some eighty years later, we have no single answer, no one theory or model of adult learning that explains all that we know about adult students, the various contexts where learning takes place, and the process of learning itself” (p. 3). Knowledge of adult students is important for colleges to understand in order to support and help them be successful. In reviewing the literature, there are several theoretical frameworks applied to adult learning. Three common adult learning models are as follows: andragogy, self-directed learning (SDL), and transformative learning (Merriam, 2001; Ross-Gordan, 2003).

Knowles’s (1980) framework of andragogy provides an understanding of the relationship between adult students, work, responsibility, and learning. Andragogy deals with adults, their needs, interests, problems, and characteristics; it assumes that adults are more mature than are traditional-age students and that they become more independent and self-directed in their learning and, because of this maturity, adults are capable of managing other aspects of their lives such as work and family responsibilities as well as planning their
own learning (Merriam, 2001). Andragogy is arguably the best known of the conceptual approaches to adult learning and is the most frequently discussed concept among adult education scholars (Ross-Gordon, 2011; Cross, 1981; Brookfield, 1986). Andragogy will be the conceptual foundation of this research and the concept of andragogy is explored more in detail later in the dissertation.

About the same time that Knowles introduced the concept of andragogy, the SDL concept appeared as a model that helped define adult students as different from children (Merriam, 2001). Brookfield (1995) explained that SDL “focuses on the process by which adults take control of their own learning, in particular how they set their own learning goals, locate appropriate resources, decide on which learning methods to use and evaluate their progress” (p. 1). Allen Tough (1971) generally has been credited with providing the first comprehensive description of SDL and initiating a long-standing body of research on this topic. Merriam (2001) noted that “it was Tough (1967, 1971), building on the work of Houle (1961), who provided the first comprehensive description of self-directed learning as a form of study” (p. 8). Most researchers studying SDL have followed Tough’s definition of SDL (Cross, 1981). Tough (1967) categorized adult students by type of learning project, which consisted of self-directed learning activities, organized learning activities, and formal learning for credit. A learning project was defined as “a series of related episodes, adding up to at least seven hours. In each episode more than half of a person’s total motivation is to gain and retain certain fairly clear knowledge and skill” (p. 6). What Tough discovered was that almost three-fourths of the learning projects of adults are completely self-directed (Tough, 1971; Cross, 1981). The descriptive understanding of SDL is that as people mature learning becomes more self-directed. Current models of SDL discuss goals of adult students,
the nature of self-direction, and different ways of assessing SDL in learning (Merriam, 2001). Ross-Gordan (2003) suggested that the research on SDL with the instructional environment suggests that adults are likely to be interested in exercising some degree of autonomy in learning, but she recommends that faculty and staff that facilitate adult students be prepared to make adjustments in expectations or level of support.

A third framework of adult learning is called transformational learning. It is credited to Jack Mezirow and associates (2000) who defined transformative learning as

the process by which we transform our taken-for-granted frames of reference (meaning perspectives, habits of mind, mind-sets) to make them more inclusive, discriminating, open, emotionally capable of change, and reflective so that they may generate beliefs and opinions that will prove more true or justified to guide action. (pp. 7–8)

According to Mezirow (1991), transformative learning can explain how adult students make sense or meaning of their experiences, the nature of the structures that influence the way they construe experience, the dynamics involved in modifying meanings, and the way the structures of meanings themselves undergo changes when students find them to be dysfunctional. (p. xii)

Mezirow (1990) defined it as a process of reflection and action:

From this vantage point, adult education becomes the process of assisting those who are fulfilling adult roles to understand the meaning of their experience by participating more fully and freely in rational discourse to validate expressed ideas and to take action upon the resulting insights. . . . Rational thought and action are the cardinal goals of adult education. (p. 354)
According to Brown (2006), transformative learning changes the way people see themselves and their world. It attempts to explain how their expectations, framed within cultural assumptions and presuppositions, directly influence the meaning they derive from their experiences. This concept supports the learner performing a critical reflection to enhance the capability to function as self-directed students (Merriam, 2001). The purposes of critical reflection are to externalize and investigate power relationships and to uncover hegemonic assumptions. Critical reflection, according to Brookfield (1995), focuses on three interrelated processes:

1. the process by which adults question and then replace or reframe an assumption that up to that point has been uncritically accepted as representing commonsense wisdom;
2. the process through which adults take alternative perspectives on previously taken for granted ideas, actions, forms of reasoning and ideologies; and
3. the process by which adults come to recognize the hegemonic aspects of dominant cultural values. (p. 2)

From the perspective of transformation theory, there are ideal conditions that promote SDL; these conditions can serve as standards for judging both the quality of adult education and the sociopolitical conditions that facilitate or impede learning (Mezirow, 1997).

Designing effective programs and services that break down barriers and help adult students succeed requires a clear understanding of students’ needs and expectations. The main purpose of these models is to understand how adults learn in order to develop effective practices in higher education and foster successful completion of the adult students’ educational goals.
Effective Practices for Facilitating Learning of Adult Students

It is important to note that, because adult students have different characteristics than do traditional-age students, the needs of the adult students are also different. The literature offers a variety of effective practices for the institution in reaching and serving adult students. CAEL is a leading organization whose mission is to make it easier for people to get the education they need. According to Flint (2005), CAEL developed eight principles of effectiveness for serving adult students. The principles are as follows:

1. Outreach: The institution conducts outreach to adult students by overcoming barriers of time, place, and tradition in order to create lifelong access to educational opportunities.

2. Life and career planning: The institution addresses adult students’ life and career goals before or at the onset of enrollment in order to assess and align its capacities to help students reach their goals.

3. Financing: The institution promotes choice using an array of payment options for adult students in order to expand equity and financial flexibility.

4. Assessment of learning outcomes: The institution defines and assesses the knowledge, skills, and competencies acquired by adult students both from the curriculum and from life/work experience in order to assign credit and confer degrees with rigor.

5. Teaching–learning process: The institution’s faculty uses multiple methods of instruction (including experiential- and problem-based methods) for adult students in order to connect curricular concepts to useful knowledge and skills.
6. Student support systems: The institution assists adult students using comprehensive academic and student support systems in order to enhance students’ capacities to become self-directed, lifelong students.

7. Technology: The institution uses information technology to provide relevant and timely information and to enhance the learning experience.

8. Strategic partnership: The institution engages in strategic relationships, partnerships, and collaborations with employers and other organizations in order to develop and improve educational opportunities for adult students.

These principles provide a framework that helps institutions of higher education adopt policies and practices to make educational opportunities more accessible and to remove obstacles from the path to degree completion.

Another often cited work on effective practices in adult learning is Brookfield’s (1986) book on adult students. Brookfield (1986) proposed six principles of effective practice for facilitating learning. The following principles apply to the teaching and learning context:

1. Participation in learning is voluntary and adults engage in learning as a result of their own volition.

2. Effective practice is characterized by a respect among participants for each other’s self-worth.

3. Facilitation is collaborative. In other words, teaching and learning is a cooperative process, not a unidirectional transaction.

4. Praxis—a continual cycle of activity, reflection, and analysis—is at the heart of effective facilitation.
5. Facilitation aims to foster in adults a spirit of critical reflection whereby they will come to question many aspects of their personal, professional, and political lives.

6. The aim of facilitation is the nurturing of self-directed, empowered adults. Brookfield (1986) suggests every group contains a configuration of idiosyncratic personalities, differing past experiences, current orientations, levels of readiness for learning, and individual learning styles. So instructors should be wary of prescribing any standardized approach to facilitating learning. Brookfield (1986) suggests these six principles have numerous implications for teaching and will have direct implications for adult students. The direct implications in the classroom include voluntary participation, mutual respect, collaborative spirit, action and reflection, critical reflection, and self-directions all which improve classroom experience and learning outcomes of the course.

A more recent study about adult learning by Ross-Gordan (2003) looked at effective practices in the classroom and identified the following recommendations for classroom practice:


2. Recognize and foster relationships between academic learning and learning in the larger world.

3. Recognize that cognitive development continues well into adulthood (Kegan, 1994). Use activities that stimulate cognitive development and growth,
challenging adults to grapple with the kind of ill-defined problems they encounter in everyday life (King & Kitchener, 1994).

4. Realize that many adults experience life-changing events immediately before or after enrolling in college. Provide the support they may need during these times of transition, whether through on-campus programs or referral to community-based counseling programs.

5. Design a curriculum that is inclusive with regard to students’ cultural backgrounds, including those from marginalized groups.

6. Recognize that because adult students are immersed in numerous external cultures and may have limited time or need for traditional types of involvement in campus culture, the classroom typically serves as the focal point of the academic experience for adults. Maximize opportunities for relationship building with faculty and classroom peers through instructional activities and academic program-related activities scheduled around their on-campus time or mediated by technology.

7. Make use of course designs and instructional activities that balance adult students’ often mixed preferences for learner-centered (flexible and responsive) and teacher-centered (structured) learning environments.

8. Create opportunities for early success to generate confidence. Provide students with information about courses and workshops designed to help them enhance self-awareness as students, improve academic learning strategies, and learn the norms of academic knowledge communities.
9. Be sensitive to individual differences. Adult students want professors who understand their special concerns and who can adapt to differences related to learning style, gender, and cultural and racial background while avoiding overgeneralizations and stereotypes.

Increased adult participation in college represents a change in focus for academic institutions. In fact, more student affairs professionals are concerned with the key goals that motivate adult student attendance, believing them to be key recruitment and retention factors (Kasworm, 2003b). Adult students’ needs and goals are equally important but somewhat different from their younger colleagues’ because they are in a different place in life and view the world and their future differently. Effective practices used to engage adult students can help an institution support learners in reaching their academic goals and engage them effectively in the classroom. Although much of what is written has to do with how an institution can adapt and better serve adult students, literature on adult students also provides insight into understanding the characteristics of these students within the classroom or distance education environment.

Andragogy

Andragogy is arguably the best known of the conceptual approaches to adult learning (Ross-Gordon, 2011). Cross (1981) mentioned that andragogy has been more successful than have other models in gaining the attention of practitioners. Brookfield (1986) noted at the time of this writing, “this concept (of andragogy) is the single most popular idea in the education and training of adults” (p. 91). Merriam (2001) stated that andragogy is one of the most enduring and widely cited pillar of adult learning. Although andragogy has had many
supporters and distracters, it has permeated the field of adult learning and endures to this day (Blondy, 2007).

The concept of andragogy is credited to Malcom Knowles. Knowles’s concept of andragogy describes adult learning as the art and science of helping adults learn (Knowles, 1984). Andragogy contends that adults should be taught differently than children because the learning processes are different (Knowles, 1980,1990; Knowles, Holton, & Swanson, 2005). The andragogical model is based on several assumptions that are different from those of a pedagogical model. Knowles (1990) noted that the andragogical model is not an ideology but a system of assumptions. He went on to state, “The pedagogical model is an ideological model which excludes the andragogical assumptions. The andragogical model is a system of assumptions which includes pedagogical assumptions” (p. 64).

Adult students are as diverse as the classes they take; however, there are some key factors that are a common thread with adult students. Knowles (1990) suggested in his book, *The Adult Learner: A Neglected Species*, that there are six assumptions about the characteristics of adult students: need to know, self-concept, experience, readiness, orientation and motivation.

First, adults need to know the reason they need to learn something before undertaking to learn it. According to Tough (1971), adults will invest considerable energy once they understand the benefits they will gain from learning it and the negative consequences from not learning it.

Second, the adult student is responsible for making daily decisions about life, and those decisions often affect others, for example children or spouses/significant others. This entails that adult learners can self-direct their own learning (Merriam, 2001). Adults develop
a self-concept through which they resist and resent situations in which they feel others are imposing their wills onto them.

Third, adults have a wide variety of life experiences that should be used in the classroom. They also value learning through experience. According to Knowles (1990), as one accumulates experience, one tends to develop mental habits, biases, and presuppositions that tend to cause one to close one’s minds to new ideas, fresh perceptions, and alternative ways of thinking. He went on to also state that as people mature, they increasingly define themselves in terms of experiences they have had.

Fourth, adults are ready to learn when they desire to know or understand something. Merriam (2001) stated that this assumption means adult students have learning needs associated with a change in social roles.

Fifth, adults tend to engage in learning after they experience a need in their life, so they are presumed to bring a problem-oriented approach to learning as opposed to a subject-oriented approach used in more traditional approaches to learning. Adults are motivated to devote energy to learn something to the extent that they perceive that it will help them perform tasks or deal with problems that they confront in their life situations.

Finally, adults are motivated by internal desire and not so much through external motivators. “While adults are responsive to some external motivators (better jobs, promotions, higher salaries, and the like), the most potent motivators are internal pressures (the desire for increased job satisfaction, self-esteem, quality of life, and the like)” (Knowles, 1990, p. 63). This sixth assumption poses the notion of intrinsic motivation. Adults are motivated to learn because they want to rather than by external factors. Knowles (1984) argued that although it acknowledges that adults will respond to some external motivators,
the andragogical model predicates that the more potent motivators are internal: self-esteem, recognition, better quality of life, greater self-confidence, self-actualization, and the like.

Knowles (1980) called upon educators to employ a seven-step process to implement and capitalize upon the assumptions of andragogy. The andragogical process involves the following phases:

1. The establishment of a climate conducive to adult learning,
2. The creation of an organizational structure for participative planning,
3. The diagnosis of needs for learning,
4. The formation of directions of learning (objectives),
5. The development of a design of activities,
6. The operation of activities, and
7. The re-diagnosis of needs for learning (evaluation). (p. 59)

Knowles (1980) recommended the above institutional processes be phased in for the planning of comprehensive programs of the adult education.

**Critiques of Andragogy**

One of the primary criticisms of andragogy was whether it can be considered a theory of adult learning (Merriam, 2001). Merriam et al. (2007) stated that critics have noted andragogy does not possess the “explanatory and predictive functions generally associated with a fully developed theory” (p. 85).

Knowles (1980) presented his model of andragogy as a set of assumptions and not an ideology. He went on to state, “Andragogy is simply another model of assumptions about students to be used alongside the pedagogical model of assumptions, thereby providing two alternative models for testing out the assumptions as to their fit in particular situation” (p.
Knowles himself came to concur that andragogy is less a theory of adult learning than “a model of assumptions about learning or a conceptual framework that serves as a basis for an emergent theory” (Merriam, 2001, p. 87).

According to Merriam (2001), another area of criticism is the extent to which the assumptions are characteristic of adult students only. She explained:

Some adults are highly dependent on a teacher for structure, while some children are independent, self-directed students. The same is true for motivation; adults may be externally motivated to learn, as in attending training sessions to keep their job, for example, while children may be motivated by curiosity or the internal pleasure of learning. (p 5)

With the understanding that these assumptions may not be true of all students, Knowles (1990) came to acknowledge that andragogy could also be applied to children. He noted that teachers in elementary and secondary were applying andragogy principles with young students and producing superior learning. “I am at the point now of seeing that andragogy is simply another model of assumptions about students to be used alongside the pedagogical model” (p. 43). Knowles (1990) also recognized that andragogy was not successful for all adults, noting that andragogy now appears to be situation specific.

Another long-standing criticism of andragogy is that it lacks the research to establish it as a basis for a theory of adult learning. According to Merriam et al. (2007), “considering that andragogy has been the primary model of adult learning for over forty years, relatively little empirical work has been done to test the validity of its assumptions or its usefulness in predicting adult learning behavior” (p. 90). One of the problems lies in the absence of a testable model. As a result, intensive research cannot be conducted to prove it as a theory for
adult learning. Cross (1981) posed the question, “Does andragogy lead to researchable questions that will advance knowledge in adult education” (p. 228). Pratt (1993) also raised concerns about the lack of empirical studies: “We cannot say, with any confidence, that andragogy has been tested and found to be, as so many have hoped, either the basis for a theory of adult learning or a unifying concept for adult education” (p. 21). Rachel (2002) concluded,

Unfortunately, the studies of the 1980s and 1990s relative to andragogy’s effectiveness in both achievement and satisfaction provide mixed results and often “no significant differences” emerging from variegated methodologies, and thus reveal an unstable theoretical foundation upon which to prescribe practice. (p. 234)

Knowles et al. (2005) acknowledged the criticism but warned that care must be taken to avoid confusing andragogy’s core principles with goals and purposes for which a learning event is being conducted. “Critiques of andragogy point to missing elements that keep it from being a defined theory of adult education, not of adult learning” (Knowles et al., 2005, p. 2). Pratt (1993), in his assessment of andragogy, noted that andragogy has been adopted by legions of adult educators around the world. He believed it would continue to be the window through which adult educators take their first look into the world of adult education. However, Pratt stated, “While andragogy may have contributed to our understanding of adults as students, it has done little to expand or clarify our understanding of the process of learning, nor has it achieved the status of a theory of adult learning” (p. 21). Merriam (2001) seems to have concurred:

However, both andragogy and SDL have become so much a part of adult education’s identity, and have had such an impact on practice, that relegating them to the status of
historical artifact is inconceivable. . . . A more likely scenario is that both of these
“pillars” of adult learning theory will continue to engender debate, discussion, and
research, and in so doing, further enrich our understanding of adult learning. (p. 11)
The importance of andragogy is found through the understanding of the adult learner.
Knowles et al. (2005) explained that andragogy presents core principles of adult learning that
help build more effective learning processes for adults. “Andragogy works best in practice
when it is adapted to fit the uniqueness of the students and the learning situation. We see this
not as a weakness of the principles, but as a strength” (Knowles et al., 2005, p. 3).

**Student Engagement**

Student engagement, according to George Kuh, is a straightforward premise:
The more students study a subject, the more they learn about it. Similarly, the more
students practice and get feedback from the faculty and staff members on their
writing, speaking, and collaborative problem solving, the more adept they become at
those skills. (Harper & Quaye, 2009, p. 313)
The importance of engagement has been researched and written about for a long period of
time, and the large body of research on student learning has concluded that students who are
actively involved in educationally purposeful activities gain more from their college
experience than do students who are not as involved (Astin, 1993; Gordon et al., 2008; Kuh,
2003; Pace, 1980; Pascarella & Terenzini, 1991).

According to Kuh (2009), the engagement construct consists of several concepts that
have evolved over time. These concepts include (a) the positive effects of time on task on
learning by Ralph Tyler, (b) quality of effort by C. Robert Pace, (c) student involvement by
Alexander Astin, (d) social and academic integration by Vincent Tinto, (e) Chickering and
Gameson’s seven good practices in undergraduate education, (f) desired outcomes of college by Ernest Pascarella, and (g) student engagement dimensions by George Kuh and other scholars.

As explained by Kuh, Kinzie, Buckley, Bridges, and Hayek (2007), student engagement represents two critical features. The first is the amount of time and effort students put into their studies and other educationally purposeful activities, and the second component of student engagement is how the institution deploys its resources and organizes the curriculum, other learning opportunities, and support services to induce students to participate in activities that lead to the experiences and desired outcomes such as persistence, satisfaction, learning, and graduation.

From the student’s perspective affecting engagement, Pace (1980) had developed the concept of quality of effort, which states,

What a student gets out of college depends, at least to some extent, on what he or she puts into it. Accountability for achievement and related student outcomes must consider both what the institution offers and what the students do with those offerings. (p. 1)

The rationale is that students gained more from their studies and other aspects of the college experience when they invested more time and energy in educationally purposeful tasks: studying, interacting with their peers and teachers about substantive matters, applying what they are learning to concrete situations and tasks (Kuh, 2009). Astin (1984) defined student involvement as the “quantity and quality of the physical and psychological energy the student invests in the college experience” (p. 157). According to Astin (1984), the greater the student involvement, the greater the learning and personal development. The principles of
both Pace and Astin make up the fundamental principle of engagement from the perspective of the student.

From the institutional perspective affecting engagement, Chickering and Gamson (1987) synthesized much of the evidence on the impact of college on students and translated it into seven principles for good practice in undergraduate education. They said that good practice in undergraduate education:

1. Encourages student-faculty contact
2. Encourages cooperation among students
3. Encourages active learning
4. Gives prompt feedback
5. Emphasizes time on task
6. Communicates high expectations
7. Respects diverse talents and ways of learning

Kuh (2003) reported that the seven principles of good practices are “perhaps the best known set of engagement indicators” that NSSE uses (p. 1). The College Student Experience Questionnaire (NSSE survey) used by NSSE is one research tool that measures these indicators. Along with the seven principles, the engagement concept also encompasses some other key activities that are deemed as being important, such as collaborating with peers on projects, problem solving tasks, and community service (Kuh, Gonyea, et al., 2001).

The NSSE survey consists of over 100 survey questions. NSSE assesses student engagement in the activities that contribute to learning and success during college—for which the main process indicators are the seven good practices (Kuh, 2009). In order to make the survey results more accessible and manageable, five benchmarks were created.
Kuh (2009) stated that “to provide a common language and framework for discussing and reporting student engagement and institutional performance results, NSSE at the outset used a combination of empirical and conceptual analyses to identify a small number of clusters, or benchmarks, of effective educational practice” (Kuh, 2009, p. 13). The benchmarks are as follows:

1. Level of academic challenge,
2. Active and collaborative learning,
3. Student–faculty interaction,
4. Enriching educational experiences, and
5. Supportive campus environment.

Institutions that more fully engage their students in the variety of activities that contribute to valued outcomes of college can claim to be of higher quality in comparison with similar types of colleges and universities (Kuh, 2003).

Several studies have indicated that nontraditional students (older, commuters, transfers) respond differently on many of the NSSE questions and consequently have lower scores on several of the NSSE benchmarks (Lerer & Talley, 2010). NSSE (2004) noted that transfer students were less engaged than were nontransfer students and that the older students did not spend as much time in educationally productive activities as did younger students. Adult students have multiple life roles and would respond to questions differently than would traditional-age students. It is important to understand the barriers to engagement with the institution that adult face.
Adult Engagement Challenges

Many adult characteristics make engagement a challenge. Commuter, part-time, transfer, and returning students must contend with the logistical problems of attending schools and multiple life roles of family responsibilities and or job responsibilities (Jacoby, 2000). These characteristics reflect a majority of adult students. Metzner and Bean (1987) noted that many adults are commuters. Kasworm (1990) noted that commuter students represent 70% of the undergraduate student population with adult students as a major subset. Commuter students are often expected to function in an environment where policies are created with the traditional student in mind. “Colleges and universities have historically failed to recognize the frustrations, anxieties and challenges of commuting to campus, being enrolled part-time and returning to school after a long hiatus” (Silverman et al., 2009, p. 225).

Adults who enter college as a transfer student have similar engagement challenges. According to NSSE (2004):

Overall, transfer students are less engaged in effective educational activities than their nontransfer peers. Transfer students tend to be older and have more external responsibilities such as working for pay off-campus and caring for dependents. Transfer students believe their coursework provides more emphasis on cultivating higher-order thinking abilities than their peers, yet they interact with faculty members and engage in enriching educational programs at levels lower than their counterparts. (p. 9)

Because of family and other responsibilities, adults have a difficult time in prioritizing tasks.
Those influences compete with the rigors of their course load and the many out-of-class opportunities that vie for their participation. In addition to being a student they might be married, in long term relationship, single or divorced. Most work full-time or part-time and may be responsible for supporting for others. (Silverman et al., 2009, p. 229)

The difficulty with competing demands often causes adult students to make tough choices. Astin (1998) found that working full time increases the likelihood that students will drop out of college.

According to Astin’s (1984, 1993) model of student involvement, activities that draw student effort off campus have a negative effect on learning because these involvements leave students with less energy or time for campus involvement. Adult students who represent a large number of the growing number of students who commute, work, and enroll part time are at risk for learning less because these characteristics limit their time on campus (Lundberg, 2003). However, Kasworm and Pike (1994) found that adult students succeed in college at about the same rate as do traditional-age students, but they engage in fewer interactions with peers than do their traditional counterparts. It is quite possible that these social interactions are not important predictors of their success. Although not entirely conclusive, Lundberg (2003) noted that other studies also have shown that social integration is relatively unimportant for adult student success (Chartrand, 1990; Kasworm & Pike, 1994; Metzner & Bean, 1987).

Lunberg (2003) found that social interactions on campus was important for adults when those social relationships were related to educational endeavors, but assumptions that adult students are inherently at a disadvantage because of their multiple obligations off
campus was not supported by the study. Lundberg stated that “older students appear to have developed a way of managing such time limitations to nullify their effects in ways that their younger counterparts have not” (p. 684). Adult students face a different set of challenges when interacting with the academic institution, and often their educational goals are more focused than those of the traditional-age student. Lerer and Talley (2010) argued that NSSE benchmarks reflect the expectations of traditional college students with more universal educational experiences that focus on academics, classroom activities, and institutional support and do not reflect nontraditional experiences.

**National Survey of Student Engagement (NSSE)**

According to Kuh (2009), the NSSE began with Russ Edgerton who was responsible for directing the education program at The Pew Charitable Trusts. Edgerton wanted to create an instrument to measure educational quality at the undergraduate level and approached Peter Ewell of National Center for Higher Education Management Systems to lead a team of researchers in order to authenticate evidence of student engagement. With funding from the Pew Charitable Trusts, he assembled a design team consisting of Alexander Astin, Gary Barnes, Arthur Chickering, John Gardner, George Kuh, Richard Light, and Ted Marchese (in addition to input from C. Robert Pace) to create a survey instrument (Kuh, 2009).

The NSSE was specifically designed to assess the extent to which students are engaged in empirically derived good educational practices and what they gain from their college experience (Kuh, Hayek, et al., 2001). The NSSE gathers data directly from students’ responses, and the findings can be used to estimate collegiate quality at the national level through the use of benchmarking. “The results can help focus institutional improvement efforts, inform accountability measures, and provide an alternative lens for the
public to better understand what makes for a quality undergraduate education” (Kuh, Hayek, et al., 2001, p. 4). The NSSE provides information and assistance to colleges, universities, and other organizations to improve student learning. Its primary activity is annually surveying college students to assess the extent to which they engage in educational practices associated with high levels of learning and development (NSSE, 2008c). The popularity and use of NSSE is growing. Kuh (2009), in discussing the importance of NSSE, stated that engagement increasingly has been featured in higher education policy discussions, scholarly and institutional research literature, and the popular media.

A major component of the way NSSE results are reported is through its benchmark scales. These scales are informed partially by an empirically derived grouping of survey items as well as an intuitive understanding of concepts proposed by Astin’s (1984) theory of student involvement and by Chickering and Gamson’s (1987) seven principles of good practice for undergraduate students (Kuh, Gonyea, et al., 2001).

The five NSSE benchmarks serve as the framework around which the NSSE annual reports are organized. The benchmarks are intended to be a useful tool for internal evaluation and also are used to facilitate comparisons among other institutions and institutional types (Kuh, 2003). The primary objective of collecting student engagement data is to discover areas where colleges and universities can improve the quality of the student experience. This can be achieved by drilling down into results from subgroups such as men and women or students who participate in certain programs or majors in different fields of study (Chen et al., 2009). Gordon, Ludlum and Hoey (2008) recommended that, when using NSSE data, institutions need to be mindful of the desired goals they have for their students and themselves:
The goal of an institution should not be to achieve higher NSSE benchmark scores for the sake of doing so, but rather to gain keener insight into the relationship between student engagement (as measured by NSSE) and the desired outcomes the institution has for its students. (p. 20)

**Benchmarks of Effective Educational Practice**

NSSE established five benchmarks of effective educational practice (see Appendix B) based on 42 key questions: level of academic challenge, active and collaborative learning, student-faculty interaction, supportive campus environment, and enriching educational activities. The logic and structure behind each benchmark taken from NSSE’s (n.d.) *Benchmarks of Effective Educational Practice* are described below.

**Benchmark 1: Level of Academic Challenge.** Challenging intellectual and creative work is central to student learning and collegiate quality. Colleges and universities promote high levels of student achievement by emphasizing the importance of academic effort and setting high expectations for student performance. Activities and conditions include:

- Time spent preparing for class (studying, reading, writing, rehearsing, and other activities related to your academic program),
- Worked harder than you thought you could to meet an instructor’s standards or expectations,
- Number of assigned textbooks, books, or book length packs of course readings,
- Number of written papers or reports of 20 pages or more,
- Number of written papers or reports between 5 and 19 pages,
- Number of written papers or reports fewer than five pages,
• Coursework emphasizes: Analyzing the basic elements of an idea, experience, or theory,

• Coursework emphasizes: Synthesizing and organizing ideas, information, or experiences,

• Coursework emphasizes: Making judgments about the value of information, arguments, or methods,

• Coursework emphasizes: Applying theories or concepts to practical problems or in new situations,

• Campus environment emphasizes spending significant amounts of time studying and on academic work.

**Benchmark 2: Active and Collaborative Learning.** Students learn more when they are intensely involved in their education and are asked to think about and apply what they are learning in different settings. Collaborating with others in solving problems or mastering difficult material prepares students to deal with the messy, unscripted problems they will encounter daily during and after college. Activities include:

• Asking questions in class or contributed to class discussions,

• Making a class presentation,

• Working with other students on projects during class,

• Working with classmates outside of class to prepare class assignments,

• Tutoring or teaching other students,

• Participating in a community-based project as part of a regular course,

• Discussing ideas from your readings or classes with others outside of class (students, family members, coworkers, etc.).
**Benchmark 3: Student-Faculty Interaction.** Students see firsthand how experts think about and solve practical problems by interacting with faculty members inside and outside the classroom. As a result, their teachers become role models, mentors, and guides for continuous, life-long learning. Activities include:

- Discussing grades or assignments with an instructor,
- Talking about career plans with a faculty member or advisor,
- Discussing ideas from your readings or classes with faculty members outside of class,
- Working with faculty members on activities other than coursework (committees, orientation, student life activities, etc.),
- Receiving prompt written or oral feedback from faculty on your academic performance,
- Working with a faculty member on a research project.

**Benchmark 4: Enriching Educational Experiences.** Complementary learning opportunities inside and outside the classroom augment the academic program. Experiencing diversity teaches students valuable things about themselves and other cultures. Used appropriately, technology facilitates learning and promotes collaboration between peers and instructors. Internships, community service, and senior capstone courses provide students with opportunities to synthesize, integrate, and apply their knowledge. Such experiences make learning more meaningful and, ultimately, more useful because what students know becomes a part of who they are. Activities and conditions include:

- Talking with students with different religious beliefs, political opinions, or values;
- Talking with students of a different race or ethnicity;
• An institutional climate that encourages contact among students from different economic, social, and racial or ethnic backgrounds;

• Using electronic technology to discuss or complete assignments;

• Participating in:
  - Internships or field experiences,
  - Community service or volunteer work,
  - Foreign language coursework,
  - Study abroad,
  - Independent study or self-assigned major,
  - Culminating senior experience,
  - Cocurricular activities,
  - Learning communities.

**Benchmark 5: Supportive Campus Environment.** Students perform better and are more satisfied at colleges that are committed to their success and cultivate positive working and social relations among different groups on campus. Conditions include:

• A campus environment that provides the support one needs to help one succeed academically,

• A campus environment that helps one cope with one’s nonacademic responsibilities (work, family, etc.),

• A campus environment that provides the support one needs to thrive socially,

• Quality relationships with other students,

• Quality relationships with faculty members,

• Quality relationships with administrative personnel and offices.
NSSE’s benchmarks are intended to underscore five well-defined, different, though interrelated, constructs of undergraduate student engagement with the institution. They are presented as applicable to all types of 4-year colleges and universities irrespective of their mission, Carnegie classification, location, and type of students served. They reflect the two sides of the engagement equation: what the student does to become involved and what the institution does to create meaningful engagement experiences (Campbell & Cabrera, 2011).

Gordon et al. (2008) stated that if the NSSE instrument is to be used for evaluation and comparison, then validation of the instrument is essential. Validation helps to establish the legitimacy of the measure and by extension supports inferences and arguments based on the interpretations of these results. Gordon et al. went on to state:

To be an effective measure of engagement, NSSE requires strong construct validity. To this end, much of the focus to date on the NSSE instrument has been in development, and in establishing its content validity (Kuh 2001). One important aspect of validation is establishing convergent (or external) validity, the degree to which an instrument and the interpretations based on that data agree with other sources of information. This is something that NSSE has not addressed regarding this survey. The need for external validation is recognized, and as such NSSE has initiated a self-study and has emphasized the need for individual institutions to explore these questions. (p. 21)

Instrument validation is a legitimate concern, and there have been other scholarly criticism aimed at the validity of the survey.
Critiques of the NSSE Survey Instrument and Response

According to Stephen R. Porter (2011), an associate professor of research and evaluation at Iowa State University, NSSE’s survey of undergraduates “has very limited validity for its intended purposes and . . . researchers and institutions must adopt a new approach to surveying college students” (p. 50). Porter decided to take a bold stand in criticizing the survey because it plays such a major role in influencing college operations, government policy, and students’ decisions about where to enroll. He said the annual reports of the survey’s findings have potentially life-altering consequences and quite possibly have caused some colleges to be unfairly regarded as poor environments for students (Schmidt, 2009). Porter (2011) provided three main criticisms:

Our field requires an ambitious research program to reestablish the foundation of quantitative research on students. Our surveys lack validity because (1) they assume that college students can easily report information about their behaviors and attitudes, when the standard model of human cognition and survey response clearly suggests they cannot, (2) existing research using college students suggests they have problems correctly answering even simple questions about factual information, and (3) much of the evidence that higher education scholars cite as evidence of validity and reliability actually demonstrates the opposite. (pp. 45–46)

For example, Porter (2011) noted that questions are of dubious relevance and are too vague to ensure high validity. One of Porter’s chief criticisms of NSSE is that many of its questions use words that are open to varying interpretations or ask students to report the frequency of behaviors on scales using vague quantifiers, such as *often*, rather than actual numbers. Porter
stated that it is likely that students do not understand much of what is asked of them (Schmidt, 2009).

Alexander C. McCormick, director of NSSE, challenged some specific criticisms contained in Porter’s (2011) paper and argued that NSSE administrators have determined through extensive discussions with student focus groups that students have very similar interpretations of the survey’s questions. He added, however, that NSSE administrators are well aware the survey has some flaws that are likely to result in errors in some of its measures of students. “Any survey instrument is a blunt instrument, I think there is a lot in this paper that will be helpful to us as we think how we can improve NSSE” (Schmidt, 2009, para. 5). Pike (2003) acknowledged that the NSSE benchmark data should be used with caution, especially when colleges or universities have a large part-time enrollment: “Institutions with large numbers of full-time students are more likely to have high engagement scores; not because of actions by the institution, but because of the characteristics of the students” (p. 17). This is an important notation, especially when trying to assess the engagement of adult students who many are part-time students.

Porter (2011) was not alone in his criticism. Campbell and Cabrera (2011) tested a single institution with an intense case study to determine the construct and predictive validity for indigenous (nontransfer) graduating seniors at a mid-Atlantic research-extensive institution. What they discovered was:

The construct validity of certain benchmarks was either marginal or poor, the benchmarks did not appear to be strongly associated with important student outcomes, like GPA, and the benchmarks were highly intercorrelated: they appear not to measure distinct domains of student engagement. (p. 80)
Campbell and Cabrera (2011) pointed out that the researchers at NSSE had not reported construct validation of the five benchmarks of effective educational practices and they did not cite research examining how well the benchmarks hold true for individual institutions. They concluded:

Our findings question the extent to which NSSE benchmarks are a universal tool for appraising institutional quality, and whether they predict such student outcomes as GPA. We echo Gordon et al.’s (2008) advice to institutional researchers and policymakers. They should carefully examine the extent to which the five NSSE benchmarks are reliable and valid for their own institutional contexts before committing themselves to major organizational changes. (p. 97)

Ewell, McClenny, and McCormick (2011) responded, stating that the survey results should be used with caution, to triangulate them with other available evidence, and to use them as the beginning point for campus discussion.

Keeping purposes in mind is keenly important. For NSSE and CCSSE, the primary purpose always has been to provide data and tools useful to higher education practitioners in their work. That’s substantially different from primarily serving academic research. While we have encouraged the use of survey results by academic researchers, and have engaged in a great deal of it ourselves, this basic purpose fundamentally conditions our approach to “validity.” As cogently observed by the late Samuel Messick of the Educational Testing Service, there is no absolute standard of validity in educational measurement. The concept depends critically upon how the results of measurement are used. In applied settings, where NSSE and CCSSE began, the essential test is what Messick called “consequential validity”—essentially the
extent to which the results of measurement are useful, as part of a larger constellation of evidence, in diagnosing conditions and informing action. This is quite different from the pure research perspective, in which “validity” refers to a given measure’s value for building a scientifically rigorous and broadly generalizable body of knowledge. (para. 2)

McCormick and McLenney (2012) later responded to the validity critique, alleged neglect of intercultural effort, and challenges to multidimensional benchmarks of effective educational practice. Specifically, they stated that NSSE and CCSSE (Community College Survey of Student Engagement) results are and should be used to make relative comparisons between the groups of students; both NSSE and CCSSE do not consider campuses to be culturally neutral spaces, and their findings indicate that at-risk, underrepresented, and underserved student populations show higher levels of student engagement and positive benefits.

LaNasa, et al. (2009) study (in which the research study is modeled after) examined the NSSE instrument’s construct validity by submitting a single, first-time freshman cohort’s NSSE responses to a confirmatory factor analysis, and proposed an alternative, eight construct model of student engagement. They concluded that although the value of engagement is well documented, the underlying constructs and the items measuring it remain somewhat challenging, particularly for institutions that attempt to document impact on students’ development and learning. They proposed that “other researchers and institutions attempt to further refine and assess the extent to which student engagement as a construct is made up of five component parts” (LaNasa et al., 2009, p. 330).
Summary

The present literature review summarized relevant literature describing and defining adult students. Adult students often have been defined as nontraditional students because they have nontraditional characteristics such as working while enrolled, attending part time, living off campus, and having dependent care responsibilities. Recently, adult students have been more commonly defined as undergraduate students who are 25 years or older and enrolled in credited academic programs. Although this definition does not encompass all nontraditional characteristics, it does seek to identify students who have acquired a status of age, the status of maturity, and the status of responsibility. This definition helps simplify a complex and sometime confusing way to classify adult students. Adult students face a variety of barriers when entering college, most notably money, time, dependent care responsibilities, and location/transportation barriers. These obstacles can hinder the time and effort adult students put into their studies, which is an important element of engagement.

The literature review also covered the concept and assumptions of adult learning. One of the most popular and enduring models of adult learning is andragogy. Andragogy assumes that adults learn differently than children do and that programs for adult education will be different than those of a traditional model like pedagogy. Moreover, this literature review highlighted literature relating to student engagement and the NSSE benchmarks of effective education practice to improve engagement. Student engagement is based on in part student involvement along with the institutional policies and practices that induce students to partake in educationally purposeful activities. The NSSE instrument was developed to measure the effective practices and provide benchmarks for colleges and universities to assess and report student engagement performance results.
CHAPTER 3. METHODOLOGY

Overview

This chapter provides not only a description of the methodology, but also the rationale for the choice of methods and the particular forms in which the methods were employed (Creswell, 2009). This quantitative study was grounded in an objectivist epistemology using a postpositivist theoretical perspective. The methodology was survey research in which the methods of analysis included descriptive statistics to describe the members of the sample from which the data were collected and a comparative analysis to compare and test the significance of the relationship among different variables within the data. CFA was used to measure how well the NSSE five benchmark construct model fit the data.

Research Questions

The following research questions guided this study:

1. What are the demographic characteristics of the adult and nonadult students who responded to 2008 NSSE survey used in this research study?

2. Are there significant differences among the demographic variables, such as gender, race, enrollment status, transfer status, and STEM major along with time spent on work, curricular participation, classroom preparation, dependent care, commuting, and level of education of father and mother, between nonadult and adult students?

3. Are there significant differences in engagement using the five NSSE engagement benchmarks between adult and nonadult students?

4. Does the NSSE five benchmark model fit for adult students? If not, is there a factor structure model that better captures the student engagement of adult students?
**Epistemology and Theoretical Perspective**

This quantitative study was grounded in an objectivist epistemology using a postpositivist theoretical perspective. According to Creswell (2009), “quantitative research is a means for testing objective theories by examining the relationship among variables” (p. 4). Variables are measured utilizing instruments and data are analyzed using statistical procedures. “Those who engage in this form of inquiry have assumptions about testing theories deductively, building in protections against bias, controlling for alternative explanations, and being able to generalize and replicate findings” (Creswell, 2009, p. 4).

Objectivism is the epistemological view that reality exists as meaningful entities independent of a person’s consciousness and experience. Objectivism is the epistemology that is the foundation of positivism (Crotty, 1998). Objectivism confronts the meaning, whereas positivism addresses the understanding of reality. The philosophical stance of postpositivism is borne from the paradigm of positivism. According to Esterberg (2002), the goal of positivism is “to discover a set of causal laws that can be used to predict general patterns of human behavior” (p. 10). This is true of postpositivism also; however, the difference lies in the whether the knowledge is utterly and definitely objective. Postpositivism, according to Crotty (1998), “is a less arrogant form of positivism. It is one that talks of probability rather than certainty, claims a certain level of objectivity rather than absolute objectivity” (p. 29). Postpositivism is grounded in the belief that scientific knowledge is both accurate and certain. However, it acknowledges it is nearly impossible for the researcher to be completely independent of the object to be studied or observed. Particularly with survey methodology, the researcher determines questions, participants, modality, methods for data analysis, and determinations of significance.
Creswell (2009) explained that postpositivism reflects the need to identify and assess the probable causes that determine outcomes. Creswell also held that postpositivism is reductionistic in nature, as postpositivists’ intent is to reduce the ideas into a small, discrete set of ideas to test, “thus, developing numeric measures of observations and studying behavior of individuals become paramount for a postpositivist” (p. 7). The meanings that are discovered are valid, absolute, generalizable, and capable of being repeated, as the truth lies independent of the researcher (Creswell, 2009; Crotty, 1998).

According to Crotty (1998), the research methodology describes the strategy behind the choice of a particular method and the link between the choice and use of methods to the desired outcome. Creswell (2009) called these research methodologies strategies of inquiries. Strategies of inquiry represent “designs or models that provide specific direction for procedures in the research design” (Creswell, 2009, p. 11). The survey research quantitative strategy used in this study “provides a quantitative or numeric description of trends or options of a population by studying a sample of that population” (Creswell, 2009, p. 12).

The methodological approach was used to analyze secondary data provided from the NSSE in order to examine adult students and student engagement. According to the NSSE 2008 Overview (NSSE, 2008a), about 1.4 million first-year and senior students from 769 institutions in the United States and Canada were invited to participate in the 2008 NSSE administration. Of this survey population, 478,079 students responded, including 78,288 students from Canadian institutions.

**Research Design**

Survey methodology was utilized as the research design. According to Creswell (2009), “a survey design provides a quantitative or numeric description of trends, attitudes, or
opinions of a population by studying a sample of that population” (p. 145). Once data have been analyzed, then certain generalizations can occur. Generalizations are the extent to which the findings in one study can be applied to other situations (Merriam & Associates, 2002).

According to the NSSE parameters for data sharing between the Indiana University Center for Postsecondary Research and the researcher (see Appendix C), NSSE 2008 data were provided to the researcher in a Statistical Package for Social Sciences (SPSS) software file. All survey items and certain institutional characteristics were provided to the researcher. All student and institution identifying information was removed. According to the agreement, the data were encrypted when not in use by the researcher and will be destroyed once this dissertation is completed. For the duration of this research, data have been stored on a password-protected network server maintained by Iowa State University.

**Population and Sample**

The survey is administered to first-year and senior-level students who had attended the institution for at least two terms. Kuh, Hayek, et al. (2001) explained that the experiences of lower division and upper division students are different and the variations are captured by sampling students at two points in their academic career in order to provide a fair picture of an overall collegiate experience.

The NSSE is typically administered to 450–1,000 students based on total undergraduate enrollment to ensure adequate samples from participating institutions (Kuh, Hayek et al., 2001). According to NSSE (2008a), about 1.4 million first-year and senior students from 769 institutions in the United States and Canada were invited to participate in the 2008 NSSE administration. Of this survey population, 478,079 students responded,
including 78,288 students from Canadian institutions. Appendix D shows how NSSE 2008 institutional characteristics compare with the profile of all baccalaureate-granting colleges and universities in the United States. Comparative data for these tables are from the U.S. Department of Education’s Integrated Postsecondary Education Data System.

The total number of respondents for this research sample was 21,959 students. Of those respondents, 18,094 were identified as 24 years old or younger and 3,865 were 25 years old or older. All of the students were classified as seniors. Data were drawn from another larger survey that focused on STEM majors and transfer students. The data were formatted to meet the following requirements (see Appendix C): A 20% random sample of all senior students who fell into three categories (transfer students from community colleges, transfer students from a 4-year institution, and nontransfer students) and attending U.S. institutions. In addition, the sample contained 50% STEM students and 50% non-STEM students. STEM students were defined as those majoring in one of the biological sciences (majrscod = 12 to 19), engineering (majrscod = 34 to 41), physical sciences (majrscod = 42 to 49), agriculture (majrscod = 73), computer science (majrscod = 75), or kinesiology (majrscod = 78). Due to the format requirements of this sample, interpretation regarding transfer students, STEM and non-STEM student outcomes were limited due to the data formatting requirements of the larger study. Since this research study was focused on the construct validity of the NSSE instrument on adult students, it was determined that the data formatting requirements outlined above would not directly affect the NSSE benchmark outcomes.

Data Collection Methods

Data were collected via 2008 NSSE Survey. Kuh, Hayek, et al. (2001) reported that the survey is administered by an independent third-party survey organization. The
organization administering the NSSE is a joint venture between the Indiana University Center for Postsecondary Research and Planning and the Indiana University Center for Survey Research (with consultation from National Center for Higher Education Management Systems). It is considered an independent organization as it is not part of the existing accountability structure of colleges and universities that participate in the surveys. Because of this arrangement, it is in a position to report results to the public with high credibility and remain free from the direct control of outside stakeholders.

Participants were not paid nor offered incentives to complete the survey. The annual NSSE survey is supported by institutional participation fees. Institutions pay a fee ranging from $1,800 to $7,800 determined by undergraduate enrollment (NSSE, 2008c).

The NSSE is administered in both a Web and paper-based format. Participating institutions may choose whether to administer a paper-only survey (respondents are mailed a paper copy of the instrument and asked to return it by mail), a Web-only survey (respondents are contacted by e-mail and asked to fill out the survey online), or a Web option survey (respondents are mailed a paper copy of the survey and can either fill out the paper survey or the online survey in response). A total of 466 institutions (61%) opted for the Web-only administration mode, in which students received all contacts by e-mail and completed the survey online. The Web+ survey option was used by 235 institutions (31%), and the remaining 68 institutions (9%) chose the paper questionnaire mode (NSSE, 2008a).

**Instrumentation**

Data were collected via the NSSE 2008 College Student Report questionnaire. The questionnaire is a 15–20 minute self-report instrument specifically designed to measure the various good practices described in the literature review of this dissertation. Responding to
the questionnaire requires that students reflect on what they are putting into and getting out of their college experience. The 2008 questionnaire contains 101 questions that are used to examine good practices in undergraduate education, reflecting behaviors by students and institutions that are associated with desired outcomes of college (NSSE, 2008c). The NSSE survey instrument was established in accordance with the following principles (Kuh, Hayek, et al., 2001):

- The survey consists principally of items that are known to be related to important college outcomes. Outcomes are compiled from three broad categories of questions identifying student behavior, institutional action and requirements, and student reactions to college.
- The survey is administered to students at both public and private four-year colleges and universities. Two-year institutions are purposely excluded.
- The survey is administered to first-year and senior level students who have attended the institution for at least two terms.
- The survey is administered to adequate samples at participating institutions. To ensure meaningful credible results, random samples are substantial enough to produce consistent and meaningful results.
- The survey is flexible, allowing institutions to use alternative sets of questions if they so choose.
- The NSSE survey is administered by an independent third party in order to remain free from direct control of outside stakeholders.
“Guidance for the NSSE project is provided by a national advisory board composed of distinguished educators and by a technical advisory panel made up of experts in institutional research and assessment” (Kuh, Hayek, et al., 2001).

### Variables in the Study

#### Dependent Variables

The demographic dependent variables consisted of nominal, dichotomous, and ordinal variables. The nominal variable was ethnicity (ethnicit) and the dichotomous variables were gender (gender), enrollment status (enrollmt), transfer status (enter), and STEM status (STEM). The ordinal variables were time spent preparing for class (acadpr01), time spent working for pay on campus (workon01), time spent working for pay off campus (workof01), time spent on cocurricular activities (cocurr01), time spent providing care for dependents living with you (carede01), time spent commuting (commute). These ordinal variables had eight possible values ranging from 1 (0 hours) to 8 (more than 30 hours). Two additional ordinal variables were father’s highest level of education (fathredu) and mother’s highest level of education (mothredu), which had seven possible values ranging from 1 (did not finish) to 7 (completed a doctoral degree).

In order to identify STEM status the variable “majrprim” was used in order to recode STEM majors into a dichotomous variable with a value of 0 (not a STEM major) or 1 (STEM major). This variable was named “STEM.” The demographic frequencies were descriptive statistics used to provide the characteristics of the sample. The descriptive statistics found in Chapter 4 provide the demographic characteristics of gender, ethnicity, transfer status, and STEM degree-seeking status of the adult and nonadult groups.
According to the *The College Student Report 2008 Codebook* (hereafter referred to as the NSSE 2008 codebook; NSSE, 2008b, p. 18; see Appendix E), NSSE created five institution-level indicators of effective educational practice: (a) level of academic challenge, (b) active and collaborative learning, (c) student faculty interaction, (d) enriching educational experiences, and (e) supportive campus environment. The five constructs were used as dependent variables. See Table 3.1 and Table 3.2 for a descriptive summary of the NSSE benchmarks and construct questions.
Table 3.1

NSSE’s Five Benchmarks and Component Constructs

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Description</th>
<th>Component items</th>
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<tbody>
<tr>
<td>AC</td>
<td><strong>Level of academic challenge:</strong> Index that measures time spent preparing for class, amount of reading and writing, deep learning, and institutional expectations for academic performance.</td>
<td>readasgn&lt;br&gt;writemor&lt;br&gt;writemid&lt;br&gt;writesml&lt;br&gt;analyze&lt;br&gt;synthesz&lt;br&gt;evaluate&lt;br&gt;applying&lt;br&gt;workhard&lt;br&gt;acadpr01&lt;br&gt;envschol</td>
</tr>
<tr>
<td>ACL</td>
<td><strong>Active and collaborative learning:</strong> Index that measures extent of class participation, working collaboratively with other students inside and outside of class, tutoring and involvement with a community-based project.</td>
<td>clquest&lt;br&gt;clpresen&lt;br&gt;classgrp&lt;br&gt;occgrp&lt;br&gt;tutor&lt;br&gt;commproj&lt;br&gt;occideas</td>
</tr>
<tr>
<td>SFI</td>
<td><strong>Student–faculty interaction:</strong> Index that measures extent of talking with faculty members and advisors, discussing ideas from classes with faculty members outside of class, getting prompt feedback on academic performance, and working with faculty on research projects.</td>
<td>facgrade&lt;br&gt;facideas&lt;br&gt;facplans&lt;br&gt;facfeed&lt;br&gt;facother&lt;br&gt;resrch04</td>
</tr>
<tr>
<td>EEE</td>
<td><strong>Enriching educational experiences:</strong> Index that measures extent of interaction with students of different racial or ethnic backgrounds or with different political opinions or values, using electronic technology, and participating in activities such as internships, community service, study abroad, cocurricular activities, and culminating senior experience.</td>
<td>diffstu2&lt;br&gt;divrstud&lt;br&gt;envdivirs&lt;br&gt;cocurr01&lt;br&gt;itacadem&lt;br&gt;intern04&lt;br&gt;volintr04&lt;br&gt;lmcom04&lt;br&gt;firling04&lt;br&gt;stdabr04&lt;br&gt;indstd04&lt;br&gt;snrx04</td>
</tr>
<tr>
<td>SCE</td>
<td><strong>Supportive campus environment:</strong> Index that measures extent to which students perceive the campus helps them succeed academically and socially, assists them in coping with nonacademic responsibilities, and promotes supportive relations among students and their peers, faculty members, and administrative personnel and offices</td>
<td>envsocal&lt;br&gt;envsuprt&lt;br&gt;envnacad&lt;br&gt;envstu&lt;br&gt;envfac&lt;br&gt;envadm</td>
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Table 3.2

**NSSE Benchmark Components and Corresponding Questions**

<table>
<thead>
<tr>
<th>Component Items</th>
<th>Component Description</th>
<th>Q#</th>
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<tr>
<td>readasgn</td>
<td>Number of assigned textbooks, books, or book-length packs of course readings</td>
<td>3a</td>
</tr>
<tr>
<td>writemor</td>
<td>Number of written papers or reports of 20 pages or more</td>
<td>3c</td>
</tr>
<tr>
<td>writemid</td>
<td>Number of written papers or reports between 5 and 19 pages</td>
<td>3d</td>
</tr>
<tr>
<td>writesml</td>
<td>Number of written papers or reports of fewer than 5 pages</td>
<td>3e</td>
</tr>
<tr>
<td>analyze</td>
<td>Analyzing the basic elements of an idea, experience, or theory, such as examining a</td>
<td>2b</td>
</tr>
<tr>
<td></td>
<td>particular case or situation in depth and considering its components</td>
<td></td>
</tr>
<tr>
<td>synthesz</td>
<td>Synthesizing and organizing ideas, information, or experiences into new, more complex</td>
<td>2c</td>
</tr>
<tr>
<td></td>
<td>interpretations and relationships</td>
<td></td>
</tr>
<tr>
<td>evaluate</td>
<td>Making judgments about the value of information, arguments, or methods.</td>
<td>2d</td>
</tr>
<tr>
<td>applying</td>
<td>Applying theories or concepts to practical problems or in new situations</td>
<td>2e</td>
</tr>
<tr>
<td>workhard</td>
<td>Worked harder than you thought you could to meet an instructor’s standards or</td>
<td>1r</td>
</tr>
<tr>
<td></td>
<td>expectations</td>
<td></td>
</tr>
<tr>
<td>acadpr01</td>
<td>Preparing for class (studying, reading, writing, doing homework or lab work, analyzing</td>
<td>9a</td>
</tr>
<tr>
<td></td>
<td>data, rehearsing, and other academic activities</td>
<td></td>
</tr>
<tr>
<td>envschol</td>
<td>Spending significant amounts of time studying and on academic work</td>
<td>10a</td>
</tr>
<tr>
<td>clquest</td>
<td>Asked questions in class or contributed to class discussions</td>
<td>1a</td>
</tr>
<tr>
<td>clpresen</td>
<td>Made a class presentation</td>
<td>1b</td>
</tr>
<tr>
<td>classgrp</td>
<td>Worked with other students on projects during class</td>
<td>1g</td>
</tr>
<tr>
<td>occgrp</td>
<td>Worked with classmates outside of class to prepare class assignments</td>
<td>1h</td>
</tr>
<tr>
<td>tutor</td>
<td>Tutor ed or taught other students (paid or voluntary)</td>
<td>1j</td>
</tr>
<tr>
<td>commproj</td>
<td>Participated in a community-based project (e.g., service learning) as part of a</td>
<td>1k</td>
</tr>
<tr>
<td></td>
<td>regular course</td>
<td></td>
</tr>
<tr>
<td>oocideas</td>
<td>Discussed ideas from your readings or classes with others outside of class (students,</td>
<td>1t</td>
</tr>
<tr>
<td></td>
<td>family members, coworkers, etc.)</td>
<td></td>
</tr>
<tr>
<td>facgrade</td>
<td>Discussed grades or assignments with an instructor</td>
<td>1n</td>
</tr>
<tr>
<td>facideas</td>
<td>Discussed ideas from your readings or classes with faculty members outside of class</td>
<td>1p</td>
</tr>
<tr>
<td>facplans</td>
<td>Talked about career plans with a faculty member or advisor</td>
<td>1p</td>
</tr>
<tr>
<td>facefeed</td>
<td>Received prompt written or oral feedback from faculty on your academic performance</td>
<td>1q</td>
</tr>
<tr>
<td>facother</td>
<td>Worked with faculty members on activities other than coursework (committees, orientation,</td>
<td>1s</td>
</tr>
<tr>
<td></td>
<td>student life activities, etc.)</td>
<td></td>
</tr>
<tr>
<td>resrch04</td>
<td>Work on a research project with a faculty member outside of course or program</td>
<td>7d</td>
</tr>
<tr>
<td>diffstu2</td>
<td>Had serious conversations with students who are very different from you in terms of</td>
<td>1v</td>
</tr>
<tr>
<td></td>
<td>their religious beliefs, political opinions, or personal values</td>
<td></td>
</tr>
<tr>
<td>divrstud</td>
<td>Had serious conversations with students of a different race or ethnicity than your</td>
<td>1u</td>
</tr>
<tr>
<td>envdivirs</td>
<td>Encouraging contact among students from different economic, social, and racial or</td>
<td>10c</td>
</tr>
<tr>
<td></td>
<td>ethnic backgrounds</td>
<td></td>
</tr>
<tr>
<td>cocurr01</td>
<td>Participating in cocurricular activities</td>
<td>9d</td>
</tr>
<tr>
<td>itacadem</td>
<td>Used an electronic medium (listserv, chat group, Internet, instant messaging, etc.)</td>
<td>1l</td>
</tr>
<tr>
<td></td>
<td>to discuss or complete an assignment</td>
<td></td>
</tr>
<tr>
<td>intern04</td>
<td>Practicum, internship, field experience, co-op experience, or clinical assignment</td>
<td>7a</td>
</tr>
<tr>
<td>volntr04</td>
<td>Community service or volunteer work</td>
<td>7b</td>
</tr>
<tr>
<td>lrncom04</td>
<td>Participate in a learning community or some other formal program where groups of</td>
<td>7c</td>
</tr>
<tr>
<td></td>
<td>students take two or more classes together</td>
<td></td>
</tr>
<tr>
<td>forlng04</td>
<td>Foreign language coursework</td>
<td>7e</td>
</tr>
<tr>
<td>stdabr04</td>
<td>Study abroad</td>
<td>7f</td>
</tr>
<tr>
<td>indstd04</td>
<td>Independent study or self-designed major</td>
<td>7g</td>
</tr>
<tr>
<td>snrx04</td>
<td>Culminating senior experience (capstone course, senior project or thesis, comprehensive</td>
<td>7h</td>
</tr>
<tr>
<td>envsocale</td>
<td>Providing the support you need to thrive socially</td>
<td>10e</td>
</tr>
<tr>
<td>envsuprt</td>
<td>Providing the support you need to help you succeed academically</td>
<td>10b</td>
</tr>
<tr>
<td>envnacad</td>
<td>Helping you cope with your nonacademic responsibilities (work, family, etc.)</td>
<td>10d</td>
</tr>
<tr>
<td>envsstu</td>
<td>Relationships with other students</td>
<td>8a</td>
</tr>
<tr>
<td>envfac</td>
<td>Relationships with faculty members</td>
<td>8b</td>
</tr>
<tr>
<td>envadm</td>
<td>Relationships with administrative personnel and offices</td>
<td>8c</td>
</tr>
</tbody>
</table>
Independent Variables

Independent variables are the variables believed to cause a change in the dependent variable; for this research problem, there was one independent variable. The independent variable, identified in the NSSE 2008 codebook as *agebase*, is a recoded variable taken from question #15 of the 2008 NSSE survey (birthyr) which states to “select (or write) in your year of birth.” The agebase variable is a numerical value that identifies the age of the participant in years at the time the survey was taken. The agebase variable was recoded as a dichotomous variable named *recoded age*, with the responses coded as 0 (24 years and younger) or 1 (25 years and older). This variable was used in accordance with the literature review to discern between adult students (ages 25 years and older) and nonadult students (24 years and younger).

Data Analysis

Data were analyzed using International Business Machine’s (IBM’s) SPSS Statistics 19 and SPSS AMOS 21 software. Survey results were provided to the researcher in the SPSS format. IBM SPSS Statistics offers the full scope of statistical and analytical capabilities; “it addresses the entire analytical process from planning and data preparation to analysis, reporting and deployment; provides tailored functionality and custom interfaces for different skill levels and functional responsibilities of business users, analysts and statisticians” (IBM, n.d.a, para. 2). Descriptive statistics, bivariate statistics, prediction for numerical outcomes, and prediction for identifying groups are among statistics included in the software. SPSS Amos enables a researcher to specify, estimate, assess, and present a model in an intuitive interface to show hypothesized relationships among variables.
Alternatively, SPSS Amos offers a nongraphical method to specify models (IBM, n.d.b, para 1).

**Method of Analysis**

Descriptive statistics were used to answer research question #1: What are the demographic characteristics of the adult and nonadult students who responded to 2008 NSSE survey used in this research study? Descriptive statistics and frequency tables were used to describe or summarize the data collected (Mertler & Vannatta, 2010). Tabachnick and Fidell (2007) defined descriptive statistics as describing samples in terms of variables or combination of variables for both describing and making inferences about a data set. “We describe the data; find reliable differences or relationships, and estimate population values for the reliable findings” (Tabachnick & Fidell, 2007, p. 8). Frequency distributions count the occurrences of values within a particular group or interval and the table summarizes the distribution of values in the sample.

Cross-tabulation, chi-square tests, and independent *t* tests were used to test significant differences for research question #2: Are there significant differences among the demographic variables, such as gender, race, enrollment status, transfer status, and STEM major along with time spent on work, curricular participation, classroom preparation, dependent care, commuting and level of education of father and mother, between nonadult and adult students?

According to SPSS version 19.0, a cross-tabulation procedure forms two-way and multi-way tables and provides a variety of tests and measures of association for two-way tables; measures of association are computed for two-way tables only. These pivot tables
help one understand whether the value of one variable is associated with or contingent upon that of another.

The chi-square test of independence is used to examine a potential relationship between two discrete variables (Tabachnick & Fidell, 2007). According to Urdan (2010), the chi-square test is appropriate for use when data are from two categorical or nominally scaled variables. “When you have two categorical variables, you may want to know whether the division of cases in one variable is independent of the other categorical variable” (p. 161). For this question, it was important to understand whether representation of gender (male or female), race (White or non-White), enrollment status (part time or full time), transfer status (yes or no), major (STEM or non-STEM) was about what one would expect independent of adult status (age 25 years or older). The following equation represents the chi-square test:

$$
\chi^2 = \sum \frac{(fo - fe)^2}{fe}
$$

where $fo$ is a set of observed frequencies and $fe$ is a set of expected frequencies.

If the fit to the observed frequencies is good (so that $\chi^2$ is small), then one concludes that the two variables are independent; a poor fit leads to a large $\chi^2$, rejection of the null hypothesis, and the conclusion that the two variables are related. (Tabachnick & Fidell, 2007, p. 59)

The most basic statistical test that measures group differences is the independent $t$ test, which analyzes significant differences between two group means. A $t$ test is appropriate when the independent variable is defined as having two categories and the dependent variable is quantitative (Tabachnick & Fidell, 2007). According to Chen et al. (2009), the following equation can be used to calculate a $t$ score:
where \( M_1 \) is the mean score for the selected institution, \( M_2 \) is the mean score for the comparison group, and \( SEM \) is the standard error of the mean. However, when the two samples are not roughly equal in size (for this research sample adults and nonadults were not equal), then an adjustment to the above formula must be made in order to take into account the differences in sample sizes. A nonparametric test must be used because the above formula essentially blends the standard errors of each sample together, gives each sample equal weight, and treats the two samples as one, new larger sample (Urdan, 2010).

According to Urdan (2010), “if the variances of the sample sizes are grossly unequal, the samples sizes very different, and/or the data are not normally distributed, a nonparametric alternative to the \( t \) test—the Mann-Whitney U test—should be considered” (p. 96). Other authors concurred that the Mann-Whitney U-test is a “nonparametric statistic used when the \( t \) test assumptions are markedly violated (Morgan, Leech, Gloeckner, & Barrett, 2007, p. 147). The Mann-Whitney U test he test involves the calculation of a statistic called \( U \). For the two groups, data are ranked and the means of the ranks are then computed. Since it compares the sums of ranks, the statistic is a non-parametric number used for assessing whether one of two samples of independent observations tends to have larger values than the other (Kline, 2011). A high means rank indicates the group scored higher than the lower means rank (Morgan, et al, 2007). The following formula is used to determine the U statistic:

\[
U = n_1 n_2 + \frac{n_1 (n_1 + 1)}{2} - \sum_{i=1}^{n_2} R_i
\]

The type of variable (whether it is nominal, ordinal, dichotomous, or scale) influences
the type of analysis that is performed. For this research study, several different types of variables were used in answering question #2. The nominal variable was ethnicity (ethnicit), and the dichotomous variables were gender (gender), enrollment status (enrollmt), transfer status (enter), and STEM status (STEM). The ordinal variables were time spent preparing for class (acadpr01), time spent working for pay on campus (workon01), time spent working for pay off campus (workof01), time spent on cocurricular activities (cocurr01), time spent providing care for dependents living with you (carede01), time spent commuting (commute). These ordinal values were answered on a scale ranging from 1 (0 hours) to 8 (more than 30 hours). Two additional ordinal variables were father’s highest level of education (fathredu) and mother’s highest level of education (mothredu), which were answered on a scale ranging from 1 (did not finish) to 7 (completed a doctoral degree). A descriptive analysis was performed on the ordinal variables to see if the variables were approximately normally distributed. The outcomes for the ordinal variables are shown in Table 3.3.

Table 3.3

Descriptive Statistics of the Ordinal Variables

<table>
<thead>
<tr>
<th>Ordinal values</th>
<th>N</th>
<th>M</th>
<th>SD</th>
<th>Skewness Statistic</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>acadpr01</td>
<td>21914</td>
<td>4.33</td>
<td>1.757</td>
<td>0.538</td>
<td>0.017</td>
</tr>
<tr>
<td>workon01</td>
<td>21899</td>
<td>1.96</td>
<td>1.561</td>
<td>1.696</td>
<td>0.017</td>
</tr>
<tr>
<td>workof01</td>
<td>21880</td>
<td>3.10</td>
<td>2.555</td>
<td>0.785</td>
<td>0.017</td>
</tr>
<tr>
<td>cocurr01</td>
<td>21917</td>
<td>2.34</td>
<td>1.613</td>
<td>1.617</td>
<td>0.017</td>
</tr>
<tr>
<td>carede01</td>
<td>21868</td>
<td>1.90</td>
<td>1.908</td>
<td>2.346</td>
<td>0.017</td>
</tr>
<tr>
<td>commute</td>
<td>21937</td>
<td>2.24</td>
<td>0.958</td>
<td>2.564</td>
<td>0.017</td>
</tr>
<tr>
<td>fathredu</td>
<td>21858</td>
<td>4.01</td>
<td>1.798</td>
<td>-0.056</td>
<td>0.017</td>
</tr>
<tr>
<td>mothredu</td>
<td>21927</td>
<td>3.90</td>
<td>1.629</td>
<td>-0.100</td>
<td>0.017</td>
</tr>
</tbody>
</table>
According to Morgan et al. (2007), when checking for normality a simple guideline is “if the skewness is less than plus or minus one (±1.0), the variable is at least approximately normal” (p. 59). From the output shown in Table 3.3, there are four variables that have skewness variables between –1 and 1: acadpr01, workof01, fathredu and mothredu. Thus one could assume they are more like scale variables, and according to Morgan et al., inferential statistics that have assumptions of normality could be used.

According to Morgan et al. (2007), when investigating the difference between two independent groups (for this study that would be nonadult and adult students), it is appropriate to choose an independent samples t test if the following assumptions are not violated:

1. The variances of the dependent variable in the population are equal.
2. The dependent variable is normally distributed within each population.
3. The data are independent.

SPSS automatically tests assumption #1 with the Levene test for equal variances. Assumption #2 was tested using a descriptive analysis performed on the ordinal variables to see if they were approximately normally distributed (the outcome is shown in Table 3.4). There were four variables that had skewness variables between –1 and 1: acadpr01, workof01, fathredu and mothredu. Thus I assumed they are more like scale variables and performed an independent samples t test to investigate the differences between the two unrelated groups. Table 3.4 shows the results of the Levene test for equality of variances.
Table 3.4

*Levene’s Test for Equality of Variances of Ordinal Values*

<table>
<thead>
<tr>
<th>Variable</th>
<th>F</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>acadpr01</td>
<td>Equal variances assumed</td>
<td>10.937</td>
</tr>
<tr>
<td>workof01</td>
<td>Equal variances assumed</td>
<td>1432.571</td>
</tr>
<tr>
<td>fathredu</td>
<td>Equal variances assumed</td>
<td>6.418</td>
</tr>
<tr>
<td>mothredu</td>
<td>Equal variances assumed</td>
<td>10.325</td>
</tr>
</tbody>
</table>

The results from the $t$ test revealed that the Levene’s test of the assumption of equal variance was statistically significant ($p < .05$). This indicates that the variances were significantly different and “the assumptions of equal variance [were] violated” (Morgan et al., 2007, p. 146). Morgan et al. (2007) suggested that if the $t$ test assumptions are markedly violated it may be appropriate to run a nonparametric statistic using the Mann-Whitney U test if the following assumptions are met:

1. It is assumed there is an underlying continuity from low to high in the dependent variable, before ranking, even if the actual data are discrete numbers.

2. The data are independent.

According to the NSSE 2008 codebook, the data for each of the following ordinal variables acadpr01, workon01, workof01, cocurr01, carede01, commute, were answered on a Likert-type scale indicating continuity from low to high with the response of 1 representing 0 hours and 8 representing more than 30 hours. The data for each of the following ordinal variables fathredu and mothredu also were answered on a Likert-type scale indicating continuity from low to high with the response of 1 representing did not finish high school and 7 representing completed a doctorate degree. All variables were ordered such that the magnitude between levels was not equal. Because the dependent variables were ordinal and the variances were
unequal, Mann-Whitney U tests were performed to compare nonadult students and adult students.

Phi was calculated for the effect size. Effect size represents the magnitude of the difference between the mean scores of two groups. The effect size is the strength of the relationship of the difference and, thus, is relevant to the issue of practical significance (Morgan et al., 2007). The effect size is a more robust indicator of group differences than is a statistical significance test in that it represents the magnitude of the difference between the groups. According to Cohen (1988), the effect size is low if the value of $r$ varies around 0.14, medium if $r$ varies around 0.36, large if $r$ varies more than 0.5, and much larger than typical if $r$ varies more than 0.7.

For research question #3 (Are there significant differences in engagement using the five NSSE engagement benchmarks between adult and nonadult students?), the criteria from research question #2 were used in determining significant differences between independent groups. According to Morgan et al. (2007), when investigating the difference between two independent groups (for this study it was nonadult and adult students), it is appropriate to choose an independent samples $t$ test if the following assumptions are not violated.

1. The variances of the dependent variable in the population are equal.
2. The dependent variable is normally distributed within each population.
3. The data are independent.

SPSS automatically tests assumption #1 with the Levene test for equal variances. The results of the Levene test for equality of variances are shown in Table 3.5.
Table 3.5

*Levene’s Test for Equality of Variances of NSSE Five Benchmarks*

<table>
<thead>
<tr>
<th>Variable</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic challenge</td>
<td>23.854</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Active and collaborative learning</td>
<td>35.627</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Student–faculty interaction</td>
<td>40.890</td>
<td>&lt; .001</td>
</tr>
<tr>
<td>Enriching educational experiences</td>
<td>10.854</td>
<td>.001</td>
</tr>
<tr>
<td>Supportive campus environment</td>
<td>51.698</td>
<td>&lt; .001</td>
</tr>
</tbody>
</table>

The results from the $t$ test revealed that the Levene test of the assumption of equal variance is statistically significant ($p < .05$) for each of the five benchmarks. This indicates that the variances were significantly different and “the assumptions of equal variance [were] violated” (Morgan et al., 2007, p. 146).

According to the NSSE 2008 codebook, the data for each of the following scaled variables, AC, ACL, SFI, EEE, and SCE, are ordered variables placed on a 100-point scale. Also according to NSSE 2008 codebook,

the precursors to these five institution-level benchmarks are the student’s average responses to items within the group, after all items have been placed on a 100-point scale. The benchmark score for an institution is the *weighted mean* of these student-level scores. (p. 18)

Because the dependent variables were scaled and the variances were unequal, Mann-Whitney U tests were performed to compare nonadult students and adult students.

The LaNasa et al. (2009) study was used as a methodological reference for the first part of research question #4: Does the NSSE five benchmark model fit for adult students? The primary instrument for determining the model fit was a confirmatory factors model,
which was performed to examine the construct validity of the five factor structure. Using Kuh’s benchmarks (NSSE, 2008b), the model hypothesized five separate factors, those being: (a) level of academic challenge, (b) student–faculty interaction, (c) active and collaborative learning, (d) enriching educational experiences, and (e) supportive campus environment. The formulators of the NSSE have argued that the results from the five benchmarks “produce a set of national benchmarks of good educational practice that participating schools are using to estimate the efficacy of their improvement efforts” (Kuh, 2003, p. 2).

In order to better understand the construct validity of the five benchmarks, a Cronbach’s alpha reliability test was used to determine the reliability of each of the five constructs. Reliability is important when variables developed from summated scales are used as predictor components in objective models like the NSSE five benchmarks. Because summated scales are an assembly of interrelated items designed to measure underlying constructs, it is very important to know whether the same set of items would elicit the same responses if the same questions are recast and readministered to the same respondents (Cronbach & Shavelson, 2004). Variables derived from test instruments are declared to be reliable only when they provide stable and reliable responses over a repeated administration of the test. “The alpha formula is one of several analyses that may be used to gauge the reliability (i.e., accuracy) of psychological and educational measurements” (Cronbach & Shavelson, 2004, p. 392). According to Kline (2011), Cronbach’s alpha reliability coefficients around .90 are excellent, .80 are very good, .70 are adequate, .60 are questionable, and around .50 and lower are considered unacceptable. Kline went on to state that “somewhat lower levels of score reliability can be tolerated if sample size is sufficiently
large” (p. 70). For this research question, the adult-only student sample was compared to the entire (nonadult and adult) sample.

Confirmatory factor analysis is an advanced analysis often used to test a theory about latent processes that might occur among variables. The main purpose of a CFA is to confirm or disconfirm a general theory (Mertler & Vannatta, 2010). “Simply put, items that measure the same construct should correlate strongly among themselves—convergent validity—while displaying low correlations with those items indexing different constructs—discriminate validity” (LaNasa et al., 2009, p. 318).

The primary instrument used to determine the model fit was CFA. CFA is a sophisticated technique in which variables are carefully and specifically chosen to reveal underlying processes and are often performed through structural equation modeling. “Structural equation modeling . . . is a collection of statistical techniques that allow a set of relationships between one or more independent variables and one or more dependent variables to be examined” (Tabachnick & Fidell, 2007, p. 676). For this research, the testing approach followed the approach of LaNasa et al. (2009) in which the construct was assessed for the extent to which the NSSE benchmarks are interdependent and examined whether the items loaded significantly in the construct the benchmarks reported to measure. For this study, the students who identified their age as being 25 years or older were used to interpret whether the NSSE’s five benchmark model fit adult students. The agebase variable was recoded into a dichotomous variable named recoded age with the responses coded as 0 (24 years and younger) or 1 (25 years and older). This variable was used in accordance with the literature review to discern between adult students (ages 25 years and older) and nonadults students (24 years and younger).
To assess whether the NSSE five benchmark model fit, CFA was performed. IBM SPSS Amos 21 was used to test the CFA model. Only adult students were used in measuring the model fit, and only participants who responded to all the 42 survey variables were included in the CFA portion of this study. According to the AMOS user guide, “one standard method for dealing with incomplete data is to eliminate from the analysis any observation for which some data value is missing” (Arbuckle, 2012, p. 269). Tabachnick and Fidell (2007) concurred that one procedure for handling missing values is simply to eliminate them: “If only a few cases have missing data and they seem to be a random subsample of the whole sample, deletion is a good alternative” (p. 63). In this study, the process was to delete respondents who did not answer all the questions from the study and proceed with a conventional analysis using a reduced sample size. It was determined that the sample size of 3,425 respondents was adequate to complete the CFA.

The extent to which the benchmarks were determined to be a good model fit was assessed by model fit indexes such as the chi-square test, GFI (goodness-of-fit index), CFI (Bentler’s comparative-fit index), RMSEA (root mean square error of approximation), and SRMR (standardized root mean square residual). Other evidence for model fit includes the correlation among the constructs, the presence of cross loadings of the items in relation to the construct as well as the substantive amounts of error in the variance of the items (LaNasa et al., 2009). According to Hu and Bentler (1999), the application of the structural equation modeling technique thus starts with the specification of a model to be estimated. The assessment of goodness of fit and the estimation of parameters of the hypothesized model are the primary goals. The two most popular ways of evaluating model fit are those that involve the chi-square goodness-of-fit statistics and fit indexes. The chi-square goodness-of-fit
statistic assesses the magnitude of discrepancy between the sample and fitted covariance matrices. However the chi-square statistic may not be a very good fit index as it is affected by larger sample sizes which produce larger chi-squares that are more likely to be significant (Type I error). Another way to assess goodness of fit is to use a fit index. A fit index can be used to quantify the degree of fit along a continuum. Fit indices can be either absolute or incremental fit indexes (Hu & Bentler, 1999). Kline (2011) advocated the use of the chi-square test, the RMSEA, the CFI, and the SRMR. This study used an absolute-fit index (the RMSEA) and an incremental-fit index CFI. It also included the SRMR value and the chi-square test for model fit evaluation. Cutoff values of each are discussed below.

A number of scholars have provided insight for interpreting the goodness-of-fit indicators. Tabachnick and Fidell (2007) stated that when looking at the overall fit of the model using the chi-square test, the test statistic should reveal a low chi-square relative to the degrees of freedom. Ideally, a nonsignificant ($p > .005$) chi square is desired. If the chi-square is significant, it should be less than two times the model degrees of freedom. However, this study had a large sample size of 3,425 respondents, which can cause chi-square values to become problematic, as chi-square tests are sensitive to large sample sizes. Kline (2011) stated that “it is possible that the chi-square test is failed even though the differences between the observed and predicted covariances are slight” (p. 201). For this study, chi-square is reported and compared, however model indices will provide further analysis about model fit.

The RMSEA is scaled as a badness-of-fit index in which a value of zero indicates the best fit (Kline, 2011). Hu and Bentler’s (1999) study provided guidance in interpreting RMSEA, suggesting a value of less than .06. Hair, Black, Babin, Anderson, and Tatham
(2006) suggested a less stringent value of .07. For this research study, the lower limit values of the RMSEA in a well-fitting model are close to 0 whereas the upper limit should be less than .07.

It’s important to note that for this study a CFI value greater than .92 is considered a good fit. For this indicator, a little background is necessary. Bentler and Bonett (1980) noted when discussing GFI (and subsequent CFI) values that “values less than .90 usually mean that the model can be improved substantially (p. 600). From this landmark study, rules of thumb of .90 and above were the norm for a good model fit. In fact, many quantitative research papers have identified GFIs greater than .90; Lance, Butts and Michels (2006) identified 72 citations of the .90 threshold in their study alone. However, in two studies investigating the effects of sample size, Hu and Bentler (1998, 1999) seemed to increase the model fit expectation to a value close to .95. Marsh, Hau and Wen (2004) cautioned against using the more stringent cutoff criteria that generalizes across different samples sizes and different situations. In evaluating goodness-of-fit models, an important study by D. W. King et al. (2000) interpreted the Hu and Bentler (1998, 1999) research with the .95 threshold as being preferred but didn’t necessarily discount models at less than .95, stating that “convention has dictated that values of such indices exceeding .90 reflect reasonable model–data fit and more recent thinking of Hu & Bentler (1998) has mandated values above .95 as preferred” (p. 628). Other authors seem to have agreed; according to Hair et al. (2006) in their textbook *Multivariate Data Analysis* (6th edition), “simpler models and smaller samples should be subject to more strict evaluation than are more complex models with larger samples. Likewise, more complex models with smaller samples may require somewhat less strict criteria for evaluation with multiple fit indices” (p. 753). They went on to state that
CFI or TLI values above .92 are appropriate for when the number of observed variables is greater than 12 but less than 30 with a sample size greater than 250 observations. Hair et al. (2006) provided further clarification:

For example, based on a sample of 100 respondents and a four construct model with only 12 total indicator variables, evidence of a good fit would include an insignificant $\chi^2$ value, a CFI of at least .97 and a RMSEA of .08 or lower. It is extremely unrealistic, however, to apply the same criteria to an eight construct model with 50 indicator variables tested with a sample of 2000 respondents. (p. 753)

Because the sample size of this research study was 3,425 respondents and the proposed model was an eight construct model using 27 indicator variables, I looked for values for both the GFI and the CFI to be above .92, as referenced in Hair et al. (2006).

The RMR and the SRMR are the square root of the difference between the residuals of the sample covariance matrix and the hypothesized covariance model (Kline, 2011). The range of the RMR is calculated based upon the scales of each indicator; therefore, if a questionnaire contains items with varying levels (some items may have a scale ranging from 1–5, whereas others may have a scale ranging 1–7), the RMR becomes difficult to interpret (Kline, 2011). The standardized RMR (SRMR) resolves this problem and is therefore much more meaningful to interpret. Values for the SRMR range from 0 to 1.0 with well-fitting models obtaining values of less than .05; however, values as high as .08 are deemed acceptable (Hair et al., 2006; Hu & Bentler, 1999). An SRMR of 0 indicates perfect fit, but it must be noted that the SRMR will be lower when there is a high number of parameters in the model and in models based on large sample sizes.
For the second part of research question #4—Is there a factor structure model that better captures the student engagement of adult students—recommendation of a new factor model that better captures the student engagement of adult students required developing new constructs using the initial 42 dependent variables. This strategy was consistent with the exploratory factor analyses (EFA) literature and with Pike’s (2006) recommendation to identify scales that are meaningful to a particular institution.

The EFA of the 42 variables was performed to determine which variables were highly correlated. The correlated variables were combined into a construct, assessed for reliability, and then assessed through CFA to determine goodness of fit of the new model. According to Tabachnick and Fidell (2007), the goal of a factor analysis is “to reduce a large number of variables to a smaller number of factors, to concisely describe (and perhaps understand) the relationships among observed variables” (p. 610). Urdan (2010) described EFA as “a method of analyzing a set of observed variables to determine which variables are most strongly associated with each other and perhaps indicative of an underlying latent construct” (p. 181). For this research study, EFA was performed on the 42 items using principle components extraction with a Varimax rotation that yielded a starting point for the new proposed model.

The new proposed model was subjected to the Cronbach alpha test to determine construct validity. CFA was then run to determine the model fit using the proposed constructs. The extent to which the new constructs were determined to be a good model fit was assessed by model fit indexes such as the chi-square statistic, GFI, CFI, RMSEA, and SRMR, which were the same used to assess the NSSE five benchmark model.
In order to test the validity and the reliability of the proposed eight construct model with smaller sample sizes, SPSS was used to select smaller random samples based on the larger adult sample. Three random sample models of 50% of the original adult sample were created. Each of the three sample data sets were then assessed using the goodness-of-fit indicators discussed previously.

**Reliability and Validity of the Instrument**

The NSSE relies on students who self-report their responses. Both the accuracy and validity of self-reports can be affected by the respondents. The accuracy can be affected by two general problems. The first is the inability of respondents to provide accurate information in response to a question (Kuh, Hayek, et al., 2001; Wentland & Smith, 1993). The second problem is an unwillingness on the part of the respondent to provide accurate information (Aaker, Kumar, & Day, 1998; Kuh, Hayek, et al., 2001). The validity can be affected by memory (Converse & Presser, 1989; Kuh, Hayek, et al., 2001) and by “the halo effect,” in which students inflate certain aspects of their behavior or performance (Kuh, Hayek, et al., 2001).

Self-reporting surveys are a common practice, and NSSE has acknowledged the accuracy and validly challenges. NSSE has stated that it follows guidelines designed to encourage accurate and valid results. According to the NSSE *Technical and Norms Report* (Kuh, Hayek, et al., 2001):

With this in mind, self-reports are likely to be valid under five general conditions (Bradburn & Sudman, 1988; Brandt, 1958; Converse & Presser, 1989; DeNisi & Shaw, 1977; Hansford & Hattie, 1982; Laing, Swayer, & Noble, 1989; Lowman & Williams, 1987; Pace, 1985; Pike, 1995). They are: (1) the information requested is
known to the respondents; (2) the questions are phrased clearly and unambiguously; (3) the questions refer to recent activities; (4) the respondents think the questions merit a serious and thoughtful response; and (5) answering the questions does not threaten, embarrass, or violate the privacy of the respondent or encourage the respondent to respond in socially desirable ways. (p. 9)

Kuh, Hayek, et al. (2001) further stated that “a good deal of evidence shows that students are accurate, credible reporters of their activities and how much they have benefited from their college experience, provided that items are clearly worded and psychometrically reliable” (p. 10).

**Ethical Issues**

Quantitative research should be conducted in compliance with institutional review board policies (Creswell, 2009). An application to conduct research involving human participants was approved by the Iowa State University Institutional Review Board on June 29, 2012 (Appendix F). Prior to IRB completing the exemption process, a written agreement was made between the Institutional Research Office and the researcher to confirm the nonuse of any identifiers such as name, birth dates, student ID, and social security number (Appendix D). This agreement protected the privacy of the survey participants (Creswell, 2009).

**Limitations and Delimitations**

Data were drawn from another larger survey that focused on STEM majors and transfer students. The data were formatted to meet the following requirements (see Appendix C): A 20% random sample of all senior students who fell into three categories (transfer students from community colleges, transfer students from a 4-year institution, and
nontransfer students) and attending U.S. institutions. In addition, the sample contained 50% STEM students and 50% non-STEM students. Due to the format requirements of this sample, a primary limitation of this study is the interpretation regarding transfer students along with STEM and non-STEM student outcomes.

A second limitation of the NSSE survey research is that it was based on 4-year colleges, and results will not able to be generalized to other college institutions such as community colleges. A third limitation is that data were self-reported, which as Porter (2011) noted, brings about questions in regard to the validity of the results. A fourth limitation is that the data reflected a 20% random sample of all senior students who attended U.S. institutions and fell into three categories (transfer students from community colleges, transfer students from a 4-year institution, and nontransfer students). A final limitation is that this study used only senior-level students.

Summary

Chapter 3 summarized the purpose of the study and research questions. In addition, it presented the epistemology and theoretical perspective, theoretical framework, research design, and methodology used in the study. This chapter also discussed population and sample, data collection methods, instrumentation, data collection, and variables in the study. Furthermore, it described data analysis, method of analysis, and reliability and validity of the instrument. Finally, the chapter concluded with ethical issues and limitations and delimitations.
CHAPTER 4. RESULTS

Chapter 4 provides an overview of the results of the data analysis. Results are provided in four sections, which correlate with each of the research questions. The first section summarizes the demographic characteristics of the study including the frequencies of adult and nonadult students as well as the frequencies of gender, ethnic, enrollment status, transfer status and STEM major among the two group groups used for this research study. The second section identifies whether there is significant differences between the two groups among the demographic variables of gender, race, transfer status, and STEM major along with other variables identified in the literature review including time spent on work, curricular participation, classroom preparation, dependent care, and commuting. The third section identifies whether there is significant differences between the two groups among the five NSSE benchmark variables. The fourth section identifies the results of the CFA using adult students.

The following research questions guided this study:

1. What are the demographic characteristics of the adult and nonadult students who responded to 2008 NSSE survey used in this research study?

2. Are there significant differences among the demographic variables, such as gender, race, enrollment status, transfer status, and STEM major along with time spent on work, curricular participation, classroom preparation, dependent care, commuting and level of education of father and mother, between nonadult and adult students?

3. Are there significant differences in engagement using the five NSSE engagement benchmarks between adult and nonadult students?
4. Does the NSSE five benchmark model fit for adult students? If not, is there a factor structure model that better captures the student engagement of adult students?

**Demographic Descriptive Analysis**

The agebase variable, as identified in the NSSE 2008 codebook, was a recoded variable taken from question #15 of the 2008 NSSE survey (birthyr), which states to “select (or write) in your year of birth.” The agebase variable is a numerical value that identifies the age of the participant in years at the time the survey was taken. It was recoded as a dichotomous variable named *recoded age*, with the responses coded as 0 (*24 years and younger*) or 1 (*25 years and older*). This variable was used in accordance with the literature review to discern between adult students (ages 25 years and older) and nonadult students (24 years and younger). In order to identify STEM status, the variable majrprim was used in order to recode STEM (science, technology, engineering and math) majors into a dichotomous variable with 0 representing not a STEM major and 1 representing a STEM major. This variable was renamed STEM. The demographic frequencies were descriptive statistics used to provide the characteristics of the sample. The descriptive statistics found in Table 4.1 provide the demographic characteristics of gender, ethnicity, transfer status, and STEM degree-seeking status of the adult and nonadult groups.

To address the first research question, I sought to identify the demographic characteristics of the adult and nonadult students who responded to 2008 NSSE survey used in this research study. The total number of respondents for this research sample was 21,959 students. Of those respondents, 18,094 were identified as 24 years old or younger and 3,865 were 25 years old or older. All of the students were classified as seniors. Among both the
Table 4.1

Demographic Descriptive Analysis

| Variable              | Nonadult | | | Adult  | | |
|-----------------------|----------|---|---|--------|---|
|                       | $n$     |  | % | $n$     |  | % |
| Gender                |         |   |   |         |   |
| Male                  | 7525    | 41.6 | | 1640    | 42.5 |
| Female                | 10569   | 58.4 | | 2223    | 57.5 |
| Total                 | 18094   | 100.0 | | 3863    | 100.0 |
| Ethnicity             |         |   |   |         |   |
| African American/Black| 852     | 5.4 | | 401     | 11.3 |
| American Indian/Alaska Native | 77  | 0.5 | | 47     | 1.3 |
| Asian/Pacific Islander| 915     | 5.7 | | 192    | 5.4 |
| Caucasian/White       | 12045   | 75.7 | | 2217    | 62.3 |
| Hispanic              | 826     | 5.2 | | 338    | 9.5 |
| Other                 | 91      | 0.6 | | 44     | 1.2 |
| Foreign               | 378     | 2.4 | | 76     | 2.1 |
| Multi-racial/ethnic   | 35      | 0.2 | | 13     | 0.4 |
| Unknown               | 696     | 4.4 | | 229    | 6.4 |
| Total                 | 15915   | 100.0 | | 3557   | 100.0 |
| Enrollment Status     |         |   |   |         |   |
| Part-Time             | 796     | 4.4 | | 1437    | 37.2 |
| Full-Time             | 17294   | 95.6 | | 2428    | 62.8 |
| Total                 | 18090   | 100.0 | | 3865    | 100.0 |
| Transfer Status       |         |   |   |         |   |
| Started Here          | 13418   | 74.2 | | 576    | 14.9 |
| Started Elsewhere     | 4676    | 25.8 | | 3289    | 85.1 |
| Total                 | 18094   | 100.0 | | 3865    | 100.0 |
| STEM status           |         |   |   |         |   |
| Not in a STEM major   | 8781    | 48.5 | | 2198    | 56.9 |
| STEM major            | 9313    | 51.5 | | 1667    | 43.1 |
| Total                 | 18094   | 100.0 | | 3865    | 100.0 |
nonadult and the adult group, females outnumbered males with nonadult females making up 58.4% \((n = 10,569)\) of the sample and adult females making up 57.5% \((n = 2,223)\) of the sample.

Among both groups, the most prevalent ethnicity was Caucasian/White, nonadult White students comprised 75.7% \((n = 12,045)\) of the sample and adult students who reported being White comprised 62.3% \((n = 2,217)\) of the sample.

A large majority, or 95.6% \((n = 17,294)\) of nonadult students were considered full-time students, as were the adult students to a lesser degree at 62.8% \((n = 2,428)\) of the sample. The majority (74.2%, \(n = 13,418\)) of nonadult students started at the college they were currently attending, whereas the majority (85.1%, \(n = 3,289\)) of adult students are transfer students 85.1% \((n = 3,289)\).

Finally when examining STEM majors, non-adult students are relatively evenly split with 51.5% \((n = 9,313)\) in a STEM major versus 48.5%. \((n = 8,781)\) reporting a major not in the STEM field. Of the adult students 43.1% \((n = 1,667)\) reported having a STEM major, and 56.9% \((n = 2,198)\) reported having a major not in a STEM field. However, the sample was defined to include an exact ratio of 50% STEM and 50% non-STEM students, so interpretation of this descriptive statistic is limited.

**Differences Among Demographic Variables**

For the second research question, I examined whether there were statistically significant differences among the demographic variables such as gender, race, enrollment status, transfer status, and STEM major along with time spent on work, curricular participation, classroom preparation, dependent care, and commuting and level of education
of father and mother between nonadult and adult students. The independent variables were variables identified through the literature as characteristics of adult students.

The type of variable (whether it was nominal, ordinal, dichotomous, or scale) influenced the type of analysis that was performed. The nominal variable was ethnicity (ethnicit) and the dichotomous variables were gender (gender), enrollment status (enrollmt), transfer status (enter), and STEM status (STEM).

The ordinal variables were time spent preparing for class (acadpr01), time spent working for pay on campus (workon01), time spent working for pay off campus (workof01), time spent on cocurricular activities (cocurr01), time spent providing care for dependents living with you (carede01), and time spent commuting (commute). The values for these ordinal values ranged from 1 (0 hours) to 8 (more than 30 hours). Two additional ordinal variables were father’s highest level of education (fathredu) and mother’s highest level of education (mothredu). The values for these two ordinal variables ranged from 1 (did not finish) to 7 (completed a doctoral degree). A descriptive analysis was performed on the ordinal variables to see if the variables were approximately normally distributed. The outcomes for the ordinal variables are shown in Table 4.2.

According to Morgan et al. (2007), when checking for normality a simple guideline is “that if the skewness is less than plus or minus one (±1.0), the variable is at least approximately normal” (p. 59). From the output shown in Table 4.2, there were four variables that had skewness between –1 and 1: acadpr01, workof01, fathredu, and mothredu. Thus, one could assume they were more similar to scale variables and, according to Morgan et al., one could use inferential statistics that have assumptions of normality.
Table 4.2

Descriptive Statistics of the Ordinal Variables

<table>
<thead>
<tr>
<th>Ordinal values</th>
<th>n</th>
<th>M</th>
<th>SD</th>
<th>Skewness</th>
<th>Statistic</th>
<th>SE</th>
</tr>
</thead>
<tbody>
<tr>
<td>acadpr01</td>
<td>21,914</td>
<td>4.33</td>
<td>1.757</td>
<td>0.538</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>workon01</td>
<td>21,899</td>
<td>1.96</td>
<td>1.561</td>
<td>1.696</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>workof01</td>
<td>21,880</td>
<td>3.10</td>
<td>2.555</td>
<td>0.785</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>cocurr01</td>
<td>21,917</td>
<td>2.34</td>
<td>1.613</td>
<td>1.617</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>carede01</td>
<td>21,868</td>
<td>1.90</td>
<td>1.908</td>
<td>2.346</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>commute</td>
<td>21,937</td>
<td>2.24</td>
<td>0.958</td>
<td>2.564</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>fathredu</td>
<td>21,858</td>
<td>4.01</td>
<td>1.798</td>
<td>–0.056</td>
<td>0.017</td>
<td></td>
</tr>
<tr>
<td>mothredu</td>
<td>21,927</td>
<td>3.90</td>
<td>1.629</td>
<td>–0.100</td>
<td>0.017</td>
<td></td>
</tr>
</tbody>
</table>

Cross-tabulation and chi-square tests were used to analyze the nominal and dichotomous variables. To investigate whether males and females differed on their status of nonadult or adult, a chi-square statistic was used. Assumptions were checked and met. The Pearson chi-square results, shown in Table 4.3, indicate that males and females did not significantly differ when comparing status of nonadult and adult, \( \chi^2 = .981, df = 1, N = 21,957, p > .005 \). Phi, which indicates the strength of the association between two variables, was –.007. The effect size is considered to be small according to Cohen (1988).

Table 4.3

Gender Cross-tabulation (N = 21,957)

<table>
<thead>
<tr>
<th>Gender</th>
<th>Nonadult</th>
<th>Adult</th>
<th>( \chi^2 )</th>
<th>p</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>7,525</td>
<td>1,640</td>
<td>0.981</td>
<td>&gt;0.005</td>
<td>1</td>
</tr>
<tr>
<td>Female</td>
<td>10,569</td>
<td>2,223</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18,094</td>
<td>3,863</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. Phi = –.007*
To investigate whether race differed on with the status of nonadult or adult, a chi-square statistic was used. Assumptions were checked and met. Pearson chi-square results, shown in Table 4.4, indicate that ethnicity was significantly different when comparing status of nonadult and adult, $\chi^2 = 400.1$, $df = 8$, $N = 19,472$, $p < .001$.

Table 4.4

*Ethnicity Cross-tabulation (N = 19,472)*

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Nonadult</th>
<th>Adult</th>
<th>$\chi^2$</th>
<th>$p$</th>
<th>$df$</th>
</tr>
</thead>
<tbody>
<tr>
<td>African American/Black</td>
<td>852</td>
<td>401</td>
<td>400.091</td>
<td>&lt;.001</td>
<td>8</td>
</tr>
<tr>
<td>American Indian/Alaska Native</td>
<td>77</td>
<td>47</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>915</td>
<td>192</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Caucasian/White</td>
<td>12,045</td>
<td>2,217</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hispanic</td>
<td>826</td>
<td>338</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Other</td>
<td>91</td>
<td>44</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Foreign</td>
<td>378</td>
<td>76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Multiracial/ethnic</td>
<td>35</td>
<td>13</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Unknown</td>
<td>696</td>
<td>229</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>15,915</td>
<td>3,557</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note. Phi = .143

Adult students were more likely than expected to be African American, American Indian/Alaska Native, or Hispanic than were nonadult students. Also, adult students were less likely than expected to be Caucasian/White or Asian/Pacific Islander compared to nonadult students. Phi, which indicates the strength of the association between two variables, was .143. The effect size is considered to be small according to Cohen (1988).
To investigate whether enrollment status differed between nonadult or adult, a chi-square statistic was used. Assumptions were checked and met. The Pearson chi-square results, shown in Table 4.5, indicate that enrollment status was significantly different when comparing nonadult and adult students, $\chi^2 = 3745.32$, $df = 1$, $N = 21,955$, $p < .001$. Adult students were more likely than expected to have part-time enrollment status than were nonadult students. Adult students were also less likely than expected to be full-time enrollment status than were nonadult students. Phi, which indicates the strength of the association between two variables, was $-.413$. The effect size is considered to be medium to large according to Cohen (1988).

Table 4.5

<table>
<thead>
<tr>
<th>Enrollment status</th>
<th>Nonadult</th>
<th>Adult</th>
<th>$\chi^2$</th>
<th>$p$</th>
<th>$df$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Part-time</td>
<td>796</td>
<td>1,437</td>
<td>3745.32</td>
<td>&lt;.001</td>
<td>1</td>
</tr>
<tr>
<td>Full-time</td>
<td>17,294</td>
<td>2,428</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18,090</td>
<td>3,865</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note. Phi = –.413*

To investigate whether transfer status differed between nonadult and adult, a chi-square statistic was used. Assumptions were checked and met. The Pearson chi-square results, shown in Table 4.6, indicate that transfer status was significantly different when comparing nonadult and adult students, $\chi^2 = 4837.35$, $df = 1$, $N = 21,959$, $p < .001$. Adult students were more likely than expected to be transfer students than were nonadult students.
Table 4.6  
*Transfer Status Cross-tabulation (N = 21,959)*

<table>
<thead>
<tr>
<th>Transfer status</th>
<th>Nonadult</th>
<th>Adult</th>
<th>( \chi^2 )</th>
<th>( p )</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Started here</td>
<td>13,418</td>
<td>2,463</td>
<td>4837.35</td>
<td>&lt;.001</td>
<td>1</td>
</tr>
<tr>
<td>Started elsewhere</td>
<td>4,676</td>
<td>3,289</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18,094</td>
<td>5,752</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Phi = .469

Phi, which indicates the strength of the association between two variables, was .469. The effect size is considered to be medium to large according to Cohen (1988).

To investigate whether enrollment in a STEM degree differed between nonadult and adult students, a chi-square statistic was used. Assumptions were checked and met. The Pearson chi-square results, shown in Table 4.7, indicate that enrollment in STEM majors was significantly different when comparing nonadult and adult students, \( \chi^2 = 88.59, df = 1, N = 21,959, p < .001 \). Adult students were less likely than expected to major in a STEM degree compared with nonadult students. Phi, which indicates the strength of the association between two variables, was –.064. The effect size is considered to be small according to Cohen (1988).

Table 4.7  
*STEM Degree Cross-tabulation (N = 21,959)*

<table>
<thead>
<tr>
<th>STEM degree status</th>
<th>Nonadult</th>
<th>Adult</th>
<th>( \chi^2 )</th>
<th>( p )</th>
<th>df</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-STEM</td>
<td>8,781</td>
<td>2,198</td>
<td>88.59</td>
<td>p &lt; .001</td>
<td>1</td>
</tr>
<tr>
<td>STEM</td>
<td>9,313</td>
<td>1,667</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>18,094</td>
<td>3,865</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note.* Phi = –.064
According to Morgan et al. (2007), when investigating the difference between two independent groups (for this study it was nonadult and adult students), it is appropriate to choose an independent samples $t$ test if the following assumptions are not violated:

1. The variances of the dependent variable in the population are equal.
2. The dependent variable is normally distributed within each population.
3. The data are independent.

SPSS automatically tests assumption #1 with the Levene test for equal variances. Assumption #2 was tested using a descriptive analysis performed on the ordinal variables to see if they were approximately normally distributed (the outcome is shown in Table 4.2).

There were four variables that had skewness variables between –1 and 1: acadpr01, workof01, fathredu and mothredu. This indicates they were more similar to scale variables and performed an independent samples $t$-test to investigate the differences between the two unrelated groups. The results from the $t$ test revealed that the Levene test of the assumption of equal variance was statistically significant ($p < .05$). This indicates that the variances were significantly different and “the assumptions of equal variance are violated” (Morgan et al., 2007, p. 146). The results of the Levene test for equality of variances are shown in Table 4.8.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Equal variances assumed</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>acadpr01</td>
<td>Equal variances assumed</td>
<td>10.937</td>
<td>.001</td>
</tr>
<tr>
<td>workof01</td>
<td>Equal variances assumed</td>
<td>1432.571</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>fathredu</td>
<td>Equal variances assumed</td>
<td>6.418</td>
<td>.011</td>
</tr>
<tr>
<td>mothredu</td>
<td>Equal variances assumed</td>
<td>10.325</td>
<td>.001</td>
</tr>
</tbody>
</table>

*Table 4.8*

_Levene’s Test of Ordinal Variables_
Morgan et al. (2007) suggested that, if the $t$ test assumptions are markedly violated, it may be appropriate to run a nonparametric statistic using the Mann-Whitney U test if the following assumptions are met:

1. It is assumed there is an underlying continuity from low to high in the dependent variable, before ranking, even if the actual data are discrete numbers.
2. The data are independent.

According to the NSSE 2008 codebook, the data for each of the ordinal variables acadpr01, workon01, workof01, cocurr01, carede01, commute, were on a Likert-type scale indicating continuity from low to high with the response of 1 representing 0 hours and 8 representing more than 30 hours. The data for each of the ordinal variables, fathredu and mothredu, also were answered on a Likert-type scale indicating continuity from low to high with the response of 1 representing did not finish high school and 7 representing completed a doctorate degree. All variables were ordered such that magnitude between levels was not equal. Because the dependent variables were ordinal and the variances were unequal, Mann-Whitney U tests were performed to compare nonadult students and adult students.

As shown in Table 4.9, nonadult and adult students did not differ on hours per week preparing for class. Mean ranks were 10,934 and 10,953, respectively, $U=34,639,789$, $p = .86$, $r = -.001$.

As shown in Table 4.10, the nonadult student had significantly higher mean ranks (11,359) than did the adult students (8,917) when reporting hours spent working for pay ON campus, $U= 26,891,767$, $p < .001$, $r = -.17$, which according to Cohen (1988) is a small effect size.
Table 4.9  
**Comparison of Nonadult and Adult Students on Hours Spent Preparing for Class**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed)</th>
<th>Effect size</th>
<th>r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per 7-day week spent preparing for class</td>
<td>34,639,789</td>
<td>0.86</td>
<td></td>
<td>–0.001</td>
<td></td>
</tr>
<tr>
<td>Nonadult</td>
<td>10,934</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>10,953</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in Table 4.10, the adult students had significantly higher mean ranks (14,252) than did the nonadult students (10,209) when reporting hours spent working for pay OFF campus, $U = 21,772,904, p < .001, r = –.26$, which according to Cohen (1988) is a small to medium effect size.

As shown in Table 4.11, the nonadult students had significantly higher mean ranks (11,854) than did the adult students (6,649) when reporting hours spent in cocurricular activities, $U = 18,180,557, p < .001, r = –.33$, which according to Cohen (1988) is a medium effect size.
Table 4.11

*Comparison of Nonadult and Adult Students on Hours Spent Working for Pay OFF Campus*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed)</th>
<th>Effect size r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per 7-day week spent working for pay OFF campus</td>
<td>21,772,904</td>
<td>&lt;.001</td>
<td>–0.26</td>
<td></td>
</tr>
<tr>
<td>Nonadult</td>
<td>10,209</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>14,252</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.12

*Comparison of Nonadult and Adult Students on Hours Spent in Cocurricular Activities*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed)</th>
<th>Effect size r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per 7-day week spent in cocurricular activities</td>
<td>18,180,557</td>
<td>&lt;.001</td>
<td>–0.33</td>
<td></td>
</tr>
<tr>
<td>Nonadult</td>
<td>11,854</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>6,649</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

As shown in Table 4.13, the adult students had significantly higher mean ranks (15,710) than did the nonadult students (9,888) when reporting hours spent providing care for dependents living with you, \( U = 16132917, p < .001, r = -.44 \), which according to Cohen (1988) is a medium to large effect size.

Table 4.14, the adult students had significantly higher mean ranks (12,406) than did the nonadult students (10,638) when reporting hours commuting to class, \( U = 29,163,326, p < .001, r = -.13 \), which according to Cohen (1988) is a small effect size.

As shown in Table 4.15, the nonadult students had significantly higher mean ranks (11,555) than did the adult students (7,886) when reporting the highest level of education that
Table 4.13
Comparison of Nonadult and Adult Students on Hours Spent Providing Care for Dependents Living With Them

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed)</th>
<th>Effect size r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per 7-day week spent providing care for dependents living with you</td>
<td>16,132,917</td>
<td>&lt;.001</td>
<td>–0.44</td>
<td></td>
</tr>
<tr>
<td>Nonadult</td>
<td>9,888</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>15,710</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.14
Comparison of Nonadult and Adult Students on Hours Spent Commuting to Class

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed)</th>
<th>Effect size r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hours per 7-day week spent commuting to class</td>
<td>29,163,327</td>
<td>&lt;.001</td>
<td>-0.13</td>
<td></td>
</tr>
<tr>
<td>Nonadult</td>
<td>10,638</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>12,406</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.15
Comparison of Nonadult and Adult Students on the Highest Level of Education That Their Father Completed

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed)</th>
<th>Effect size r</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the highest level of education that your parent(s) completed?—Father</td>
<td>22,868,263</td>
<td>&lt;.001</td>
<td>–0.23</td>
<td></td>
</tr>
<tr>
<td>Nonadult</td>
<td>11,555</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>7,886</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
their father completed, \( U = 22,868,263, p < .001, r = -.23 \) which according to Cohen (1988) is a small to medium effect size.

As shown in Table 4.16, the nonadult student had significantly higher mean ranks (11,646) than did the adult students (7,662) when reporting the highest level of education that their mother completed, \( U = 22,071,644, p < .001, r = -.24 \), which according to Cohen (1988) is a small to medium effect size.

Table 4.16

Comparison of Nonadult and Adult Students on the Highest Level of Education That Their Mother Completed

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed) ( p )</th>
<th>Effect size ( r )</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the highest level of education that your parent(s) completed?—Mother</td>
<td>22,071,644</td>
<td>&lt;.001</td>
<td>-0.24</td>
<td></td>
</tr>
<tr>
<td>Nonadult</td>
<td>11,646</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>7,662</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Differences in the Five NSSE Benchmarks

For the third research question, I sought to identify whether there were significant differences in engagement using the five NSSE engagement benchmarks between adult and nonadult students. The five benchmarks identified by the NSSE 2008 codebook used for this analysis are level of academic challenge, active and collaborative learning, student–faculty interaction, enriching educational experiences, and supportive campus environment.
According to Morgan et al. (2007), when investigating the difference between two independent groups (for this study it was nonadult and adult students), it is appropriate to choose an independent samples $t$ test if the following assumptions are not violated.

1. The variances of the dependent variable in the population are equal.
2. The dependent variable is normally distributed within each population.
3. The data are independent.

SPSS automatically tests assumption #1 with the Levene test for equal variances. The results from the $t$ test revealed that the Levene test of the assumption of equal variance was statistically significant ($p < .05$) for each of the five benchmarks. This indicates that the variances were significantly different and “the assumptions of equal variance are violated” (Morgan et al., 2007, p. 146). The results of the Levene test for equality of variances are shown in Table 4.17.

<table>
<thead>
<tr>
<th>Variable</th>
<th>$F$</th>
<th>$p$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic challenge ($AC$)</td>
<td>23.854</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Active and collaborative learning ($ACL$)</td>
<td>35.627</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Student-faculty interaction ($SFI$)</td>
<td>40.890</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Enriching educational experiences ($EEE$)</td>
<td>10.854</td>
<td>.001</td>
</tr>
<tr>
<td>Supportive campus environment ($SCE$)</td>
<td>51.698</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

Morgan et al. (2007) suggested that, if the $t$ test assumptions are markedly violated, it may be appropriate to run a nonparametric statistic using the Mann-Whitney $U$ test if the following assumptions are met:
1. It is assumed there is an underlying continuity from low to high in the dependent variable, before ranking, even if the actual data are discrete numbers.

2. The data are independent.

According to the NSSE 2008 codebook, the data for each of the scaled variables—level of academic challenge, active and collaborative learning, student–faculty interaction, enriching educational experiences, and supportive campus environment—are ordered variables placed on a 100-point scale. According to the NSSE 2008 codebook, the precursors to these five institution-level benchmarks, are the student’s average responses to items within the group, after all items have been placed on a 100-point scale. The benchmark score for an institution is the weighted mean of these student-level scores. (p. 18)

Because the dependent variables were scaled and the variances were unequal, Mann-Whitney U tests were performed to compare nonadult students and adult students.

As shown in Table 4.18, the nonadult student had significantly higher mean ranks (11,034) than did the adult students (10,624) for the academic challenge benchmark, \( U = 33,537,334, p < .001, r = -.02 \), which according to Cohen (1988) is a small effect size.

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed)</th>
<th>Effect size r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic challenge</td>
<td>33,537,334</td>
<td>&lt;.001</td>
<td>–0.02</td>
<td></td>
</tr>
<tr>
<td>Nonadult</td>
<td>11,034</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>10,624</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As shown in Table 4.19, the nonadult students had significantly higher mean ranks (11,057) than did the adult students (9,975) for the active and collaborative learning benchmark, $U = 30,893,944$, $p < .001$, $r = -.07$, which according to Cohen (1988) is a small effect size.

As shown in Table 4.20, the nonadult students had significantly higher mean ranks (11,272) than did the adult students (9,202) for the student–faculty interaction benchmark, $U = 27,983,601$, $p < .001$, $r = -.13$, which according to Cohen (1988) is a small effect size.

Table 4.19
Comparison of Nonadult and Adult Students on Benchmark #2: Active and Collaborative Learning

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed) $p$</th>
<th>Effect size $r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active and collaborative</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>learning</td>
<td></td>
<td>30,893,944</td>
<td>&lt;.001</td>
<td>−0.07</td>
</tr>
<tr>
<td>Nonadult</td>
<td>11,057</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>9,975</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.20
Comparison of Nonadult and Adult Students on Benchmark #3: Student–Faculty Interaction

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed) $p$</th>
<th>Effect size $r$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Student–faculty interaction</td>
<td></td>
<td>27,983,601</td>
<td>&lt;.001</td>
<td>−0.13</td>
</tr>
<tr>
<td>Nonadult</td>
<td>11,272</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>9,202</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
As shown in Table 4.21, the nonadult students had significantly higher mean ranks (11,635) than did the adult students (7,732) for the enriching educational experiences benchmark, \(U = 22,374,386, p < .001, r = -.24\), which according to Cohen (1988) is a small to medium effect size.

As shown in Table 4.22, the nonadult student had significantly higher mean ranks (11,072) than did the adult students (10,371) for the supportive campus environment benchmark, \(U = 32,542,576, p < .001, r = -.04\), which according to Cohen (1988) is a small effect size.

Table 4.21

*Comparison of Nonadult and Adult Students on Benchmark #4: Enriching Educational Experiences*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed) p</th>
<th>Effect size r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Enriching educational experiences</td>
<td></td>
<td>22,374,386</td>
<td>&lt;.001</td>
<td>–0.24</td>
</tr>
<tr>
<td>Nonadult</td>
<td>11,635</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>7,732</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Table 4.22

*Comparison of Nonadult and Adult Students on Benchmark #5: Supportive Campus Environment*

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean rank</th>
<th>Mann-Whitney U</th>
<th>Asymp. sig. (2-tailed) p</th>
<th>Effect size r</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supportive campus environment</td>
<td></td>
<td>32,542,576</td>
<td>&lt;.001</td>
<td>–0.04</td>
</tr>
<tr>
<td>Nonadult</td>
<td>11,072</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adult</td>
<td>10,371</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
NSSE Model Fit for Adult Students

For the fourth research question, I sought to identify whether the NSSE five benchmark model is good fit for adult students. The five benchmarks identified by the NSSE 2008 codebook used for this analysis are the following: level of academic challenge, active and collaborative learning, student–faculty interaction, enriching educational experiences, and supportive campus environment. Relying upon the NSSE benchmark calculation found in the NSSE 2008 codebook (NSSE, 2008b), I identified the 42 items that constituted the five NSSE benchmarks as the starting point for this analysis. See Table 4.23 for a list of the variables used.

Table 4.23

Variables Used in the Confirmatory Factors Analysis

<table>
<thead>
<tr>
<th>No.</th>
<th>Item</th>
<th>Item description</th>
<th>M</th>
<th>SD</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>clquest</td>
<td>Asked questions in class or contributed to class discussions</td>
<td>3.15</td>
<td>0.85</td>
</tr>
<tr>
<td>2</td>
<td>envsoc</td>
<td>Providing the support you need to thrive socially</td>
<td>2.07</td>
<td>0.95</td>
</tr>
<tr>
<td>3</td>
<td>envdivr</td>
<td>Encouraging contact among students from different economic, social, and racial or ethnic backgrounds</td>
<td>2.45</td>
<td>1.00</td>
</tr>
<tr>
<td>4</td>
<td>envnacad</td>
<td>Helping you cope with your nonacademic responsibilities</td>
<td>1.91</td>
<td>0.97</td>
</tr>
<tr>
<td>5</td>
<td>envsupr</td>
<td>Providing the support you need to help you succeed academically</td>
<td>2.91</td>
<td>0.87</td>
</tr>
<tr>
<td>6</td>
<td>clpresen</td>
<td>Made a class presentation</td>
<td>2.71</td>
<td>0.93</td>
</tr>
<tr>
<td>7</td>
<td>classgrp</td>
<td>Worked with other students on projects during class</td>
<td>2.49</td>
<td>0.91</td>
</tr>
<tr>
<td>8</td>
<td>occgrp</td>
<td>Worked with classmates outside of class to prepare class assignments</td>
<td>2.58</td>
<td>0.95</td>
</tr>
<tr>
<td>9</td>
<td>tutor</td>
<td>Tutored or taught other students (paid or voluntary)</td>
<td>1.77</td>
<td>0.92</td>
</tr>
<tr>
<td>10</td>
<td>commpro</td>
<td>Participated in a community-based project as part of a regular course</td>
<td>1.58</td>
<td>0.84</td>
</tr>
<tr>
<td>11</td>
<td>itacadem</td>
<td>Used an electronic medium to discuss or complete an assignment</td>
<td>2.79</td>
<td>1.05</td>
</tr>
<tr>
<td>12</td>
<td>facgrade</td>
<td>Discussed grades or assignments with an instructor</td>
<td>2.81</td>
<td>0.88</td>
</tr>
<tr>
<td>13</td>
<td>facplans</td>
<td>Talked about career plans with a faculty member or advisor</td>
<td>2.27</td>
<td>0.95</td>
</tr>
<tr>
<td>14</td>
<td>facideas</td>
<td>Discussed ideas from your readings or classes with faculty members outside of class</td>
<td>2.05</td>
<td>0.92</td>
</tr>
<tr>
<td>15</td>
<td>facfeed</td>
<td>Received prompt written or oral feedback from faculty on your academic performance</td>
<td>2.79</td>
<td>0.84</td>
</tr>
<tr>
<td>No.</td>
<td>Item</td>
<td>Item description</td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>-----</td>
<td>--------</td>
<td>-----------------------------------------------------------------------------------</td>
<td>------</td>
<td>------</td>
</tr>
<tr>
<td>16</td>
<td>workhard</td>
<td>Worked harder than you thought you could to meet an instructor’s standards or expectations</td>
<td>2.80</td>
<td>0.85</td>
</tr>
<tr>
<td>17</td>
<td>facother</td>
<td>Worked with faculty members on activities other than coursework</td>
<td>1.59</td>
<td>0.85</td>
</tr>
<tr>
<td>18</td>
<td>oocidea</td>
<td>Discussed ideas from your readings or classes with others outside of class</td>
<td>2.84</td>
<td>0.86</td>
</tr>
<tr>
<td>19</td>
<td>divrstud</td>
<td>Had serious conversations with students of a different race or ethnicity than your own</td>
<td>2.56</td>
<td>1.01</td>
</tr>
<tr>
<td>20</td>
<td>diffstu2</td>
<td>Had serious conversations with students who are very different from you</td>
<td>2.53</td>
<td>0.98</td>
</tr>
<tr>
<td>21</td>
<td>analyze</td>
<td>Analyzing the basic elements of an idea, experience, or theory</td>
<td>3.23</td>
<td>0.76</td>
</tr>
<tr>
<td>22</td>
<td>synthesz</td>
<td>Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships</td>
<td>3.05</td>
<td>0.83</td>
</tr>
<tr>
<td>23</td>
<td>evaluate</td>
<td>Making judgments about the value of information, arguments, or methods</td>
<td>2.95</td>
<td>0.90</td>
</tr>
<tr>
<td>24</td>
<td>applying</td>
<td>Applying theories or concepts to practical problems or in new situations</td>
<td>3.17</td>
<td>0.83</td>
</tr>
<tr>
<td>25</td>
<td>readasgn</td>
<td>Number of assigned textbooks, books, or book-length packs of course readings</td>
<td>3.11</td>
<td>1.02</td>
</tr>
<tr>
<td>26</td>
<td>writemor</td>
<td>Number of written papers or reports of 20 pages or more</td>
<td>1.64</td>
<td>0.82</td>
</tr>
<tr>
<td>27</td>
<td>writemid</td>
<td>Number of written papers or reports between 5 and 19 pages</td>
<td>2.46</td>
<td>0.96</td>
</tr>
<tr>
<td>28</td>
<td>writesml</td>
<td>Number of written papers or reports of fewer than 5 pages</td>
<td>2.78</td>
<td>1.18</td>
</tr>
<tr>
<td>29</td>
<td>intern04</td>
<td>Practicum, internship, field experience, co-op experience, or clinical assignment</td>
<td>3.01</td>
<td>1.03</td>
</tr>
<tr>
<td>30</td>
<td>acadpr01</td>
<td>Preparing for class</td>
<td>4.35</td>
<td>1.80</td>
</tr>
<tr>
<td>31</td>
<td>cocurr01</td>
<td>Participating in cocurricular activities</td>
<td>1.43</td>
<td>0.91</td>
</tr>
<tr>
<td>32</td>
<td>envschol</td>
<td>Spending significant amounts of time studying and on academic work</td>
<td>3.23</td>
<td>0.75</td>
</tr>
<tr>
<td>33</td>
<td>envstu</td>
<td>Relationships with other students</td>
<td>5.46</td>
<td>1.44</td>
</tr>
<tr>
<td>34</td>
<td>envfac</td>
<td>Relationships with faculty members</td>
<td>5.47</td>
<td>1.41</td>
</tr>
<tr>
<td>35</td>
<td>envadm</td>
<td>Relationships with administrative personnel and offices</td>
<td>4.82</td>
<td>1.70</td>
</tr>
<tr>
<td>36</td>
<td>stdabr04</td>
<td>Study abroad</td>
<td>2.06</td>
<td>0.71</td>
</tr>
<tr>
<td>37</td>
<td>indstd04</td>
<td>Independent study or self-designed major</td>
<td>2.29</td>
<td>0.93</td>
</tr>
<tr>
<td>38</td>
<td>snrx04</td>
<td>Culminating senior experience</td>
<td>2.74</td>
<td>0.99</td>
</tr>
<tr>
<td>39</td>
<td>volintr04</td>
<td>Community service or volunteer work</td>
<td>3.01</td>
<td>1.09</td>
</tr>
<tr>
<td>40</td>
<td>lrncm04</td>
<td>Participate in a learning community or some other formal program where groups of students take two or more classes together</td>
<td>2.32</td>
<td>1.00</td>
</tr>
<tr>
<td>41</td>
<td>resrch04</td>
<td>Work on a research project with a faculty member outside of course or program requirements</td>
<td>2.25</td>
<td>0.95</td>
</tr>
<tr>
<td>42</td>
<td>forlng04</td>
<td>Foreign language coursework</td>
<td>2.59</td>
<td>1.03</td>
</tr>
</tbody>
</table>
NSSE explained that one potential limitation of the results is that higher correlations result from more heterogeneous groups of respondents and the correlations reported could only be generalized to students with characteristics similar to the students analyzed in the overall population. “It is possible that the alphas and correlations for other subpopulations of students could be very different” (NSSE, 2011b, p. 2)

A conventional measure of internal consistency of a constructed scale is Cronbach’s alpha, a measure of the intercorrelation of the items that make up a scale. Cronbach’s alpha measures the internal consistency of a group of items by measuring the homogeneity of the group of items. The measurement “is an indication of how well the different items complement each other in their measurement of different aspects of the same variable or quality” (Litwin, 2003, p. 22). Cronbach’s alpha ranges in value between 0 and 1. Values closer to 1 indicate a higher internal consistency; values closer to 0 indicate a lower internal consistency. Although there are no absolute criteria in the literature, practitioners usually strive for .70 or above (Lance et al., 2006). The minimum level of internal consistency is to some extent dependent upon the goals and objectives of the scale.

In order to examine the internal consistency of the research sample, Cronbach’s alphas were calculated for the main sample survey of all 22,000 respondents and compared to the sample of the adult students (only those students who were 25 years of age or older). The results are presented in Table 4.24.

The internal consistency of a set of items is an indicator of how well the items measure the same variable or construct. Assuming the scales effectively measure an underlying construct, one would expect to find high estimates of their internal consistency. The results of the Cronbach’s test suggested that the internal consistency of the scores were
Table 4.24

*Cronbach’s Alpha Values for Benchmark Scales*

<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Cronbach’s alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nonadult &amp; adult sample</td>
<td>Adult-only sample</td>
</tr>
<tr>
<td>Active and collaborative learning</td>
<td>.66</td>
</tr>
<tr>
<td>Student-faculty interaction</td>
<td>.75</td>
</tr>
<tr>
<td>Enriching educational experiences</td>
<td>.63</td>
</tr>
<tr>
<td>Supportive campus environment</td>
<td>.77</td>
</tr>
<tr>
<td>Level of academic challenge</td>
<td>.72</td>
</tr>
</tbody>
</table>

fair with only two benchmarks (active and collaborative learning and enriching educational experiences) scoring a bit lower than .70 (.63 and .66, respectively) in the main sample and only one benchmark (enriching educational experiences) scoring below .70 (.66) in the adult-only sample. McMillan and Schumacher (2001) suggested that groups of items with an alpha below .70 should be used with caution.

To assess whether the NSSE five benchmark model fit, CFA was performed. IBM SPSS Amos 21 was used in testing the CFA model. Only adult students were used in measuring the model fit, and only participants who responded to all the 42 survey variables were included in the CFA portion of this study. According to the AMOS user guide, “one standard method for dealing with incomplete data is to eliminate from the analysis any observation for which some data value is missing” (Arbuckle, 2012, p. 269). Tabachnick and Fidell (2007) concurred that one procedure for handling missing values is simply to eliminate them: “If only a few cases have missing data and they seem to be a random subsample of the whole sample, deletion is a good alternative” (p. 63). In this study, the process was to delete respondents who did not answer all the questions from the study and proceed with a
conventional analysis based on complete data but with a reduced sample size. A total of 440 respondents were removed. It was determined that the sample size of 3,425 respondents was adequate to complete the CFA.

The confirmatory factors model presumed that the five dimensions accounted for the intercorrelations underlying the 42 variables comprising the NSSE benchmarks (Kuh, 2003; LaNasa et al., 2009). LaNasa et al. (2009) provided poor fit guidelines for a similar CFA, stating:

Evidence against the conceptual model would be provided by poor indicators of fit, high correlations among the constructs, the presence of cross-loadings of the items in relation to constructs it is not supposed to measure, also referred as factorially complex items (Cattell, 1978), as well as, substantive amounts of error in the variance of the items. (p. 318)

The results of the AMOS structural equation model are displayed in Figure 4.1 and Table 4.25.

For the first benchmark, active and collaborative learning, none of its indicators had loadings of 0.70 or higher, suggesting that most of the variance for the seven indicators remains unexplained (LaNasa et al., 2009). The range of unexplained variances ranged from 70% to 80%. If treated as a scale, the reliability of this benchmark would be acceptable ($\alpha = 0.70$).

For the second benchmark, student–faculty interactions, only two of its indicators had loadings of 0.70 or higher (facplans, .73; facideas, .74), suggesting that most of the variance for the remaining four indicators remains unexplained. The range of the remaining
unexplained variances ranged from 65% to 90%. If treated as a scale, the reliability of this benchmark would be acceptable ($\alpha = 0.74$).
Figure 4.1. Five benchmark model of (adults only) student engagement (ACL = active and collaborative learning, SFI = student–faculty interactions, EEE = enriching educational experience, SCE = supportive campus environment, AC = academic challenge).
<table>
<thead>
<tr>
<th>Benchmark</th>
<th>Measure</th>
<th>Loading</th>
<th>Variance Explained</th>
<th>Error</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Active and collaborative learning</td>
<td>oocideas</td>
<td>.55</td>
<td>.30</td>
<td>.70</td>
<td>.702</td>
</tr>
<tr>
<td></td>
<td>clquest</td>
<td>.48</td>
<td>.23</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td>clpresen</td>
<td>.53</td>
<td>.28</td>
<td>.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>classgrp</td>
<td>.48</td>
<td>.23</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td></td>
<td>occgrp</td>
<td>.54</td>
<td>.29</td>
<td>.71</td>
<td></td>
</tr>
<tr>
<td></td>
<td>tutor</td>
<td>.44</td>
<td>.20</td>
<td>.80</td>
<td></td>
</tr>
<tr>
<td></td>
<td>compmroj</td>
<td>.48</td>
<td>.23</td>
<td>.77</td>
<td></td>
</tr>
<tr>
<td>Student faculty interaction</td>
<td>facgrade</td>
<td>.58</td>
<td>.34</td>
<td>.66</td>
<td>.738</td>
</tr>
<tr>
<td></td>
<td>facplans</td>
<td>.73</td>
<td>.53</td>
<td>.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>facideas</td>
<td>.74</td>
<td>.54</td>
<td>.46</td>
<td></td>
</tr>
<tr>
<td></td>
<td>facfeed</td>
<td>.50</td>
<td>.25</td>
<td>.75</td>
<td></td>
</tr>
<tr>
<td></td>
<td>facother</td>
<td>.59</td>
<td>.35</td>
<td>.65</td>
<td></td>
</tr>
<tr>
<td></td>
<td>resrch04</td>
<td>.31</td>
<td>.10</td>
<td>.90</td>
<td></td>
</tr>
<tr>
<td>Enriching educational experience</td>
<td>diffstu2</td>
<td>.84</td>
<td>.70</td>
<td>.30</td>
<td>.655</td>
</tr>
<tr>
<td></td>
<td>divrstud</td>
<td>.83</td>
<td>.69</td>
<td>.31</td>
<td></td>
</tr>
<tr>
<td></td>
<td>envdivrs</td>
<td>.32</td>
<td>.10</td>
<td>.90</td>
<td></td>
</tr>
<tr>
<td></td>
<td>cocurr01</td>
<td>.20</td>
<td>.04</td>
<td>.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>itacadem</td>
<td>.26</td>
<td>.07</td>
<td>.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td>intern04</td>
<td>.21</td>
<td>.04</td>
<td>.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>volntr04</td>
<td>.26</td>
<td>.07</td>
<td>.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lrncom04</td>
<td>.24</td>
<td>.06</td>
<td>.94</td>
<td></td>
</tr>
<tr>
<td></td>
<td>forlng04</td>
<td>.18</td>
<td>.03</td>
<td>.97</td>
<td></td>
</tr>
<tr>
<td></td>
<td>stdabr04</td>
<td>.12</td>
<td>.01</td>
<td>.99</td>
<td></td>
</tr>
<tr>
<td></td>
<td>indstd04</td>
<td>.12</td>
<td>.02</td>
<td>.98</td>
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</tr>
<tr>
<td></td>
<td>snrx04</td>
<td>.17</td>
<td>.03</td>
<td>.97</td>
<td></td>
</tr>
<tr>
<td>Supportive campus environment</td>
<td>envsttu</td>
<td>.51</td>
<td>.26</td>
<td>.74</td>
<td>.783</td>
</tr>
<tr>
<td></td>
<td>envfac</td>
<td>.67</td>
<td>.46</td>
<td>.54</td>
<td></td>
</tr>
<tr>
<td></td>
<td>envadm</td>
<td>.60</td>
<td>.36</td>
<td>.64</td>
<td></td>
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<tr>
<td></td>
<td>envsuprt</td>
<td>.72</td>
<td>.52</td>
<td>.48</td>
<td></td>
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<td></td>
<td>envnacad</td>
<td>.65</td>
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<td>.57</td>
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<td></td>
<td>envsocal</td>
<td>.68</td>
<td>.46</td>
<td>.54</td>
<td></td>
</tr>
<tr>
<td>Academic challenge</td>
<td>workhard</td>
<td>.43</td>
<td>.18</td>
<td>.82</td>
<td>.732</td>
</tr>
<tr>
<td></td>
<td>analyze</td>
<td>.75</td>
<td>.56</td>
<td>.44</td>
<td></td>
</tr>
<tr>
<td></td>
<td>synthesz</td>
<td>.79</td>
<td>.63</td>
<td>.37</td>
<td></td>
</tr>
<tr>
<td></td>
<td>evaluate</td>
<td>.72</td>
<td>.52</td>
<td>.48</td>
<td></td>
</tr>
<tr>
<td></td>
<td>applying</td>
<td>.73</td>
<td>.53</td>
<td>.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>readasgn</td>
<td>.24</td>
<td>.06</td>
<td>.94</td>
<td></td>
</tr>
<tr>
<td></td>
<td>writemor</td>
<td>.23</td>
<td>.05</td>
<td>.95</td>
<td></td>
</tr>
<tr>
<td></td>
<td>writemid</td>
<td>.29</td>
<td>.09</td>
<td>.91</td>
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<td></td>
<td>writesml</td>
<td>.20</td>
<td>.04</td>
<td>.96</td>
<td></td>
</tr>
<tr>
<td></td>
<td>acadpr01</td>
<td>.27</td>
<td>.07</td>
<td>.93</td>
<td></td>
</tr>
<tr>
<td></td>
<td>envschol</td>
<td>.35</td>
<td>.12</td>
<td>.88</td>
<td></td>
</tr>
</tbody>
</table>
For the third benchmark, enriching educational experience, only two of its indicators had loadings of 0.70 or higher (diffstu2, .84; divrstud, .83), suggesting that most of the variance for the remaining 10 indicators remains unexplained. The range of the remaining unexplained variances ranged from 90% to 99%. If treated as a scale, the reliability of this benchmark would be low ($\alpha = 0.66$).

For the fourth benchmark, supportive campus environment, all of the indicators had loadings close to 0.70 or higher (range of .51 to .72). The range of the unexplained variances for the six indicators ranged from 54% to 74%. If treated as a scale, the reliability of this benchmark would be acceptable ($\alpha = 0.78$).

For the fifth benchmark, academic challenge, only four of its indicators had loadings of 0.70 or higher (analyze, .75; synthesz, .79; evaluate, .72; applying, .73), suggesting that most of the variance for the remaining eight indicators remains unexplained. The range of the remaining unexplained variances ranged from 82% to 95%. If treated as a scale, the reliability of this benchmark would be acceptable ($\alpha = 0.73$).

Relative independence among the five NSSE benchmarks was not supported by the CFA as shown by one of the five benchmarks being highly correlated with another. The structural correlation between active and collaborative learning and student–faculty interactions was .83 (see Figure 4.1). Moderate structural correlations also were found between active and collaborative learning and enriching educational experiences (.68) as well as between academic challenge and active and collaborative learning (0.62). Only supportive campus environment and enriching educational experiences benchmarks were relatively independent of another (0.31).
Results summarized in Table 4.26 depict a model that did not have a reasonable fit of the data. The resulting measurement model obtained the following: \( \chi^2/df > 5 \), CFI and GFI < 0.92, RMSEA > 0.06, and a SRMR > .05 for this adult student sample. Both the CFI and GFI were below the threshold of .92 recommended by Hair et al. (2006). The RMSEA and SRMR values did meet the RMSEA threshold value of less than .06 and the SRMR thresholds value of less than .05 recommended by Hu and Bentler (1999).

Table 4.26

<table>
<thead>
<tr>
<th>Model</th>
<th>( n )</th>
<th>( \chi^2 )</th>
<th>( df )</th>
<th>( \chi^2/df )</th>
<th>CFI</th>
<th>RMSEA</th>
<th>GFI</th>
<th>SRMR</th>
<th>( p )</th>
</tr>
</thead>
<tbody>
<tr>
<td>NSSE five benchmark model</td>
<td>3,425</td>
<td>14,099</td>
<td>809</td>
<td>17.43</td>
<td>.676</td>
<td>.069</td>
<td>.802</td>
<td>.077</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

**Proposed Model of Engagement for Adult Students**

The above analysis did not fully support the five benchmark model as a good model fit for adult students. As with the LaNasa et al. (2009) study, poor item loadings and the high correlation among the latent constructs and poor goodness-of-fit indicators led to conducting an exploratory factor analysis that would attempt to better identify the dimensions explaining the data for adult students.

For the exploratory factor analysis, the goal was to describe and summarize the data by grouping together certain variables that may be correlated and for which a reliable construct could be identified. Factor analysis was conducted to determine what, if any, underlying structure existed for measures of the 42 NSSE items. The initial factor analysis,
using principle components extraction using a Varimax factor rotation with Kaiser normalization, produced 11 factors with eigenvalues greater than 1.0.

Each of the 11 components was subjected to the Cronbach’s alpha test of reliability to examine the internal consistency. The reliability analysis revealed that 8 out of 11 factors formed a reliable scale above .6. According to Kline (2011), Cronbach’s alpha reliability coefficients around .90 are considered excellent, .80 are very good, .70 are adequate, .60 are questionable, and around .50 and less are unacceptable. Kline stated that “somewhat lower levels of score reliability can be tolerated if sample size is sufficiently large” (p. 70). Within the remaining eight factors, the alpha was improved for two components (diversity interaction and classroom effort) when items itacadem and oocideas were removed. Two more items, envsupt and clquest, were removed from two more components (mental activities and institutional emphasis) when factor loadings within the construct were unusually low.

The eight dimensions were labeled as (a) mental activities, (b) institutional emphasis, (c) faculty interaction, (d) institutional relationships, (e) academic workload, (f) diversity interaction, (g) classroom effort, and (h) cocurricular activity. These dimensions were named following a process of item inspection and in conjunction with relevant student engagement literature.

The exploratory results were submitted to a series of CFA tests similar to the ones used for assessing the construct validity of the five benchmark model. For the first construct, mental activities, all of the factorial loadings were above .70, suggesting considerable correlations with the construct (LaNasa et al., 2009). The unexplained variances ranged from
34% to 46%. If treated as a scale, the reliability of this benchmark would be acceptable ($\alpha = 0.84$).

For the second construct, institutional emphasis, only one of the three indicators had a loading below 0.70 (endivrs, .64). For this item, the unexplained variance was 59%. If treated as a scale, the reliability of this benchmark would be acceptable ($\alpha = 0.80$).

For the third construct, faculty interaction, two of the four indicators had a loading below 0.70 (facgrade, .60; facfeed, .53). The unexplained variances were 63% and 72%, respectively. If treated as a scale, the reliability of this benchmark would be acceptable ($\alpha = 0.74$).

For the fourth construct, institutional relationships, two of the three indicators had a loading below .70 (envadm, .68; envstu, .56). The unexplained variance was 53% and 68%, respectively. If treated as a scale, the reliability of this benchmark would be acceptable ($\alpha = 0.72$).

For the fifth construct, academic workload, only one of its indicators had loadings of .70 or higher (writemid, .75), suggesting that most of the variance for the remaining three indicators remained unexplained. The remaining unexplained variances ranged from 71% to 78%. If treated as a scale, the reliability of this benchmark would be low ($\alpha = 0.63$).

For the sixth construct, diversity interaction, all of the factorial loadings were above .70 suggesting considerable correlations with the construct. The range of unexplained variances was from 23% to 26%. If treated as a scale, the reliability of this benchmark would be high ($\alpha = 0.86$).
For the seventh construct, classroom effort, none of the loadings were .70 or higher, suggesting that most of the variance for the indicators remained unexplained. The range of the unexplained variances ranged from 60% to 61%. If treated as a scale, the reliability of this benchmark would be low (\( \alpha = 0.65 \)).

For the eighth construct, cocurricular activity, none of the loadings were .70 or higher, suggesting that most of the variance for the indicators remained unexplained. The unexplained variances ranged from 60% to 76%. If treated as a scale, the reliability of this benchmark would be low (\( \alpha = 0.63 \)).

The average error for academic workload, classroom effort, and cocurricular activity was 56%, 62% and 55%, respectively. Few of the items comprising these constructs had highly acceptable loadings. These problems explained, in part, why each of these three scales report questionable Cronbach’s alpha reliabilities of below .70.

Relative independence among the eight constructs was supported by the CFAs, as none of the structural correlations revealed a strong correlation of .70 or higher. According to LaNasa et al. (2009), “Pedhazur (1982) argued that correlations among variables of 0.70 signify a high degree of multicolinearity to the point of suggesting that the two variables may be alternative measures of the same concept” (p. 323). Moderate structural correlations were found between faculty interaction and classroom effort (.62), with all others falling below a phi of .57. The proposed model, with factor loading, variance, and reliability measures, is displayed in Figure 4.2. The loadings and variance accounted for the proposed eight factor model are shown in Table 4.27.
Figure 4.2. Proposed eight factor model of student engagement for adult students (MA = Mental activities, IE = Institutional emphasis, FI = Faculty interaction, IR = Institutional relationships, AW = Academic workload, DI = Diversity interaction, CE = Classroom effort, CA = Cocurricular activity).
Table 4.27
Loadings and Variance Accounted for in the Proposed Eight Factor Model of Student Engagement for Adult Students

<table>
<thead>
<tr>
<th>Proposed benchmark</th>
<th>Measure</th>
<th>Loading</th>
<th>Variance Explained</th>
<th>Error</th>
<th>Cronbach’s α</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mental activities</td>
<td>synthesz</td>
<td>.81</td>
<td>.66</td>
<td>.34</td>
<td>.844</td>
</tr>
<tr>
<td></td>
<td>analyze</td>
<td>.76</td>
<td>.58</td>
<td>.42</td>
<td></td>
</tr>
<tr>
<td></td>
<td>applying</td>
<td>.74</td>
<td>.55</td>
<td>.45</td>
<td></td>
</tr>
<tr>
<td></td>
<td>evaluate</td>
<td>.73</td>
<td>.54</td>
<td>.46</td>
<td></td>
</tr>
<tr>
<td>Institutional emphasis</td>
<td>envsocal</td>
<td>.87</td>
<td>.75</td>
<td>.25</td>
<td>.803</td>
</tr>
<tr>
<td></td>
<td>envnacad</td>
<td>.80</td>
<td>.64</td>
<td>.36</td>
<td></td>
</tr>
<tr>
<td></td>
<td>envdivrs</td>
<td>.64</td>
<td>.41</td>
<td>.59</td>
<td></td>
</tr>
<tr>
<td>Faculty interaction</td>
<td>facgrade</td>
<td>.60</td>
<td>.37</td>
<td>.63</td>
<td>.736</td>
</tr>
<tr>
<td></td>
<td>facefeed</td>
<td>.53</td>
<td>.28</td>
<td>.72</td>
<td></td>
</tr>
<tr>
<td></td>
<td>facplans</td>
<td>.73</td>
<td>.53</td>
<td>.47</td>
<td></td>
</tr>
<tr>
<td></td>
<td>facideas</td>
<td>.71</td>
<td>.51</td>
<td>.49</td>
<td></td>
</tr>
<tr>
<td>Institutional relationships</td>
<td>envfac</td>
<td>.81</td>
<td>.66</td>
<td>.34</td>
<td>.718</td>
</tr>
<tr>
<td></td>
<td>envadm</td>
<td>.68</td>
<td>.47</td>
<td>.53</td>
<td></td>
</tr>
<tr>
<td></td>
<td>envstu</td>
<td>.56</td>
<td>.32</td>
<td>.68</td>
<td></td>
</tr>
<tr>
<td>Academic workload</td>
<td>writemid</td>
<td>.75</td>
<td>.57</td>
<td>.43</td>
<td>.629</td>
</tr>
<tr>
<td></td>
<td>writesml</td>
<td>.47</td>
<td>.22</td>
<td>.78</td>
<td></td>
</tr>
<tr>
<td></td>
<td>readasgn</td>
<td>.49</td>
<td>.24</td>
<td>.76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>writemor</td>
<td>.54</td>
<td>.29</td>
<td>.71</td>
<td></td>
</tr>
<tr>
<td>Diversity interaction</td>
<td>divrstud</td>
<td>.86</td>
<td>.74</td>
<td>.26</td>
<td>.860</td>
</tr>
<tr>
<td></td>
<td>diffstu2</td>
<td>.88</td>
<td>.77</td>
<td>.23</td>
<td></td>
</tr>
<tr>
<td>Classroom effort</td>
<td>occgrp</td>
<td>.63</td>
<td>.40</td>
<td>.60</td>
<td>.647</td>
</tr>
<tr>
<td></td>
<td>classgrp</td>
<td>.59</td>
<td>.34</td>
<td>.66</td>
<td></td>
</tr>
<tr>
<td></td>
<td>clpresen</td>
<td>.63</td>
<td>.39</td>
<td>.61</td>
<td></td>
</tr>
<tr>
<td>Cocurricular activity</td>
<td>volntr04</td>
<td>.54</td>
<td>.29</td>
<td>.71</td>
<td>.630</td>
</tr>
<tr>
<td></td>
<td>intern04</td>
<td>.49</td>
<td>.24</td>
<td>.76</td>
<td></td>
</tr>
<tr>
<td></td>
<td>lrncom04</td>
<td>.52</td>
<td>.27</td>
<td>.73</td>
<td></td>
</tr>
<tr>
<td></td>
<td>commproj</td>
<td>.63</td>
<td>.40</td>
<td>.60</td>
<td></td>
</tr>
</tbody>
</table>
The CFAs provided support for the eight factor model as shown by the pattern of goodness-of-fit indexes (see Table 4.28). The chi square was significant, which can be expected with a large number of variables and a large sample size (Hair et al., 2006). The chi square, in relation to its degrees of freedom, was slightly above 7. However, due to the significant sample size of 3,425 respondents, a higher value would not necessarily indicate a poor fit (Hair et al., 2006; Kline, 2011).

The goodness-of-fit indicators provided support for the proposed eight factor structure, and the resulting measurement model obtained the following: CFI and GFI > 0.92, RMSEA < 0.06, and a SRMR < .05. Both GFI and CFI indices were above the threshold of .92 suggested by Hair et al. (2006). Moreover, the RMSEA value was below the 0.06 threshold and the SRMR was below the .05 threshold recommended by Hu and Bentler (1999).

**Validity and Reliability of the Proposed Eight Construct Model**

In order to test the validity and the reliability of the proposed eight construct model with smaller sample sizes, SPSS was used to select smaller random samples based on the larger adult sample. Three random sample models of 50% of the original adult sample were used. The model indicated a $\chi^2/df$ value of around 4 for each of the three subsequent random samples.

Similar to the indicators for the larger sample sizes, the goodness-of-fit indicators provided support for the proposed eight-factor structure using smaller sample sizes (see Table 4.28). The resulting measurement model obtained the following: $\chi^2/df < 5$, CFI and GFI > 0.92, RMSEA < 0.06, and a SRMR < .05. Both GFI and CFI indices were above the threshold of 0.92 suggested by Hair et al. (2006). Moreover, the RMSEA value was below
Table 4.28

**Goodness of Fit Indicators for the Proposed Eight-Construct Model**

<table>
<thead>
<tr>
<th>Proposed model</th>
<th>n</th>
<th>$\chi^2$</th>
<th>df</th>
<th>$\chi^2$/df</th>
<th>CFI</th>
<th>RMSEA</th>
<th>GFI</th>
<th>SRMR</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eight constructs</td>
<td>3,425</td>
<td>2,105</td>
<td>296</td>
<td>7.11</td>
<td>.936</td>
<td>.042</td>
<td>.955</td>
<td>.0409</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Random sample #1 (50%)</td>
<td>1,717</td>
<td>1,130</td>
<td>296</td>
<td>3.82</td>
<td>.941</td>
<td>.041</td>
<td>.953</td>
<td>.0414</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Random sample #2 (50%)</td>
<td>1,719</td>
<td>1,179</td>
<td>296</td>
<td>3.98</td>
<td>.938</td>
<td>.042</td>
<td>.951</td>
<td>.0410</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Random sample #3 (50%)</td>
<td>1,706</td>
<td>1,215</td>
<td>296</td>
<td>4.11</td>
<td>.935</td>
<td>.043</td>
<td>.949</td>
<td>.0446</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

the 0.06 threshold and the SRMR was below the .05 threshold recommended by Hu and Bentler (1999).

**Summary**

Chapter 4 provided an overview of the results of the data analysis. Results were presented in four sections correlating with each of the research questions. The first section summarized the demographic characteristics of the study including the frequencies of adult and nonadult students and the frequencies of gender, ethnic, enrollment status, transfer status, and STEM major for the two group groups.

The second section identified whether there was significant differences between the two groups among the demographic variables of gender, race, transfer status, and STEM major along with other variables identified in the literature review, including: time spent on work, curricular participation, classroom preparation, dependent care, and commuting between nonadult and adult students. The research indicated that males and females did not significantly differ in numbers when comparing the status of nonadult and adult students. Adult students also did not significantly differ from nonadult students in the amount of hours per week spent preparing for class. However, when comparing ethnicity, it was discovered
that adult students were more likely than expected to be African American, American
Indian/Alaska Native, or Hispanic than were nonadult students. Adults were more likely to
be enrolled part time, transfer in from another institution, work more hours off campus, and
spend more time caring for dependents than were nonadult students. Adult students on
average spent less time on campus engaging in cocurricular activities and spent more time
commuting to classes than did their traditional counterparts. Nonadult students were more
likely to have parents who had completed a higher level of education than were adult
students.

The third section identified whether there were significant differences between the
two groups among the five NSSE benchmark variables. It was discovered that nonadults had
significantly higher scores on each of the five benchmarks when compared to adult students.

The fourth section identified the results of the CFA using adult students and
discovered that the NSSE five benchmark model was not a good fit for adult students. A
proposed a new model was created by conducting an exploratory factor analysis to identify
reliable constructs. After a series of analyses, a new eight construct model was proposed
and, subjected to CFA, was found to be a better model fit for adult students. Subsequent
smaller random samples also were subjected to CFA, and similar results were measured,
indicating a better model fit for adult students.
CHAPTER 5. DISCUSSION AND CONCLUSION

This chapter provides a summative discussion of the study’s results and significance. This is followed by an examination and discussion of the study’s research questions including interpretations and implications. Finally, implications are presented for policy and practice as are recommendations for further research.

Discussion

The creators of NSSE have argued that the results from the five benchmarks produce a standard of good educational practices for colleges and universities to estimate the efficacy of their engagement efforts. Adult students and traditional students have different objectives and different needs. Adult students are often characterized by the responsibilities they carry outside of the classroom; they have family responsibilities and they have jobs. These responsibilities directly relate to having less opportunity for the adult student to be engaged in learning activities within the academic institution. Adults don’t always have the time to put into their studies and other activities because of responsibilities at home and time spent at work or commuting.

The purpose of this study was two fold. First, this study examined national student engagement data and identified whether there was a significant difference between adult students and nonadult students. The literature review regarding adult students guided the formulation of the research questions. The scholarly research has indicated that adult students and traditional students differ in participation by demographic variables such as gender and race. Adults tend to be part time versus full time students and transfer from other academic institutions. Adult students have more work and family responsibilities and, subsequently, less time for overall curricular participation and classroom preparation. Adult
students tend to live off campus and commute to classes, and the education levels of their fathers and mothers has been shown to be lower than for those of traditional-age students.

Second, this study compared engagement results (represented by the five NSSE benchmarks and other variables) and performed CFA to test the construct validity of the five NSSE benchmarks when applied to adult students. LaNasa et al. (2009) noted that recent research has begun to decompose the five benchmarks in a variety of ways, but only a few research studies have sought to explore the underlying structure of these five benchmarks.

Many institutions assess how well they are doing by gauging themselves against the five benchmarks. NSSE is an instrument used to capture the impact of the institution on students and their educational activities. The validity and reliability of the NSSE benchmarks are essential. NSSE results are oriented toward practical use, as campuses use their NSSE results in innovative ways to improve the undergraduate experience. With recent federal initiatives promoting higher education, coupled with competing in the job market, it is expected that adult students will continue to enter higher education in large numbers. NCES (2009b) projections of higher education enrollment from 2007–2018 suggested that the number of students over 25 years of age will remain stable or increase during the current decade. Adult students’ knowledge, experiences, skills, and learning ability are different than those of the traditional-age student. Institutions that are designing effective practices to serve adult students rely on the NSSE benchmark system to guide their efforts. As institutions attempt to enhance student engagement and foster adult students, it is important to examine the construct validity and reliability of NSSE as an instrument to measure student engagement among adult students.
Demographic Descriptive Analysis

To address the first research question, the demographic characteristics of the adult and nonadult students who responded to 2008 NSSE survey used in this research study were examined. The total number of respondents for this research sample was 21,959 students. Of those respondents, 18,094 were identified as 24 years old or younger and 3,865 were 25 years old or older. All of the students were classified as seniors.

The gender of students who participated in the study was not evenly divided. Among both the nonadult and the adult group, females outnumbered males, nonadult females making up 58.4% \( (n = 10,569) \) of the sample and adult females making up 57.5% \( (n = 2,223) \) of the sample. The adult student gender demographics confirm what was found in the literature: that women make up a larger percentage of adult students than do men (Kasworm 2003b). Compton et al. (2006) stated that “women are the majority population in postsecondary education” (p. 74). This research sample confirmed this.

Among both groups, the largest ethnicity was Caucasian/White; nonadult White students comprised 75.7% \( (n = 12,045) \) of the sample, and adult students who reported being White comprised 62.3% \( (n = 2,217) \) of the sample. Kasworm (2003b) found the increase in adult student enrollment students has brought with it an increase in student diversity, although minorities are still underrepresented. She reported that minority adult students represent about 24% of the adult student population. This research sample supports the idea that the minority population of adult students are increasing.

The majority (95.6%; \( n = 17,294 \)) of nonadult students were considered to be enrolled full time, as were adult students to a lesser degree at 62.8% \( (n = 2,428) \) of the sample. This research sample indicates that adult students attend full time to a lesser extent than their
traditional counterparts. The NCES (1995) found that adults as a whole continue to be predominantly part-time students, at 69% compared with 27% of younger undergraduate students.

The majority of nonadult students (74.2%, \( n = 13,418 \)) started at the college they were currently attending, whereas the majority (85.1%, \( n = 3,289 \)) of adult students were transfer students. This supports what the literature stated. Adult students are more apt to return to college after a significant break, either after high school or after taking other college courses previously (Aslanian, 2001; Kasworm, 2003b; NCES, 1998). Kasworm and Pike (1994) concurred that older students were more likely than younger students to be transfer students.

Finally, when examining whether or not students had a STEM major, nonadult students were relatively evenly split with 51.5% \( (n = 9,313) \) having a STEM major versus 48.5%. \( (n = 8,781) \) reporting a major not in the STEM field. Of adult students, 43.1% \( (n = 1,667) \) reported having a STEM major and 56.9% \( (n = 2,198) \) reported a major not in a STEM field. However, the sample was defined to include an exact ratio of 50% STEM and 50% non-STEM students, so interpretation of this descriptive statistic is limited.

**Differences among Demographic Variables**

The second research question addressed whether there were statistically significant differences among the demographic variables, such as gender, race, enrollment status, transfer status, and STEM major along with time spent on work, curricular participation, classroom preparation, dependent care, commuting, and level of education of father and mother, between nonadult and adult students. The independent variables are variables that were identified through the literature as characteristics of adult students.
To investigate whether males and females differed on their status of nonadult or adult, a chi-square statistic was used. Results indicate that males and females do not significantly differ when comparing the status of nonadult and adult. In reviewing the literature, it was found that women make up a larger percentage of adult students than do men and their number is growing at a faster rate. However, there was little stated on the comparison to the trend of traditional-age students, so interpretation of this finding is limited. This research found that there were no significant differences between the two groups in regards to gender.

To investigate whether race differed between nonadult and adult status, a chi-square statistic was used. Results indicate that ethnicity is significantly different when comparing the status of nonadult and adult students. Adult students are more likely than expected to be African American, American Indian/Alaska Native, or Hispanic than are nonadult students. Also, adult students are less likely than expected to be Caucasian/White or Asian/Pacific Islander than are nonadult students. Kasworm (2003b) noted that adult minority participation is significantly higher compared with national trends of younger minority student participation. She observed that higher percentages of minority adult students compared to minority traditional-age students are enrolled in 2-year colleges, whereas their percentages of enrollment at 4-year institutions appear to be less than those of their younger colleagues.

To investigate whether part-time versus full-time enrollment status differed between nonadult and adult students, a chi-square statistic was used. Results indicate that enrollment status is significantly different when comparing nonadult and adult students. Adult students are less likely to have full-time enrollment status than are nonadult students and thus more likely to have part-time enrollment status than are nonadult students. The part-time status indicates that adults are focused on other responsibilities and have a limited time
commitment to academic involvement (Kasworm, 2003b). Kasworm and Pike (1994) found that younger students were more likely to be enrolled full-time than were older students. This is logical. Factors such as family and employment obligations compete with the rigors of the course load and limit the many out-of-class opportunities, such as student organizations, internships, and social activities that their traditional student counterparts can participate in (Silverman et al., 2009).

Adult students are more likely than expected to be transfer students than are nonadult students. When investigating whether transfer status differed between nonadult or adult students, a chi-square statistic was used. Results indicate that transfer status is significantly different when comparing nonadult and adult students. The literature stated that adult students are more apt to return to college after a significant break, either from high school or from taking other college courses previously. Kasworm (2005) reported that many adults enroll in community colleges. She noted that the community college environment has historically offered a dominant collegiate place for adult students by reflecting classroom settings with a significant representation of adult students (25 years of age or older). Other studies have reported that 60% of college adults enrolled in higher education institutions are studying at 2-year institutions and that approximately 44% of community college students are 25 years of age or older (Aslanian, 2001). Eggleston and Laanan (2001) found that nearly 50% of transfer students actually come from community college technical programs. With adults making up a large portion of community college students, it makes sense that a higher portion of adult students would be transfer students. In a study performed by Kasworm and Pike (1994), they found that older students were more likely than were younger students to be transfer students. The present study supports the findings of the prevalent literature.
Adult students are less likely than expected to major in a STEM degree than are nonadult students. To investigate whether enrollment in a STEM degree differed between nonadult and adult students, a chi-square statistic was used. Results indicate that enrollment in a STEM major is significantly different when comparing nonadult and adult students. The literature suggested that adults are less likely to enter STEM programs. A recent study by NCES (2009a) found that percentages of students entering STEM fields were higher for younger (age 19 or younger) and dependent students than for older (age 24 or older) and independent students. One reason for this is that adult students may not see the advantages of a STEM degree for their chosen career path or they may feel that they do not have the time to dedicate to the more rigorous coursework. It is important to note that the sample used in the present study reflected an exact ratio of 50% STEM and non-STEM students \((N = 22,000)\), so interpretation of this outcome is limited. Further research in this area is needed to confirm findings.

Nonadult and adult students do not differ on the number of hours per week spent preparing for class. Mean ranks in this study were 10,934 and 10,953, respectively. This statistic is not surprising; adults are motivated by internal desire and not so much by external motivators. Knowles (1980) suggested that adult students are intrinsically motivated to learn. Adults are motivated to learn because they want to rather than because of external factors. This statistic of hours spent preparing for class supports Knowles’s (1980) assumption. Adults use discretionary time to prepare for class. Knowles (1980) also suggested that adult students are self-directed. Because adults are more mature than traditional-age students, they become more independent and self-directing in their learning. Because of this maturity, adults are capable of managing other aspects of their lives, such as work and family
responsibilities, as well as planning their own learning (Merriam, 2001). Richardson and King (1998) argued that adult students are actually more capable of learning than their younger counterparts are because of their ability to use their prior experiences in order to process new ideas and situations and that the obstacles faced could actually be seen as strengths for adult students. Though not the intent of this research study, this statistic may provide evidence supporting the concept of andragogy.

Nonadult students are more likely to work on campus than are adult students. Nonadult student had significantly higher mean ranks (11,359) than did the adult students (8,917) when reporting the number of hours spent working for pay on campus. However, the adult students had significantly higher mean ranks (14,252) than did the nonadult students (10,209) when reporting the number of hours spent working for pay off campus. Most adult students (85%) reported that career reasons are their key college enrollment goal (Aslanian, 2001). However, the job itself can be a major barrier to adult participation. In a 1989–90 study, more than 46% of adult students worked full-time (over 40 hours a week) and an additional 25% worked more than 20 hours a week (Kasworm, 2003b). It is expected that younger traditional students would have more on-campus employment opportunities than their adult counterparts would. Traditional students are more likely to live on campus and partake in work–study programs offered by the college. Adult students may not be able to participate in the work–study option or the part-time opportunities on campus due to dependent care or higher financial obligations.

Adult students are less likely to participate in cocurricular activities than are nonadult students. Nonadult students had significantly higher mean ranks (11,854) than did the adult students (6,649) when reporting the number of hours spent in cocurricular activities. Factors
such as family and employment obligation compete with the rigors of the course load and limit the many out-of-class opportunities, such as student organizations, internships, and social activities, in which their traditional-student counterparts can participate (Silverman et al., 2009). Kasworm (2003b) noted that adult collegiate participation appears to be influenced by employer support and the flexibility of work roles. This research supports the findings of the literature on the subject of cocurricular participation.

Adult students are more likely to spend time caring for dependents than are nonadult students. Adult students had significantly higher mean ranks (15,710) than did the nonadult students (9,888) when reporting the number of hours spent providing care for dependents living with the respondent. This difference is to be expected. Adults have life circumstances that are diverse: they may be married, in a long-term relationship, having to care for a child or other dependent, or supporting a family (Silverman et al., 2009). A major hurdle for adults attending higher education is looking after children or family responsibilities (NCES, 1998). Adults are challenged by family and work responsibilities, frequently needing childcare if they are to attend classes (CAEL, 2008). Students with children have to divide their time between providing for their child’s welfare and their own. In order to provide for their families, these students often have to hold a part-time or full-time job. The role as caregiver results in competition for adult students’ time and attention, forcing them to prioritize according to their own perceptions of the return on time invested for each demand in their lives (Silverman, 2009). This research supports the findings of the prevalent literature.

Adult students spend more time commuting to class. Adult students had significantly higher mean ranks (12,406) than did the nonadult students (10,638) when reporting the
amount of time spent commuting to class. Metzner and Bean (1987) found that many adults are commuters having to travel to and from the campus. Commuters have life circumstances that are diverse; they may be married, in a long term relationship, having to care for a child or other dependent, or supporting a family (Silverman et al., 2009). Kasworm (1990) noted that adults make up a major portion of the commuter population on a traditional campus. This research supports the findings of the literature.

Adult students are more likely to have less educated parents than are nonadult students. Nonadult students had significantly higher mean ranks (11,555) than did the adult students (7,886) when reporting the highest level of education for both their father and the mother. NCES (1995) found that older students (24 years or older) tended to have less-educated parents than did their younger counterparts. Older students were much less likely than were younger students to have a parent with a bachelor’s degree (25% compared with 43%, respectively). About two-thirds of all students in their 40s or older came from families in which the parents had a high school education or less, compared with only one-third of students who were less than 24 years old.

Although many older students’ parents belong to a generation that was less likely to complete high school or attend college, it is noteworthy that even those aged 24–29 were less likely to have parents with a bachelor’s degree and more likely to have parents with only a high school education or less. (NCES, 1995, p. 9) Bean and Metzner (1985) concluded that students age 25 years of age or older were more likely to have lower parental educational attainment.

In summary, this research supports the findings of the literature on the demographics of adult students. Adult students are more likely than nonadult students to be from a
minority group, be enrolled part time, have attended another institution, and seek a degree other than in STEM. In addition, adult students are more likely to be employed off campus, have dependent care requirements, spend more time commuting, and have parents with less education than are younger nonadult students.

**Differences in the Five NSSE Benchmarks**

The third research question addressed identifying whether there are significant differences in engagement between adult and nonadult students using the five NSSE engagement benchmarks. A major component of the way NSSE results are reported is through its benchmark scales. These scales are informed partially by an empirically derived grouping of survey items as well as by an intuitive understanding of concepts proposed by Astin’s (1984) theory of student involvement and by Chickering and Gamson’s (1987) seven principles of good practice (Gordon et al., 2008; Kuh, Hayek, 2001). The five benchmarks identified by the NSSE 2008 codebook used for this analysis are level of academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences, and supportive campus environment. The benchmarks serve as the framework around which the NSSE annual reports are created. The benchmarks are intended to be a useful tool for internal evaluation and are also used to facilitate comparisons among other institutions and institutional types (Gordon et al., 2008; Kuh, 2001). In order to evaluate the NSSE benchmarks, the respondents were divided into two groups: students 25 years or older and students 24 years old or younger to see if there were any significant differences in the five benchmarks. Because the dependent variables were scaled and the variances were unequal, Mann-Whitney U tests were performed to compare nonadult students and adult students.
This research found that nonadult students outperform adult students on all of the five NSSE benchmarks, a finding supported by the literature. Several studies have shown that nontraditional students respond differently on many of the NSSE questions, especially those items inquiring about activities outside the classroom (Lerer & Talley, 2010). One explanation for this is that the characteristics of adult students (part time, transfer, and commuter) create barriers to engagement. First, adult students are inclined to be part-time students. Students enrolled full-time have more opportunities to become engaged in the educationally purposeful activities that NSSE purportedly measures. Another characteristic of adult students is that they are more likely to be transfer students. Similar results for the NSSE benchmarks are shown for students who entered the institution as transfers. NSSE (2004) has acknowledged that transfer students are less engaged in effective educational activities than are their nontransfer peers: “Transfer students believe their coursework provides more emphasis on cultivating higher-order thinking abilities than their peers, yet they interact with faculty members and engage in enriching educational programs at levels lower than their counterparts” (p. 9). Finally, adult students also tend to be commuter students, and commuter students also have been found to be less engaged. “It appears that the further away from campus (walking distance, driving distance) the less likely a student is to take advantage of the educational resources the institution provides” (Kuh, Gonyea, et al., 2001, p. 9). Finally NSSE (2004) has acknowledged the differences with adult students, noting that “younger traditional-age students (18–24 years) report spending slightly more time in educationally productive activities and perceive their campus environment as more supportive than older students” (p. 9).
So, it is not a surprise that adult students have lower mean scores compared to nonadult students. NSSE has claimed that level of academic challenge, time on task, and other educationally purposeful activities directly influence the quality of a student’s learning (Kuh, 2001). The other purposeful educational activities include collaborating with peers on projects, problem-solving tasks, and community service (Kuh, Gonyea, et al., 2001). Adult students cannot always participate in educationally purposeful activities outside the classroom due to constraints on their time or conflicting responsibilities of home and life. Lerer and Talley (2010) noted that research has found that adult students (those over age 25) had similar responses to younger seniors on most NSSE items and institution controls, such as classroom activities, relationships with faculty and administrators, and institutional support, but had different responses on items that were related to activities and interaction with other students and faculty outside the classroom.

According to NSSE (2008b), the enriching educational experiences benchmark is an index that measures extent of interaction with students of different racial or ethnic backgrounds or with different political opinions or values, using electronic technology, and participating in activities such as internships, community service, study abroad, cocurricular activities, and a culminating senior experience. The enriching educational experiences benchmark has five survey questions that inquire about outside-of-classroom activities. These nonacademic activities include cocurricular activities (cocurr01), practicum, internship, field experience, coop experience or clinical assignment (intern04), community service or volunteer work (volntr04), study abroad (stdabr04), and learning communities (lrncom04). Learning communities is problematic for adult students in that it is usually a part of students’ first-year experience, and many adult students may transfer in from
community colleges. This research study found that the mean ranks (11,635) for nonadult students were significantly higher than for adult students (7,732).

Another benchmark that measures educationally purposeful activities outside the classroom is the student–faculty interaction benchmark. According to NSSE (2008b), student–faculty interaction is an index that measures extent of talking with faculty members and advisors, discussing ideas from classes with faculty members outside of class, getting prompt feedback on academic performance, and working with faculty on research projects. The activities that take place outside of the classroom include talk about career plans with faculty members (facplans), working with faculty on activities other than coursework committees, orientation, student-life activities (facother), discussing ideas from readings or classes outside of the classroom (facideas), and working on a research project with a faculty member outside of a course or program (resrch04). This research study found that the nonadult students had significantly higher mean ranks (11,272) than did the adult students (9,202).

The active and collaborative learning benchmark also had items measuring activities outside the classroom. According to NSSE (2008b), active and collaborative learning is an index that measures the extent of class participation, working collaboratively with other students inside and outside of class, tutoring, and involvement with a community-based project. Activities outside the classroom include working with classmates outside of class to prepare class assignments (occgrp), tutoring or teaching other students (tutor), participating in a community-based project as part of a regular course (commproj), and discussing ideas from readings or classes with others outside of class (oocideas). This research study found
that nonadult students had significantly higher mean ranks (11,057) than did adult students (9,975).

The academic challenge benchmark is also problematic for adult students due to the part-time characteristic that often comes with being an adult student. According to the NSSE 2008 codebook, academic challenge is an index that measures time spent preparing for class, the amount of reading and writing, deep learning, and institutional expectations for academic performance. Adult students are less likely to score higher than traditional-age students on this index. NSSE (2008) offers an adjusted benchmark, acknowledging that because part-time students spend less time in classes, they are likely to report lower numbers for several items on the questionnaire such as hours spent preparing for class, number of papers written and number of assigned books read. This research used the nonadjusted academic challenge to analyze the true differences between nonadult students and adult students. This research study found that nonadult students had significantly higher mean ranks (11,034) than did adult students (10,624).

The final benchmark measures a supportive campus environment. According to NSSE (2008b), supportive campus environment is an index that measures the extents to which students perceive that the campus helps them succeed academically and socially; assists them in coping with nonacademic responsibilities; and promotes supportive relations among students and their peers, faculty members, and administrative personnel and offices. This research study found that nonadult students had significantly higher mean ranks (11,072) than did the adult students (10,371). One reason for this is that adult students may have a different concept of what the relationship with the academic institution is. Adult students who commute, care for dependents, or are engaged in working view the institution
as a place to earn a degree and not as one that helps them to succeed socially. Hammer et al. (1998) found that adult students focus on completing academic requirements in a minimum amount of time and are primarily concerned with the institution’s proximately to home and work; availability of night, weekend and online courses; and college services such as faculty office hours, accurate academic advisement, and quality instruction. Kasworm (2003b) stated that adult students typically enroll in a college that is readily accessible, relevant to current life needs, cost-effective, flexible in course scheduling, and supportive of adult lifestyle commitments. Kasworm and Pike (1994) found that adult students succeed in college at about the same rate as traditional-age students, but they engage in fewer interactions with peers than do their traditional counterparts. It is quite possible that these social interactions are not important predictors of their success. Although not entirely conclusive, Lundberg (2003) noted that other studies also have shown that social integration is relatively unimportant for adult student success (Chartrand, 1990; Kasworm & Pike, 1994; Metzner & Bean, 1987). According to CAEL (2008), adults are more concerned with the flexibility of the academic institution, especially relationships with the faculty, administration offices and academic counselors, than with the social relationships gained from attending college.

**NSSE Model Fit for Adult Students**

The fourth research question addressed identifying whether the NSSE five benchmark model was a good fit for adult students. To assess whether the NSSE five benchmark model fit, CFA was performed, and it was discovered that the model was not a good fit for adult students. Relative independence among the five NSSE benchmarks was not supported by CFA as shown by one of the five benchmarks being highly correlated with each other. The
structural correlation between the active and collaborative learning and student–faculty interactions benchmarks was .83 (see Figure 4.1). Moderate structural correlations also were found between the active and collaborative learning and enriching educational experiences benchmarks (.68) as well as between the academic challenge and active and collaborative learning benchmarks (.62). Only the supportive campus environment and enriching educational experiences benchmarks were relatively independent of each other (0.31).

Loadings of many items were very low, particularly for the active and collaborative learning and enriching educational experiences benchmarks. Two of the five benchmarks had Cronbach’s alpha values below the recommended .70 threshold. Finally, goodness-of-fit measures were calculated, and results indicated a model that did not have a reasonable fit of the data. The resulting measurement model obtained the values $\chi^2/df > 5$, CFI and GFI < 0.92, RMSEA > 0.06, and a SRMR > .05 for the adult student sample.

The literature reflects only a few scholars who have investigated the construct validity of the NSSE (Campbell & Cabrera, 2011). Porter (2011) reviewed the literature investigating the validity and reliability of the NSSE benchmarks and found that the NSSE failed to meet validity or reliability standards. He also noted that there was not sufficient evidence to support the claim that the NSSE benchmarks were associated with student outcomes (Campbell & Cabrera, 2011). LaNasa et al. (2009) found that the NSSE model was reasonable but found several problems including poor factor loadings, high correlation among benchmarks, and poor model fit indicators. One limitation of this study is that it was from a single institution, and it recommended that a more widespread analysis be replicated. This current research study included a large sample from several different institutions.
The principle of construct validity asks for evidence of the extent to which items or scales measure the construct they purport to represent. The NSSE uses items that reflect experiences and expectations that focus on academics, classroom activities, and institutional support. However, there is no discernment of the type of experiences that are valid to create a higher quality of learning. This research study confirms that adult students have a different set of characteristics than do nonadult student and, therefore, the NSSE benchmarks cannot reflect the expectations of both types of students. NSSE (2011b) has concurred, explaining that one potential limitation of the results is that higher correlations result from more heterogeneous groups of respondents and the correlations reported could only be generalized to students with characteristics similar to the students analyzed in the overall population. Institutions with high levels of adult or nontraditional students compared to the students analyzed in the overall population may not find the NSSE to be a valid indicator of engagement.

NSSE’s current way of measuring student engagement is at odds with adult learning models. It is not surprising that the model does not fit. Knowles’s (1980) framework of andragogy provides an understanding of the relationship between adult students and work, responsibility, and learning. Andragogy deals with adults and their needs, interests, problems, and characteristics, and it assumes that adults are more mature than are traditional-age students and that they become more independent and self-directing in their learning. With maturity, adults are able to manage their responsibilities as well as create time for learning.

NSSE purports to measure student engagement, which includes activities that are traditionally associated with learning, such as reading and writing, preparing for class,
interacting with instructors about various matters, and spending time on campus partaking in educationally purposeful activities (Kuh, 2001). Traditional student development indicates that the time and energy students devote to educationally purposeful activities is the single best predictor of their learning and personal development (Kuh, 2003). However, adult learning models acknowledge that adult students already have developed a self-concept and usually have had a variety of life experiences that developed into maturity (Knowles, 1990). This suggests that the adult student does not need certain college activities for personal development.

Kuh (2003) stated that good educational practice helps focus faculty, staff, students, and others on the tasks and activities that are associated with higher yields in terms of desired student outcomes. The literature suggests that adult learning outcomes may be different. Mezirow (1990) suggested in his concept of transformational learning that rational thought and action are the goals of adult education. Adults have a need to make sense or meaning from their experiences. Knowles (1990) acknowledged meaning through experiences and implied that adults value learning through those experiences and believe that sharing those life experiences in the classroom help them to learn. The desired outcomes between adults and nonadults may be different.

Kuh (2003) suggested that faculty and administrators would do well to arrange the curriculum and other aspects of the college experience in accordance with good practices such as writing more papers, reading more books, meeting more frequently with faculty and peers, participating in cocurricular activities, thereby encouraging students to put forth more effort. Knowles (1990) believed that adult students are motivated by internal desire and not so much by external motivators. He suggested that, although adults are responsive to some
external motivators (better jobs, promotions, higher salaries, and the like), the most potent motivators are internal pressures (the desire for increased job satisfaction, self-esteem, quality of life, and the like). These internal motivators drive adult students to achieve their goals. These internal motivators are different than the eternal motivators that Kuh et al. (2007) stated are critical to student engagement. They argued that student engagement represents two critical features. The first is the amount of time and effort students put into their studies and other educationally purposeful activities; the second component of student engagement is how the institution deploys its resources and organizes the curriculum, other learning opportunities, and support services to induce students to participate in activities that lead to the experiences and desired outcomes such as persistence, satisfaction, learning, and graduation. According to the literature, adult students do not need the same amount of inducing to partake in educationally purposeful activities, as they are more motivated by internal desire.

Adults are self-directed in their learning process. SDL theory states that adults take control of their own learning, in particular how they set their own learning goals, locate appropriate resources, decide on which learning methods to use, and evaluate their progress (Brookfield, 1995). The descriptive understanding of SDL is that as people mature learning becomes more self-directed. Knowles (1990) argued that, because adult students are responsible for making daily decisions about life and those decisions often affect others, they develop a concept through which they can actually resist and resent situations in which they feel others are imposing their wills on them. This concept would be problematic when defining educationally purposeful activities. The adult student potentially has a view different from the that of the institution and most likely wants some influence over deciding
what is important. Adult students differ from nonadult students in many ways, and colleges and universities will be better served with an engagement construct model that is designed for the adult student.

**Proposed Model of Engagement for Adult Students**

The CFA did not fully support the five benchmark model as a good model fit for adult students. As with the LaNasa et al. (2009) study, in the present study poor item loadings and the high correlation among the latent constructs and poor goodness of fit led to conducting an exploratory factor analysis that would attempt to better identify the dimensions explaining the data for adult students.

Pike (2006) proposed that researchers and assessment professionals use scalelets to overcome the challenges posed by the need to present survey data that are specific to a college. The present study used Pike’s (2006) recommendation to explore scalelets to examine a factor structure better suited to adult students. According to Pike (2006), “The objective of using scalelets in outcomes assessment is to make judgments about educational quality” (p. 552). Pike went on to say, “Scalelets may hold the greatest promise for surveys developed by colleges and universities because they suggest a new model for survey construction” (p. 559).

For the EFA, the goal was to describe and summarize the data by grouping together certain variables that may be correlated and for which a reliable construct could be identified. Factor analysis was conducted to determine what, if any, underlying structure exists for measures of the 42 NSSE items. After examination and reliability testing, eight constructs were formed to create a new model. The eight dimensions were labeled as (a) mental activities, (b) institutional emphasis, (c) faculty interaction, (d) institutional relationships, (e)
academic workload, (f) diversity interaction, (g) classroom effort, and (h) cocurricular activity. These dimensions were named following a process of item inspection and in conjunction with relevant student engagement literature.

The CFA provided support for the eight factor model as shown by the pattern of goodness-of-fit indexes. Validity and reliability were checked by running subsequent CFA on smaller random samples. The three random sample models of 50% of the sample size indicated a $\chi^2/df$ value of around 4. The goodness-of-fit indicators provided support for the proposed eight-factor structure, and the resulting measurement model obtained the following values: $\chi^2/df < 5$ (using smaller random samples), CFI and GFI > 0.92, RMSEA < 0.06, and a SRMR < .05.

These results suggest that student engagement comprises several independent factors that are different from the five benchmark descriptions utilized by the NSSE researchers as the primary means to share results and compare institutions. Although these results are not meant to suggest that there is no meaning in the original five benchmarks, it does suggest that a more comprehensive analysis may be required for individual institutions. As with LaNasa et al.’s (2009) study, there may be slight variations to the structures, perhaps suggesting that engagement may take different forms at various institutions depending on student makeup or to overcome the challenges posed by the need to present survey data that are specific to a department or college (Pike, 2006).

Adult students, when compared to nonadult students, bring more complex and varied backgrounds of life experiences and prior knowledge and skills; complex educational histories; and wide-ranging maturity levels, motivations, and attitudes to the classroom. They usually have limited time, resources, and access for college engagement (Kasworm,
However adults display a self-directed learning focus on the process by which they take control of their own learning, in particular how they set their own learning goals, locate resources, and decide on what learning methods to use (Brookfield, 1995). This is an important distinction between adult and nonadult students. The new proposed eight factor model still relies on the premise that engagement has two critical factors of student effort and institutional practices that induce participation that lead to desired outcomes. However, the new proposed model takes into account the strength of the correlation between the different variables using only adult student data and using CFA to confirm how well the structure fits the adult student data. Adult student correlations would be different than for nonadult students, so the new proposed model is for institutions with heavy adult student populations.

**Implications for Practice and Policy**

The results of the first part of this research study (research questions #1 and #2) generally confirmed the findings of previous studies concerning the differences between nonadult and adult undergraduate students. Adult students are more likely to care for dependents, spend more time at work, commute, transfer in from another institution, have parents with less education than those of nonadult students, and spend less time with cocurricular activities. The research shows no difference in the amount of time adults spend preparing for class, although they are burdened with time constraints, than for nonadult students. Knowing what kinds of barriers prevent adults from engaging in educational pursuits will assist faculty, administrators, and others to increase the retention rate of the adult students and to improve the quality of the educational experience. With this guiding principle, there are a couple of practices that are recommended for institutions that wish to engage adult students more effectively.
Because adult students have numerous responsibilities (work, dependent care, etc.) and may have limited time or need for traditional types of involvement in campus culture, institutions should look for ways to maximize opportunities for student support services scheduled around classroom time. Adult students need as much as, if not more than, their younger cohorts in the way of quality academic and student support. Institutions should look for ways to provide student support tailored to adult students. Some examples include:

- Providing certain administrative services, such as financial aid counseling and academic counseling, that accommodate adult student class schedules.
- Developing programs to assist students with childcare in order that adult students can attend classes and stay after class for a period of time in order to engage with faculty and staff and other students.
- Providing special parking passes and areas for commuter students only in order to accommodate those that live off campus. This helps students to get to class quickly and easily, promoting an efficient use of their time.
- Scheduling office hours for faculty so they can meet with adult students before and or after classroom times.

Another recommendation is that institutions (including both administration and faculty) should engage technology to provide relevant and timely information to enhance the learning experience. Some examples include:

- Allowing students to complete administrative tasks, such as paying their tuition bills, ordering textbooks, etc., via the Internet. This assists busy students who do not have time to come to campus.
• Institutions redesigning their websites to include information adult students need such as course schedules, class times, campus maps, parking passes, tutor information and campus activities. Encourage faculty to post classroom materials such as articles, PowerPoint presentations, and current grades.

• Developing an online “bulletin board” or forum for adult students to engage with other adult students. This could help students discover what is happening on campus, identify other students with whom they can carpool, and enhance building relationships with other students. An online forum or bulletin board can promote meaningful relationships both in and out of classrooms.

• Faculty being encouraged to look into classroom delivery options, as the rise in online classes has truly opened doors for adult students. Online delivery options enable adult students to perform learning activities on their own time to accommodate their life schedule.

The second part of this research (research questions #3 and #4) examined the effectiveness of the NSSE benchmarks when applied to adult students. NSSE was designed to assess the extent to which students are engaged in good educational practices (Kuh, 2001). It is used at more than 1,300 baccalaureate-granting colleges and institutions that enroll both nonadult and adult students (NSSE, 2008a). However, both the literature and this research study support the notion that there are significant differences between these groups of students. Lerer and Talley (2010) noted that several studies have indicated that adult students respond differently on many of the NSSE questions and consequently have lower scores on several of the NSSE benchmarks. NSSE (2004) has acknowledged that transfer students, commuter students, and adult students are less engaged than traditional-age students.
and that the older students do not spend as much time in educationally productive activities as younger students. Using the NSSE to assess both types of students seems to put institutions with large adult student populations at a comparative disadvantage.

NSSE has argued that institutions that more fully engage their students in the variety of activities that contribute to valued outcomes of college can claim to be of higher quality in comparison with similar types of colleges and universities (Kuh, 2003). Although NSSE researchers clearly have implied by the way the benchmarks are constructed that out-of-classroom activities are an essential part of students’ educational experiences, they have not proven that adult students, who tend to engage in these activities less than traditional students, receive an inferior education (Lerer & Talley, 2010). NSSE’s own researchers seem to support this by noting that nontraditional students are more satisfied with their overall educational experiences (NSSE, 2004). Adult students do not have the same educational goals as their traditional counterparts. Lerer and Talley (2010) agreed, stating that adults “tend to focus on academics, and do not have the time to participate in off-campus activities or interactions outside the classroom” (p. 356).

Adults have the ability to learn how to learn and have the ability to adapt to different classroom environments in order to focus on meeting their educational goals (Brookfield, 1995). Knowles (1990) suggested that institutions that want to improve services for adult students establish a climate conducive to adult learning and then create an organizational structure for participative planning. Adults should be included in the formation of directions of learning (objectives) and design activities that are conducive to the adult learners’ experience and maturity. Along with these initial steps, from the findings of this research study, it is recommended that the proposed eight construct model be used to better assess
adult student engagement. The proposed eight construct model is a better model fit for adult students than is the NSSE five benchmark model. The intent is for the proposed model to provide a valuable tool for analyzing institutional practices focusing on engagement of adult students. However, this study also highlights the need for institutions to validate their own results and explore the potential need to construct items most appropriate to their institutional data, as suggested by Pike (2006). It is highly recommended that institutions explore their data and more thoroughly define the nature of engagement within their institutional environment. This research study questions the extent to which NSSE benchmarks are a universal tool for appraising institutional quality and whether they predict a high quality education for those institutions with large adult student populations. This research supports Gordon et al.’s (2008), LaNasa et al.’s (2009) and Campbell and Carrera’s (2011) advice to institutional researchers and policymakers. Colleges and universities should carefully examine the extent to which the five NSSE benchmarks are reliable and valid for their own institutional contexts before committing themselves to major organizational changes.

**Recommendations for Future Research**

Care should be taken not to over-generalize these results. The findings of this study were based on a subset of universities who participated in the NSSE. Tests based on a larger sample of institutions might identify other important relationships between NSSE benchmarks and student populations.

This study is a first step in examining the engagement of adult students, as the current and future research call for attention to examine the relationship among student engagement, degree attainment/completion, and career mobility and self-sustainability as desired outcomes for the adult student. These results suggest that more work is needed to understand
component parts of student engagement. Adult learning models hold that adults are more apt to be self-directed and self-motivated, indicating a different amount of student effort and institutional practice is needed.

This research confirms that the NSSE five benchmark model of student engagement is not a good fit for adult students. Future research must replicate the proposed model and examine the extent to which these underlying constructs are present in the data of institutions with large numbers of adult students. Also, future research is needed to identify the extent to which the proposed eight construct model predicts desired student outcomes such as retention rates and/or graduation rates.

An inspection of the proposed 8 factor model indicates a few problems with four of the dimensions. For the construct, institutional relationships, two of the three indicators had a loading below .70 (envadm, .68; envstu, .56), leading to the unexplained variance at 53% and 68%, respectively. For the construct, academic workload, only one of its indicators had loadings of .70 or higher suggesting that most of the variance for the remaining three indicators remained unexplained. If treated as a scale, the reliability of this benchmark would be low (a = 0.63). For the constructs, classroom effort and cocurricular activity, none of the loadings were .70 or higher, suggesting that most of the variance for the indicators remained unexplained. The range of the unexplained variances ranged from 60% to 61%. If treated as a scale, the reliability of both benchmarks would be low (a = 0.65, and a = 0.63 respectively). The overall amount of errors on these four dimensions indicates a better understanding of each of these constructs is needed. It also suggests that more analysis is needed to better understand the concept of engagement when it comes to adult students. This study was limited because it only accounts for measurement of engagement of a single year. Future
research should replicate this approach and examine the engagement constructs using adult students over a broader period of time.

It may be possible that different survey questions may be needed in order to better capture adult student engagement. Institutions should be aware that the unexplained variances are based on measures utilizing the NSSE and are constrained to the survey questions that the NSSE uses. Engagement is a complex construct in which more understanding may be needed when applied to adult students. Supplemental measurements, such as social/psychological measurements (surveys, etc.) should be developed specifically for adult students.

There is a lack of understandings of the adult learning experience in an undergraduate classroom setting. A deeper examination is needed to understand how adult students’ experiences and current involvements influence their academic learning. In order to propose more accurate measures of engagement, a better understanding is needed of what educationally purposeful activities are for the adult student. Qualitative research may provide more information and a deeper understanding of the adult student experience. Finally, linking the NSSE data to existing institutional data, such as transcript data, enrollment data, and financial aid data might be critical to fully understand the complexity of student engagement among adult students.

**Conclusion**

Adult students are an important part of higher education. They have many specialized needs and different expectations than do traditional-age students. They are a growing segment of the population of students who are entering colleges. Having this
understanding will allow colleges to develop processes that can help adults reach their educational goals.

This research found that NSSE’s five benchmarks had significant differences when comparing adult and nonadult students. On average, adult students scored lower than did nonadult students. Because NSSE claims that the benchmarks lead to higher quality of learning (Kuh, 2001), one would have to assume that adult students are less engaged and thus have a lesser quality of learning. This reasoning is problematic, as NSSE does not measure student learning outcomes directly but claims to provide the kind of information that every school needs in order to focus its efforts to improve the undergraduate experience. However, if there are such significant differences between these two groups of students in terms of goals, needs, and learning abilities, then how can institutions rely on the benchmark scores to improve collegiate quality?

Adult learning models state that adult students learn and engage with the institution differently than do nonadult students. Adults are self-directed, self-motivated, value experiential learning, and create learning goals that are in line with their personal goals.

The findings of this research study in total seem to challenge the notion that student engagement (as a concept for all types of students) is built on just five interdependent constructs and suggest that engagement of adult students involves a more complex and interdependent set of constructs.
# APPENDIX A. 2008 NSSE SURVEY

## National Survey of Student Engagement 2008

### The College Student Report

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

<table>
<thead>
<tr>
<th>Very Often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Asked questions in class or contributed to class discussions</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>b. Made a class presentation</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>c. Prepared two or more drafts of a paper or assignment before turning it in</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>d. Worked on a paper or project that required integrating ideas or information from various sources</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>e. Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>f. Come to class without completing readings or assignments</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>g. Worked with other students on projects during class</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>h. Worked with classmates outside of class to prepare class assignments</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>i. Put together ideas or concepts from different courses when completing assignments or during class discussions</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>j. Tutored or taught other students (paid or voluntary)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>k. Participated in a community-based project (e.g., service learning) as part of a regular course</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>l. Used an electronic medium (listserv, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>m. Used e-mail to communicate with an instructor</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>n. Discussed grades or assignments with an instructor</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>o. Talked about career plans with a faculty member or advisor</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>p. Discussed ideas from your readings or classes with faculty members outside of class</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>q. Received prompt written or oral feedback from faculty on your academic performance</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Very Often</th>
<th>Often</th>
<th>Sometimes</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>r. Worked harder than you thought you could to meet an instructor's standards or expectations</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>s. Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>t. Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>u. Had serious conversations with students of a different race or ethnicity than your own</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>v. Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Very Much</th>
<th>Quite a Bit</th>
<th>Some</th>
<th>Very Little</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Memorizing facts, ideas, or methods from your courses and readings so you can repeat them in pretty much the same form</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>b. Analyzing the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth and considering its components</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>c. Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>d. Making judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
<tr>
<td>e. Applying theories or concepts to practical problems or in new situations</td>
<td>□</td>
<td>□</td>
<td>□</td>
</tr>
</tbody>
</table>
3. **During the current school year, about how much reading and writing have you done?**

   - a. Number of assigned textbooks, books, or book-length packs of course readings
     - None 1-4 5-10 11-20 More than 20
   - b. Number of books read on your own (not assigned) for personal enjoyment or academic enrichment
     - None 1-4 5-10 11-20 More than 20
   - c. Number of written papers or reports of 20 pages or more
     - None 1-4 5-10 11-20 More than 20
   - d. Number of written papers or reports between 5 and 19 pages
     - None 1-4 5-10 11-20 More than 20
   - e. Number of written papers or reports of fewer than 5 pages
     - None 1-4 5-10 11-20 More than 20

4. **In a typical week, how many homework problem sets do you complete?**

   - None 1-2 3-4 5-6 More than 6

5. **Mark the box that best represents the extent to which your examinations during the current school year have challenged you to do your best work.**

   - Very little 1 2 3 4 5 6 Very much

6. **During the current school year, about how often have you done each of the following?**

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

7. **Which of the following have you done or do you plan to do before you graduate from your institution?**

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

8. **Mark the box that best represents the quality of your relationships with people at your institution.**

   - a. Relationships with other students
     - Unfriendly, Unsupportive, Sense of alienation
     - Friendly, Supportive, Sense of belonging
   - b. Relationships with faculty members
     - Unavailable, Unhelpful, Unsympathetic
     - Available, Helpful, Sympathetic
   - c. Relationships with administrative personnel and offices
     - Unhelpful, Inconsiderate, Rigid
     - Helpful, Considerate, Flexible
### About how many hours do you spend in a typical 7-day week doing each of the following?

<table>
<thead>
<tr>
<th>Activity</th>
<th>Hours per week</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)</td>
<td>0</td>
</tr>
<tr>
<td>b. Working for pay on campus</td>
<td>0</td>
</tr>
<tr>
<td>c. Working for pay off campus</td>
<td>0</td>
</tr>
<tr>
<td>d. Participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.)</td>
<td>0</td>
</tr>
<tr>
<td>e. Relaxing and socializing (watching TV, partying, etc.)</td>
<td>0</td>
</tr>
<tr>
<td>f. Providing care for dependents living with you (parents, children, spouse, etc.)</td>
<td>0</td>
</tr>
<tr>
<td>g. Commuting to class (driving, walking, etc.)</td>
<td>0</td>
</tr>
</tbody>
</table>

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

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

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

- Excellent
- Good
- Fair
- Poor

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

- Excellent
- Good
- Fair
- Poor

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

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

16. Your sex:
   - Male
   - Female

17. Are you an international student or foreign national?
   - Yes
   - No

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

19. What is your current classification in college?
   - Freshman/first-year
   - Sophomore
   - Unclassified
   - Junior

20. Did you begin college at your current institution or elsewhere?
   - Started here
   - Started elsewhere

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

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

23. Are you a member of a social fraternity or sorority?
   - Yes
   - No

24. Are you a student-athlete on a team sponsored by your institution’s athletics department?
   - Yes
   - No (Go to question 25.)

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

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

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

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

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

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

28. Please print your major(s) or your expected major(s).
   a. Primary major (Print only one.):

   b. If applicable, second major (not minor, concentration, etc.):

THANKS FOR SHARING YOUR RESPONSES!
After completing the survey, please put it in the enclosed postage-paid envelope and deposit it in any U.S. Postal Service mailbox. Questions or comments? Contact the National Survey of Student Engagement, Indiana University, 1000 East Tenth Street, Eigenmann Hall Suite 410, Bloomington IN 47406-7513 or nsee@indiana.edu or www.nsee.iub.edu. Copyright © 2007 Indiana University.
APPENDIX B. NSSE BENCHMARKS

NSSE benchmarks are based on 42 key questions from the NSSE survey that capture many vital aspects of the student experience. These student behaviors and institutional features are some of the more powerful contributors to learning and personal development.

**Level of Academic Challenge**

Challenging intellectual and creative work is central to student learning and collegiate quality. Colleges and universities promote high levels of student achievement by emphasizing the importance of academic effort and setting high expectations for student performance.

Activities and conditions:

- Time spent preparing for class (studying, reading, writing, rehearsing, and other activities related to your academic program)
- Worked harder than you thought you could to meet an instructor’s standards or expectations
- Number of assigned textbooks, books, or book-length packs of course readings
- Number of written papers or reports of 20 pages or more
- Number of written papers or reports between 5 and 19 pages
- Number of written papers or reports fewer than 5 pages
- Coursework emphasizes: Analyzing the basic elements of an idea, experience, or theory
- Coursework emphasizes: Synthesizing and organizing ideas, information, or experiences
- Coursework emphasizes: Making judgments about the value of information, arguments, or methods
- Coursework emphasizes: Applying theories or concepts to practical problems or in new situations
- Campus environment emphasizes spending significant amounts of time studying and on academic work

**Active and Collaborative Learning**

Students learn more when they are intensely involved in their education and are asked to think about and apply what they are learning in different settings. Collaborating with others in solving problems or mastering difficult material prepares students to deal with the messy, unscripted problems they will encounter daily during and after college.

Activities:

- Asked questions in class or contributed to class discussions
- Made a class presentation
- Worked with other students on projects during class
- Worked with classmates outside of class to prepare class assignments
- Tutored or taught other students
- Participated in a community-based project as part of a regular course
- Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)

![Student-Faculty Interaction Graph](image-url)
**SFI**

**Student-Faculty Interaction**

Students see first-hand how experts think about and solve practical problems by interacting with faculty members inside and outside the classroom. As a result, their teachers become role models, mentors, and guides for continuous, life-long learning.

Activities:
- Discussed grades or assignments with an instructor
- Talked about career plans with a faculty member or advisor
- Discussed ideas from your readings or classes with faculty members outside of class
- Worked with faculty members on activities other than coursework (committees, orientation, student-life activities, etc.)
- Received prompt written or oral feedback from faculty on your academic performance
- Worked with a faculty member on a research project

**SCE**

**Supportive Campus Environment**

Students perform better and are more satisfied at colleges that are committed to their success and cultivate positive working and social relations among different groups on campus.

Conditions:
- Campus environment provides support you need to help you succeed academically
- Campus environment helps you cope with your non-academic responsibilities (work, family, etc.)
- Campus environment provides the support you need to thrive socially
- Quality of relationships with other students
- Quality of relationships with faculty members
- Quality of relationships with administrative personnel and offices

**EEE**

**Enriching Educational Experiences**

Complementary learning opportunities inside and outside the classroom augment the academic program. Experiencing diversity teaches students valuable things about themselves and other cultures. Used appropriately, technology facilitates learning and promotes collaboration between peers and instructors. Internships, community service, and senior capstone courses provide students with opportunities to synthesize, integrate, and apply their knowledge. Such experiences make learning more meaningful and, ultimately, more useful because what students know becomes a part of who they are.

Activities and conditions:
- Talking with students with different religious beliefs, political opinions, or values
- Talking with students of a different race or ethnicity
- An institutional climate that encourages contact among students from different economic, social, and racial or ethnic backgrounds
- Using electronic technology to discuss or complete assignments
- Participating in:
  - Internships or field experiences
  - Community service or volunteer work
  - Foreign language coursework
  - Study abroad
  - Independent study or self-assigned major
  - Culminating senior experience
  - Co-curricular activities
  - Learning communities

---

**NSSE**

National Survey of Student Engagement

Indiana University Center for Postsecondary Research
1900 East Tenth Street, Suite 419
Bloomington, IN 47406-7512

Phone: 812-856-5924
Fax: 812-856-5150
E-mail: nsse@indiana.edu
Web: nsse.iub.edu
APPENDIX C. NSSE DATA SHARING AGREEMENT

Indiana University Center for Postsecondary Research
Data Sharing Agreement

This Indiana University Center for Postsecondary Research Data Sharing Agreement ("Agreement") defines the parameters for data sharing from the National Survey of Student Engagement ("NSSE") between the Research Institution and its Authorized Researchers named below and the Trustees of Indiana University on behalf of the Indiana University Center for Postsecondary Research ("IUCPR"). The terms below are intended to reflect and comply with the existing agreements between NSSE and the institutions that participate in the survey program. Under these participation agreements, NSSE may:

"...make data, in which individual institutions or students cannot be identified, available to researchers interested in studying the undergraduate experience... NSSE results specific to each institution and identified as such will not be made public except by mutual agreement between NSSE and the institution."

RESEARCHERS

The following researchers ("Authorized Researchers") of Iowa State University ("Research Institution") may make use of NSSE data pursuant to the terms of this Agreement:

Frankie Santos Laanan, PhD
Yi Zhang, PhD

Iowa State University

Iowa State University

DATA DESCRIPTION

Under this Agreement, IUCPR will provide the researchers a data file delimited in the following ways ("NSSE Data File"):

- **Data Source:** NSSE 2008

- **Variables:** All survey items and certain institutional characteristics (Carnegie classification and control). These institutional characteristics will each be in ranges/categories that include at least 5 institutions. All student and institution identifying information will be removed.

- **Cases:** A 20% random sample of all senior students who fall into three categories (transfer students from community colleges, transfer students from a 4-year institution, and non-transfer students) and attending U.S. institutions. In addition, the sample should contain 50% STEM students and 50% non-STEM students. For this study, STEM students are defined as those majoring in one of the biological sciences (majrscod = 12 to 19), engineering (majrscod = 34 to 41),...
PARAMETERS FOR DATA SHARING:

1. IUCPR will provide a single copy of the NSSE Data File solely for non-commercial research by the Authorized Researchers.

2. The NSSE Data File will exclude the Unit ID code from Integrated Postsecondary Educational Data System (IPEDS), any other unique school or student identifiers, and any variables that IUCPR determines reasonably may permit the identification of a participating school or student.

3. The Authorized Researchers will not make any attempt, privately or publicly, to associate elements of the NSSE Data File with the individual institutions or individual students participating in the NSSE, nor will they share the data with anyone else who might do so.

4. In all publications or presentations of data obtained through this agreement, the Authorized Researchers agree to include the following citation: “NSSE data were used with permission from The Indiana University Center for Postsecondary Research.”

5. The Authorized Researchers agree to provide to IUCPR a copy of all reports, presentations, analyses, or other materials in which the data given under this Agreement are presented, discussed, or analyzed.

6. The data should be encrypted when not in use by the above researcher and should be destroyed once this particular research project has been completed. If the researcher needs the data for any longer period than that which is necessary for completing the project, the researcher is required to ask for an extension. Using the data for other purposes besides completing the designated project must be approved by the Director for the Center for Postsecondary Research at Indiana University at Bloomington.

7. The IUCPR of Indiana University may, by written notification to the Authorized Researchers and the Research Institution, terminate this Agreement if it determines, in its sole discretion, that either the Authorized Researchers or the Research Institution have breached the terms of this Agreement. In the event that this Agreement is terminated, the Authorized Researchers and Research Institution shall return the originals and all copies of the NSSE Data File to the IUCPR, and securely destroy all NSSE Data File elements contained in any analyses or other materials created or maintained by Authorized Researchers, within ten (10) days of the receipt of the termination notice.

8. IU will not be liable to the Research Institution for any direct, consequential, or other damages, related to the use of the NSSE Data File or any other information delivered by Indiana University or IUCPR in accordance with this Agreement. The Research
Institution shall defend, indemnify, and hold harmless The Trustees of Indiana University, their officers, employees, and agents, with respect to any and all claims, causes of action, losses, and liabilities, of any kind whatsoever, arising directly or indirectly from the Authorized Researchers’ use of the NSSE Data File.

9. FEES

In exchange for access to and use of the NSSE Data File, Iowa State University agrees to pay Indiana University the sum of $1,750, by check upon execution of this Agreement.

SIGNATURES

The undersigned hereby consent to the terms of this Agreement and confirm that they have all necessary authority to enter into this Agreement.

For The Trustees of Indiana University:

Marcia Landen  
Director, Grant Services  
Office of the VP for Research Administration  
Indiana University

[Signature]  
Date

[Signature]  
Date

Alexander C. McCormick  
Director, National Survey of Student Engagement

For the Research Institution:

[Signature]  
Date

Name, Title, and Organization  
Authorized Institutional Official of Research Institution

Kerry A. Agnitsch  
IIR Co-Chair  
Office for Responsible Research  
Iowa State University
APPENDIX D. 2008 NSSE PROFILE OF SAMPLE DATA

Profile of U.S. NSSE 2008 Institutions Against All U.S. Baccalaureate-Granting Institutions and Their Students

<table>
<thead>
<tr>
<th>Institution-Level</th>
<th>Student-Level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>NSSE</strong></td>
<td><strong>US</strong></td>
</tr>
<tr>
<td><strong>Carnegie Classification – Basic 2005</strong></td>
<td></td>
</tr>
<tr>
<td>RU/VH</td>
<td>4%</td>
</tr>
<tr>
<td>RU/H</td>
<td>7%</td>
</tr>
<tr>
<td>DRU</td>
<td>5%</td>
</tr>
<tr>
<td>Master’s L</td>
<td>27%</td>
</tr>
<tr>
<td>Master’s M</td>
<td>13%</td>
</tr>
<tr>
<td>Master’s S</td>
<td>7%</td>
</tr>
<tr>
<td>Bac/A&amp;S</td>
<td>22%</td>
</tr>
<tr>
<td>Bac/Diverse</td>
<td>16%</td>
</tr>
<tr>
<td><strong>Control</strong></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>42%</td>
</tr>
<tr>
<td>Private</td>
<td>58%</td>
</tr>
<tr>
<td><strong>Undergraduate Enrollment</strong></td>
<td></td>
</tr>
<tr>
<td>Fewer than 1,000</td>
<td>13%</td>
</tr>
<tr>
<td>1,000 – 2,499</td>
<td>35%</td>
</tr>
<tr>
<td>2,500 – 4,999</td>
<td>21%</td>
</tr>
<tr>
<td>5,000 – 9,999</td>
<td>16%</td>
</tr>
<tr>
<td>10,000 – 19,999</td>
<td>10%</td>
</tr>
<tr>
<td>20,000 or more</td>
<td>5%</td>
</tr>
<tr>
<td><strong>Region</strong></td>
<td></td>
</tr>
<tr>
<td>New England</td>
<td>10%</td>
</tr>
<tr>
<td>Mid East</td>
<td>23%</td>
</tr>
<tr>
<td>Great Lakes</td>
<td>15%</td>
</tr>
<tr>
<td>Plains</td>
<td>11%</td>
</tr>
<tr>
<td>Southeast</td>
<td>25%</td>
</tr>
<tr>
<td>Southwest</td>
<td>6%</td>
</tr>
<tr>
<td>Rocky Mountains</td>
<td>3%</td>
</tr>
<tr>
<td>Far West</td>
<td>8%</td>
</tr>
<tr>
<td>Outlying Areas</td>
<td>0%</td>
</tr>
<tr>
<td>U.S. Service Schools</td>
<td>&lt;1%</td>
</tr>
<tr>
<td><strong>Location</strong></td>
<td></td>
</tr>
<tr>
<td>City</td>
<td>47%</td>
</tr>
<tr>
<td>Suburban</td>
<td>22%</td>
</tr>
<tr>
<td>Town</td>
<td>24%</td>
</tr>
<tr>
<td>Rural</td>
<td>7%</td>
</tr>
</tbody>
</table>

### Notes
- Percentages are unweighted and based on U.S. postsecondary institutions that award baccalaureate degrees and belong to one of the eight Carnegie classes in the table. Totals may not sum to 100% due to rounding.
- U.S. percentages are based on data from the 2007 IDES Institutional Characteristics file.
- For information on the 2005 Basic Carnegie Classifications, see: [www.carnegiefoundation.org/classifications](http://www.carnegiefoundation.org/classifications)
APPENDIX E. 2008 NSSE CODEBOOK

NSSE 2008 Codebook

Please note the following for the NSSE data file and codebook:

1. Invalid responses and non-responses are coded as missing "*" in the data file.
2. Changes to the questionnaire and/or data file from the previous year are identified by the following:
   - One asterisk (*) denotes a variable that has been revised slightly from last year.
   - Two asterisks (**) denote a variable that has been revised significantly from last year and given a new name.
   - Three asterisks (***) denote a new variable.
3. Changes made in previous years can be viewed in past codebooks, available on the NSSE Web site at www.nss.edu/administrational_reports.cfm.
<table>
<thead>
<tr>
<th>Item</th>
<th>Variable</th>
<th>Variable Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a</td>
<td>eqsqn</td>
<td>Asked questions or comments in class or course wide class discussions</td>
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<tr>
<td>1b</td>
<td>cpssen</td>
<td>Made a class presentation</td>
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<tr>
<td>1c</td>
<td>respppy</td>
<td>Presented your own ideas with a paper or assignment before reading it in class</td>
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<tr>
<td>1d</td>
<td>integrt</td>
<td>Worked on a paper or project that required integrating ideas or information from various sources</td>
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<tr>
<td>1e</td>
<td>divcns</td>
<td>Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments</td>
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<tr>
<td>1f</td>
<td>clmpnp</td>
<td>Came to class without completing readings or assignments</td>
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<tr>
<td>1g</td>
<td>clspry</td>
<td>Worked with other students on projects during class</td>
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<td>1h</td>
<td>ocrrs</td>
<td>Worked with classmates outside of class to prepare class assignments</td>
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<tr>
<td>1i</td>
<td>wntns</td>
<td>Put together ideas or concepts from different courses when completing assignments or during class discussions</td>
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<tr>
<td>1j</td>
<td>mtrld</td>
<td>Turned or taught other students paid or voluntary</td>
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<td>1k</td>
<td>commproj</td>
<td>Participated in a community-based project (e.g., service learning) as part of a regular course</td>
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<tr>
<td>1l</td>
<td>msond</td>
<td>Used an electronic medium (e-mail, chat room, Elluminate, instant messaging, etc.) to discuss or complete an assignment</td>
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<td>1m</td>
<td>smntl</td>
<td>Used a mail to communicate with an instructor</td>
</tr>
<tr>
<td>1n</td>
<td>fnograde</td>
<td>Discussed grades or assignments with an instructor</td>
</tr>
<tr>
<td>1o</td>
<td>dscsrs</td>
<td>Talked about course plans with a device member of an advising</td>
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<tr>
<td>1p</td>
<td>fncsrs</td>
<td>Discussed ideas from your readings or classes with faculty members outside of class</td>
</tr>
<tr>
<td>1q</td>
<td>fncfrd</td>
<td>Received prompt written or oral feedback from faculty on your academic performance</td>
</tr>
</tbody>
</table>

* Slight revision from last year; ** Significant revision from last year or new variable name created; *** New variable
<table>
<thead>
<tr>
<th>Item</th>
<th>Variable Label</th>
<th>Response Values and Labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>1a.</td>
<td>worked</td>
<td>Worked harder than you thought you would at any instructor's or professor's request</td>
</tr>
<tr>
<td>1b.</td>
<td>faculty</td>
<td>Worked with faculty members on activities other than coursework (committee, orientation, student life activities, etc.)</td>
</tr>
<tr>
<td>1c.</td>
<td>outside</td>
<td>Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)</td>
</tr>
<tr>
<td>1d.</td>
<td>invited</td>
<td>Had serious conversations with students of a different race or ethnicity than your own</td>
</tr>
<tr>
<td>1e.</td>
<td>different</td>
<td>Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Item</th>
<th>Mental Activity</th>
<th>Response Values and Labels</th>
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</thead>
<tbody>
<tr>
<td>2a.</td>
<td>analyze</td>
<td>Analyses the basic elements of an idea, examines, or origins, such as examining a scientific concept or situation in depth and considering its components</td>
</tr>
<tr>
<td>2b.</td>
<td>synthesize</td>
<td>Synthesizes and organizes ideas, information, or experiences to review, restate, or synthesize interpretations and relationships</td>
</tr>
<tr>
<td>2c.</td>
<td>evaluate</td>
<td>Making judgments about the worth of information, arguments, or methods, such as evaluating how others gathered interpreted data and assessing the soundness of their conclusions</td>
</tr>
<tr>
<td>2d.</td>
<td>apply</td>
<td>Applying theories or concepts to practical problems or in new situations</td>
</tr>
</tbody>
</table>

* Right when done last year. **Significant change from last year or new variable measured. *** New variable.

**National Survey of Student Engagement**

**The College Student Report NSSE 2008 Codebook**

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<tr>
<th>Item</th>
<th>Variable Label</th>
<th>Response Values and Labels</th>
</tr>
</thead>
<tbody>
<tr>
<td>3a.</td>
<td>reading</td>
<td>Duties assigned: reading, books, or look through parts of course readings</td>
</tr>
<tr>
<td>3b.</td>
<td>assignment</td>
<td>Duties assigned: get out reading, class assignments, or academic assignments</td>
</tr>
<tr>
<td>3c.</td>
<td>writing</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
</tr>
<tr>
<td>3d.</td>
<td>overall</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
</tr>
<tr>
<td>3e.</td>
<td>overall</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
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</tbody>
</table>

**Question 3. During the current school year, about how much reading and writing have you done?**

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<th>Mental Activity</th>
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</thead>
<tbody>
<tr>
<td>4a.</td>
<td>problem</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
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<tr>
<td>4b.</td>
<td>problem</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
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<td>4c.</td>
<td>problem</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
</tr>
<tr>
<td>4d.</td>
<td>problem</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
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</table>

**Question 4. In a peer review, how many homework problems did you complete?**

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<th>Mental Activity</th>
<th>Response Values and Labels</th>
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<tbody>
<tr>
<td>5a.</td>
<td>homework</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
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<td>5b.</td>
<td>homework</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
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<td>5c.</td>
<td>homework</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
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<tr>
<td>5d.</td>
<td>homework</td>
<td>Duties assigned: any written work or reports on a class project, paper, or term paper</td>
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* Right when done last year. **Significant change from last year or new variable measured. *** New variable.
### National Survey of Student Engagement

#### The College Student Report

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#### Responce Values and Labels

**Question 4.** During the current school year, about how often have you done each of the following?

1.作业? Attended an art exhibition, play, dance, music, theater, or other performance
2. exercisE. Exercised or participated in physical fitness activities
3. sportI. Participated in athletics to enhance your physicality (e.g., running, swimming, yoga, etc.)
4. studyI. Studied or researched a topic or issue
5. readI. Read a book or other material
6. review. Learned something about the social or cultural context in which you were exposed

#### Response Values and Labels

1. Never
2. Sometimes
3. Often
4. Very often

**Question 5.** Which of the following have you done or to do that you plan to do before you graduate from your institution?

1. workI. Practiced, learned, field experience, co-op experience, or clinical assignment
2. workI. Service or volunteer work
3. workI. Participated in a community service or service learning project
4. workI. Work in a research project with a faculty member outside of course or program requirements
5. workI. Foreign language coursework
6. workI. Study abroad
7. workI. Independent study or self-designed major
8. workI. Calculating course experience (e.g., research, service projects, thesis, comprehensive exam, etc.)

* Higher education than the year; ** Significant evidence from last survey where none existed; *** New variable

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### National Survey of Student Engagement

#### The College Student Report

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#### Response Values and Labels

**Question 8.** Select the circle that best represents the quality of your relationships with people at your institution.

1. Unfriendly, Unsupportive, Bureaucratic
2. Friendly, Supportive, Sense of Belonging
3. Unavailable, Unhelpful, Unnurturing
4. Not helpful, Inconsistent, Rigid
5. Helpful, Consistent, Flexible

**Question 9.** About how many hours do you spend in a typical 7-day week doing each of the following?

1. workI. Preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, researching, and other academic activities)
2. workI. Working for peers (off-campus)
3. workI. Working for pay (off-campus)
4. workI. Taking part in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intramural sports, etc.)
5. workI. Relaxing and socializing (watching TV, parties, etc.)
6. workI. Providing care for dependents living with you (parents, children, siblings, spouse, etc.)
7. workI. Commuting to class (driving, walking, etc.)

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<td>学术</td>
</tr>
</tbody>
</table>

* Slight rotation from last year, ** Significant revision from last year or new variable name only
<table>
<thead>
<tr>
<th>Item</th>
<th>Variable</th>
<th>Variable Label</th>
<th>Response Values and Labels</th>
</tr>
</thead>
</table>
| 16   | sex      | Your sex       | 1 = Male  
2 = Female |
| 17   | inter    | Are you an international student or foreign national? | 1 = No  
2 = Yes |
| 18   | nat05    | What is your racial or ethnic identification? (Select only one.) | 1 = African American  
2 = Asian  
3 = Asian American or Pacific Islander  
4 = Black or African American  
5 = Hispanic  
6 = Mexican American  
7 = Other Hispanic or Latino  
8 = Native American  
9 = Other  
10 = Prefer not to respond |
| 19   | clas06    | What is your current classification in college? | 1 = Freshman  
2 = Sophomore  
3 = Junior  
4 = Senior  
5 = Undeclared  
6 = Unknown  
7 = Transfer  |
| 20   | inst07    | Did you begin college at your current institution or elsewhere? | 1 = Started here  
2 = Started elsewhere |

* Slight rewording from last year; ** Significant revision from last year to new variable name created; *** New variables
<table>
<thead>
<tr>
<th>Item #</th>
<th>Variable</th>
<th>Variable Label</th>
</tr>
</thead>
<tbody>
<tr>
<td>18</td>
<td>gp_basketball</td>
<td>Basketball</td>
</tr>
<tr>
<td>19</td>
<td>gp_bowling</td>
<td>Bowling</td>
</tr>
<tr>
<td>20</td>
<td>gp_campus_00</td>
<td>Cross Country</td>
</tr>
<tr>
<td>21</td>
<td>gp_field_hockey</td>
<td>Field Hockey</td>
</tr>
<tr>
<td>22</td>
<td>gp_football</td>
<td>Football</td>
</tr>
<tr>
<td>23</td>
<td>gp_golf</td>
<td>Golf</td>
</tr>
<tr>
<td>24</td>
<td>gp_gymnastics</td>
<td>Gymnastics</td>
</tr>
<tr>
<td>25</td>
<td>gp_hockey</td>
<td>Ice Hockey</td>
</tr>
<tr>
<td>26</td>
<td>gp_track</td>
<td>Track &amp; Field</td>
</tr>
<tr>
<td>27</td>
<td>gp_last</td>
<td>Last Name</td>
</tr>
<tr>
<td>28</td>
<td>gp_phd</td>
<td>PhD</td>
</tr>
<tr>
<td>29</td>
<td>gp_racquetball</td>
<td>Racquetball</td>
</tr>
<tr>
<td>30</td>
<td>gp_skiing</td>
<td>Skiing</td>
</tr>
<tr>
<td>31</td>
<td>gp_soccer</td>
<td>Soccer</td>
</tr>
<tr>
<td>32</td>
<td>gp_track_and_field</td>
<td>Track &amp; Field</td>
</tr>
<tr>
<td>33</td>
<td>gp_water_volleyball</td>
<td>Swimming &amp; Water Polo</td>
</tr>
<tr>
<td>34</td>
<td>gp_water_polo</td>
<td>Water Polo</td>
</tr>
<tr>
<td>35</td>
<td>gp_wrestling</td>
<td>Wrestling</td>
</tr>
<tr>
<td>36</td>
<td>gp_other</td>
<td>Other</td>
</tr>
</tbody>
</table>

1 = Team Member
2 = Not a team member

* Significant effect from last year's variable assessment; ** New variable

---

### National Survey of Student Engagement

#### The College Student Report

**NSSE 2008 Codebook**

<table>
<thead>
<tr>
<th>Item #</th>
<th>Variable</th>
<th>Variable Label</th>
</tr>
</thead>
</table>

26. **graden:** What have most of your graduates been up to now at this institution?

1 = Did not finish high school
2 = Graduated from high school
3 = Attended college but did not complete a degree
4 = Completed an associate's degree (AA, AS, etc.)
5 = Completed a bachelor's degree (BA, BS, etc.)
6 = Completed a master's degree (MA, MS, etc.)
7 = Completed a doctorate degree (PhD, EdD, etc.)
8 = Alumnus or emeritus

27. **reason:** Which of the following best describes where you are going now while attending college?

1 = Did not finish high school
2 = Graduated from high school
3 = Attended college but did not complete a degree
4 = Completed an associate's degree (AA, AS, etc.)
5 = Completed a bachelor's degree (BA, BS, etc.)
6 = Completed a master's degree (MA, MS, etc.)
7 = Completed a doctorate degree (PhD, EdD, etc.)
8 = Alumnus or emeritus

28. **field:** What is the highest level of education that your mother completed?

1 = Did not finish high school
2 = Graduated from high school
3 = Attended college but did not complete a degree
4 = Completed an associate's degree (AA, AS, etc.)
5 = Completed a bachelor's degree (BA, BS, etc.)
6 = Completed a master's degree (MA, MS, etc.)
7 = Completed a doctorate degree (PhD, EdD, etc.)

29. **major:** Please name your major(s) or your expected major(s).

30. **field:** What is the highest level of education that your father completed?

1 = Did not finish high school
2 = Graduated from high school
3 = Attended college but did not complete a degree
4 = Completed an associate's degree (AA, AS, etc.)
5 = Completed a bachelor's degree (BA, BS, etc.)
6 = Completed a master's degree (MA, MS, etc.)
7 = Completed a doctorate degree (PhD, EdD, etc.)

* Significant effect from last year's variable assessment; ** New variable
* Eight variables from last year; ** Significant variables from last year are not variable in recent; *** New variable

185
### National Survey of Student Engagement

**The College Student Report**

**NSSE 2008 Codebook**

<table>
<thead>
<tr>
<th>Item #</th>
<th>Variable</th>
<th>Variable Label</th>
<th>Categories</th>
</tr>
</thead>
</table>
| 1     | s3       | Student ID     | 1 = Junior  
2 = Senior |
| 2     | s5       | Gender         | 1 = Male  
2 = Female |
| 3     | s6       | Race ethnicity | 1 = African American/Black  
2 = American Indian/Alaska Native  
3 = Asian/Pacific Islander  
4 = Asian/White  
5 = Hispanic  
6 = Other  
7 = Foreign  
8 = Multiracial/Other  
9 = Unknown |
| 4     | s64      | Class rank     | 1 = Freshman/First-year student  
2 = Sophomore  
3 = Junior  
4 = Senior  
5 = Other |
| 5     | s65      | Enrollment status | 1 = Part-time  
2 = Full-time |

---

* Slight modification from last year; ** Significant modification from last year so new variable names created; *** New variable
Student-Level Benchmark scores. To facilitate comparisons about student engagement and its importance to student learning, college survival, and institutional improvement, NSSE created five institution-level benchmarks: benchmark of effective educational practice: (1) Level of Academic Challenge; (2) Active and Collaborative Learning; (3) Student-Faculty Interaction; (4) Facilitating Educational Environments; and (5) Institutional Environment. Student- and institution-level scores are created for each student and each institution, which are then used to assign scores to levels of institutions. These scores can be used to benchmark scores for the institution or to compare the institution’s scores with the national average. The benchmarks are calculated using a weighted average of the individual scores for each level. For more detailed information about the benchmarks, visit the NSSE Web site at www.nss.org/html/2008_report.html.

- **Variable Description**
- **Benchmark Score**

<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>AC</td>
<td>Level of Academic Challenge: Index that measures student enrollment, teaching and learning, and institutional expectations for academic performance.</td>
</tr>
<tr>
<td>AC</td>
<td>Total score of student-level benchmark scores, adjusted for part-time enrollment status.</td>
</tr>
<tr>
<td>ACL</td>
<td>Active and Collaborative Learning: Index that measures student enrollment, teaching and learning, and institutional expectations for academic performance.</td>
</tr>
<tr>
<td>SF</td>
<td>Student-Faculty Interaction: Index that measures student enrollment, teaching and learning, and institutional expectations for academic performance.</td>
</tr>
</tbody>
</table>

* Slight revision from last year; ** Significant revision from last year; N = new variable.
<table>
<thead>
<tr>
<th>Variable</th>
<th>Description</th>
<th>Component/Race</th>
</tr>
</thead>
<tbody>
<tr>
<td>EEE</td>
<td>Reaching Educational Experience Index that measures extent of interaction with students of different racial or ethnic backgrounds or with different political opinions or values, using electronic technology, and participating in activities such as internships, community service, study abroad, cocurricular activities, and learning community experiences. (Note: Because question 7 was revised in 2006, year-to-year comparison of EEE means with years prior to 2004 are invalid.)</td>
<td>diffnr, diffmr, cenvr01, lainmnr, linmr06, skwe04, femeq04, femeq06, midchf8, indv001, smale001</td>
</tr>
<tr>
<td>SCE</td>
<td>Supportive Campus Environment: Index that measures extent to which students perceive the campus helps them succeed academically and socially, assist them in coping with non-academic responsibilities, and promotes supportive relationships among students, students' peers, faculty members, and administrative personnel and others.</td>
<td>support, cinstg, cinstm, cinstf, cinstc, creatv, cenvr, rcsddm</td>
</tr>
</tbody>
</table>
APPENDIX F. IRB APPROVAL LETTER

IOWA STATE UNIVERSITY
OF SCIENCE AND TECHNOLOGY

Institutional Review Board
Office for Responsible Research
Vice President for Research
1118 Pearson Hall
Ames, Iowa 50011-2007
515-294-4566
FAX 515-294-4267

Date: 6/29/2012
To: Dr. Frankie Santos Laanan
N225A Lagomarino

From: Office for Responsible Research

Title: Vertical and Horizontal Transfers at a Large Research University: A Comparative Study of Student Engagement & Satisfaction

IRB ID: 10-065

Study Review Date: 6/29/2012

The project referenced above has been declared exempt from the requirements of the human subject protections regulations as described in 45 CFR 46.101(b) because it meets the following federal requirements for exemption:

- Research involving the collection or study of existing data, documents, records, pathological specimens, or diagnostic specimens if these sources are publicly available or if the information is recorded by the investigator in such a manner that subjects cannot be identified directly or through identifiers linked to the subjects.

The determination of exemption means that:

- You do not need to submit an application for annual continuing review.

- You must carry out the research as described in the IRB application. Review by IRB staff is required prior to implementing any modifications that may change the exempt status of the research. In general, review is required for any modifications to the research procedures (e.g., method of data collection, nature or scope of information to be collected, changes in confidentiality measures, etc.), modifications that result in the inclusion of participants from vulnerable populations, and/or any change that may increase the risk or discomfort to participants. Changes to key personnel must also be approved. The purpose of review is to determine if the project still meets the federal criteria for exemption.

Non-exempt research is subject to many regulatory requirements that must be addressed prior to implementation of the study. Conducting non-exempt research without IRB review and approval may constitute non-compliance with federal regulations and/or academic misconduct according to ISU policy.

Detailed information about requirements for submission of modifications can be found on the Exempt Study Modification Form. A Personnel Change Form may be submitted when the only modification involves changes in study staff. If it is determined that exemption is no longer warranted, then an Application for Approval of Research Involving Humans Form will need to be submitted and approved before proceeding with data collection.

Please note that you must submit all research involving human participants for review. Only the IRB or designees may make the determination of exemption, even if you conduct a study in the future that is exactly like this study.

Please be aware that approval from other entities may also be needed. For example, access to data from private records (e.g., student, medical, or employment records, etc.) that are protected by FERPA, HIPAA, or other confidentiality policies requires permission from the holders of those records. Similarly, for research conducted in institutions other than ISU (e.g., schools, other colleges or universities, medical facilities, companies, etc.), investigators must obtain permission from the institution (s) as required by their policies. An IRB determination of exemption in no way implies or guarantees that permission from these other entities will be granted.

Please don't hesitate to contact us if you have questions or concerns at 515-294-4566 or irb@iastate.edu.
INSTITUTIONAL REVIEW BOARD (IRB)
Amendment for Personnel Changes

Title of Project: Vertical & Horizontal transfers at a large research university: a comparative study of student engagement and satisfaction

Principal Investigator (PI): Dr. Frankie Laanan
University ID: [ ]
Phone: (513) 294 7292
Email Address: laanan@lstate.edu

FOR STUDENT PROJECTS (Required when the principal investigator is a student.)
Name of Major Professor/Supervising Faculty:
University ID: [ ]
Phone: [ ]
Email Address: [ ]

Changes in Key Personnel:
Key personnel includes any individuals who will have contact with the participants or the participants' data (e.g., interviewers, transcribers, etc.). This information is intended to inform the committee of the training and background related to the specific procedures that each person will perform on the project. For more information, please see Human Subjects - Persons Required to Obtain IRB Training. Personnel who will have contact with human blood, specimens, or other biohazardous materials must also complete Bloodborne Pathogens Training. If the principal investigator has or will change, a complete new IRB application is required.

List any individuals to be removed from the study staff:

Complete the following table to list any new key personnel:

<table>
<thead>
<tr>
<th>NAME</th>
<th>Involvement in communication with subjects or access to private identifiable data?</th>
<th>Contact with human blood, specimens, or other biohazardous materials?</th>
<th>Qualifications (i.e., special training, degrees, certifications, coursework, etc.)</th>
<th>Responsibilities in Research</th>
<th>Human Subjects Training Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kip Bottenfield</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>[ ]</td>
<td>05/25/2011</td>
</tr>
</tbody>
</table>

FOR IRB USE ONLY [ ] All human subjects training requirements have been met.

IRB Reviewer Signature [ ]
Date [ ]

Office for Responsible Research: 08/26/11
REFERENCES


