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Social and academic factors of success and retention for students of color at a predominantly white institution in agricultural and engineering based disciplines

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Social and academic factors of success and retention for students of color at a predominantly white institution in agricultural and engineering based disciplines

by

LeQuetia Natasha Ancar

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

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ABSTRACT

Being a student of color at a predominantly White institution can be extremely challenging, yet rewarding. For the select students in this mixed methods study, overcoming academic and social hurdles was paramount to their success in science, technology and engineering based disciplines at this large research intensive Midwestern institution. Some of the themes that arose from their academic and social challenges were: feelings of isolation and alienation, demystification of stereotypes, minimal relationships with faculty and staff, inadequate academic advising, and a lack of academic and social preparation and skills. Students of color in the College of Agriculture and Life Sciences and the College of Engineering overcame the aforementioned academic and social challenges by participating in countless university, college and departmental based experiences that fostered a greater sense of belonging and connection to their environment, ultimately impacting their level of commitment and persistence to graduation. Of which, student services, academic advising, recruitment and retention programs, relationships and collaborations with faculty, staff and peers, support from family and friends, participation in minority based and major/college specific student organizations, access to fitness programs, academic and career work experiences, and service learning were focused on in this study.

CHAPTER 1. INTRODUCTION

About the Author

LeQuetia N. Ancar is a first generation college graduate and the only member of her immediate family to pursue and obtain a terminal degree. Born in the deep south and raised in the north, she experienced a privileged learning and living environment as a member of a minority among the majority, while never losing ties to her ethnic and cultural identity. As the product of a working class family, obtaining a college degree was never a question of “if”, only a matter of “where”. With strong ties to her family she chose to attend a higher education institution that was near home and closely resembled the system in which she grew up, Iowa State University. From the first day of her summer enrichment program (SEP), immediately following her senior year, she had no idea that the journey she was going to embark on would forever change her life and that of those closest to her.

Faced with the trials and tribulations of being a college student, she also had to experience and overcome hurdles associated with being a double minority, woman and Black, in a male dominated discipline of study and maintaining a sense of “self” in two very different worlds; always experiencing a “double consciousness” as defined by W.E.B DuBois. Through dedication and resourcefulness and countless angels, she was able to persevere and persist. Her history of success in the face of uncertainty and responsibility to those before and after her is the driving force behind her motivation to serve her community, country and world by having an impact on the life of every other “LeQuetia” out there. Her diverse background of experiences as a daughter, sister, mother, student, and teacher have an impact on everything that she does, including this study of other students of color who have

so bravely chosen to follow in her footsteps and venture down the road less traveled in pursuit of a higher education.

Introduction to Study

What does it mean to be a student of color at a predominately White institution (PWI)? According to Rendón, Garcia and Person (2004), a “student of color” is a socially constructed classification that is often interchanged with “minority” and is used to describe under-represented groups: African Americans, Hispanics, Asians/Pacific Islanders, and American Indian/Alaska Natives. Being a member of one of these special populations poses many challenges at predominantly White colleges and universities. Some of the challenges faced by students of color include but are not limited to isolation, judgment, tokenism, and culture shock; each of which have an added impact on the attrition rate of under-represented students when coupled with the everyday rigors of college life. According to Loo and Rolison (1986), ethnic minorities “feel socially and culturally alienated,” which has the ability to play a much larger role in their attrition than their academic ability (p. 61).

While many students of color experience adverse conditions that may hinder their social and academic success, there are many students that manage to navigate the higher education system at PWIs and persist to graduation. A critical element of this persistence to graduation is the level of engagement in the social and academic aspects of the university. According to Kuh (2006), in an annual report of the National Survey of Student Engagement (NSSE) results of 2006, “while engagement is positively linked to desired outcomes for all types of students, historically underserved students tend to benefit more than majority students” (p. 9). This study took a look at these success factors in hopes of determining potential actions that can take place at the departmental, college and institutional level to aid

in the persistence of this under-represented population of students to graduation and combat the disparity between the graduation of ethnic minorities and their White counterparts.

Problem of Study

The problem of this study stems from students of color at a majority university having a lower percentage of enrollment and graduation than their White counterparts. This is especially true in the science and technology based disciplines in the College of Agriculture and Life Science (AGLS) at Iowa State University, where minority student enrollment is often lower than the other fields of study. Based on 2006-2007 enrollment data from the Office of the Registrar, enrollment in AGLS is a mere 4.9% (132 of 2697 undergraduate population total). With an average of 3.8% for each academic year from 1999-2007, this is a meager number of students of color in this college when compared to the total institutional enrollment of 9% (1885) among 21,004 total undergraduates, and other colleges in the University system: Human Sciences 8%, Design 9.9%, Engineering 8.4%, Business 10.3%, Liberal Arts and Sciences 10.7% (Iowa State University, 2007b).

As the enrollment of racial minorities in disciplines in AGLS continues to be a challenge, so does the retention and graduation of these under-represented populations in science, engineering, and technology based programs in AGLS and the College of Engineering (CoE). According to the Iowa State University Student Profile (2007a), graduation rates for students of color are far below that of their White counterparts. Based on 6-year data for those entering in 2000, 30% of Native Americans, 51% of African Americans, 55% of Latinos, and 61% of Asian Americans persisted to graduation, compared to 67% of White students. Of the students of color that successfully navigated the system to graduation, they earned 3.5% of their degrees from AGLS and 8.1% from CoE (Iowa State

University, 2007c). In comparison to other four year institutions, the percentage of under-represented populations receiving degrees based on 6-year graduation rates for the class entering in 2000 were, 39.2% of Native Americans, 41.2% of African Americans, 47.6% of Latino, 65.8% of Asian Americans, and 59.4% of Whites (Knapp, Kelly-Reid, Ginger, & Miller, 2008). According to the National Center for Educational Statistics (2008c), the percentage of degrees conferred for racial minorities in agriculture and engineering based disciplines at Iowa State University are substantially different than the national average of 5.1% and 4.6%, respectively.

While there are few students that participate and graduate from science, technology and engineering based disciplines, those that do often find the necessary social and academic tools they need to be successful. This study will identify the social and academic factors that are needed to assist students of color as they navigate the higher education system in AGLS and CoE at Iowa State University based on data collected from a background survey, in-depth interviews, focus groups, and a nationally administered engagement survey.

Purpose of study

There are many academic and social attributes that can have a positive or negative impact on the retention of all students in higher education. Being a member of an ethnic population poses increased and unique challenges at PWIs. Some of the challenges faced by students of color that may have an added impact on their persistence to graduation include, but are not limited to, alienation, loneliness, racism, discrimination, and culture shock (Benton, M., 2006; D'Augelli, A., & Hershberger, S., 1993; Lett, 2003; Lewis, C., Ginsberg, R., Davies, T., and Smith, K., 2004; Townsend, L., 1994). According to Loo and Rolison (1986), ethnic minorities “feel socially and culturally alienated,” which has the ability to play

a much larger role in their attrition than their academic ability even though a student's academic ability is often the variable used to determine an individual's ultimate success in college (p. 61; Berger & Milem, 1999).

While many students of color experience adverse conditions that may hinder their social and academic success, there are many others who manage to navigate the higher education system at PWIs and persist to graduation. A critical element of this persistence to graduation is the level of engagement in the social and academic aspects of the university (Tinto, 1975). In fact, according to Kuh (2006), "while engagement is positively linked to desired outcomes for all types of students, historically underserved students tend to benefit more than majority students" (p. 9).

This primary purpose of this study was to take a look at the various academic and social factors that impact the retention and graduation of senior students of color in AGLS and CoE, in hopes of determining potential actions that can take place at the departmental, college and institutional level to aid in the persistence of this under-represented population of students and combat the disparity between the graduation of ethnic minorities and their White counterparts.

Need for study

Students of color, especially African American students, at predominately White institutions of higher education can feel like "uninvited guests in a strange land" as a member of a minority population among the majority. With academic and social needs that transcend those of White students, Black students at PWIs experience "higher attrition rates, lower cumulative grade point averages, and less persistence to graduation than do majority students" (Lewis, 2004, p. 1). These meager outcomes in higher education, according to

Brown (1986), occur because of the lack in academic preparation for higher education, an insufficient number of campus role models, feelings of isolation and helplessness and an uncertainty of how to negotiate the campus' academic and social systems.

To combat this disparity and address the needs of students of color at a majority institution, this study identified the social and academic success factors associated with the persistence of senior students. Knowing, understanding and implementing these factors have the ability to have a substantial impact on the degree attainment of students of color; ultimately contributing to the betterment of their overall well-being. According to Pascarella and Terenzini (1991), "a bachelor's degree continues to be a primary vehicle by means of which one gains an advantaged socioeconomic position in American society"; therefore, the benefits of degree completion has the ability to have long-term effects on an individual's well-being, which may include better health, marital status and stability, family size, child nurturance, consumer behavior, and leisure activities (Pascarella & Terenzini, 1991, p.575).

The education of under-represented populations is not only instrumental to the success of people of color but our increasingly diverse society and economy as a whole. More specifically, the success of these students in science, technology, and engineering based disciplines is critical to "the health of the U.S. economy," our country's competitive edge in "scientific and technological innovation," and a more integrated democratic society (Ashby, 2006, p. 1). As stated by Rendón, et al. (2004):

A key reason that educators need to be concerned about educating students of color is that national and world societal structures require a well-educated and trained workforce with a high degree of social consciousness...(in addition) the future of the American economy is tied to the education of

students of color. As these individuals join the ranks of well-paid citizens, their taxable wealth could translate into billions of dollars of revenue for federal, state, and local communities, benefiting all citizens (p.12).

Objectives of the Study

The objectives of this study are:

1. To determine the social and academic factors that contribute to the success of students of color in the College Agriculture and Life Sciences and the College of Engineering at Iowa State University.
2. To determine the social and academic factors that contribute to students of color remaining in and graduating from the Department of Agricultural and Biosystems Engineering at Iowa State University.
3. To determine if social and academic factors of success, as determined by the National Survey of Student Engagement, of senior students of color is significantly different than their White counterparts in the College of Agriculture and Life Sciences and the College of Engineering at Iowa State University.

Research Questions

Specific research questions are:

1. What perceived factors contribute to the academic and social success of senior students of color in science, technology and engineering based disciplines in the College of Agriculture and Life Sciences and the College of Engineering at a predominantly White institution?

2. What perceived social and academic factors contribute to the success and retention of senior students of color in Agricultural and Biosystems Engineering at a predominantly White institution?
3. Are the social and academic factors of success, as determined by the National Survey of Student Engagement, of senior students of color significantly different than White students in the College of Agriculture and Life Sciences and the College of Engineering at a majority institution?

Methodology

Institution

The participants of this study attend a large Midwestern research intensive institution nestled in a small town located 30 minutes from the largest metropolitan area in a state of over 2.9 million people (U.S Census Bureau, 2007). Comprised of a population of over 21,000 undergraduate and nearly 5,000 graduate students, this university has seven colleges: agriculture and life sciences, business, design, engineering, human sciences, liberal arts and science, and veterinary medicine (professional degree). Of these 21,000 undergraduates, approximately 9% (1885) are students of color: 132 agriculture, 343 business, 185 design, 388 engineering, 221 human sciences, 616 liberal arts and science (Iowa State University, 2007b). The largest racial minority of the 1885 students of color are Asian Americans, which has historically been the case since 2000. Prior to this date, African American students constituted the largest percentage of racial minorities; however, recently there has been an increase in the number of Latinos, American Indians and African Americans, with a slight decrease in Asian Americans enrolled in the university (Iowa State University, 2007e). Compared to the overall state population, Latinos comprise the largest racial minority at

3.7%, followed by African Americans at 2.3%, Asian Americans at 1.4%, and Native Americans at .3%; with the largest rise among the Latino population (U.S Census Bureau, 2007).

While Iowa State University may be miles away from the diverse opportunities of a city life, it offers students a multitude of social and academic opportunities. There are nearly 600 student organizations, over 50 intramural sports, dozens of sports clubs, countless indoor and outdoor student-led activities, leadership opportunities through student government, volunteering through campus-wide events such as VEISHEA (historically the largest student run university celebration in the nation), several professional and career development programs, and many cultural events (Iowa State University, 2008b).

Subjects

The primary target population of this study is comprised of students of color at Iowa State University at the college and departmental levels. The sample of students came from AGLS, CoE and ABE. The total number of students in the primary population of AGLS and CoE that met the criteria of the qualitative portion of the study was 152; 26 in AGLS and 126 in CoE. The ethnic breakdown of this select sample population of students was 9 African Americans, 11 Asian Americans, and 6 Latinos in the AGLS and 5 American Indians/Alaskan Natives, 39 African Americans, 48 Asian Americans, and 34 Latinos in the CoE. The total number of students in the primary population of ABE that met the criteria was 12: 5 African Americans, 6 Asian Americans, and 1 Latino (Iowa State University, 2007b) . The secondary population, which was used in a comparative analysis of the qualitative portion of this study, was White students in the AGLS and CoE. The total number of students in this portion of the study was 1164. Of which, 98 belonged to a racial

minority and 1066 were identified as White. The primary and secondary samples of students for this study were classified as upperclassmen with senior classification from diverse educational and socioeconomic backgrounds.

Instruments

The qualitative data collected and analyzed in this study was derived from demographic and focus group questions created and administered by the researcher (see appendix A). Some of which were adapted from the mid-1980's study of the alienation of minority students at a predominantly White institution by Loo and Rolison (1986). The demographic information consisted of statements pertaining to the name, age, hometown, family size, major, academic classification, and family educational attainment of each student. The focus group questions included inquiry into the student's extra-curricular activities, relationships, academic satisfaction, racial and ethnic identity, support systems, and success factors.

The findings from the analysis of the qualitative data described above was used in conjunction with pre-existing quantitative data derived from the National Survey of Student Engagement, administered by the Indiana University to Iowa State University freshman and senior students. For the purpose of this study, one sample consisted of senior students of color from AGLS and CoE and the other sample of senior White students from the same colleges.

This survey tool was piloted in 1999 by the Indiana University Center for Postsecondary Research in an effort to assess the quality of higher education based on "the investments that institutions make to foster proven instructional practices and the kinds of activities, experiences, and outcomes that their students receive as a result" (National Survey

of Student Engagement, 2007, p.1). Through the use of 28 sets of questions (14 of which are demographic) assessed on a likert-scale, this instrument focuses on student experiences and relationships inside and outside of the classroom. For this study, specific questions were chosen for analysis based on themes found in the review of literature on academic and social success factors of students in higher education (see Appendix B for specific questions): 1g, h, j, k, n, o, s, t, u, v; 6a-d; 7a-d, g; 8a-c; 9a-f; 10a-g; 13-16; 18-20; 22-23; 24; 26-28.

This questionnaire has been administered to nearly 1100 institutions worldwide since its pilot study eight years ago; of which Iowa State University has participated seven times (excluding 2004). The results of this survey from 2002-2003 and 2005-2007 were obtained from the Iowa State Office of Institutional Research and included two samples from the population. The survey results for the years 1999-2001 were not utilized because of their inconsistency with the questions on the 2002-2003 and 2005-2007 survey. The survey results for 2004 were also omitted because the featured institution did not participate that year.

Procedure

The qualitative data were derived from 5 scheduled one-hour focus groups with an anticipation of 4-5 students each. However, due to scheduling conflicts, in-depth interviews were also conducted. In total, there were three one-on-one in-depth interviews that lasted for approximately 1 1/2 hours each, and two, one-hour group interviews comprised of 2-3 students each. Of these five interview settings, three were comprised of students from the CoE and two from the AGLS. Students were identified based on each college's Fall 2007 semester 10-day list (a list of students enrolled on the 10th day of classes; a format used by the university to determine their enrollment demographics) and sorted according to their

ethnic identity and classification. Only students of color with senior status were then selected for email solicitation for voluntary participation.

The initial email correspondence to students was through a mass list, which yielded very few responses. Due to this lack of initial interest, the researcher sorted the email list based on college and created a message more specific to each student. This method of formulating the written communication yielded several potential interview participants. To gain further interest in participation, the researcher utilized several other avenues of communication which only yielded two more interested students: academic advisors, minority based student organizations and services, and college representatives of students of color.

Once the interviewees were selected, the researcher proceeded by facilitating and recording the individual and group interviews on a weekly basis until the final group was completed. To ensure validity and reliability of the information presented in the interviews, periodically the researcher did a member-check to ensure her interpretation of the information presented was the correct perception of the interviewees. Upon the conclusion of the interview, the researcher reviewed her notes and presented her key points to the interviewees for further clarification.

Upon the conclusion of each interview and prior to the start of the next interview, the researcher transcribed the audiotapes and field notes in search of emergent themes. Upon the transcription of the final interview, the researcher sorted and categorized the data based on the emergent themes.

In conjunction with the collection and analysis of the qualitative data, the NSSE data from 2002-2003 and 2005-2007 with respect to samples specified in the “subjects” section

above, was accessed and analyzed. The analysis of these populations yielded descriptive and inferential statistical data based on an independent samples t-test with Levene's test for equality of variances to determine differences in the mean values that were statistically significant ($p \leq .05$), in an effort to summarize and generalize the survey results with respect to the targeted samples to determine what types of measures should be implemented to specifically address the social and academic needs of students of color (Hinke, Wiersma & Jurs, 2003). Based on the analysis of the selected questions (listed in the Instruments section above) only seven were found to have a statistically significant difference in mean values: 1u; 7d; 10a-e.

Limitations

1. The findings from this study are generalizations based on the responses from a subset of the targeted population.
2. The results of this study are unique to the learning environment in which they are taken from and are not conducive to all predominantly White institutions.
3. The sample population of students of color, self select their ethnicity and program of study; therefore, the potential participants may not have included all senior students of color or a completely accurate representation of under-represented students in each respective college.
4. The sample population featured in the qualitative portion of this study does not include members of the Native American or Latino community, therefore, caution should be taken when interpreting the term "students of color," under-represented," and "racial minority" when referring to the sample population.
5. The researcher for this study is a member of an ethnically under-represented

population and an undergraduate alumnus of the featured department; therefore, personal biases and experiences may have an impact on the analysis of the data.

Dissertation Organization

The compilation of data from this mixed methods study yielded insight into the thoughts, feelings and perceptions of students of color in science, engineering, and technology based disciplines with respect to factors associated with their ability to succeed academically and socially at a predominantly White institution at the university, college and departmental level. In order to adequately represent the different components of this data analysis, the researcher chose to create a dissertation based on the journal article format, with the intent of each manuscript being able to stand alone while creating a greater impact as a compiled piece of work. This format encompasses chapters based on an overall introduction to the topic, a literature review, three manuscripts for publication submissions, a summary discussion of findings, implications and recommendations for future research.

The following section, chapter two, is a review of the literature which discusses the theoretical models used as the framework for the study and the contributions of other researchers with respect to social and academic factors of success of students in higher education. The author also focuses on the presence of students of color in science, engineering and technology based fields and the retention of this under-represented population in higher education.

Chapter three is a manuscript prepared for submission to the *Journal of Higher Education*. The focus of this work is to gain a broad perspective on the first research question: what perceived factors contribute to the academic and social success of senior students of color in science, technology and engineering based disciplines in the College of

Agriculture and Life Sciences and the College of Engineering at a predominantly White institution. Through a qualitative based methodology this article highlights the participants' definition of success and implications in their persistence. In addition, the researcher focuses on the critical factors of retention including but not limited to student services, academic advising, recruitment and retention programs, relationships with faculty, staff, and students of color, support networks, minority based student organizations, and college, major specific and athletic organizations.

Chapter four is a manuscript prepared for submission to the *NASPA Journal*. The primary focus of this article is to gain an in-depth perspective on the second research question: what perceived social and academic factors contribute to the success and retention of senior students of color in Agricultural and Biosystems Engineering at a predominantly White institution. Through a qualitative based methodology utilizing in-depth interviews, the researcher presents the thoughts, feelings and experiences of two senior African American females. The main highlights of their experiences being those associated with persistence based on the utilization of student services, the presence of support systems, participation in retention programs and campus based activities.

Chapter five is a manuscript prepared for submission to the *Journal of College Student Development*. The focus of this article is on the third research question: are the social and academic factors of success, as determined by the National Survey of Student Engagement, of senior students of color significantly different than White students in the College of Agriculture and Life Sciences and the College of Engineering at a majority institution. Through a quantitative based methodology utilizing institutional data, the researcher presents an analytical comparison between senior students of color and their

White counterparts on multiple variables of the student engagement questionnaire. These statistically significant variables include collaboration with peers and faculty, service learning, institutional emphasis, cross-cultural interactions, work experiences, and perceived institutional support.

The final section, chapter six, provides an overview of the findings from each article, recommendations for institutional consideration in the retention of under-represented populations, and future implications. In addition, the researcher highlights some of the challenges students of color in the study had to overcome in order to be socially and academically successful, that arose from the data analysis but was not included in the manuscripts because of the study's focus on factors of success.

CHAPTER 2. LITERATURE REVIEW

Theoretical Models

The premise of this research is based on two models of student development theory: 1) student attrition by Tinto (1975, 1987); and 2) student involvement by Astin (1984, 1985, 1999). While neither one can fully explain the matriculation of students of color at predominantly White institutions in science, engineering, and technology based disciplines, each theory has components that contribute to the understanding of the social and academic success factors of this distinct population. As stated by Kuh, Kinzie, Buckley, Bridges, and Hayek (2006), “no one theoretical perspective is comprehensive enough to account for all the factors that influence student success in college...taken together, the different theoretical perspectives on student success and departure provide a holistic accounting of many of the key factors that come into play to shape what students are prepared to do when they get to college and influence the meanings they make of their experiences” (p. 16).

The first theoretical concept included in this study, student attrition, by Tinto (1975, 1982) is a model of student dropout in an attempt to determine the correlation between the success of students and their integration into the academic and social system of an institution. In this model he defines the academic system as one that focuses on the formal educational process of students and the social system as one that focuses on the daily life and personal needs of students (Tinto, 1987). Tinto’s model is built on the premise:

Individual departure from institutions can be viewed as arising out of a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences, and

dispositions (intentions and commitments) and other members of the academic and social systems of the institution (1987, p. 113).

In other words, the attributes of the student and the institutional agents must work together in a way that enables the student to be most successful. For example, if a student learns best in small classroom settings, then the college or university chosen should be one in which there is a small teacher to student ratio or an environment that utilizes team-based learning techniques such as learning communities that enable more one-on-one contact between the student and educator. According to Huebner (1980), “congruence theorists suggest that a good fit between students (their needs, attitudes, goals, and expectations) and the environments (its press, demands, supports, and the characteristics of its inhabitants) has a positive impact and promotes satisfaction, achievement, and personal growth, whereas poor fit creates stress” ultimately leading to their persistence or departure (Thompson & Fretz, 1991, p. 437).

While Tinto’s model is based upon research conducted on a majority population, as with numerous others, there have been a handful of researchers that have utilized this model as a foundation for inquiry into the attrition of students of color, specifically African Americans. Studies that have been a hallmark in this area are those that were completed by Braddock (1981) and Allen (1985), each of which have taken a look at the success of African American students with respect to their interactions with various institutional components at predominantly White and historically Black and White institutions, respectively.

In addition to these studies, there have been a substantial number of researchers that have evaluated various aspects of minority undergraduates that have focused on access, enrollment, attrition, and degree attainment, as well as quantitative data on student

background, attitudes and institutional characteristics. Other studies have sought to explain performance and persistence differences among students of color and their White counterparts, differences within and among students of color and majority students, relationships between student characteristics and institutional factors, student performance with respect to attrition rates, and the effects of student and institutional characters and their effects on educational outcomes (Mow & Nettles, 1996).

A key component of student attrition, as based on the above mentioned theoretical concepts, is the lack or imbalance of academic and social involvement of the student in his/her environment. This notion of involvement is defined and utilized by Astin (1984, 1985, 1999) as the amount of energy devoted to various activities such as studying, interacting with faculty and students, and participating in student organizations and other campus based activities. The emphasis in involvement is on what students do and not what they think or feel, that ultimately has the ability to impact the persistence of students to graduation. Under Astin's (1985, 1999) model of student involvement, there are five key premises:

- energy exerted in various activities is both physical and psychological
- levels of involvement varies from student to student and situation to situation
- involvement has qualitative and quantitative features
- student learning and development is dependent upon the quality and quantity of student involvement
- the effectiveness of any policy or practice is impacted by its ability to increase student involvement

The foundation of this theory lies in the assumption that what a student does is more paramount to the developmental process than what the educator does, essentially shifting from a teacher-centered to a learner-centered approach to education. While Astin has been instrumental in the development and use of this theory of involvement, this concept stems from the emergence of the student affairs profession and its focus on meeting the needs of the student as a whole entity through various academic and social student services programs that stem from the quantity and quality of student involvement (Moore, Lovell, McGann, & Wyrick, 1998). Contributing researchers have highlighted the positive relationship between involvement and leadership skills and self perception, the impact of involvement on student aspirations and degree attainment, and the positive impact of involvement on a student's success after college with respect to obtaining employment and career development (Albrecht, Carpenter, & Sivo, 1994; Pascarella & Terenzini 1991; Moore, et al., 1998).

Other studies on student involvement revolve around student participation in various campus programs and activities and the impact of the level of this involvement. These include, but are not limited to, athletics, Greek membership, student clubs and organizations, activities outside of class, interactions with faculty and peers, part-time and full-time employment, student government, and orientation programs (Hernandez, Hogan, Hathaway, & Lovell, 1999; Moore, et al., 1998). The quality and quantity of involvement in these activities has the ability to have a positive or negative impact on a student's academic and social success.

Several involvement theorists have revealed the correlation between student athletes and cognitive outcomes, the link between Greek membership and academic achievement, student development through participation in student organizations and leadership

experiences including student government, impact and importance of faculty-student and student-student relationships and interaction outside the formal classroom setting, and the effectiveness of orientation programs in acclimating students to the university environment both academically and socially (Boudreau & Kromrey, 1994; Cooper, Healy & Simpson, 1994; Edison, Nora, Hagedorn, & Terenzini, 1996; Gass, 1990; Glass & Garrett, 1995; Kuh, 1995; Moore, 1995; Pascarella, Bohr, Nora, & Terenzini, 1995; Pike & Askew, 1990;).

Other studies of student involvement have focused on variables impacting student involvement (traditional and non-traditional aged students, residential and commuter students, institutional size), student demographics (ethnicity, gender, socioeconomic status, sexual orientation, and disability), personal attributes of the student, and various characteristics of the educational environment and their ability to adequately integrate the student into the higher education system (Astin, 1993; Chapman & Pascarella, 1983; Moore, et al., 1998; Tinto, 1997).

Students of Color in SET Fields

In science, engineering, and technology (SET; often referred to as STEM-science, technology, engineering, and mathematics) based fields of study there has and continues to be a shortage of professional positions held by people of color. According to a study funded by the National Science Foundation and a report by the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development (2000), the largest pool of potential workers (women, minorities, and persons with disabilities) “continues to be isolated from SET careers” (p. 1). Based on this report, the effect of not tapping into this valuable human capital will cause the United States to “risk losing its economic and intellectual preeminence” (p.1). While there are many reasons listed

in this report as contributing factors to the despairing number of people of color in SET related professions, a primary source is the attrition of potential candidates from higher education institutions across the nation.

In a May 2006 report by the United States Government Accountability Office on trends in science, technology, engineering and mathematics disciplines, several other reasons were listed as contributing factors to the under-representation of ethnic minorities and women in STEM fields. Of these, the lack of quality in K-12 education, the decrease in the level of science (physics) and mathematics (calculus) course completion in high school, an increase in tuition costs associated with more courses for STEM degree programs, and the lack in mentoring services are key factors in the preparation of minorities for STEM careers (Ashby, 2006).

In order to address these concerns and combat this disparity, the United States government has invested heavily in the development of the knowledge and skill base of under-represented minorities in these disciplines, through nearly \$3 billion in funds for over 200 programs sponsored by agencies such as the National Institutes of Health and the National Science Foundation (nearly 50% of programs) and accessed by numerous secondary and postsecondary institutions (Ashby, 2006). With so much monetary investment in addressing the lack of people of color in science, technology, engineering, and mathematics careers, there must be another reason why our nation's colleges and universities are not fully tapping into and holding onto this potential pool of applicants. The postsecondary institution in which this study was conducted is no different when it comes to recruiting and retaining students of color in the SET based disciplines in the AGLS and CoE.

Retention of Students of Color

The academic and social adjustment to college can be a challenge for all students regardless of their ethnic, educational, or socioeconomic background. Academically, students may have to adjust to more rigorous course demands, such as an increase in homework, more independent and self-directed study, and increased accountability and ownership of their education. In addition, the demands of navigating the social system of an institution can be equally challenging. Students may have to deal with overcoming the fear of creating a new network of friends, finding a support system away from home, and taking the initiative to find and get involved in extra-curricular activities (Benton, 2006; D'Augelli & Hershberger, 1993).

This adjustment can be compounded when all the dimensions of a student's identity are thrown into the college experience (Jones & McEwen, 2000). More specifically, attributes such as one's ethnic identity as a minority at a predominantly White institution can cause heightened vulnerability to attrition. As stated by Elmers and Pike (1997), "although minorities cannot be considered a homogeneous group, several studies of college persistence have suggested that minority students, in general, encounter common experiences that are different than those of nonminority students" (p. 79). Some of these experiences include but are not limited to feelings of isolation and alienation in the classroom. For example, being the last person to be chosen for team-based activities or not having one's cultural perspective represented in course content or classroom experiences (Benton, 2006). As stated by Stage (1989), their social engagement has a much larger impact on their academic achievement which ultimately determines their ability to persist to graduation.

Many researchers have weighed in on the retention debate in higher education over the past years. Of these, there have been numerous that have focused on the social and academic challenges students of color face at majority institutions which impact their rate of attrition (Benton, 2006; Flowers, 2002; Watson & Kuh, 1996). Yet few have sought to determine ways in which institutions can combat this drop-out trend for this population. Some key suggestions proposed by this group of researchers include but are not limited to: institutional embrace and commitment to diversity awareness and inclusion, comprehensive orientation and retention programs that focus on the integration of the student and their family in the fabric of the university, adequate financial aid packages, diverse faculty and staff, mentoring relationships for students, ethnic specific student programming and extra-curricular activities; social and academic support systems (Dumas-Hines, 2001; Obiakor, 1997; Rendón, Hope and Associates, 1996; Sedlacek, 1999).

Despite the attempts of researchers to reveal the necessary courses of actions to combat the attrition of students of color at predominantly White institutions, this pattern of degree incompleteness continues to persist. According to Hodge and Pickron (2004), “the U.S Department of Education retention (reports) continue to show a dismal account of student graduation rates in colleges and universities...the National Center for Educational Statistics and the Council for Aid to Education have reported that dropout rates have soared between 44-50 percent...the problem is more pervasive among minority students” (p. 4). In comparison to this national data, students of color at Iowa State University are no different than those at other institutions when it comes to successfully navigating the academic and social systems in higher education which ultimately lead to degree attainment. As stated by Elmers and Pike (1997), “although several institutions can boast of successfully recruiting

minority students, relatively few can do the same for their ability to retain these same students” (p. 77). The few select institutions that can take pride in this achievement, for their African American student population, are those that are among the most elite institutions in the country: Harvard, Colgate, and Amherst; each of which has over a 90% graduation rate (Journal of Blacks in Higher Education, Autumn 2002). Their success can possibly be attributed to race-sensitive admissions policies, retention and orientation programs and sufficient financial aid packages.

While the retention of students of color as a whole after the first year may be comparable to White students at the large Midwestern public university featured in this study, historically this level of retention through graduation has not been maintained. According to the Office of Institutional Research (2007) 2006-2007 Student Profile at Iowa State University, the first year retention rate of all students of color entering in 2005 was 84%, the same as White students; with American Indian students having the highest rate at 100% and African American’s having the lowest at 76% and Asian/Pacific Islander’s and Latinos at 87% and 86% respectively. Based on this data, the university and its agents (students, faculty, and staff) are implementing and utilizing the necessary tools for success on the front end of the college experience; however, historically this has not been maintained throughout a student’s college years as evidenced by the graduation rates previously discussed in the problem of the study section.

Based on graduation rates between 30-60%, few students of color obtain degrees in AGLS and CoE. Those that are fortunate enough to persist and go on to complete their college education despite these dismal graduation numbers do so because they are able to address various factors that are associated with both their academic and social lives.

According to Rendón, et al.(2004), these points of interest that need to be addressed include interrupted or part-time course enrollment which prevents a greater degree of involvement in the life of the institution, greater familial responsibilities outside of the university, first generation student status, lack of validation, encouragement, and support from family and friends, culture shock from a new highly homogeneous environment, high aspirations of goal attainment, little or inadequate financial assistance, and lack of formal and informal interactions with faculty and staff. Students of color who are able to address and combat these issues are better able to invest in the university's community and experience the life of a majority student.

Not only are students stakeholders in their academic and social success, but the university has a great deal of responsibility as well. According to Townsend (1994), "universities are coming up short on their end with a shortfall of financial aid, fiscal counseling, inadequate mentoring, lack of cultural and social support, a dependence on Eurocentric curricula, faculty indifference, racial hostility, and an absence of institutional commitment" (p.1). Attention to each of these factors doesn't level the playing field, but it starts to alleviate some of the issues that have a detrimental effect on the success of students of color in higher education.

One way to address these issues is to determine what activities graduating senior students of color have engaged in to counteract all of the negative experiences they had with respect to social and academic factors. The best way to learn more about overcoming these obstacles is to go directly to the source, students of color. While the majority of research specifies factors associated with why students do not persist and graduate based on a university-wide population, there is little literature on students of color that do make it

through the system at predominantly White institutions. According to Moore, Lovell, McGann, and Wyrick (1998), “it is important for student affairs administrators to fully explore what causes or at least assists in having students remain at an institution through graduation” (p. 9). With the vast array of national and cross-institutional studies of students of color at PWIs, according to the ProQuest Dissertation and Thesis Database (2007), there have been few qualitative-based inquiries that have focused on under-represented ethnic populations at Iowa State University and none that have focused solely on the academic and social success factors of this senior population within the science, engineering and technology based disciplines in the College of Agriculture and Life Sciences and the College of Engineering.

CHAPTER 3. ACADEMIC AND SOCIAL SUCCESS OF STUDENTS OF COLOR IN SET BASED DISCIPLINES AT A PREDOMINANTLY WHITE INSTITUTION

A manuscript to be submitted to the *Journal of Higher Education*

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What does it take to be a successful student of color at a science, engineering and technology focused predominantly White institution (PWI)? Some would say that a student's persistence has little to do with their social and academic environment and more to do with their personal academic ability. While an individual's intellectual aptitude may play a substantial role in their persistence in the higher education system, the components of the social and academic environment have the potential to play a much larger role; especially for students of color. According to Rendón, Garcia and Person (2004) and for the purpose of this study, a "student of color" is a socially constructed classification that is often interchanged with "minority" and is used to describe under-represented groups: African Americans, Hispanics (Latinos), Asians/Pacific Islanders, and American Indian/Alaska Natives. This particular population of students is having a substantial impact on the higher education system as the ethnic and cultural face of the students in the pipeline has risen to 42% (National Center for Educational Statistics, 2008b).

One type of institution that has seen a constant rise in the percentage of students of color it serves is the PWI. According to the National Center for Educational Statistics (2008a), over the past 20 years, the percentage of students of color entering higher education has increased from 15.4% in 1976 to 30.9% in 2005, with the largest and most steady increase occurring among African American, Latino and Asian/Pacific Islander students.

Due to the continued increase in students of color in higher education, and subsequently predominantly White institutions, there is a need to know and understand the various components that contribute to their success, academically and socially, which ultimately leads to their persistence and graduation from PWIs; something this study seeks to showcase based on a large Midwestern research intensive PWI.

Literature Review

The premise of this research is based on two models of student development theory: 1) student attrition by Tinto (1975, 1987); and 2) student involvement by Astin (1984, 1985, 1999). While neither one can fully explain the matriculation of students of color at predominantly White institutions in science, engineering, and technology based disciplines, each theory has components that contribute to the understanding of the social and academic success factors of this distinct population. As stated by Kuh, Kinzie, Buckley, Bridges, and Hayek (2006), “no one theoretical perspective is comprehensive enough to account for all the factors that influence student success in college...taken together, the different theoretical perspectives on student success and departure provide a holistic accounting of many of the key factors that come into play to shape what students are prepared to do when they get to college and influence the meanings they make of their experiences” (p. 16).

The first theoretical concept included in this study, student attrition, by Tinto (1975, 1982) is a model of student dropout in an attempt to determine the correlation between the success of students and their integration into the academic and social system of an institution. In this model he defines the academic system as one that focuses on the formal educational process of students and the social system as one that focuses on the daily life and personal needs of students (Tinto, 1987). Tinto’s model is built on the premise:

Individual departure from institutions can be viewed as arising out of a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences, and dispositions (intentions and commitments) and other members of the academic and social systems of the institution (1987, p. 113).

In other words, the attributes of the student and the institutional agents must work together in a way that enables the student to be most successful. For example, if a student learns best in small classroom settings, then the college or university chosen should be one in which there is a small teacher to student ratio or an environment that utilizes team based learning techniques such as learning communities that enable more one-on-one contact between the student and educator. According to Huebner (1980), “congruence theorists suggest that a good fit between students (their needs, attitudes, goals, and expectations) and the environments (its press, demands, supports, and the characteristics of its inhabitants) has a positive impact and promotes satisfaction, achievement, and personal growth, whereas poor fit creates stress” ultimately leading to their persistence or departure (Thompson & Fretz, 1991, p. 437).

While Tinto’s model is based upon research conducted on a majority population, as with numerous others, there have been a handful of researchers that have utilized this model as a foundation for inquiry into the attrition of students of color, specifically African Americans. Studies that have been a hallmark in this area are those that were completed by Braddock (1981) and Allen (1985), each of which have taken a look at the success of African American students with respect to their interactions with various institutional components at predominantly White and historically black and white institutions, respectively.

In addition to these studies, there have been a substantial number of researchers that have evaluated various aspects of minority undergraduates that have focused on access, enrollment, attrition, and degree attainment, as well as quantitative data on student background, attitudes and institutional characteristics. Other studies have sought to explain performance and persistence differences among students of color and their White counterparts, differences within and among students of color and majority students, relationships between student characteristics and institutional factors, student performance with respect to attrition rates, and the effects of student and institutional characters and their effects on educational outcomes (Mow & Nettles, 1996).

A key component of student attrition, as based on the above mentioned theoretical concepts, is the lack or imbalance of academic and social involvement of the student in his/her environment. This notion of involvement is defined and utilized by Astin (1984, 1985, 1999) as the amount of energy devoted to various activities such as studying, interacting with faculty and students, and participating in student organizations and other campus based activities. The emphasis in involvement is on what students do and not what they think or feel, that ultimately have the ability to impact the persistence of students to graduation. Under Astin's (1985, 1999) model of student involvement, there are five key premises:

- energy exerted in various activities is both physical and psychological
- levels of involvement varies from student to student and situation to situation
- involvement has qualitative and quantitative features
- student learning and development is dependent upon the quality and quantity of student involvement

- the effectiveness of any policy or practice is impacted by its ability to increase student involvement

The foundation of this theory lies in the assumption that what a student does is more paramount to the developmental process than what the educator does, essentially shifting from a teacher-centered to a learner-centered approach to education. While Astin has been instrumental in the development and use of this theory of involvement, this concept stems from the emergence of the student affairs profession and its focus on meeting the needs of the student as a whole entity through various academic and social student services programs that stem from the quantity and quality of student involvement (Moore, Lovell, McGann, & Wyrick, 1998). Contributing researchers have highlighted the positive relationship between involvement and leadership skills and self perception, the impact of involvement on student aspirations and degree attainment, and the positive impact of involvement on a student's success after college with respect to obtaining employment and career development (Albrecht, Carpenter, & Sivo, 1994; Moore, et al., 1998; Pascarella & Terenzini 1991).

Other studies on student involvement revolve around student participation in various campus programs and activities and the impact of the level of this involvement. These include, but are not limited to, athletics, greek membership, student clubs and organizations, activities outside of class, interactions with faculty and peers, part-time and full-time employment, student government, and orientation programs (Hernandez, Hogan, Hathaway, & Lovell, 1999; Moore, et al., 1998). The quality and quantity of involvement in these activities has the ability to have a positive or negative impact on a student's academic and social success.

Several involvement theorists have revealed the correlation between student athletes and cognitive outcomes, the link between greek membership and academic achievement, student development through participation in student organizations and leadership experiences including student government, impact and importance of faculty-student and student-student relationships and interaction outside the formal classroom setting, and the effectiveness of orientation programs in acclimating students to the university environment both academically and socially (Boudreau & Kromrey, 1994; Cooper, Healy & Simpson, 1994; Edison, Nora, Hagedorn, & Terenzini, 1996; Gass, 1990; Glass & Garrett, 1995; Kuh, 1995; Moore, 1995; Pascarella, Bohr, Nora, & Terenzini, 1995; Pike & Askew, 1990).

Other studies of student involvement have focused on variables impacting student involvement (traditional and non-traditional aged students, residential and commuter students, institutional size), student demographics (ethnicity, gender, socioeconomic status, sexual orientation, and disability), personal attributes of the student, and various characteristics of the educational environment and their ability to adequately integrate the student into the higher education system (Astin, 1993; Chapman & Pascarella, 1983; Moore, et al., 1998; Tinto, 1997).

Purpose of Study

Based on the preceding tenets of Tinto's (1975, 1982) and Astin's (1984, 1985, 1999) theories of attrition and involvement, this study will focus primarily on their notion of interactions between students and attributes of the social and academic environment and the quality and quantity of this engagement on student persistence. While there are many academic and social attributes that can have a positive or negative impact on the retention of all students in higher education, being a member of an under-represented ethnic population

poses increased and unique challenges at PWIs. Some of the challenges faced by students of color include but are not limited to alienation, isolation, loneliness, judgment, tokenism, racism, discrimination, and culture shock; each of which have an added impact on the attrition rate of under-represented students when coupled with the everyday challenges of college life (Benton, 2006; D'Augelli & Hershberger, 1993; Lett, 2003; Lewis, Ginsberg, Davies, & Smith, 2004; Townsend, 1994). According to Loo and Rolison (1986), racial minorities “feel socially and culturally alienated,” which has the ability to play a much larger role in their attrition than their academic ability even though a student’s academic ability is often the variable used to determine an individual’s ultimate success in college (p. 61; Berger & Milem, 1999).

While many students of color experience adverse conditions that may hinder their social and academic success, there are many others who manage to navigate the higher education system at PWIs and persist to graduation. A critical element of this persistence to graduation is the level of engagement in the social and academic aspects of the university (Tinto, 1975). In fact, according to Kuh (2006), “while engagement is positively linked to desired outcomes for all types of students, historically underserved students tend to benefit more than majority students” (p. 9).

While the majority of research specifies factors associated with why students do not persist and graduate based on a university-wide population, there is little literature on students of color (especially African Americans) that do make it through the system at predominantly White institutions (Flowers, 2002). According to Moore, Lovell, McGann, and Wyrick (1998), “it is important for student affairs administrators to fully explore what causes or at least assists in having students remain at an institution through graduation” (p.

9). With the vast array of national and cross-institutional studies of students of color at PWIs, according to the ProQuest Dissertation and Thesis Database (2007), there have been few qualitative-based inquiries that have focused on under-represented ethnic populations at Iowa State University and none that have focused solely on the academic and social success factors of this senior population within the science, engineering and technology based disciplines in College of Agriculture and Life Sciences (AGLS) and the College of Engineering (CoE).

This study will take a look at the various academic and social factors that impact the retention and graduation of senior students of color in AGLS and CoE, in hopes of determining potential actions that can take place at the departmental, college and institutional level to aid in the persistence of this under-represented population of students and combat the disparity between the graduation of racial minorities and their White counterparts. Bridging this graduation gap is instrumental to the success of not only people of color but our increasingly diverse society and economy as a whole. More specifically, the success of these students in science, technology, and engineering based disciplines is critical to “the health of the U.S. economy” and our country’s competitive edge in “scientific and technological innovation” (Ashby, 2006, p. 1). As stated by Rendón, et al. (2004):

A key reason that educators need to be concerned about educating students of color is that national and world societal structures require a well-educated and trained workforce with a high degree of social consciousness...the future of the American economy is tied to the education of students of color...(translating) into billions of dollars of revenue for federal, state, and local communities, benefiting all citizens (p.12).

Methodology

Participants

The primary target population of this study is comprised of students of color at Iowa State University in AGLS and CoE. These particular students were chosen as the focus of this study for several reasons. First, the AGLS has historically had the lowest percentage of enrollment and retention through graduation of students of color; however, it has seen a constant increase this number. Second, the CoE is at the other end of the spectrum of enrollment of under-represented ethnic populations as it has historically been closer to the university-wide average (Iowa State University, 2007). Lastly, disciplines within these science, engineering and technology (SET) based fields at PWIs nationally, have historically enrolled and graduated the least number of students of color; ultimately impacting the pipeline into SET careers and our country's contention in science, technology and engineering as we miss out on the knowledge, skills and abilities of this population that is tied to the rapidly changing demographics of the nation's population (Ashby, 2006).

The sample pool of participants was identified by the Office of the Registrar as being classified as upperclassmen with senior classification (90 plus credits), and self-identified members of a racial minority (American Indian/Alaskan Native, African American, Asian American, or Hispanic(Latino)) from diverse educational and socioeconomic backgrounds who have achieved traditional academic success in the form of meeting their degree requirements with the potential to obtain their degree upon the conclusion of the 2007-2008 academic year.

The total number of students in AGLS and CoE that met the two critical criteria stated above was 152; 26 in AGLS and 126 in CoE. The ethnic breakdown of this select

sample population of students was 9 African Americans, 11 Asian Americans, and 6 Latinos in the AGLS and 5 American Indians/Alaskan Natives, 39 African Americans, 48 Asian Americans, and 34 Latinos in the CoE. From this sample population, eight students volunteered to be participants in this study. This particular sub-population of students consisted of three African American males, one Asian American male, and two Asian American females from CoE and two African American females from AGLS.

While the selected sample is similar in their quest to obtain degrees in fields that have historically been dominated by the majority, their background characteristics yield both similarities and differences that may or may not have contributed to their ability to persist (Tinto, 1987). With an average age of 22, the majority of these students were raised in large Midwestern cities in Iowa, Illinois, Nebraska and Missouri with the exception of two students from New York and New Jersey. All of the respondents have siblings in the home and are from two parent households. Six out of 8 have parents with a college education: 2 with four-year degrees, 1 with both parents earning PhDs, 3 with some college or two-year degrees. Six of the 8 participants were considered high ability students enrolled in honors classes in high school. Lastly, all of the students were involved in multiple social, academic, athletic, and community activities, with only a couple participating in religious and spiritual experiences.

Instruments

The qualitative data collected and analyzed in this study was derived from a demographic survey and focus group questions created and administered by the researcher. Some of the questions utilized in the interviews were adapted from the mid-1980s study of the alienation of minority students at a predominantly White institution by Loo and Rolison

(1986). The demographic information consisted of statements pertaining to the name, age, hometown, family size, major, academic classification, and family educational attainment of each student. The focus group questions include inquiry into the student's extra-curricular activities, relationships, academic satisfaction, racial and ethnic identity, support systems, and success factors.

Prior to their arrival and participation in the focus group, students were asked to complete a short survey pertaining to their demographic background. Upon the completion and submission of this information, via email to the researcher, the participants were given the opportunity to choose from a couple of focus group meeting times. Upon the confirmation of their meeting selection and their arrival at the focus group location, the researcher reviewed the purpose and format of the study, followed by the distribution and review of the informed consent document. Once the participants reviewed and signed the document, the researcher signed the form and distributed a signed copy to each participant. The researcher then proceeded to enable the recording device and begin the group or individual interviews.

The findings from the analysis of the above mentioned qualitative data yielded grounded theories, defined as categories of thoughts or ideas derived directly from the data, based on the research question "what perceived factors contribute to the academic and social success of senior students of color in the fields of engineering and agriculture at a predominantly White institution?" Based on Taylor and Bogdan's (1998) premise of reality being defined by perception, this qualitative study sought to define and interpret the creation and meaning of the experiences of students of color, which impacted their perception of

reality at a predominantly White institution (Denzin and Lincoln, 1994; McMillan and Schumacher, 2001).

Procedure

The qualitative data were derived from 5 scheduled one-hour focus groups with an anticipation of 4-5 students each. However, due to scheduling conflicts, in-depth interviews were also conducted. In total, there were three one-on-one in-depth interviews that lasted for approximately 1 1/2 hours each, and two one hour group interviews comprised of 2-3 students each. Of these five interview settings, three were comprised of students from the CoE and two from the AGLS. Students were identified based on each college's Fall 2007 semester 10-day list (a list of students enrolled on the 10th day of classes; a format used by the university to determine their enrollment demographics) and sorted according to their racial identity and classification. Only students of color with senior status were then selected for email solicitation for voluntary participation.

Once the interviewees were selected, the researcher proceeded by facilitating and recording the individual and group interviews on a weekly basis until the final group was completed. To ensure validity and reliability of the information presented in the interviews, periodically the researcher did a member-check to ensure her interpretation of the information presented was the correct perception of the interviewees. At the end of the interview, the researcher reviewed her notes and presented her key points to the interviewees for further clarification. Upon the conclusion of each interview and prior to the start of the next, the researcher transcribed the audiotapes and field notes in search of emergent themes. Upon the transcription of the final interview, the researcher sorted and categorized the data based on the emergent themes which will be discussed in further detail below.

Findings

Defining Success

Success in higher education has traditionally been defined as the level of academic achievement obtained by a student through their grade point average (GPA) and ultimately degree attainment. The ability or lack thereof as determined by a student's GPA can define their persistence in postsecondary education. As stated by Prime (2001), "low GPAs have been cited as one of the primary reasons why students leave college prematurely. In the deficiency model, low grades mean, at best, that the student has not learned the essentials of the course but often get interpreted to mean that the student cannot learn the essentials, either because she/he does not have the ability, or has not had the necessary preparation" (p. 120). Today, success goes beyond degree attainment through academic development to include social aspects of a student's development. These social aspects include a student's professional and personal support systems and extra-curricular activities.

Does the definition of success for students of color in SET based disciplines coincide with the standard measurement of success in higher education that, according to Kuh et al. (2006), is defined by theorists as "persistence and educational attainment, or achieving the desired degree or educational credential" (p. 11)? For a distinguished set of African American and Asian American students in AGLS and CoE at this large Midwestern PWI, success goes beyond the calculation of a grade or the completion of a degree. For these students of color, their success is defined more by who they are than what they have. Their definition, which is both intrinsically and extrinsically motivated, has had a substantial impact on their persistence in higher education.

For several of the students interviewed, success is a very personal concept that is ultimately determined by the individual or as being “in the eye of the beholder” as defined by an African American male respondent. This particular group of students did not see success as being something that is determined and measured by an outside entity. To them, success is defined by the process of participation in the higher education system which consequently leads to degree attainment. Being able to learn new things and interact with different people and environments, and the ability to set and obtain a self-described goal are the common elements of their responses:

...(success) being the opportunity to participate. Attending classes, learning new information. Meeting people from diverse groups. It's already a success for me...when I get an 'A' in the class or a 'B' in a class is not the real purpose why I am here in the university. I am here primarily to engage in the process...(African American male, CoE)

Success to me is whether or not I meet my goals. So here at Iowa State basically, I set some goals that I wanted to have, a coop before my junior, a job offer before I graduated, I wanted to have this GPA are examples of some.. Basically when you give it your all, your best effort. (African American male, CoE)

Knowing that I've put forth all of my effort. (Asian American female, CoE)

While the above students spoke of the process of success and its intrinsic foundations, other students spoke of servant leadership in that their success is tied to the success of those around them and their desire to reciprocate the support and guidance they received. There is a demonstration of their desire to lead by example, which is not only interpreted through these passages, but also later in the interviews when students discussed the various mentoring relationships they've been involved in throughout their collegiate experience. Having this sense of civic responsibility to one's peers and family has the ability to have a substantial impact on the success of these students (Elmers & Pike, 1997; Sedlacek, 1990). Their

dedication to the betterment of those around them and giving back to their family and community is evidenced below:

Success can be measured in different ways for different people. I think for African Americans, for minority students period, actually finishing this portion of the race is a grand achievement as opposed to being number one in your class. There are far too many of us who have so much baggage to carry; yes I would love to get straight A's in my courses, I'd love to be on the dean's list, but for the responsibilities I have to carry, it is not a realistic option for me. Simply finishing this race is enough for me because this is bigger than me (African American Male, CoE)

It has a lot to do with the things that I've done to empower others or other people empowering me to do what I can. That is pretty important to me. It's not like getting a project done. (Asian American male, CoE)

Being able to give back to those that have given things to me. (Asian American female, CoE)

Even though the majority of students interviewed defined success in the non-traditional manner, the following students equated success with extrinsic attributes associated with socioeconomic status such as monetary gains and the privileges and flexibility it affords upon degree attainment. According to Pascarella and Terenzini (1991), “a bachelor’s degree remains a major, if not *the* major, prerequisite for entrée into relatively high status and high paying technical, managerial, and professional jobs,” ultimately providing graduates with the potential for a better “quality of life” (p. 575). This sentiment is felt by two African

American females:

I probably equate success largely with money. Because usually if you are successful, like in a job, you are going to make a lot of money. Success is just accomplishing whatever you set out to accomplish. So I guess success in a school sense would be to ace a test or if you learn something in a class, it was a successful class. (African American female, AGLS)

Being able to balance financially with what you want versus what you need. (African American female, AGLS)

These student's definitions of success is the lens through which they have navigated and gauged the importance of the social and academic aspects of the educational system from their freshman to senior year. Based on their perception of success extending beyond a grade in a class and a completed transcript, it is evident that there is more to higher education than academic success. The social process of involvement and development plays as much of a role in a student's retention and degree completion as their academic involvement (Astin, 1999; Chapman & Pascarella, 1983; Elmers & Pike, 1997; Tinto, 1975, 1982, 1987; Stage, 1989).

To determine what these academic and social factors are, participants were asked a series of questions: what academic factors have aided in your success, what academic factors have hindered your success, what social factors have aided in your success, what social factors have hindered your success. Their responses to these core questions revealed several themes relative to their experiences based on two broad categories: academic factors of involvement and social factors of involvement. With respect to academic involvement, participants attributed their success to student services offered at the university and college level, minority-based recruitment and retention programs and a professional support system with faculty and peers. Socially, student's spoke of a personal support system consisting of family and friends, and campus extracurricular activities including athletics and student organizations (minority and professionally based).

Academic Factors

Student services. Students of color benefit from the utilization of campus academic resources as much, if not more than majority students. Based on the responses from participants, the services that were most useful were tutoring for "weed-out" courses such as

calculus and physics and learning community based activities comprised of their peers and upperclassmen, such as study tables. This is critical for students of color because math and science are the two subject areas in which Native Americans/Pacific Islanders, African Americans, and Latinos have the lowest level of college preparation, which ultimately affects their persistence in science, engineering and technology based disciplines. Involvement in these types of voluntary experiences demonstrates initiative and dedication on the part of the student to their academic success and it also displays the importance of peer-to-peer contact. As a result of their positive experiences with these components of student services, the participants reciprocated the assistance and guidance given to them by taking on leadership roles as mentors and tutors to younger students. This not only shows their commitment to the success of their peers but also their desire to have a positive impact on their community as evidenced by their personal definitions of success as stated above. Responses from the African American male students best showcase the importance of peers as educators and the degree of collaboration that occurs in these types of educational settings:

I got a tutor. I did supplemental instruction. Went to talk to my professors a lot. I also became a tutor and I think that has helped me as well. Getting a tutor was my biggest help. I had a tutor my first four semesters, even when I didn't need it. It just helps. It really helps. (African American Male, CoE)

For me, what contributed to my academics to get me to the point where I am now, was mostly asking for help. I tried to surround myself with people that were smart, that knew the material and could break it down for me because sometimes the professors were so far along that when they explained it to you it was like "huh". (African American Male, CoE)

I think the biggest reason I had such a good GPA was because of study groups that I formed on my own with people in my classes. I have six that I do all of my homework with in all of my classes. That has probably been my biggest help. (African American Male, CoE)

Learning Communities...people pursuing the same majors to be in the same environment on a more frequent basis...in the minority community students come from all different

backgrounds and even in the dominant community, we all have issues that we need to deal with and those resources are accessible to succeed. (African American Male, CoE)

Academic advising. A critical agent in the undergraduate experience is the academic advisor. Students of color at Iowa State University not only have access to a formal advisor, but they also have the expertise of a Multicultural Liaison Officer (MLO), which is housed in each college. This person works in conjunction with the Office of Multicultural Student Affairs (OMSA) as an advocate for the needs of students of color with respect to their academic, professional and personal development. Their responsibilities include, but are not limited to, advising students and organizations, recruitment, outreach, and retention. In addition to the MLO, students of color are assigned a formal academic advisor. This individual is responsible for being a resource in the academic and professional development of the student at the departmental level.

Depending on the discipline of study, the model used for advising may vary across the institution. The first degree of variation is the advisor. This individual can be a full-time staff member whose sole responsibility is to provide this service, faculty who also have research and teaching commitments in addition to advising, or a part-time staff member who has other obligations that may include teaching, program coordination or graduate work. This aspect of the model appears to be most critical to success in that it determines the amount of time devoted to a student's needs. The second degree of variation is the location of the service. Academic advising can be held in a central location or scattered throughout a college. With respect to the CoE, this service is offered in a central location for students that have not declared an area of specialization within the college. Once a student has chosen a

program of study, their advising shifts to the departmental level where there may be one advisor for all students or multiple advisors.

The final variation in the advising model is the quality and quantity of service. For many students, the quality depends on the degree of interpersonal communication between the advisor and student and the level of experience of the advisor. The quantity of service can also fluctuate depending on the needs of the student and the availability of the advisor. Most students see their advisor during registration season, mid-semester; however, the amount of other communication is based on the student's needs. The importance and impact of a student's relationship with their academic advisor has the ability to positively and negatively affect their persistence based on knowledge about courses, degree requirements, career opportunities, and campus based resources. As evidenced by student responses, the student-advisor relationship was often positive and influential once a specific program of study was chosen:

As far as Iowa State goes, we have Engineering Career Services. In Aerospace Engineering, he does well but there is just not enough of him to go around. Overall, they have done well in advising me. (African American Male, CoE)

When I declared "industrial" our advisor is great. You can call her on weekends for anything; she knows things inside and out. She is not a faculty member so I think that has a lot to do with it. She is just very heavily involved in what you want to do. (Asian American Female, CoE)

Every since my junior year he has been more available. They made a lot of departmental changes in the ME department as far as advisors and he has been the one that has stuck around since I've been here. He's really good at responding to my emails. If I ever have any questions I just go in there and ask him. We had a pretty good relationship. (Asian American Male, CoE)

Recruitment and retention programs. Students of color in the AGLS and the CoE are benefiting tremendously from minority based recruitment and retention programs. Both

university and departmentally based, these programs are having a substantial impact on the recruitment, persistence and graduation of under-represented populations at Iowa State University. At the university level, the programs that were mentioned most by the interviewees were those that are housed in the Office of Multicultural Student Affairs- George Washington Carver Program (Carver Academy), Multicultural Vision Program (MVP), and Academic Program for Excellence (APEX). Other programs that received notable mention were the McNair Scholars Program, the Learning through Engineering and Academic Diversity (LEAD) Program, the Multicultural Learning Community (MLC), and Student Support Services Program (SSSP). Of these aforementioned programs, the CARVER and MVP programs serve close to 45% of the student of color population on campus; responsible for recruiting nearly 200 Native American/Alaskan Native, African American, Asian American, and Latino students combined, each year.

Each of these programs provide countless resources to students of color, some of which are tutoring, mentoring, computer and printer access, textbook access, conference and professional society membership payment, cultural events, emergency financial assistance, academic success seminars, social gatherings, professional development opportunities through industry partnerships, and meeting space (Iowa State University, 2008c, 2008d, 2008e). When coupled with majority student services these ethnic specific programs enable students of color to compensate for shortcomings associated with being a minority student on a predominantly White campus by fostering academic and social support systems that may not otherwise be created. Students described these programs and the facilities that house them as “creating a home away from home” and a “safe place to land.” One student credited his participation in these programs with his “successful navigation through the system.” This

appreciation and utilization of these programs were clearly evident in this representative sample of student responses:

LEAD-Learning through Engineering and Academic Diversity, that was a great program. I would go upstairs to the LEAD room and have tutors up there or have my peers help me out. Whatever you needed help in. (African American Male, CoE)

I was in CARVER and LEAD, they provided me tutors. I had a really good support structure, which was one reason why I chose Iowa State. (African American Male, CoE)

Mentors through CARVER and talking to upperclassmen has helped. Just friends. I think I have a good amount of support when it comes to that. (African American Male, CoE)

I was in APEX when I first came in. That may have added to my success because I got an early start here. Coming from my home and high school (New Jersey) I didn't know what to expect from college. Being here that summer allowed me to set up everything for that fall. I feel that helped me with the transition. LEAD also helped because they offered a lot of seminars and workshops on things like resumes and time management and a lot of other stuff. I was also in SSSP. I'm also in the CARVER academy. They all offered workshops on a lot of things. (African American Female, AGLS)

APEX helped with my transition. CARVER offered two free tutors and offered a mentor. They also offered reimbursements for conferences and stuff like that. It helps because that is less money that had to come out of my pocket. SSSP offered computer use, free printing, free copying, books you could borrow if you didn't have money to buy your books. They also offered free tickets to social events that brought people together. SSSP also offers two tutors. For a while I had tutors for every class. (African American Female, AGLS)

Relationships with faculty and staff. Equally important as student services, are personal and professional relationships with faculty and staff both inside and outside of the classroom. This is especially true for students of color at predominantly White institutions because of the lack of their ethnic representation among faculty and staff. Not only do faculty and staff have the ability to expose students to potential career paths, but they can also be very influential in encouraging and supporting students as they progress through their chosen discipline. Interacting with faculty and staff of color creates a greater sense of belonging and understanding of shared cultural experiences. Participants discussed

interacting with faculty and staff at university and college functions sponsored by programs through the OMSA, such as the Student of Color Family Reception, FACs (Friday After Class) gatherings, and faculty/staff meet and greets. They described their interactions as “comforting” and “awesome to have someone care enough to take time out of their schedule to get to know us not only as students but individuals.” It is clear from the student’s responses that spending time with faculty and staff has had an impact on their desire and ability to persist, as evidenced by two African American male students in the CoE:

I’ve met a lot of great people on campus, Dr. Hill...the director of the McNair Program Dr. Jackson, he has done so much for me on this campus. That man is a wonder. He’s amazing. He’s inspiring. I can honestly say that one of the main reasons I keep coming back is because of him. If nothing else, I’ve got to get my undergraduate at least to go and say “I may not have gotten that Masters that you required, but I got this, thanks.” (African American Male, CoE)

My freshman year I was a little intimidated by my professors. After I got to know a few of my professors, go visit them during their office hours, ask them questions, talk about what they love doing. I think after freshman year I was a lot more comfortable and to this day I talk to my professors on the regular. (African American Male, CoE)

Interacting with faculty on a personal level, as described above, enabled these two students to be able to make a greater social connection to the institution and sense of responsibility to their academic success by striving to meet the expectations of those they admire for taking an interest in them. For many students of color, especially first generations, the relationships they have with faculty and staff of color in the higher education environment, may be the only source of professional or elder mentoring and encouragement they have to assist them through the academic process. The students in this study are no different, in that many of them will be first generation graduates.

Relationships with students of color. Equally important to the success of students of color is a second component of their support system, relationships with other students of

color with similar ethnic backgrounds. The ability to share in the same cultural experience is paramount to the social development of this under-represented population in disciplines that are, and have historically been, pursued by members of the majority population. The need and desire to communicate with students that “look like you” is extremely important to the participants. Their social development, which is tightly intertwined with their academic development, has enabled these students to become more involved in the institutional environment, thus increasing their commitment and ultimately their persistence to graduation.

Whether this interaction with their peers is fostered in their home department, at a university function or in their living environment, it is evident that for these students the need is imminent. There is clearly a desire for the camaraderie and sense of community that can occur within a group that shares a common cultural experience. For the African American male participants, this was equally important:

When you come together, it's easy. You can relax. We all have a certain mask that we wear, but ultimately, you can't really hide who you are when you are among your own people. (African American Male, CoE)

One day I was driving on campus and I thought I recognized a friend of mine driving in front of me from a glimpse in his rearview mirror. I followed his vehicle, flashed my lights, blew my horn, until he finally recognized who I was. I mean, that is how acute the sensitivity is; that all it takes is a shadow of the hue and just a possibility that I know that person. If it turned out not to be him, which it was, at the very least I made a new Black friend. (African American Male, CoE)

These African American men went on to discuss the extra effort they have had to go through in order to see and interact with other students of color at a majority institution:

The Memorial Union, I've gone down there sometimes for lunch just so I can see the different people walking by. It's not exactly that I like the food down there anymore. It's the atmosphere. Once in a while I might see someone I know. (African American Male, CoE)

I have some of those days where I decide to walk across campus just to see who I can see. I go over to Parks (Library) and just sit downstairs and people watch. You may see a person that you know from say the McNair Program and you say “what’s up, I remember you.”
(African American Male, CoE)

For these students, simply knowing that they are not the only student of color on campus brings them a level of comfort and feeling of not “being alone.” This seemed to be more important for the African American students than the Asian American students interviewed, as evidenced by their responses.

Social Factors

Support of family and friends. The presence of a social support system for students of color is critical to their development at a predominantly White institution. Whether this system is comprised of faith, family, or friends that provide emotional or financial support, varies from student to student. For this study’s participants, knowing that there is someone to “pick you up and push you on when you don’t feel like going any further” was a very important aspect of their strength and perseverance to work through and overcome the obstacles they faced. Aside from their family providing a solid foundation and encouraging words, students depended a great deal on their circle of friends to carry them through some of their toughest experiences as students because of their shared experience. Often their peers were considered “like family” because of their close relationships. In addition to friends and family, students spoke of their faith and the strength it gave them to go on from day to day. While none of them spoke of participating in religious activities on a regular basis, they were confident in their spirituality and religious beliefs:

...a combination of family and friends and the support from them. It was sometimes I would just call my parents, barely crying. Just ‘cause it was like so hard. “I don’t think I can handle this, I am about to switch majors, just forget it”. It was their support and uplifting words and everything that kinda kept me going little by little. I have very supportive friends.

So they made sure I was doing what I need to do. They encouraged me every step of the way. I would just say it is the people I have in my life. (African American Male, CoE)

I would say my support system (is) my family. I would come up with random ideas, like I don't want to be an engineer today and the next minute I do, and they would support me. Without their support I don't think I would have been able to make it. (Asian American Female, CoE)

I attribute most of my success to God and my parents. They set me up for success more than anything else... Enabled us to take responsibility. (African American Male, CoE)

I've said many times, that if I had not had the group of friends that I had throughout this time, I don't think I would have failed, but I probably would have been a very unhappy person and probably wouldn't have stayed here...I feel that if I didn't have my group of friends I wouldn't have been here because you don't have anybody else to talk to. I came from a predominantly Black neighborhood and a predominantly Black school, so I've always been in the majority. (African American Female, AGLS)

While it is clear that faith, family and friends were an important component of their college experiences, their personal drive, ambition, and dedication to their goal of degree completion was the underlying force. With a strong vision of the “prize” these students were able to see past all of the pain and frustration associated with coursework, exams, social conflicts, and professional challenges.

Minority-based student organizations. An equally important social factor of success of students of color at predominantly White institutions is the opportunity to participate in special interest student organizations that are ethnically and culturally based. These include but are not limited to learning communities such as the Multicultural Learning Community (MLC) and the Leadership through Engineering and Academic Diversity Learning Community (LEAD LC), Greek organizations, college specific programs such as Minorities in Agriculture, Natural Resources and Related Sciences (MANRRS), and service organizations such as the Black Student Alliance (BSA). These organizations allow a student of color the opportunity to connect to other students who have a shared academic and

professional experience as a member of a minority at a predominantly White institution. In essence, students are allowed to interact with other students that “look like them” and alleviate the sense of loneliness that occurs with being in the minority; at least for a structured amount of time. These venues provide an opportunity for this under-represented population to renew their confidence, sense of purpose and perseverance by physically seeing that they are not alone in their pursuits and receiving encouragement from those who have paved the path and those that are walking along with them. Active participation in these types of organizations has the ability to have a profound impact on the sense of belonging and connection a student of color has to the institution and its agents, which ultimately leads to persistence and graduation.

The level of involvement in the various types of organizations mentioned above and its degree of impact varies from student to student; however, the need for some level of participation is evident. The participants in this study displayed a high degree of involvement and commitment to their chosen minority-based student organizations, ultimately becoming a part of their identity as a student. This dedication often led to leadership opportunities within the specific organization or equipped them with the skills to take on roles in other arenas. The importance of these experiences is clearly visible in their responses:

I went from GSB, our student government to NSBE-National Society of Black Engineers, Black Student Alliance, and Black Cultural Center Task Force. Finally found my niche in two of them. Those have been very beneficial to me socially...It's been great. (African American Male, CoE)

I also work at a restaurant. That is kinda like my hobby job...It is a Thai restaurant. It is like a community there. They treat us like their family. I get my social support there. Being there, I get to educate people on my culture a little bit and that is what I really, really enjoy. Also, the Thai student association, I've been really involved in. I've been in it for the past

four years. When people ask us to be involved in other things, like VEISHEA, I am there. (Asian American Female, CoE)

No other Black run organizations are throwing any events, so I just never quite got into the culture. Anything I went to was something through BSA like Harambe, talent shows and stuff like that. But that is not connected to Iowa State. Anything I've been to socially is through these organizations so I identify with them and not Iowa State. (African American Female, AGLS)

*Probably the only person that is close to faculty that I have more of a personal bond with would be ***. She's a member of my sorority and the closest person I can think of to being a faculty member. (African American Female, AGLS)*

Based on the above statements, it is clear that students are in need of an avenue that enables them the opportunity to develop not only academically but socially as well; with a great deal of this development occurring among their peers with whom they share a common cultural experience. For this specific set of students, these experiences have strengthened their support systems and provided them access to resources and activities they otherwise would not seek to participate in.

College, major specific, and athletic organizations. In addition to involvement in minority-based student organizations that meet the cultural need of students of color, participation in organizations based on an individual's college/major and activities that promote physical fitness are equally important to the development of these under-represented students. Participation in college/major specific organizations not only expands a student's personal and professional support system, it also enables access and insight into a chosen career and the cultural norms of the majority population. Students in this study spoke of the benefits of being involved in these types of professional development organizations and the impact it has had on them academically and socially. Responses from two CoE students best represent the sentiment felt by the majority of the participants in this study:

I was also involved in E-week. On top of that getting involved in other organizations outside; like I was a Cyclone Aid for one summer, you get to network with people and that has helped me to meet different types of people and to see things from their point of view. It opens your mind up a lot more to opportunities that are available out there, whether it's school work or not.(Asian American Male, CoE)

Things like the AGC student chapter, Association of General Contractors, I'm a Construction Engineering major, things like that were right there for me. Providing me the opportunity to better know and understand my major and what to expect after graduation...I think for the time that I've been here at ISU, maybe a year and a half I was an active member in my student chapter. (African American Male, CoE)

As evidenced by the responses above, it is clear that students of color need to have balanced involvement in various types of student organizations, which will enable them to meet their social, academic and professional develop needs. In addition to participation in these academically based activities which feed the mind and spirit, students also need to feed their body. At Iowa State University students are able to access a multitude of athletic activities through the recreational services program. In addition to several facilities, students have the opportunity to participate in everything from wilderness programs such as hiking, canoeing, and camping to organized individual and team-based intramural sports such as basketball, soccer and volleyball. For the students of color in this study, participating in new activities and intramural sports were an important part of their overall development. These experiences not only addressed the importance of physical health, but they also provided balance within their lives and gave them the opportunity to interact with members of the larger university community; ultimately strengthening their connection to the institution and impacting their persistence, as evidenced by the representative statements from two Asian American students:

Intramurals was a big one for me. I stayed open-minded. First time I ever won an intramurals shirt was in paint ball. I had never played paintball in my entire life. One of my buddies asked me one day if I wanted to play and we ended up winning that day. That was

definitely a really good experience for me. Other than that, just finding things to do. There is a lot of free stuff to do on campus. On top of that, a lot of night life too. As long as you stay involved and not get caught up in it, you won't find yourself too far behind. (Asian American Male, CoE)

I've been active in sports clubs, tennis team, volleyball club team. I've done intramurals too. (Asian American Female, CoE)

The ability to get and stay involved in campus-based activities is clearly important to the academic, social and professional development of students of color at a predominantly White institution. Whether it is through minority-based student organizations, major specific organizations or athletic competitions, “keeping busy” was instrumental in the persistence of this select group of under-represented students.

Discussion

As evidenced throughout this study, it is clear that students of color at predominantly White institutions have experiences that transcend those of the majority population, which have the ability to adversely impact their persistence to graduation. In order to combat the disparity in matriculation that results from these experiences, students of color must exert a great deal of energy on being academically and socially engaged in their environment. Grounded in Tinto (1975, 1987) and Astin's (1984, 1985, 1989) theories of attrition and involvement, this study sought to determine the perceived factors that assist in the retention and graduation of ethnic minorities from a large midwestern research intensive PWI.

For the select group of students of color featured in this study, several academically and socially based experiences assisted in their development and persistence to graduation. Academic aspects include recruitment and retention programs, student academic services, career and academic advising, and personal and professional relationships with faculty, staff, and peers. Social aspects include support networks comprised of faith, family, and friends,

participation in ethnic and culturally based student organizations, access to professional student organizations, and participation in fitness programs. Based on the findings from this study, characteristics of the academic and social environments of the featured institution, and undergraduate and graduate experiences of the researcher at the focus institution, there are several key actions predominantly White colleges and universities can take to foster the retention and graduation of students of color.

First, recruitment and retention programs that facilitate academic, professional and social development are paramount to the success of students of color at predominantly White institutions. These types of programs must go beyond bringing students to the institution, to include resources and experiences that assist the participants in navigating the implicit and explicit norms and expectations of the environment, better enabling them to navigate the system (Carey, 2008). Attributes of these types of programs need to be a collaborative effort between aspects of student and academic affairs. Key components should include faculty, staff and students of color to serve in mentoring relationships, fiscal resources to supplement student academic expenses, professional development and cultural experiences, weekly seminar based activities that facilitate personal, professional and social identity development that occur from freshman to senior year of enrollment, and physical space to promote collaborative and cooperative learning.

Second, access to resources through student services, such as tutors and study tables, enable collaboration and peer education to occur. According to Terenzini, Pascarella, and Bliming (1996), “peer tutoring increases student involvement in the learning process and enhances content mastery...when tutoring takes place, students (both tutors and tutored) and institution benefit” (p. 156). Due to the potential impact of peer educators on the success of

students of color, colleges and universities should consider creating programs at the institutional and departmental level that facilitate and encourage this type of learning.

Programs such as an Academic Success Center to provide comprehensive academic services such as tutoring and supplemental instruction facilitated by students, and departmental help sessions for “weed-out” courses such as math, physics, and chemistry, also facilitated by students can assist in combating some of the academic challenges faced by students of color.

In addition to academic success resources, under-represented students need access to adequate academic and career advising to aid in the demystification of course and career selection. With a large percentage of students of color being first generation college students, there is a need for a higher level of guidance through the formalities of the higher education process, due to their potential lack of background knowledge. Not knowing and understanding the rules and regulations for navigating the system can be detrimental to the success of this select population of students. To ease in this transition and navigation, universities should consider implementing a mandatory checks and balance system for advising students, especially under-represented populations. A system that utilizes intrusive advising techniques that require periodic correspondence between the student and their advisor throughout their academic career, not only when they are experiencing academic challenges, would be most beneficial (Jackson, 2003).

Last, personal and professional relationships with majority and minority faculty and staff, and peers of color are critical in the persistence of under-represented populations. Formal and informal experiences with faculty and staff, has the ability to enable students of color to receive encouragement, support, and guidance in navigating their degree program and the structures of the university. Ideal avenues for fostering these types of relationships is

through faculty and staff involvement in the classroom, such as faculty roundtables that enable faculty to share their expertise on a less formal platform, periodic social gatherings such as FACs (Friday After Class) or guest presentations at student organizational meetings, departmental sponsored faculty-student meet and greets, and one-on-one mentoring. Of the various types of relationships students have with faculty, informal relationships that focus on “intellectual/literary or artistic interests, value issues, or future career concerns have the greatest impact...(and) have a significant positive influence on such criteria as college persistence, personal development, and educational aspirations” (Pascarella, 1980, p.565).

Also critical to the success of students of color are peer relationships within under-represented populations (Thompson & Fretz, 1991). These relationships enable students of a shared ethnic and cultural experience to create a greater sense of camaraderie, community, and connection to the university. Fostering of these relationships can occur through formal mentoring programs sponsored through learning communities, activities promoting community building through residential programming, and participation in ethnically and culturally based student professional and service organizations. Active participation in these types of activities has the ability to alleviate feelings of isolation and loneliness that students of color experience at PWIs as a member of a racial minority, by connecting them to multiple aspects of the university environment; ultimately strengthening their ties to the institution.

Equally, if not more, important to the preceding academic factors are the social factors that impact the persistence of students of color at predominantly White institutions. The first of which, support networks of family and friends, is critical to the success of students of color. Having “people in your corner” that offer continuous encouragement and someone to share frustrations with enables students to be able to focus on their goal of degree

attainment by essentially sharing the emotional burdens associated with the higher education process. Support networks also have the ability to hold students accountable for their academic achievement by communicating their high expectations, further preventing many students from dropping out. To ensure students have a personal support system, universities should encourage experiences that foster connections between families and the student's institution. Activities such as frequent university, college and department sponsored social events, family campus visits and periodic newsletters from advisors are avenues for this type of relationship building. The belief that students should be treated like independent adults once they arrive on campus and the notion of student privacy regulations, such as FERPA, should be seriously reconsidered as we move into a generation of students who are increasingly co-dependent on their parents and each other (Howe & Strauss, 2000).

Second, participation in ethnic and culturally based student organizations enable students of color to build a sense of community and belonging with others who share a similar experience as a member of the minority among the majority (Jones, Castellanos, & Cole, 2002). Participation in minority based special interest organizations and activities has the ability to alleviate feelings of loneliness and alienation, while renewing a sense of purpose and confidence. Engaging in these types of experiences can include anything from professional, personal and social development to service learning opportunities. To foster this avenue of development, universities have to support and promote ethnic and culturally based organizations and activities at the institutional, college and departmental levels. This includes, but is not limited to, fiscal resources, diverse cultural programming, and faculty of color incentives for mentoring and service to these types of organizations.

Equally important to ethnic and culturally based student organizations are discipline

and college specific (professional) organizations. Engagement in these types of career focused activities provides students of color the opportunity to experience and learn the explicit and implicit norms of the majority culture and career expectations. Universities can foster this type of development through departmental programming and requirements. An example of this is a required learning community based seminar with an emphasis on professional development that provides and requires participation in specific events such as interviewing and resume skill development, networking and visits to industry, and participation in service learning and professional organization meetings.

Lastly, access to and participation in wellness programs have the ability to foster a healthy body which has the ability to directly impact the mental capability of a student to succeed academically. For the students of color in this study, participating in fitness programs and athletic competitions with their peers served multiple purposes, including building a sense of community and belonging and a source of relief from the stress and anxiety associated with the college experience. Higher education institutions can foster physical fitness by offering general recreational facilities, intramural sporting competitions, and wellness programs, such as exercise classes and wilderness activities including hiking and mountain biking. Mandating participation in physical wellness activities can be done through departmental programming and degree requirements.

Based on the thoughts and experiences of the students of color in this study it is clear that institutional involvement in academic, social and professional experiences are critical to the success of these under-represented populations at predominantly White institutions. Without a consistent level of engagement in their environment, this select population will continue to struggle in the higher education system, causing them to drop out and have a long

term adverse impact on the larger society and economy as a whole. It is in our nation's best interest to foster and nourish the development of this student as a whole. If we choose not to do so, we will be missing out on the knowledge, skills and talent of the next generation of leaders.

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CHAPTER 4. ACADEMIC AND SOCIAL SUCCESS OF STUDENTS OF COLOR IN A
TECHNOLGY BASED PROGRAM AT A PREDOMINANTLY
WHITE INSTITUTION

A manuscript to be submitted to the *NASPA Journal*

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What does it take to be a successful student of color in a technology based discipline at a predominantly White institution (PWI)? First we must define a student of color and what it means to be a “success” in higher education. According to Rendón, Garcia and Person (2004), a “student of color” is a socially constructed classification that is often interchanged with “minority” and is used to describe under-represented groups: African Americans, Hispanics (Latinos), Asians/Pacific Islanders, and American Indian/Alaska Natives. For this population of students in this study, the definition of success goes beyond the traditional definition given by theorists as, “persistence and educational attainment, or achieving the desired degree or educational credential” (Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006, p. 11). Being successful is more than a grade in the grade book or the completion of a transcript based on a chosen program of study. Success includes intrinsic and extrinsic rewards based on academic and social experiences that culminate with financial privileges afforded by degree completion, which ultimately leads to a “better quality of life” (Pascarella & Terenzini, 1991, p. 575).

While the definition of success may vary from student to student and campus to campus, there are many attributes of an institution and its agents (faculty, staff, and students) that must co-exist in order for the student to reach their full potential (Pascarella & Terenzini, 1991). These include both academic and social experiences that have an effect on the degree of student involvement, which ultimately leads to their institutional commitment and

persistence. For students of color, the academic experiences can include but are not limited to student services such as advising, tutoring, and mentoring. Social experiences can include relationships with peers and faculty, participation in student organizations, and intramural sports. At predominantly White institutions these experiences are critical to the success of minority populations because they assist in alleviating feelings of isolation, loneliness, judgment, tokenism, racism, discrimination, and culture shock; each of which have an added impact on the attrition rate of under-represented students when coupled with the everyday rigors of college life (Benton, 2006; D'Augelli, & Hershberger, 1993; Lett, 2003; Lewis, Ginsberg, Davies, & Smith, 2004; Townsend, 1994). According to Loo and Rolison (1986), ethnic minorities “feel socially and culturally alienated,” which has the ability to play a much larger role in their attrition than their academic ability even though a student’s academic ability is often the variable used to determine an individual’s ultimate success in college (p. 61; Berger & Milem, 1999).

Success through academic ability and achievement for students of color in science, engineering and technology (SET) based disciplines has historically been less than their White counterparts (Ashby, 2006; Cross & Slater, 2001). This less than favorable trend continues to exist for a multitude of reasons. Some of which are identified by Ashby (2006) and a 2006 National Science Foundation report by the Congressional Commission on the Advancement of Women and Minorities in Science, Engineering and Technology Development as being a lack of quality in K-12 education, a decrease in the level of science (physics) and mathematics (calculus) course completion in high school, an increase in tuition costs associated with more courses for SET degree programs, and the lack in mentoring services. Coupled with the challenges of being a student of color at a predominantly White

institution and the everyday rigor of college life, it is no wonder the number of under-represented students are opting out of SET disciplines, especially at PWIs.

Even with all of the above mentioned obstacles obstructing the path to degree completion, there are a select number of students that find the necessary tools to be successful in an environment that is based on an educational system that was not initially created to serve them. This qualitative based study will take this “glass is half full” approach by focusing on two members of this extraordinary group of students who have successfully navigated the higher education system through countless academic and social experiences, African American females in the College of Agriculture and Life Sciences (AGLS) and College of Engineering’s (CoE) Department of Agricultural and Biosystems Engineering (ABE). As participants in the Industrial Technology program within this department, these two individuals were chosen as the focus of this portion of a larger study in an effort to determine potential actions that can take place at the departmental level to aid in the persistence of this under-represented population of students and assist in combating the disparity between the graduation of ethnic and gender minorities and their White counterparts.

Bridging this graduation gap is instrumental to the success of not only people of color and women, but our increasingly diverse society and economy as a whole. More specifically, the success of these students in science, technology, and engineering based disciplines is critical to the future and well-being of the U.S economy, especially our scientific and technological competitive edge (Ashby, 2006). “the health of the U.S. economy” and our country’s competitive edge in “scientific and technological innovation” (Ashby, 2006, p. 1). As stated by Rendón, et al. (2004), a well educated population of people of color translates

into taxable wealth which has the ability to impact revenue for federal, state, and local communities. In addition to being a viable economic resource, an educated racial minority has the ability to provide diverse perspectives that lead to innovative solutions and a more integrated democratic society.

Purpose of Study

Students of color, especially African American students, at predominately White institutions of higher education feel like “uninvited guests in a strange land” as a member of a minority population among the majority. With academic and social needs that transcend those of White students, students of color, more specifically Black students, at PWIs experience “higher attrition rates, lower cumulative grade point averages, and less persistence to graduation than do majority students” (Lewis et al., 2004, p. 1). These meager outcomes in higher education, according to Brown (1986), occur because of the lack in academic preparation for higher education, an insufficient number of campus role models, feelings of isolation and helplessness and an uncertainty of how to negotiate the campus’ academic and social systems.

To combat this disparity and address the needs of students of color at a majority institution, this study will identify the social and academic success factors associated with the persistence of senior students of color in a SET discipline. Knowing, understanding and implementing these factors have the ability to have a substantial impact on the degree attainment of the greater body of students of color; ultimately contributing to the betterment of their overall well-being. According to Pascarella and Terenzini (1991), “a bachelor’s degree continues to be a primary vehicle by means of which one gains an advantaged socioeconomic position in American society” (p.575); therefore, the benefits of degree

completion has the ability to have long-term effects on an individual's well-being, which may include better health, marital status and stability, family size, child nurturance, consumer behavior, and leisure activities. Through the use of the findings from this study, administrators at the focus university, and comparable predominantly White institutions, will be able to better serve the needs of students of color by creating an academic and social learning environment conducive to their needs to aid in their matriculation.

Literature Review

Theoretical Models

The premise of this research is based on two models of student development theory; one on student attrition by Tinto (1975) and the other on student involvement by Astin (1984). While neither one can fully explain the matriculation of students of color at predominantly White institutions in SET based disciplines, each theory has components that contribute to the understanding of the social and academic success factors of this distinct population. As stated by Kuh et al. (2006), "no one theoretical perspective is comprehensive enough to account for all the factors that influence student success in college...taken together, the different theoretical perspectives on student success and departure provide a holistic accounting of many of the key factors that come into play to shape what students are prepared to do when they get to college and influence the meanings they make of their experiences" (p. 16).

The first theoretical concept, student attrition, by Tinto (1975, 1982) is a model of student dropout in an attempt to determine the correlation between the success of students and their integration into the academic and social system of an institution. In this model he defines the academic system as one that focuses on the formal educational process of

students and the social system as one that focuses on the daily life and personal needs of institutional agents, more specifically students (Tinto, 1987). Tinto's model is built on the premise:

Individual departure from institutions can be viewed as arising out of a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences, and dispositions (intentions and commitments) and other members of the academic and social systems of the institution (1987, p. 113).

In other words, the attributes of the student and the institutional agents must work together in a way that enables the student to be most successful. For example, if a student learns best in small classroom settings, then the college or university chosen should be one in which there is a small teacher to student ratio or an environment that utilizes team based learning techniques such as learning communities that enable more one-on-one contact between the student and educator. According to Huebner (1980) as stated by Thompson and Fretz (1991), "congruence theorists suggest that a good fit between students (their needs, attitudes, goals, and expectations) and the environments (its press, demands, supports, and the characteristics of its inhabitants) has a positive impact and promotes satisfaction, achievement, and personal growth, whereas poor fit creates stress" which ultimately may lead to drop out behavior (p. 437).

While Tinto's model is based upon research conducted on a majority population, as with numerous others, there have been a handful of researchers that have utilized this model as a foundation for inquiry into the attrition of students of color, specifically African Americans. Studies that have been a hallmark in this area are those that were completed by

Allen (1985) and Braddock (1981), each of which have taken a look at the success of African American students with respect to their interactions with various institutional components at predominantly White and historically Black and White institutions, respectively.

In addition to these studies, according to Mow and Nettles (1996), there have been a substantial number of studies that have evaluated various aspects of minority undergraduates that have focused primarily on access, enrollment, attrition, and degree attainment, as well as numerical results of survey data on student background, attitudes and institutional characteristics. Further studies have sought to explain performance and persistence differences among students of color and their White counterparts, differences within and among these groups, the relationship between student characteristics and institutional factors, and the effects of student and institutional characteristics and their effects on educational outcomes (Mow & Nettles, 1996).

A key component of student attrition, as based on the above mentioned theoretical concepts, is the lack or imbalance of academic and social involvement of the student in his/her environment. This notion of involvement was defined and utilized by Astin (1999) as the amount of energy devoted to various activities such as studying, interacting with faculty and students, and participating in student organizations and other campus based activities. The emphasis in involvement is on what students do and not what they think or feel, that ultimately have the ability to impact the persistence of students to graduation (1999). Under Astin's model of student involvement, there are five key premises:

- energy exerted in various activities is both physical and psychological
- levels of involvement varies from student to student and situation to situation
- involvement has qualitative and quantitative features

- student learning and development is dependent upon the quality and quantity of student involvement
- the effectiveness of any policy or practice is impacted by its ability to increase student involvement

The foundation of this theory lies in the assumption that what a student does is more paramount to the developmental process than what the educator does, essentially shifting from a teacher-centered to a learner-centered approach to education. While Astin has been instrumental in the development and use of this theory of involvement, this concept stems from the emergence of the student affairs profession and its focus on meeting the needs of the student as a whole entity through various academic and social student services programs that stem from the quantity and quality of student involvement (Moore, Lovell, McGann, & Wyrick, 1998).

Pioneers in the area of student involvement have focused on its overall impact on development, programs that foster involvement, and variables that affect the level of involvement (Moore et al., 1998). Various studies have highlighted the positive relationship between involvement and leadership skills and self perception, the impact of involvement on student aspirations and degree attainment, and the positive impact of involvement on a student's success after college with respect to obtaining employment and career development (Albrecht, Carpenter, & Sivo, 1994; Pascarella & Terenzini, 1991; Moore et al., 1998).

Another area of research on student involvement revolves around student participation in various campus programs and activities and the impact of the level of this involvement. These include, but are not limited to, athletics, greek membership, student clubs and organizations, activities outside of class, interactions with faculty and peers, part-

time and full-time employment, student government, and orientation programs (Hernandez, Hogan, Hathaway, & Lovell, 1999; Moore, et al., 1998). The quality and quantity of involvement in these activities has the ability to have a positive or negative impact on a student's academic and social success. There have been several theorists that have had a substantial impact on the literature in these areas; Pascarella, Bohr, Nora, and Terenzini (1995) revealed the correlation between student athletes and cognitive outcomes, Pike and Askew (1990) uncovered the link between greek membership and academic achievement, and Cooper, Healy, and, Simpson (1994) and Moore (1995) showcased student development through participation in student organizations and leadership experiences including student government (Hernandez et al., 1999).

Other key studies in this area include work by Kuh (1995) and Edison, Nora, Hagedorn, and Terenzini (1996) on the impact and importance of faculty-student and student-student relationships and interaction outside the formal classroom setting, and research by Gass (1990), Glass and Garrett (1995), and Boudreau and Kromrey (1994), on the effectiveness of orientation programs in acclimating students to the university environment both academically and socially (Moore et al., 1998).

The final area, variables impacting student involvement, include student demographics, personal attributes of the student, and various characteristics of the educational environment and their ability to adequately integrate the student into the higher education system (Moore et al., 1998). Some of the variables researchers have focused on include traditional and non-traditional aged students, residential and commuter students, institutional size, and dimensions of a student's identity (ethnicity, gender, socioeconomic

status, sexual orientation, and disability), among others (Astin, 1993; Chapman & Pascarella, 1983; Jones & McEwen, 2000; Tinto, 1997).

Methodology

Participants

The primary target population of this study is comprised of students of color at Iowa State University in the AGLS and the CoE department of ABE. Students of color within this discipline were selected as the focus of this study based on the researcher's interest in determining effective persistence strategies utilized by students within her degree granting department and according to the Office of Institutional Research (2008), has a 90% retention and 82% graduation rate. The sample pool of participants was initially identified by the Office of the Registrar as being classified as upperclassmen with senior classification (90 plus credits), and self-identified members of a racial minority (American Indian/Alaskan Native, African American, Asian American, or Hispanic(Latino)) from diverse educational and socioeconomic backgrounds who have achieved traditional academic success in the form of meeting their degree requirements with the potential to obtain their degree upon the conclusion of the 2007-2008 academic year.

Two African American females from the AGLS, were chosen as the focus of this study, based on participant interest. Identified as Elise and Sharon, these two students are enrolled in ABE's Industrial Technology Program (ITEC). With a total student of color population of 24, ABE's ITEC degree program has the second largest minority population in the AGLS following Animal Science (34 students): 10 African Americans, 8 Asian Americans, 5 Latinos, and 1 American Indian (Iowa State University, 2007b). While the selected sample is similar in their quest to obtain degrees in fields that have historically been

dominated by the majority, their background characteristics yield both similarities and differences that may or may not have contributed to their ability to persist.

Elise is a 22 year old African American female, raised in Willingboro, New Jersey. The eldest of two children, Elise shared her living environment with her brother, father and step-mother in a predominantly Black neighborhood in which she was always a member of the majority, including her elementary education. The first in her family to attend a four year institution and to leave the east coast, Elise reluctantly accepted admittance into a summer enrichment program prior to the start of her freshman year which led to her initial enrollment in the CoE (later transferring to a program within the AGLS) through an academic-based scholarship she earned as a result of being at the top of her high school class with above average SAT scores. With a desire to get as “far away from New Jersey” as possible and not return without her degree, Elise managed to navigate the higher education system through countless academic and social experiences that fostered her commitment to degree completion. With academic and social experiences based heavily in programming for students of color, Elise participated and held leadership positions in multicultural recruitment and retention programs, Greek and student organizations.

Sharon is a 22 year old African American female from Chicago, Illinois. The eldest of three children, she was reared in a predominantly Black environment with her mother, father and grandparents exerting the most influence on her. As a first generation college student, Sharon chose to attend college because she saw it as the only avenue for a “promised future.” With high academic ability based on her elementary and secondary educational achievements, Sharon began her college career in a summer enrichment program designed to introduce first generation students to the higher education environment prior to the start of

their freshman year. With the opportunity to enroll in two general education courses, Sharon took this opportunity as her chance to experience a “different type of atmosphere than the Chicagoland area.” Through countless academic and social experiences that centered on her support network, Sharon was actively involved in athletic activities, student organizations and retention programs.

Institution

The participants of this study attend a large Midwestern research intensive institution nestled in a small town located 30 minutes from the largest metropolitan area. Comprised of a population of over 21,000 undergraduate and nearly 5,000 graduate students, this university has seven colleges: agriculture and life sciences, business, design, engineering, human sciences, liberal arts and science, and veterinary medicine (professional degree). Of these 21,000 undergraduates, approximately 9% (1885) are students of color: 132 agriculture, 343 business, 185 design, 388 engineering, 221 human sciences, 616 liberal arts and science (Iowa State University, 2007b). The largest racial minority of the 1885 students of color are Asian Americans, which has historically been the case since 2000. Prior to this date, African American students constituted the largest percentage of racial minorities; however, recently there has been an increase in the number of Latinos, American Indians and African Americans, with a slight decrease in Asian Americans enrolled in the university (Iowa State University, 2007e).

While Iowa State University may be miles away from a city life, it offers students a multitude of social and academic opportunities. There are nearly 600 student organizations, over 50 intramural sports, dozens of sports clubs, countless indoor and outdoor student-led activities, leadership opportunities through student government, volunteering through

campus-wide events such as VEISHEA (historically the largest student run university celebration in the nation), several professional and career development programs, and many cultural events (Iowa State University, 2008b).

Procedure

This study utilized qualitative data collection techniques that included in-depth interviews and short answer survey questions created and administered by the researcher. Some of the questions utilized in the interviews were adapted from the mid-1980's study of the alienation of minority students at a predominantly White institution by Loo and Rolison (1986). The in-depth interview questions include inquiry into the student's extra-curricular activities, relationships, academic satisfaction, racial and ethnic identity, support systems, and social success factors. Prior to their arrival and participation in the interview, students were asked to complete a short survey pertaining to their demographic background. This information consisted of statements pertaining to their name, age, hometown, family size, major, academic classification, and family educational attainment, in addition to why they chose to attend college at their institution, the types of activities they are involved in outside of the classroom and leadership experiences.

The initial email correspondence to students of color in the ABE Department was sent through a mass email list to all senior students, 12 in total: 5 African Americans, 6 Asian Americans, and 1 Latino. This first attempt at seeking participants yielded zero volunteers due to a lack of interest in the subject or time conflicts. A second, more personalized email was sent to students who did not respond to the initial email. This second round of correspondence received a reply from two ABE students, which were subsequently given individual in-depth interviews for the duration of 1½ hours. To ensure validity and reliability

of the information presented in the interviews, periodically the researcher did a member-check to ensure her interpretation of the information presented was the correct perception of the interviewees. Upon the conclusion of each interview, the researcher reviewed her field notes and presented her key points to the interviewees for further clarification. Once a consensus was reached, the interview was concluded. Prior to the start of the next interview, the researcher transcribed the audiotapes and her field notes in search of emergent themes. Upon the transcription of the final interview, the researcher sorted and categorized the data from both interviews based on the recurring thoughts and ideas which led to foundational themes of the study.

Analysis

The findings from the analysis of the above mentioned qualitative data, interviews and short answer survey data, yielded grounded theories, defined as categories of thoughts or ideas derived directly from the data, based on the research question “what perceived factors contribute to the academic and social success of senior students of color in the fields of agriculture and engineering at a predominantly White institution,” more specifically, students of color in the ABE department. Based on Taylor and Bogdan’s (1998) premise of reality being defined by perception, this qualitative study sought to define and interpret the creation and meaning of the experiences of students of color, which impacted their perception of reality at a predominantly White institution (Denzin & Lincoln, 1994; McMillan & Schumacher, 2001).

The subsequent themes that rose directly from the student responses to interview questions and the demographic survey were based on two broad categories defined by the research question: academic factors of success and social factors of success. The themes

within the category of academic factors include student services, academic advising, recruitment and retention programs, and support systems. The themes yielded based on social factors are support systems and campus activities: minority based student organizations, college and major specific organizations, and university fitness based activities.

Findings

Defining Success

What does it mean to be successful in higher education? Is this success defined and dictated by a grade point average or academic honors? Based on responses from Elise and Sharon, success in college goes beyond a grade on a class project or a score on an exam. For these two young women, success is tied to degree attainment, career advancement and the socioeconomic mobility it can afford. Not only the opportunity for one's self but also the opportunities it can afford one's family. For Elise, the root of her drive and motivation for success was her family and being able to obtain financial freedom and access to a life different than the one in which she was raised. She spoke of finishing "no matter what" because she has "nothing to go home to." By "nothing" she was referring to the lack of opportunity in her hometown and the lack of progress her high school friends were experiencing and there was no way that she would allow herself to fail and end up back at home a part of the vicious cycle of oppression that those she knew were experiencing. In essence obtaining a college degree was her ticket out and access to a better life.

Aside from the obligation to their family being the force that kept them going from day to day, both Elise and Sharon spoke of the importance of grades and their ability to determine whether or not they are able to advance in their degree programs, and ultimately

persist to graduation. Essentially grades were merely a means to an end. In the long run grades were not the most important determinant of success as evidenced by their definitions below:

Elise: I probably equate success largely with money. Because usually if you are successful, like in a job, you are going to make a lot of money. Success is just accomplishing whatever you set out to accomplish. So I guess success in a school sense would be to...learn something in a class, it was a successful class.

Sharon: Success will be to graduate and go on in the most experiences. Being able to balance financially with what you want versus what you need.

In order to reach their goal of degree attainment and bring their definition of success to fruition, Elise and Sharon had numerous experiences that impacted their journey. Some of which included programs sponsored by student services, minority based recruitment and retention programs, support systems, and campus activities such as participation in intramural sports, minority based student organizations and degree specific student organizations. The importance of each of these components is depicted in their responses to two key questions discussed in the following sections:

1. *What **academic** factors have aided in your success at Iowa State University and in the Department of Agricultural and Biosystems Engineering?*
2. *What **social** factors have aided in your success at Iowa State University and in the Department of Agricultural and Biosystems Engineering?*

Academic Factors of Success

Student services and support systems. The importance of student services in the development of students, academically and socially, is paramount to their success. Whether these services are departmental, college or university based resources, they are especially necessary for students of color at predominantly White institutions. Iowa State University offers various academic based student services at the university level through the Dean of

Students Office. For students of color, these services are provided through multiple departments such as the Academic Success Center, the Office of Multicultural Student Affairs, and Student Support Services. These programs provide services that equip students with the necessary tools that assist them in navigating the academic system; some of which include tutoring, mentoring, academic advising, and career counseling. Placed in a situation in which they are not accustomed to the rituals and norms of the majority, Elise and Sharon who are products of an inner city youth, utilize these resources to strengthen their knowledge and skill base and assist them in overcoming their academic challenges. The need for these services is evident by the lack of high school preparation for the academic demands of college as displayed in Elise's comment:

...I feel like a lot of Black students that come from predominantly Black places, mainly from Chicago, you don't have a good school system in Chicago. Yeah, they may have a 3.9 and get admitted to Iowa State, but we have no clue what is going on when we get here. All of my classes in high school were accelerated classes. I got here in Engineering, took Physics and failed it three times. I failed it twice and dropped it the third time. I took two years of Physics in high school and I was like I should know all of this, but I didn't. I don't feel like we are at all prepared when we come here. I feel like they get us here from high school because we have good grades, but in actuality we don't know anything...I don't know, if I didn't have (MSA) I wouldn't have made it.

The utilization of student services, especially tutoring, is critical for students experiencing situations similar to Elise's. While students may enter higher education with less than favorable educational backgrounds, it is not impossible for them to learn the necessary concepts to be successful. Clearly Elise was able to accomplish this through hard work, dedication, perseverance, and resourcefulness to compensate for her shortfall. Sharon also shared in Elise's sentiments of the importance of tutoring in her discussion of her academic support system, "the tutoring services, small classes and the teacher to student

ratio. For my classes we have study sessions. We come prepared with questions to ask and answer with our peers.”

Each of the above mentioned components were described as being key in Sharon’s academic achievement and central to her teaching and learning experiences within ABE; her degree granting department. Known for its commitment to a student-centered approach to teaching and learning, the ABE Department boasts of a retention rate of over 95% after the first year of enrollment and an 82% graduation rate after 6 years, according to the Iowa State University Office of Institutional Research. Through the utilization of a learning community model (Technology Learning Community-TLC) that encompasses the use of team-based learning that fosters a smaller teacher to student ratio through the use of peer educators and mentors, freshman through senior seminars, faculty/staff and industry involvement, and departmental and university sponsored resources, ABE is retaining and graduating nearly all of its students of color.

Another critical component of student services are the support systems that are created and sustained through learning community based initiatives, such as the Technology Learning Community (Ancar, Freeman, & Field, 2006; Ancar, Freeman & Field, in press). The TLC is creating an environment in which all students, including students of color, are able to foster relationships with peers, faculty and staff that encourage the development of an academic support system in which all agents are able to learn. Through the use of team focused activities inside and outside of the classroom, students are able to become better acquainted with each other in a less formal environment. This engagement allows students to build partnerships, based on a common goal, that better nourish relationships that are

academically and socially based. Elise and Sharon depicted the benefit of these peer to peer and student to faculty and staff relationships and their impact on their academic success:

In Engineering I didn't have any of my friends in my classes so I didn't have anyone to lean back on if I missed something. But here, I may not know them that well, but atleast I feel comfortable talking to them about classwork. (academic advisor) is personable and cool to talk to. Everybody is cool. I think this has been my best move. I finally enjoy going to classes now. I never went to class before.

The ITEC department. I have the same people in classes and we come together to study and talk about what is going on.

Creating a sense of community and comfort among students within the classroom through team based activities allows them to extend their relationships outside of the classroom. This enables them the opportunity to broaden their support system to include students they wouldn't normally communicate with. Elise's experiences in the ABE department fostered this sense of community through the use of small class sizes and team based learning. She describes this connection with majority students below:

Being in ITEC was where it started for me to actually begin to speak to a White guy that I had seen in my class because these classes are so small and you see everybody everyday and you get to know them.

For students of color, this is an opportunity for them to collaborate and learn from majority students, and vice versa, thus easing the feelings of "not belonging" that may occur in a predominantly White environment, as evidenced above.

Recruitment and retention programs. Equally important to the academic success of students of color in SET based disciplines are recruitment and retention programs and services that focus primarily on under-represented populations. At the university and college level, the majority of these programs are based on learning community models. These programs offer students of color services that focus on academic, social and professional

development. They are able to access free and subsidized tutoring, electronic resources (computer, printing, copying, phone, and fax), recreational activities, academic and career advising, access to meeting space, funding for cultural events, assistance with conference registration and attendance, cultural media (movies and books), peer and faculty mentoring, and textbook access, among numerous others. Each of these programs seeks to assist students in overcoming the academic and social challenges associated with being a member of a racial minority at a predominantly White institution by providing them with the tools they need to be most successful.

The recruitment and retention programs utilized by Elise and Sharon include APEX, Carver Academy, LEAD, and SSSP. The APEX program is a summer enrichment program geared towards students of color during the summer prior to the start of their first fall semester. This program enables students to begin their college education by acclimating them to the university environment and the demands of college courses. The program funds the room, board and tuition of its participants, allowing them the opportunity to enroll in general education courses (total of eight credits of English, math, psychology and sociology) and engage in community building activities with their peers, faculty, and staff (Iowa State University, 2008c).

The Carver Academy is a full tuition scholarship program for high ability students of color. Recruiting nearly 100 students per year, this program focuses on the holistic development of students from their freshman to senior year through academic and social programming opportunities. In conjunction with university and industry agents, Carver scholars are able to participant in activities that enrich their college experience by focusing

on college acclimation, academic and career development, community building, and identity and leadership development (Iowa State University, 2008c).

The LEAD program is designed to assist students of color with their academic and social integration in the university by providing resources for homework assistance, social support and networking, academic and career advising and counseling, and professional networking through industry based activities (Iowa State University, 2008d). SSSP, a component of the government funded TRIO program, was created to help students overcome class, social and cultural barriers to higher education through services and programs such as academic, financial and personal advising, career planning, tutoring, mentoring, and cultural and educational activities (Iowa State University, 2008e).

Elise and Sharon depicted these programs as critical in their acclimation to the spoken and silent cultural norms of the university environment. As a Carver Scholar and APEX participant, Elise utilized resources from all of the programs described above. The most influential being tutoring and professional development opportunities:

LEAD helped because they offered a lot of seminars and workshops on things like resumes and time management and a lot of other stuff. I was also in SSSP. I'm also in the CARVER academy. They all offered workshops on a lot of things...CARVER offered two free tutors and offered a mentor. They also offered reimbursements for conferences and stuff like that. It helps because that is less money that had to come out of my pocket. SSSP offered computer use, free printing, free copying, books you could borrow if you didn't have money to buy your books. They also offered free tickets to social events that brought people together. SSSP also offers two tutors. For a while I had tutors for every class.

It was clear through the interview with Elise, that she really appreciated having multiple types of resources available from various programs on campus. This wealth of academic tools gave her a sense of security in knowing that even though she may not have taken advantage of all the resources available to her, they were there if she “needed them” and

more importantly, she was aware they existed and knew how to access them. While academic factors played a critical role in the persistence of Elise and Sharon, this is not the only component of their educational experience that had a profound impact on their ability to navigate the higher education system. Equally, if not more, important to the utilization of academic resources in making the grade is social factors such as support systems and campus based activities.

Social Factors of Success

Support systems. Social support systems are critical to a student's ability to successfully migrate through the higher education system. These systems provide for formal and informal network channels that enable students to become more integrated in the fabric of the educational environment. For students of color, the energy spent on this attribute of success is important to their survival at a predominantly White institution (Levey, Blanco, & Jones, 1998). In an environment in which they experience feelings associated with "being a guest in someone's home; one never achieves a sense of ownership or feeling like a full member of the academic community. These students are lonely and do not perceive that faculty, staff, and administrators are interested in their well-being and academic success" (Kuh et al., 2006, p.14). These feelings of loneliness and not belonging were depicted by Sharon and Elise:

Sharon and Elise:

The most challenging thing is not being able to see as many people that look like you and striving for the same goal...Being in the classroom with a majority of White students all day is exhausting and lonely. I always feel like I'm being watched or judged; as if I don't really belong. They may be able to relate to me by working on an assignment or project, but they can't relate to me being a Black person or a Black woman for that matter.

I felt a difference in the environment here than in Jersey. People smile and I was wondering what is going on. But I didn't feel warmth. I didn't feel included. Nobody made me feel

included from any other race. I've had class in which I am the only Black person and I don't feel like any of the White people reached out to me.

To alleviate this feeling of not belonging, students of color need the opportunity to create and develop relationships with institutional agents such as their peers and instructors. These relationships can be fostered through recruitment and retention programs designed specifically for the purpose of integrating minority students into the system of the university, especially the social system. Programs such as APEX, Carver Academy and LEAD, facilitate these relationships through mentoring, cultural activities, and faculty-student personal and professional development gatherings. Elise used these avenues to form their social networks at the beginning of their college experience, as evidence by her response:

*I think the social component is bigger than they give credit to. I was thinking the other day, if I had not gone to APEX I don't know what I would have done... I've said many times, that if I had not had the group of friends that I had throughout this time, I don't think I would have failed, but I probably would have been a very unhappy person and probably wouldn't have stayed here...The group of friends I met in APEX are the group of friends I hang out with now...I don't let a lot of people in my circle of friends. The roommate I had in APEX, *****, I've had as a roommate all my college years...I feel that if I didn't have my group of friends I wouldn't have been here because you don't have anybody else to talk to.*

These relationships extend beyond peers to include other university agents such as faculty and staff of color; many of which are associated with minority based programs. Elise describes her relationship with her Multicultural Liaison Officer (MLO), an African American female, as one in which she learned how to cope in a predominantly White environment. An MLO is an individual who provides academic and career advising, and acts as an advocate for the needs of students of color at the college level. Essentially, they are the bridge between the academic and student services utilized by under-represented ethnic populations in each of the colleges at the host institution.

If these relationships, such as those described above, are not fostered among minority students and the majority environment, students will not feel any commitment to the institution or dedication to the higher education experience. Elise states this most clearly in her response:

I go here and I am about to leave (graduate). That is it. I think it is just a school for me. It has not become a culture for me. I feel like things that do involve students of color or diversity issues are outliers. I don't feel like they are things that are intertwined. Like the whole VEISHEA and Harambe thing. Harambe was an add on. It is not like an integral part of what VEISHEA is even though it occurs at the same time. Now why is that? That's sad. Its like we're here and there are things for us, but they are not a part of the system. They are just add ons. That's why I said I never got into the culture.

Based on this discussion, it is clear that the social success of students of color goes beyond relationships with the human components of the institutional environment. The need for under-represented students to feel as if they are an integral part of all aspects of the system is equally important. This includes campus activities and university policies and structures, as discussed in the proceeding sections.

Campus activities. An integral aspect of the social development of students is the degree of institutional involvement and engagement through campus based activities. For students of color at a PWI, involvement in these types of activities is critical to their level of development and sense of belonging. For Elise and Sharon, these campus based activities have been sponsored by minority-based student organizations. Student organization sponsored activities give participants the opportunity to strengthen their interpersonal and leadership skills in addition to promoting active engagement and commitment to the larger university community; ultimately impacting their persistence to graduation.

For Elise and Sharon, participation in these types of sponsored activities played an instrumental role in their matriculation. These experiences provided an avenue for them to

become more connected to the larger university community by interacting with other students who have a shared cultural experience in the campus environment. Elise and Sharon both spoke of their appreciation and connection to an African American based service organization, Black Student Alliance (BSA):

Playing basketball, cards and just hanging out with friends on a regular basis has really helped me out...BSA, they were the first organization that opened up to me when I first arrived at ISU.

Anything I went to was something through BSA like Harambe, talent shows and stuff like that. But that is not connected to Iowa State. Anything I've been to socially is through these organizations so I identify with them and not Iowa State.

In addition to BSA, these students also discussed their participation in student professional organizations within their chosen discipline of study. In the Department of ABE, students have the opportunity to participate in a diverse array of student-led professional organizations that provide experiences that foster career development through industry visits, interviewing and resume writing workshops, networking, and workplace etiquette. In addition to these opportunities, students are able to collaborate with other internal and external organizations in community service, fundraising and celebratory events such as VEISHEA. For students of color, participation in these types of functions can ease the transition from college to the corporate world by providing student-to-employer connections, provide access to tools and resources needed to be successful after college, foster relationships with members of the majority population, and knowledge development of the majority culture.

It is clearly evident that the degree of involvement in campus based activities can have the ability to play a critical role in the commitment and persistence of under-represented students to their department and larger university community at a PWI. Once students

become involved and find their social niche, they can spend more time and energy on their academic development and success. Sharon and Elise's involvement in recruitment and retention programs and campus activities through minority and majority based student organizations enabled them to create and sustain their social support network, which has been instrumental in their success and matriculation.

Discussion

The degree of success of students of color at a predominantly White institution in a technology based discipline can be determined by their level of involvement in the academic and social attributes of the university community (Berger & Milem, 1999; Flowers, 2002, 2004). Based on Tinto's (1975, 1987) theory of attrition and Astin's (1984, 1985, 1999) theory of involvement, this study sought to determine these social and academic attributes through a qualitative based methodology which utilized in-depth interviews. For two African American female students, referred to as Elise and Sharon in this study, their path to degree attainment was based highly on the quantity and quality of their involvement in university based academic resources: student services such as tutoring, mentoring, academic advising and career counseling, support systems from family, friends, and faculty, and academic, social, and professional development opportunities provided by retention based programs. In addition to the utilization of academic resources, Elise and Sharon met their social needs through support networks comprised of their peers, faculty and staff (minority and majority), and participated in campus-based activities sponsored by minority-based student organizations and student discipline specific (professional) organizations. Based on the experiences of these students, the attributes of their educational environment, and the undergraduate and graduate experiences of the researcher at the featured institution, colleges

and universities should consider the following recommendations when creating and implementing an environment that is conducive to the academic and social success of under-represented populations in a predominantly White setting.

The utilization of student services at the departmental and college level is critical to the success of students of color at a predominantly White institution. Access to tutoring, mentoring, academic advising and career counseling through collaborative efforts by multiple university agents has the ability to provide a sound academic support structure for under-represented students (Elmers & Pike, 1997; Terenzini, Pascarella, & Blimling, 1996). To aid in the creation of such a structure, majority institutions should consider implementing programs at the department and college level which provide access to free and subsidized tutoring services, mentor-mentee relationships with peers, faculty, and staff, and continuous academic and career advising with academic and student affairs agents.

Meeting the academic needs of students of color can be done through a central campus location, such as an academic success center, that provides interdisciplinary individual tutoring, group tutoring, and supplemental instruction. In addition, departments should offer a student services center that houses centralized discipline-specific academic advising, career counseling, tutoring, study tables, and other academic-focused services on a smaller and more interpersonal level; a model that is currently utilized by the ABE department and proving to be very effective in meeting the academic needs of students of color.

Participation in a mentoring program can also be instrumental in the academic success of students of color (Dumas-Hines, 2001; Pascarella, 1980; Townsend, 1994). Whether this is comprised of peers, faculty or staff, this under-represented population should

be connected to institutional agents who can assist them in the academic and professional process of higher education. University and departmental based programs, such as learning communities, is a prime avenue for this type of network and support building (Tinto, 1997). Within a learning community model, the utilization of upperclassmen as peer mentors and faculty and staff as program collaborators, students of color can have personalized access to the knowledge and skills of individuals who they may not normally have the opportunity to learn from in the classroom setting. In addition, this type of interaction provides the students with an increased number of connections and resources in the larger university community, thus impacting their level of accountability and commitment which ultimately has the ability to impact their persistence to graduation. Creating this open channel of communication and cooperation can be facilitated through a learning community that has a required weekly seminar component that hosts activities such as faculty roundtables, informal faculty-staff-student meet and greet social gatherings, department sponsored student-led events focused around networking and community service, and structured peer-peer and peer-faculty mentor-mentee relationships; some attributes of which are currently being utilized by the ABE department and proven successful for Elise and Sharon.

The creation of a support system and the participation in minority based retention programs also has the ability to play a substantial role in the matriculation of students of color at PWIs (Cabrera, Nora, Terenzini, Pascarella, & Hagedorn, 1999; Cross & Slater, 2001; Kim, 2002; Sedlacek, 1999). With the ability to foster academic, professional and social development, support systems are critical in assisting students with understanding, accessing and utilizing the multitude of resources internal and external to the university system and the mental and emotional demands of college (Lett, 2003). An avenue for the

development and support of these relationships should stem from minority based retention programs at the department, college and university level that work collaboratively with academic and student affairs to meet the needs of the whole student. The structure of these programs should include mandatory components that address all developmental aspects of students of color in a predominantly White environment; especially the impact of the student's ethnic and cultural identity in attaining a college degree. These programs can be offered as a part of a curriculum or as a requirement of scholarships that are tied to the recruitment of under-represented populations. Students should be provided the opportunity to participate in credit-based seminars from their freshman to senior year that focus on different levels of their development. Some topics to consider within the context of racial and ethnic identity are community building, academic success through study and time management skills, professionalism through networking and etiquette, and career development. Fostering a support system between students of color and their peers, family, faculty and staff should be paramount to an institutions commitment to the retention and graduation of under-represented populations.

In addition to participation in retention programs, students of color should be encouraged to have an active role in student ethnic and cultural organizations and discipline specific (professional) organizations (Allen, 1985; Baxter Magolda, 1992; DeSousa & Kuh, 1996; Furr, 2005; Watson & Kuh, 1996). With the academic demands of higher education, it may be extremely challenging to convince students to spend their "free" time participating in these types of extracurricular activities; however, administrators and educators need to be extremely creative in encouraging these types of experiences. One way to do this is to blend academic and student affairs through collaborative activities between student organizations

and faculty, within and outside the confines of the formal classroom. Student organizations can sponsor faculty presentations at organizational meetings or invite faculty to social outings and faculty can welcome students into their classroom to co-facilitate laboratory experiences and present projects. These types of activities have the potential to create an environment in which students feel a greater sense of belonging and connection to the faculty, department and larger university community, in addition to expanding their support network and providing them with increased academic and professional development opportunities.

When considering the findings of this study, educators and administrators must take into account several limitations. First, the findings from this study are generalizations based on the responses from a subset of the target population and cannot be applied to all students of color in science, engineering and technology based disciplines. Second, the results of this study are unique to the learning environment in which they are taken from and are not conducive to all predominantly White institutions. Third, the sample population of students of color self select their ethnicity in the admissions process; therefore, the potential participants may not have included all senior students in the ABE department. Lastly, the researcher for this study is a member of the population being studied and an alumnus of the featured department; therefore, personal biases and experiences may have had an impact on the analysis of the data.

Insight into the experiences of the participants in this study provided invaluable knowledge for educators and administrators. Meeting the academic and social needs of students of color at predominantly White institutions is not only critical to their success, but also to the success of the university and the larger society as a whole. Paramount to this

success is their holistic development in the context of their ethnic and cultural identity in a majority environment (Watson, Terrell, Wright, & Associates, 2002). Without the retention and graduation of under-represented students in higher education, especially those in science, engineering, and technology-based disciplines, this nation and world will miss out on the talent of an increasingly present student population of African Americans, Asian Americans, Native Americans and Latinos (Rendón, Hope, & Associates, 1996).

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CHAPTER 5. UNDER-REPRESENTED STUDENT ENGAGEMENT IN ENGINEERING
AND AGRICULTURAL DISCIPLINES AT A PREDOMINANTLY WHITE
INSTITUTION: A NSSE ASSESSMENT

A manuscript to be submitted to the *Journal of College Student Development*

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Do under-represented students at predominantly White institutions experience different types and levels of engagement in social and academic activities than their White counterparts? Based on results from the National Survey of Student Engagement (NSSE), there may be more truth to this than fiction. While all students experience a great deal of development and adjustment through various types of engagement, students of color at majority institutions may choose to participate in opportunities that are vastly different and perceive their environment as one that either fosters or hinders this involvement, which has the ability to impact their retention and persistence to graduation. As stated by Kuh (2006), “students who engage in educationally effective practices get better grades, are more satisfied, and are more likely to persist...while engagement is positively linked to desired outcomes for all types of students, historically underserved students tend to benefit more than majority students” (p. 9).

Based on this notion of differences in quality and quantity of academic and social experiences, this study sought to answer the question: do the social and academic factors of success, as determined by the National Survey of Student Engagement, of senior students of color mirror that of White students in the College of Agriculture and Life Sciences (AGLS) and the College of Engineering (CoE) at a majority institution? Knowing and understanding the types of experiences students are engaged in has the ability to better assist academic and

student affairs professionals in creating equal and equitable opportunities that foster the development of the whole student for racial minority and majority learners; ultimately impacting their persistence to graduation and life thereafter. As stated by Kuh (2003), “students who are involved in educationally productive activities in college are developing habits of the mind and heart that enlarge their capacity for continuous learning and personal development” (p. 25).

Theoretical Framework

The premise of this research is based on two models of student development theory: 1) student attrition by Tinto (1975) and 2) student involvement by Astin (1984). While neither one can fully explain the matriculation of students in science, engineering, and technology based disciplines, each theory has components that contribute to the understanding of the social and academic success factors of students of color and their White peers. According to Kuh, Kinzie, Buckley, Bridges, and Hayek (2006), “...the different theoretical perspectives on student success and departure provide a holistic accounting of many of the key factors that come into play to shape what students are prepared to do when they get to college and influence the meanings they make of their experiences” (p. 16).

The first theoretical concept, student attrition, by Tinto (1975, 1982) is a model of student dropout in an attempt to determine the correlation between the success of students and their integration into the academic and social system of an institution. In this model he defines the academic system as one that focuses on the formal educational process of students and the social system as one that focuses on the daily life and personal needs of institutional agents, more specifically students (Tinto, 1987). Tinto’s (1987) model is built on the premise:

Individual departure from institutions can be viewed as arising out of a longitudinal process of interactions between an individual with given attributes, skills, financial resources, prior educational experiences, and dispositions (intentions and commitments) and other members of the academic and social systems of the institution (p. 113).

In other words, the attributes of the student and the institutional agents must work together in a way that enables the student to be most successful. For example, if a student learns best in small classroom settings, then the college or university chosen should be one in which there is a small teacher to student ratio or an environment that utilizes team based learning techniques such as learning communities that enable more one-on-one contact between the student and educator. According to Huebner (1980) as stated by Thompson and Fretz (1991), “congruence theorists suggest that a good fit between students (their needs, attitudes, goals, and expectations) and the environments (its press, demands, supports, and the characteristics of its inhabitants) has a positive impact and promotes satisfaction, achievement, and personal growth, whereas poor fit creates stress” which ultimately may lead to drop out behavior (p. 437).

A key component of student attrition, as described above, is the lack or imbalance of academic and social involvement of the student in his/her environment. This notion of involvement was defined and utilized by Astin (1999) as the amount of energy devoted to various activities such as studying, interacting with faculty and students, and participating in student organizations and other campus based activities. The emphasis in involvement is on what students do and not what they think or feel, that ultimately have the ability to impact the

persistence of students to graduation (1999). Under Astin's model of student involvement, there are five key premises:

- energy exerted in various activities is both physical and psychological
- levels of involvement varies from student to student and situation to situation
- involvement has qualitative and quantitative features
- student learning and development is dependent upon the quality and quantity of student involvement
- the effectiveness of any policy or practice is impacted by its ability to increase student involvement

The foundation of this theory lies in the assumption that what a student does is more paramount to the developmental process than what the educator does, essentially shifting from a teacher-centered to a learner-centered approach to education.

Method

Data

The primary data collection tool used in this study was the NSSE that is administered by the Indiana University at colleges and universities nation-wide to freshman and senior students. This survey tool was piloted in 1999 by the Indiana University Center for Postsecondary Research in an effort to assess the quality of higher education based on "the investments that institutions make to foster proven instructional practices and the kinds of activities, experiences, and outcomes that their students receive as a result" (National Survey of Student Engagement, 2007, p.1). Through the use of 28 sets of questions (14 of which are demographic) assessed on a likert-type scale, this instrument focuses on student academic and social experiences and relationships inside and outside of the classroom. According to

Kuh (2003), “the time and energy students devote to educationally sound activities inside and outside of the classroom, and the policies and practices that institutions use to induce students to take part in these activities” indicate “the quality of the undergraduate education at the institution” (p.25).

This questionnaire has been administered to nearly 1,100 institutions worldwide since its pilot study nine years ago; of which Iowa State University (the featured institution in this study) has participated eight times (excluding 2004). The results of this survey were obtained from the Office of Institutional Research and included two random samples from the student body population that completed the NSSE survey. One sample consisted of senior students of color from the AGLS and the CoE and the other sample of senior White students from the same colleges.

Sample

The sample population chosen for this study was randomly selected students that were identified by the Office of the Registrar as having a senior classification prior to completing the NSSE survey and either self-identified as White (non-Hispanic) or a member of a racial minority: American Indian or other Native American, Asian, Asian American, or Pacific Islander, Black or African American, Mexican or Mexican American, Puerto Rican, Other Hispanic or Latino, or Multiracial. Students in the sample population also self selected their primary major on the survey tool. The total number of students in the study was 1140. Of which, 74 belonged to a racial minority (also referred to as students of color) and 1066 were identified as White.

Variables

Dependent Variables. For the purpose of the study, the type, quantity and quality of student engagement was measured based on three categories of inquiry defined by the researcher based on the results of the analysis. The NSSE questions utilized as the focus of this analysis were categorized based on three types of student engagement: academic activities, social activities, and extra-curricular activities. Student answers were rated on likert-type scales (1u; 7d; 10a-e) which were transformed into interval scales as defined below. The academic activities were described by questions 7d and 10a (see Results section for specific questions). Question 7d was measured on a scale of one to four with 1 = have not decided, 2 = do not plan to do, 3 = plan to do, and 4 = done. Questions 10a-b were measured on a scale of one to four with 1 = very little, 2 = some, 3 = quite a bit, and 4 = very much.

The social activities were defined by questions 1u and 10c (see Results section for specific questions). Question 1u was measured on a scale of one to four with 1 = never, 2 = sometimes, 3 = often, and 4 = very often. Question 10c was measured on a scale of one to four with 1 = very little, 2 = some, 3 = quite a bit, and 4 = very much.

The extra-curricular activities were identified as questions 10d-e (see Results section for specific questions). Questions 10d-e were measured on a scale of one to four with 1 = very little, 2 = some, 3 = quite a bit, and 4 = very much.

Independent variables. The purpose of this study was to determine if the academic and social activities students of color in the AGLS and the CoE engage in are significantly different than their White counterparts. Senior students in these respective colleges at a predominantly White institution responded to questions on the NSSE survey that gauged

their participation and perception of various types of involvement. For this study, a select set of questions focused on academic, social and extra-curricular activities. Academic activities were those that gauged the type and quantity of student engagement in academic-based experiences with faculty. The social activities were determined by a student's quantity and quality of relationships with institutional agents. The extra-curricular activities were those that gauged a student's involvement and perception of activities outside of the classroom such as institutional support of non-academic responsibilities.

Analytical Procedures

For this study, specific questions based on the 2002-2003 and 2005-2007 surveys were chosen for analysis: 1g, h, j, k, n, o, s, t, u, v; 6a-d; 7a-d, g; 8a-c; 9a-f; 10a-g; 13-16; 18-20; 22-23; 24; 26-28. The survey results for the years 1999-2001 were not utilized because of their inconsistency with the questions on the 2002-2003 and 2005-2007 survey. The survey results for 2004 were also omitted because the featured institution did not participate that year. The specific questions for each data set were chosen based on themes found in the review of literature on academic and social success factors of students in higher education. Of these selected questions, only seven were found to have a statistically significant difference in mean values: 1u; 7d; 10a-e (for complete survey see nsse.iub.edu/html/survey_instruments_2006.cfm).

Based on the results of the NSSE survey, students of color in the AGLS and the CoE were identified, grouped into one sample and assigned an ethnic code of one. White students in the CoE and AGLS were also identified and grouped into one sample and assigned an ethnic code of two. An independent samples t-test for equality of means with Levene's test for equality of variances was conducted using SPSS, a quantitative analysis software, to

determine differences in mean values for each question by ethnicity. From these results, several questions were determined to have a statistically significant difference ($p \leq .05$) in their mean values. The results section focuses on these significant results.

Limitations

When considering the findings from this study, there are several limitations that must be taken into consideration. First, the sample population may have some discrepancy in ethnic representation and college affiliation due to self-selection of these attributes by students. Second, the major college classification identified by students include those listed as agriculture, biological sciences, and engineering, which may include or exclude some majors within AGLS and CoE. Third, the analysis and interpretation of results are not indicative of all situations and should be kept in the context in which they were taken. Lastly, the findings and implications cannot be applied to all students of color, majority students or predominantly White institutions; only those represented by the sample population.

Results

Student engagement in the academic and social aspects of higher education is critical to their commitment and persistence to degree completion. Based on results from the analysis of the NSSE data, students of color and their White counterparts had varying levels of involvement and perceptions of the institution in fostering this engagement. Through academic, social, and extra-curricular activities, students in the AGLS and the CoE had significantly different perceptions of institutional support, collaboration with faculty, and cross-cultural communication.

Academic Activities

Participation in academic based experiences, internal and external to the classroom, can have a profound impact on the academic success of students of color and their White counterparts. Based on collaborative efforts between various institutional agents, these can include tutoring, academic services such as advising and career planning, team assignments and projects, faculty-student interactions, and service learning opportunities. The quality and quantity of involvement in these activities can vary from student to student, within and across ethnicities. Based on Table 1, there is a statistically significant difference in the mean values of academic experiences of senior students of color in the AGLS and CoE and White students.

TABLE 1 <i>Independent Samples T-Test Values for Equality of Means for Academic Experiences of Students of Color Compared to White Students</i>				
Academic Experiences	Ethnic Code	N	Mean*	p-value
Work on a research project with a faculty member outside of course or program requirements (7d)	Students of Color	74	2.69	.011
	White Students	1057	2.41	
Spending significant amounts of time studying and on academic work (10a)	Students of Color	74	3.24	.033
	White Students	1053	3.05	
Providing the support you need to help you succeed academically (10b)	Students of Color	74	2.91	.031
	White Students	1053	2.70	
*Range: (7d): 1=have not, 2=do not plan to do, 3=plan to do, 4=done; (10a-b): 1=very little, 2=some, 3=quite a bit, 4=very much				

Collaboration with peers and faculty

According to Table 1, students of color are more engaged with faculty than their peers in academic-based activities. With mean values of 2.69 and 2.41, students of color are more likely to work on a research project with a faculty member outside of course or program requirements than White students.

Institutional emphasis on academics

According to the Table 1, students of color are more likely to spend a considerable amount of their time on studying and completing academic work compared to their White peers, with mean values of 3.24 and 3.05, respectively. Students of color also perceive the university community as being more academically supportive than White students, with mean values of 2.91 and 2.70.

Social Activities

In addition to academic experiences, colleges and universities need to foster the development of social relationships among students and institutional agents such as faculty, staff, majority and other minority students. These relationships have the ability to increase a student's level of connection and commitment to the university community by building their support network and access to resources which can ultimately lead to greater academic success and retention. For students of color these relationships are just as, if not more instrumental, in their ability to persist to graduation than majority students. As evidenced by Table 2, the types and quantity of social opportunities experienced by students of color varies from that of White students in the AGLS and CoE.

Cross-cultural interactions

Based on Table 2, students of color in AGLS and CoE were more likely to have had serious conversations with students of a different race and ethnicity than their own, as compared to their White counterparts. With mean values of 2.69 and 2.61, for students of color and White students respectively, there is a significant difference in the average degree and likelihood of engagement in this type of social activity. Students of color also perceived a greater degree of institutional emphasis on encouraging contact among students from different economic, social, and racial or ethnic backgrounds than majority students; mean values of 2.42 and 2.16.

TABLE 2				
<i>Independent Samples T-Test Values for Equality of Means for Social Experiences of Students of Color Compared to White Students</i>				
Social Experiences	Ethnic Code	N	Mean*	p-value
Had serious conversations with students of a different race or ethnicity than your own (1u)	Students of Color	74	2.69	.000
	White Students	1066	2.61	
Encouraging contact among students from different economic, social, and racial or ethnic backgrounds (10c)	Students of Color	74	2.42	.032
	White Students	1050	2.16	
*Range: (1u): 1=never, 2=sometimes, 3=often, 4=very often; (10c): 1=very little, 2=some, 3=quite a bit, 4=very much				

Extra-Curricular Activities

Students spend a considerable amount of time participating in activities outside the classroom. For students of color and White students, the level of involvement may vary. Whether it is student organization activities, social gatherings, physical fitness through exercising and intramural sports, or university based activities, successful minority and

majority students are highly involved in the university and surrounding community. Based on the analysis of the NSSE data for the sample of senior students of color and White students in the AGLS and the CoE for 2002-2007, there was a statistically significant difference in the mean values for institutional non-academic support.

Extra-Curricular Experiences	Ethnic Code	N	Mean*	p-value
Institutional emphasis on helping students cope with non-academic responsibilities (10d)	Students of Color	74	2.11	.000
	White Students	1052	1.71	
Institutional emphasis on providing the support you need to thrive socially (10e)	Students of Color	74	2.24	.037
	White Students	1051	2.04	
*Range: (10d-e): 1=very little, 2=some, 3=quite a bit, 4=very much				

Institutional support

As shown in Table 3, students of color perceive a greater level of institutional support in coping with non-academic based responsibilities than White students. With mean values of 2.11 and 1.71 (maximum of 4.00), students perceive the university support for non-academic issues as very minimal. Based on mean values of 2.24 and 2.04, ethnically under-represented students also perceive the institutional support in social acclimation to the university environment to be greater than that of their White counterparts. With a maximum value of 4.0 on the likert-scale, both samples of students perceive social support to be minimal.

Summary Results

Students of color in the AGLS and the CoE at a majority institution have academic and social experiences that mirror and transcend those of their White counterparts. Based on the analysis of NSSE results from the featured institution, students of color had a statistically significant difference in mean values than their White peers for extra-curricular based activities and perceptions of institutional non-academic support.

In addition to extra-curricular experiences, students of color have participated in and perceived academic-based activities different than majority students. These activities include collaboration with peers and faculty and perceived institutional emphasis on academics. Lastly, students of color and White students participated in varying types and levels of social experiences: cross-cultural interactions with peers and quality of relationships and support networks.

Discussion

The degree of success of students in higher education can be attributed to their quality and quantity of involvement in the academic and social aspects of the university community (Astin, 1984, 1985, 1999; Kuh, 2003, 2006;). For students of color, this level of involvement may be similar or vastly different than that of their White counterparts. To determine the difference in varying levels and types of engagement, the NSSE gauges these activities based on student feedback (Bennet, 2006). According to Kuh (2001), “NSSE annually assesses the extent to which students at hundreds of four-year colleges and universities are participating in educational practices that are strongly associated with high levels of learning and personal development...NSSE data focuses on...how students actually use the resources for learning that their school provides” (p. 12). As a result of this survey from a sample of under-

represented students and White students in SET based disciplines in the AGLS and the CoE, numerous social and academic experiences were significantly different between the two populations. Based on these findings, characteristics of the academic and social environments, and experiences of the researcher through undergraduate and graduate studies at the featured institution, recommendations for student and academic affairs practitioners at predominantly White institutions were derived and discussed below.

The first type of involvement that had a significant difference was academic-based activities. Students of color were more likely to engage in research projects with faculty outside of course requirements, than their White counterparts. Based on these findings, it is evident that senior students of color are more likely to create greater connections to the university environment through educationally based experiences with faculty versus their peers (Allen, 1992; Townsend, 1994). To continue the student-faculty interactions depicted by the NSSE data, colleges within the university system should support collaborative projects between students and faculty through formal mentoring programs (Pascarella, 1980). These programs should be housed at the departmental level and enable students to have greater hands-on informal contact with faculty in their areas of expertise inside and outside of the classroom. According to Wasley (2006), “students who participate in collaborative learning and educational activities outside the classroom and who interact more with faculty members get better grades, are more satisfied with their education, and are more likely to remain in college. But the gains from these practices are even greater for students from underrepresented racial and ethnic backgrounds, or who come to college less prepared than their peers” (p. 1).

In addition to working with faculty on research projects, students of color are more likely to spend a significant amount of time on studying and completing academic work and perceived the university community as more academically supportive than their White peers (Watson & Kuh, 1996). It is evident that the more time spent studying and on coursework, the more academic success a student will experience and strengthen their persistence to graduation. To better ensure and increase student use of time towards studying and academic activities, universities should offer services through a centralized academic success center, retention programs, and departmental programs. These services can include, but are not limited to, individual and group tutoring (subsidized), supplemental instruction sessions, study sessions, and open subject-specific help rooms. In addition, students should be able to access resources that teach effective study skills, enable them to become knowledgeable on teaching and learning styles, and allow them to receive direct feedback from instructors. Having resources available and knowing they exist is half the battle in achieving academic success (Jones, Castellanos, & Cole, 2002).

The second type of involvement, as depicted by the NSSE data in this study, is the participation in social activities. Students of color are more likely to be engaged in serious conversations with students of a different race and ethnicity than their own, when compared to their White counterparts. It is clear that the demographics of the university community may play a substantial role in the need for under-represented students to be actively involved with someone of a different ethnic and cultural background than their own to be most successful academically and socially (Allen, 1992). Due to the need and impact of these interpersonal relationships, it is critical that all levels of the institution foster the development of this communication. To assist in this process, student organizations with majority

populations can participate in collaborative experiences with minority-based organizations, learning communities can support and organize activities that foster community building among under-represented populations and the majority community, and departments can encourage and support mentoring relationships among students, in addition to team-based learning opportunities. According to Carey (2008), “learning communities provide more connected, individualized instruction, allowing students to form strong academic relationships with their fellow students, share knowledge, and work together to succeed in school” (p. 7). While it is common for students of color to prefer to engage in relationships with students who share similar ethnic and cultural experiences, it is paramount for their success to know how to interact with members of the majority population to learn the implicit and explicit norms; something faculty, staff, majority students and administrators have the ability to play an instrumental role in.

The importance of peer relationships is critical to the success of all students, especially under-represented students at a majority institution. To foster this type of development, academic and student affairs professionals, in addition to majority students, need to take responsibility in actively engaging in social and academic experiences with students of color to build a greater sense of connection to the university community. Conversely, students of color need to take the initiative to step outside of their comfort zone and get connected (Hodge & Pickron, 2004). This can be done through university sponsored events that focus on diversity education, college and departmental programs that highlight specific ethnicities and cultures, collaborations among student organizations, and curriculum inclusion of diverse perspectives. Students of color need to have a sense of security in knowing that their social and academic well-being is being considered and they are an

integral part of the fabric of the university and not an afterthought (Watson, Terrell, Wright, & Associates, 2002). As stated by Berger and Milem (1999), “if we are serious about improving retention on campus, particularly for traditionally underrepresented groups, then we must find educationally sound ways to ensure that campus environments reflect the norms and values of a wider variety of students rather than the norms and values of a select few” (p. 662).

The final aspect of involvement that was statistically significant was extra-curricular activities, more specifically, the degree to which students perceived the institutional support in coping with non-academic based responsibilities and fostering social acclimation. Based on the NSSE data in this study, racial minority students perceive a greater level of support than their White counterparts, even though both sample populations see the support as minimal. Perceiving one’s environment as supportive is extremely important in a student’s persistence (Loo & Rolison, 1986). Not only is academic integration in the university community critical, so is social integration (Baxter Magolda, 1992; Elmers & Pike, 1997; Terenzini, Pascarella & Blimling, 1996). These may include, but are not limited to, support networks of peers, participation in campus based activities and student-led events, and financial and familial responsibilities. When students struggle with non-academic issues, it takes away from the time and energy they are able to devote to their academics. A way to combat this lack of non-academic support is for student and academic affairs to work collaboratively on meeting the needs of the whole student. This can be done through department sponsored student-led social events that include administration, faculty and students, learning community based programs designed to address personal and professional development, and student-student and student-faculty mentoring relationships.

Based on the NSSE data analyzed in this study, senior students of color in the AGLS and the CoE at a majority institution, engaged in numerous academic and social experiences that were significantly different than their White peers. Whether they participated in research projects with faculty, spent more time studying or engaged in cross-cultural relationships, under-represented students are having a different higher education experience than majority students. Based on qualitative data from a larger study of which these findings are based, a significant contributor to the higher level of engagement of students of color at this featured institution may include but is not limited to minority-based recruitment and retention programs. Administered primarily at the college and university level, most often through the Office of Multicultural Student Affairs (OMSA), these programs are geared towards under-represented populations and provide countless opportunities for students to development their academic, social and professional skills through seminar and community based activities (Iowa State University, 2008c, 2008d, 2008e). Often tied to scholarship and curriculum requirements, students of color are exposed to opportunities with faculty, staff, minority and majority students that enable them to better overcome academic and social challenges associated with being a member of an under-represented population in a predominantly White environment (Baxter Magolda, 1992; Benton, 2006; Berger & Milem, 1999; Cabrera, Nora, Terenzini, Pascarella & Hagedorn, 1999; Chapman & Pascarella, 1983).

In order to create an environment in which African American, Asian American, Native American and Latino students are able to be academically and socially successful, university agents must take notice of the experiences that are impacting the persistence and graduation of this distinct population; especially those associated with the departments and programs charged with the responsibility of recruiting and retaining racial minorities. As

stated by Allen (1992), “ student’s academic performance will also be affected by the quality of life at the institution, the level of academic competition, university rules/procedures/ resources, racial relations on campus, relationships with faculty and friends, and the extent of social support networks on campus” (p. 40). The effects of attrition are not only detrimental to the university community, but also the larger society as this talent and knowledge pool is left fully untapped.

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CHAPTER 6. DISCUSSION

Summary

Academic and Social Success

Based on the results of this mixed method study, students of color in the College of Agriculture and Life Sciences (AGLS) and the College of Engineering (CoE) participated in countless academically and socially-based university, college and departmental experiences that fostered a greater sense of belonging and connection to their environment, ultimately impacting their level of commitment and persistence to graduation. Of which, student services, academic advising, recruitment and retention programs, relationships and collaborations with faculty, staff and peers, support from family and friends, participation in minority based and major/college specific student organizations, access to fitness programs, academic and career work experiences, and service learning were most prominent.

In order to determine the types of social and academic experiences students of color engaged in at the institutional and college level, focus groups and in-depth interviews of eight AGLS and CoE students were conducted to answer the following question: *What perceived factors contribute to the academic and social success of senior students of color in science, technology and engineering based disciplines in the College of Agriculture and Life Sciences and the College of Engineering at a predominantly White institution?*

Based on the analysis of the results, there were several key themes that arose based on categories of academic and social characteristics. The academic factors of success were: 1) participation in recruitment and retention programs that focused on academic, professional and social development; 2) access to resources through student services to facilitate collaboration and peer education; 3) access to adequate academic and career advising; 4)

personal and professional relationships with majority and minority faculty and staff, and peers of color. The social factors of success were: 1) support networks comprised of family and friends for academic and emotional support; 2) participation in ethnic and culturally based student organizations to promote community building and sense of belonging among ethnic peers; 3) participation in discipline and college specific organizations to ensure professional and career development; 4) access to and participation in wellness programs to foster physical health.

To determine the degree and types of social and academic development of students of color at the departmental level, two in-depth interviews of ABE students were conducted to answer the following question: *What perceived social and academic factors contribute to the success and retention of senior students of color in Agricultural and Biosystems Engineering at a predominantly White institution?*

Based on the analysis of the findings, there were multiple themes associated with academic and social success characteristics. The academic factors of success included: 1) utilization of student services at the departmental and college level to access academic resources such as tutoring, academic advising and career counseling; 2) participation in mentoring programs to foster community building and academic and professional development among students and their faculty and peers; 3) creation of support systems comprised of peers, family, faculty, and staff to foster academic, professional and social development and assist in the understanding, access, and utilization of internal and external university resources. The social factors of success included: 1) participation in retention programs to aid in the academic, personal and social development of the student and creation

of support networks; 2) active involvement in minority-based and professional student organizations to foster ethnic identity and career development.

To further understand the types and quantity of academic and social involvement experiences of students of color within the university environment, a comparative quantitative analysis of data from the National Survey of Student Engagement (NSSE) was conducted for a sample of majority students and their White counterparts in an attempt to answer the question: *Are the social and academic factors of success, as determined by the National Survey of Student Engagement, of senior students of color significantly different than White students in the College of Agriculture and Life Sciences and the College of Engineering at a majority institution?*

Based on the mean comparisons of select NSSE questions for the sample populations, there were several academic, social and extra-curricular experiences that were significantly different among students of color and majority students. The academic factors of involvement were: 1) collaboration with faculty on a research project outside of course or program requirements; 2) amount of time spent studying and on academic work; 3) support to succeed academically. The social factors of involvement were: 1) engagement in serious conversations with students of a different race or ethnicity than their own; 2) perception of the institutional emphasis on encouraging contact among students from different economic, social, and racial or ethnic backgrounds. The extra-curricular factors were: 1) perceived institutional emphasis on support of non-academic responsibilities; 2) perceived institutional support of social development.

Social and Academic Challenges

While students of color in this study were successful in navigating the social and academic environments of the higher education system at this predominantly White institution, they had to overcome many challenges in order to persist to graduation. Although not the primary focus of this study, it is important to know and understand the obstacles students of color may have to overcome in order to be successful. These challenges presented themselves throughout the interviews and focus groups as themes based on the social and academic experiences of each participant. Some of the themes were: feelings of isolation and alienation, demystification of stereotypes, minimal relationships with faculty and staff, inadequate academic advising, and a lack of academic and social preparation and skills. The most prevalent of which, social alienation, stereotypes, academic advising, and academic and social preparation will be discussed below.

Isolation, loneliness and alienation. One of the most challenging aspects of being a student of color at a predominantly White institution is dealing with feelings of not belonging and the isolation and loneliness that come along with it. For this select group of students, being a member of the minority had a substantial impact on their development and their ability to live a life similar to that of a majority student. For these young men and women, the color of their skin was never far from their minds as they were reminded on a daily basis that they were not a member of the majority:

A lot of the kids that come here are from rural areas, they come from states and cities where the vast majority have spent their day the same way that I spend my day, hardly ever seeing a Black face. When I get up in the morning, if I don't look myself in the mirror, I may not see another Black face for the rest of the day. When I leave...the faces that are passing me by don't reflect me. You somewhat have to deal with that. (African American Male, CoE)

I felt a difference in the environment here than in Jersey...I didn't feel warmth. I didn't feel included. Nobody made me feel included from any other race. I've had class in which I am the only Black person and I don't feel like any of the White people reached out to me. (African American Female, AGLS)

I haven't gotten involved in "Iowa State" functions. I don't do the homecomings, you know what I mean, because I don't feel like they are geared towards me. I go to VEISHEA because it is the thing to do... I think because I haven't participated in many of the activities that I haven't gotten fully into the culture in the four years that I've been here because I don't feel like anything is geared towards us so I don't go. (African American Female, AGLS)

Based on the preceding responses it is evident that students of color are extremely cognizant of their ethnic and cultural differences based on their interactions, or lack thereof, with the university environment and its agents. Being conscious of their ethnic and cultural differences adversely impacted their level of engagement in the larger university community, as stated in the last student's response "I don't feel like anything is geared towards us so I don't go."

Stereotypes. An equally challenging aspect of being a student of color at a predominantly White institution is dealing with the preconceived notions peers and faculty may have about one's ability to succeed in the higher education system. Several students described their challenge of having to work against stereotypes on a regular basis:

Having to deal with the perception that one, you're here, but you don't quite belong. The perception that you might be good, but you're still not good enough. There's a perception that there is not enough of them to matter. (African American Male, CoE)

That has been the greatest challenge. Perception about who you are as an individual. Perception about who you are as a member of a particular group... I do belong to a minority group, so immediately, there are certain stereotypes that are associated with those things. (African American Male, CoE)

Perceptions that we are incapable...the vast majority of the people you are working with belong to the dominant group. Dealing with a lot of those perceptions. (African American Male, CoE)

In addition to dealing with stereotypes of the majority, these students also had to deal with the perceptions of “selling out” held by members of their own ethnic group. The notion that a student of color changes the way they talk and act to coincide with the norms of the majority, as a survival mechanism, is at the heart of this concept. This is best described by one of the African American women interviewees:

My friends make fun of me for how I talk. They make fun of me because they say I talk too proper. Its funny 'cause I identify as being Black but sometimes I get flack for the things I do or for the way I am because they don't think I act Black or whatever you want to say.(African American Female, AGLS)

As evidenced by this statement, the notion of “double consciousness” as defined by DuBois (1965), requires these students to constantly be aware of their identity as a student of color among the majority and their identity among their own ethnic group, thus adding to the challenging dynamics at a PWI.

Academic and social preparation and skills. Equally important to the social forces that inhibit the success of students of color at a PWI are the academic hurdles these students must overcome. Often a product of an inferior elementary and secondary education system, these students have to begin their college career a step behind the majority students and spend a considerable amount of time making up for the academic skills they did not acquire to prepare them for higher education. Some of the skills these select students had to learn were how to study properly, utilizing their peers as educators and time management. An African American male and female discuss the initial shock they felt and how they perceived themselves to be academically unprepared when they began college:

It was sort of an academic shock. I am a product of Chicago public school systems and I was top 10 in my class when I graduated and I just thought I knew all the stuff. I knew what it was to be known. When I came to college it was the biggest wake up call in my life. It was just like all these guys, everybody was smarter than me. It was kinda tough to deal with

coming from being on top and realizing that you are not as smart as you thought you were. I think high school semi-prepared me. I think they would have prepared me if I had done something that was not engineering, something probably in the college of LAS because science and math definitely lacked a lot. (African American Male, CoE)

...I feel like a lot of Black students that come from predominantly Black places, mainly from Chicago, you don't have a good school system in Chicago. Yeah, they may have a 3.9 and get admitted to Iowa State, but we have no clue what is going on when we get here. All of my classes in high school were accelerated classes. I got here in Engineering, took Physics and failed it three times. I failed it twice and dropped it the third time. I took two years of Physics in high school and I was like I should know all of this, but I didn't. I don't feel like we are at all prepared when we come here. I feel like they get us here from high school because we have good grades, but in actuality we don't know anything. (African American Female, AGLS)

It is clear that these students felt like “fish out of water” when they began college. With feelings of being academically inferior, they had to deal with the reality of being unprepared for the rigorous demands of the courses within their field of study.

In addition to being academically unprepared, this select group of students of color had to learn how to manage their time and adjust their study habits to meet the demands of college. While all of them talked of being extremely involved in extracurricular activities in high school, they voiced concerns of not being able to manage the same type of academic and social load once they arrived on campus. This lack of skills not only impacted their grades, but also made them question their ability to succeed. Responses from three African American males best depict these sentiments:

I am really learning to time management for the first time. In high school it was easy. You just went to class. You didn't have to read the book at home. Here it is an all new ball game. I was always good at delegating and prioritizing my time, but I was over-involved. College is a whole other level. It became very hard and it had a toll on my grades. (African American Male, CoE)

The initial adjustment to realizing that not only do I have to study but I have to study correctly. In high school I pretty much memorized stuff and that won't cut it. That was probably my biggest adjustment. I was doing the homework, but not touching it again and reviewing just before the test; when I got the test back I was like “what, I thought I was doing

this correctly". Basically figuring out how to study, how much time I have to put in, and figuring out that I needed to get a study group. I didn't have that at all in high school. It was just me. (African American Male, CoE)

That was probably my biggest thing as well, learning how to study. I just really figured out the great thing about studying in groups. If you don't understand something you can be like "help me" and they are like "aw yeah, I know how to do that". We help each other. It is a give and take relationship. We pick off each other's brains a lot. Not knowing how to study and knowing to look to your peers. (African American Male, CoE)

While these students felt challenged by their lack of academic preparedness, time management and study skills, they were able to overcome these shortcomings by realizing that the educational process was not solely based on the individual, the importance of peers in the learning process, and the utilization of academic and social resources.

Academic advising. Aside from compensating for a lack in academic and social preparation and skills, some students of color in this study had to deal with less than favorable academic advising experiences. Of these experiences, the lack of personal attention given to the needs of the individual student was at the center of this disconnection. Being that the academic advisor is traditionally a student's initial link to academic and career resources, and often a student's first point of contact at the university, this relationship is of utmost importance in their ability to navigate the higher education system and persist to graduation. The absence of this relationship was described best by students of color from the College of Engineering:

My advisor did not have the time. Every time I got in I felt like I needed to get out because he was doing things, just moving about. When I go there, I have to know what I want to ask and then I have to get out. I just can't be there, hang around and ask a couple of more questions. He doesn't have time. He is my academic advisor and a faculty member. (Asian American Female, CoE)

I don't think the advising system is adequate enough to support the various needs and demands of students, especially students who come from a background where college wasn't necessarily a prime focus or a traditional avenue for success. There is a lack of

understanding of how to deal with students and their background... having an advisor who has other large responsibilities, it certainly does take away from that. (African American Male, CoE)

When it comes to advising, there isn't a quantity or quality of advisors cause primarily you have, from my experience, professors who are advising students and there is a certain disconnect between how things were then and how things are now. Or what a student's background is... Many people that aspire to attend universities don't necessarily have ALL of the tools, but their desire can overcome a lot of these obstacles. (African American Male, CoE)

In addition to the everyday rigors of being a college student, this select group of students of color had to combat feelings of isolation and alienation, demystification of stereotypes, minimal relationships with faculty and staff, inadequate academic advising, and a lack of academic and social preparation and skills. In conjunction with hard work and perseverance they were able to overcome their shortcomings and achieve success through academic and social experiences.

Conclusions

According to the findings from the three components of this study, it is evident that the quality and quantity of involvement in the social and academic aspects of the university community is critical to the success and retention of students of color at the featured predominantly White institution in the science, technology and engineering based disciplines in the College of Agriculture and Life Sciences and the College of Engineering. Based on these results, student affairs and academic affairs professionals need to work collaboratively to meet the holistic needs of a diverse population of students, more specifically under-represented ethnic populations. Institutional agents at all levels of the university must take an active role in fostering the academic and social inclusion of this distinct sub-population of the student body.

To effectively meet the needs of an increasingly diverse student population, predominantly White institutions should consider enhancing current programs and policies to meet specific student needs or implementing new programs and policies, to create a greater sense of connection and belonging. The following recommendations are not all-inclusive and should be tailored to meet the needs of the population being served; however, they can serve as a starting point for colleges and universities that are serious about the retention and graduation of African American, Asian American, Native American, and Latino students. Based on the triangulation of experiences of the students in this study, attributes of the educational environment, and the undergraduate and graduate experiences of the researcher at the featured institution, ten key actions and recommendations for practice for university agents in predominantly White environments were derived:

1. Utilization of recruitment and retention programs which allow for collaborative programming between academic and student affairs that facilitate the academic, professional and social development of students within the context of their ethnic and cultural identity. Key components of such programs should include faculty, staff and students of color as program collaborators, financial resources to supplement student academic expenses, professional development and cultural experiences, weekly seminar based activities that facilitate personal, professional and social development that occur from freshman to senior year of enrollment, and physical space to promote collaborative and cooperative learning.
2. Provision and access to comprehensive academic services through a central university-wide student services facility that utilizes peer and faculty educators. Services offered through this facility should include tutoring, supplemental

- instruction, open help rooms, academic success strategists, interventionists, and programs, in addition to physical study and meeting space equipped with updated educational tools.
3. Provision and access to comprehensive academic services at the department and college level through a student services center that includes intrusive academic and career advising, which foster a consistent and continuous relationship between the student and academic personnel. In addition, access to tutors, study tables, academic success programs and meeting space on a more interpersonal level should be provided.
 4. Implementation of mentoring programs among minority and majority faculty, and staff to foster formal and informal relationships that encourage academic, professional, and personal support and guidance. Components of these programs should include classroom activities such as faculty roundtables, social gatherings such as FACs (Friday After Class), guest faculty presentations at student organization meetings, departmental sponsored faculty-student meet and greets, and faculty-led research opportunities.
 5. Development of programs that foster peer-to-peer relationships among under-represented populations, in addition to majority students. Creating this type of connection can occur through formal and informal mentoring programs between undergraduate and graduate students or freshman/sophomore and junior/senior students, learning community social and academic activities, residential programming, participation in ethnically and culturally-based student professional and service organizations, collaborative programming between minority and majority

- based student organizations, university sponsored events that focus on diversity education, college end departmental programs that highlight specific ethnicities and cultures, and curriculum inclusion of diverse perspectives.
6. Creation of programs and policies that enable the development and sustainability of support networks comprised of family and friends. Examples of activities include university, college and department sponsored social events, frequent campus visits that extend beyond the first semester and beginning of each academic year, and periodic correspondence between the institution and the family through monthly newsletters from advisors or administrators to keep guardians aware of university activities and student progress.
 7. Implementation and institutional support of university, college and departmental minority based student organizations. Programming components of such organizations should focus on professional, personal and academic adjustment and develop and community service through collaborations with all university agents: students, faculty, staff, and administrators.
 8. Access to student-led professional organizations at the college and departmental level. These organizations should focus on career and professional development within the realm of a student's program of study, in addition to providing students with opportunities for industry experiences through internships, practicum and co-op opportunities and networking.
 9. Access to recreational services that promote and foster the development of a health body and mind. These resources should include a wide selection of fitness and

sporting facilities such as intramural sports competitions, wilderness classes, and general exercise opportunities.

10. Department based programming that fosters the development of peer-peer academic and professional collaborations inside and outside of the classroom. Components of such programs can be learning community or class based to include opportunities for under-represented students to complete class projects and assignments as members of a team and the implementation of faculty-led community building exercises within the classroom.

Recommendations

Based on the findings from this study, it is clearly evident that students of color are having a higher education experience that transcends that of their White counterparts. With social and academic challenges that have the ability to adversely impact their retention and persistence to graduation, under-represented students in this study were able to overcome these obstacles through high levels of involvement in their academic and social environments. In order to obtain a greater understanding of the tools utilized by successful students of color, future research should take a qualitative look at a larger sample of students that has a more equal representation of each racial and ethnic identity. In addition, researchers may want to consider a cross-institutional study with other universities similar in stature to Iowa State University to determine if the findings and suggestions of this study can be more broadly applied to the student of color population. Lastly, future research should seek to determine if there are factors other than those presented in this study that impact the persistence and graduation of ethnic minorities at predominantly White institutions.

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APPENDIX A. PRE-FOCUS GROUP SURVEY AND INTERVIEW QUESTIONS

Pre-Focus Group Survey

Thank you for agreeing to participate in this study. Your feedback will provide invaluable insight in meeting the future needs of other students of color by shedding light on the challenges and successes faced by this population on a majority campus. Prior to attending your selected focus group, please take a few minutes to complete the following background information and submit to the facilitator.

Demographic

1. Age: _____
2. Ethnic Identification: _____
3. Hometown: _____
4. Major: _____
5. College: _____
6. Please list the types of individuals that were present in your household as you were growing up (i.e. mother, father, grandmother, grandfather, aunts, uncles, sister, brother, family friend, etc.): _____, _____, _____, _____, _____.
7. Please describe the highest educational attainment of the individuals that were present in your household or had an impact on your growth and development:
 - a. Mother: _____
 - b. Father: _____
 - c. Grandmother: _____
 - d. Grandfather: _____
 - e. Sister/Brother: _____

College Activities

1. Why did you choose to go to college?

2. Why did you choose to come to ISU?

3. Why have you returned to ISU to continue your education each year?

4. What type of activities are you involved in outside of the classroom?
 - a. Social

 - b. Academic (departmental and/or campus-wide)

 - c. Athletic

 - d. Community

 - e. Spiritual

5. Why did you choose these particular extra-curricular activities?

6. What type of leadership experiences have you participated in?

7. What led you to choose these leadership experiences?

Focus Group Questions

Student Perceptions of Success Related Academic and Social Factors

1. What does it mean to you to be successful?
2. How do you define success with respect to your academic and social involvement at Iowa State?
3. What **academic** factors have aided in your success at Iowa State University and in the Department of Ag and Biosystems Engineering?
4. What **academic** factors have hindered your success at Iowa State University and in the department of Ag and Biosystems Engineering?
5. What **social** factors have aided in your success at Iowa State University and in the Department of Ag and Biosystems Engineering?
6. What **social** factors have hindered your success at Iowa State University and in the Department of Ag and Biosystems Engineering)?
7. What is the most challenging thing about being a student at Iowa State?
Academically, socially, ethnically?

Ethnic/Racial Identity

1. Do you identify as a student of color on campus (beyond checking the box)? If so, how? If not, why?
2. Are you involved in cultural organizations? If yes, which ones and why? If not, why?

Relationships

1. What type of **social** support system do you have?
2. How often and for what reasons do you use this **social** support group?
3. What type of **academic** support system do you have?
4. How often and for what reasons do you use this **academic** support group?

Overall feelings/perceptions of institution

1. What are your overall thoughts about Iowa State and the Department of Ag and Biosystems Engineering?
2. If there is one thing you would change about Iowa State and the Department of Ag and Biosystems Engineering what would it be?

APPENDIX B. NSSE SURVEY



National Survey of Student Engagement 2006

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

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

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

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

	Very much	Quite a bit	Some	Very little
a. Memorizing facts, ideas, or methods from your courses and readings so you can repeat them in pretty much the same form	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
c. Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
e. Applying theories or concepts to practical problems or in new situations	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

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
- a. Number of problem sets that take you **more** than an hour to complete
-
- b. Number of problem sets that take you **less** than an hour to complete
-

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

- Very little Very much
- 1 2 3 4 5 6 7

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

- Very often Often Sometimes Never
- a. Attended an art exhibit, gallery, play, dance, or other theater performance
-
- b. Exercised or participated in physical fitness activities
-
- c. Participated in activities to enhance your spirituality (worship, meditation, prayer, etc.)
-
- d. Examined the strengths and weaknesses of your own views on a topic or issue
-
- e. Tried to better understand someone else's views by imagining how an issue looks from his or her perspective
-
- f. Learned something that changed the way you understand an issue or concept
-

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

- | | Done | Plan to do | Do not plan to do | Have not decided |
|--|--------------------------|--------------------------|--------------------------|--------------------------|
| a. Practicum, internship, field experience, co-op experience, or clinical assignment | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| b. Community service or volunteer work | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| c. Participate in a learning community or some other formal program where groups of students take two or more classes together | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| d. Work on a research project with a faculty member outside of course or program requirements | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| e. Foreign language coursework | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| f. Study abroad | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| g. Independent study or self-designed major | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |
| h. Culminating senior experience (capstone course, senior project or thesis, comprehensive exam, etc.) | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> | <input type="checkbox"/> |

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
- 1 2 3 4 5 6 7
- b. Relationships with **faculty members**
- Unavailable, Unhelpful, Unsympathetic Available, Helpful, Sympathetic
- 1 2 3 4 5 6 7
- c. Relationships with **administrative personnel and offices**
- Unhelpful, Inconsiderate, Rigid Helpful, Considerate, Flexible
- 1 2 3 4 5 6 7

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

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

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

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

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

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

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

Excellent
 Good
 Fair
 Poor

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

Excellent
 Good
 Fair
 Poor

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

Definitely yes
 Probably yes
 Probably no
 Definitely no

15 Write in your year of birth:

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 Senior
- Sophomore Unclassified
- Junior

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

21 Since graduating from high school, which of the following types of schools have you attended other than the one you are attending now? (Mark all that apply.)

- Vocational or technical school
- Community or junior college
- 4-year college other than this one
- None
- Other

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	Mother	
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Did not finish high school
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Graduated from high school
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Attended college but did not complete degree
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Completed an associate's degree (A.A., A.S., etc.)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Completed a bachelor's degree (B.A., B.S., etc.)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Completed a master's degree (M.A., M.S., etc.)
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	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 VIEWS!

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, 1900 East Tenth Street, Eigenmann Hall Suite 419, Bloomington IN 47406-7512 or nsse@indiana.edu or www.nsse.iub.edu. Copyright © 2005 Indiana University.



APPENDIX C. INTERVIEW TRANSCRIPTS

Interview 1

Oct. 2, 2007 @ 5:28pm (scheduled for 5:15pm)

African American Male-CoE

How do you define success?

I mean, there is the impericle quantifying; your grades. Me being a non-tradational student, being the opportunity to participate. Attending classes, learning new information. Meeting people from diverse groups. It's already a success for me. I am at the point in my life, like when I tell me kids, when I get and 'A' in the class or a 'B' in a class is not the real purpose why I am here in the university. I am here primarily to engage in the process and it also helps to show them that it is something that you can persevere through and accomplish and the end results is you've succeeded.

When you finished your high school education, did you go straight to work then?

Um yeah. Primarily.

In your academic success, what types of things helped you be successful in that particular area?

Definitely a lot of the support. Especially a lot of the support that I am receiving now. I don't think that the advising system, I'm in the College of Engineering, in my department I don't think the advising system is adequate enough to support the various needs and demands of students, especially students who come from a background where college wasn't necessarily a prime focus or a traditional avenue for success. There is a lack of understanding of how to deal with students and their background. Which I don't necessarily believe is the primary focus of a university, but for me and my situation and the department that I am in, having an advisor who has other large responsibilities, it certainly does take away from that.

Student services has a lot of resources. Learning Communities...people pursuing the same majors to be in the same environment on a more frequent basis. Those kinds of things certainly help beyond the regular, we are in the same class together, so lets work together.

Is there anything that you can find, that may have hindered you as far as academics go?

I think, the inability as a non-traditional student and also a commuting student, you don't really have access to a lot of the services on campus because obviously if you have a lot of responsibilities that take you off campus on a regular basis, using the labs or things of that nature or access to certain software, in the college of engineering especially, the implementation of a program where students can use and access software off campus would be a great improvement and assist in my success.

Have you ever sought out any extra services that may be offered in the MSA office or anything like that?

Yes, for a time I was in the McNair Program. That certainly brought out a lot more desire on my part to succeed. Their requirements are pretty lofty and I wasn't there yet. Eventually I am getting more and more interested in wanting to get a Masters and wanting to take that beyond. But for right now, I think I am doing my part so to speak with getting my 3 kids into the educational system and getting them through successfully. So, yeah, the McNair Program. The state of Iowa has an office here in the student services building called Rehabilitation Services, and they offer a lot of resources for students who have disabilities or difficulties meeting the academic standards based on some emotional issues...any other services housed in the student services building.

In the minority community students come from all different backgrounds and even in the dominant community, we all have issues that we need to deal with and those resources are accessible to succeed. When it comes to advising, there isn't a quantity or quality of advisors cause primarily you have, from my experience, professors who are advising students and there is a certain disconnect between how things were then and how things are now. Or what a student's background is. Yes we are all adults and we should be prepared to face the rigors of our academic pursuits but we all know that is not necessarily clear and true across the board. Many people that aspire to attend universities don't necessarily have ALL of the tools, but their desire can overcome a lot of these obstacles.

Are there any social factors that have aided in your success here at ISU?

I'd say yes. Even though I am a minority student, I didn't join NSBE, I was never contacted and I didn't know they had a group until I knew a few people who had attended. Things like the AGC student chapter, Association of General Contractors, I'm a Construction Engineering major, things like that were right there for me. Providing me the opportunity to better know and understand my major and what to expect after graduation. I understand there is also the Black Student Alliance, that is also socially motivated. Those are all well and good. I could see from a distance there are resources available for minority students to come together and make an impact on the larger community.

So, you've only sought out the one (organization)?

I mean yeah, cause scheduling was an issue. I think for the time that I've been here at ISU, maybe a year and a half I was an active member in my student chapter. It's pretty difficult to attend meetings at 7 o'clock at night with a family and things like that. As much as I would have been willing to participate, my constraints and restraints, that's all I could do. I am sure it's the same for other students that have to work, that live on campus, they have some sort of part time job to keep up with the basic needs of having to live away from home.

Have you formed any types of relationships with any faculty members or instructors?

Not really. Being that we live in a very individualistic society and the demands that engineering place on the individual at the undergraduate, graduate and doctorate level, there is a very distinct separation that I perceive, unless you are doing research with a professor, with the average student and the professor. That is not to say that I don't have a rapport with my advisor. He has been recently promoted to a higher position in the department so when I see him in the hallway I say "hi" because I know he is my advisor. When it's time to register, I go to him and get my card signed or whatever and that's it. Beyond that, we've discussed my disabilities in school, but as far as a relationship, no not really. As far as TAs, they'll help you if you knock on their door or if you see them in the hallway, but it's kind of difficult when they're going in one direction and you are going in the other direction to form these kinds of relationships.

In your department in general, is there any student and faculty interaction?

Yes. The various student chapters have representatives that sit on a board that meets monthly, from my understanding, to discuss where the program is headed and to get some input from the student body; what they think and how they think.

But I think there is a different dynamic when you're talking about members of the dominant group functions in those positions, the impact on decisions on how minority students are affected are marginal at best. I know from my program, minority students are grossly underrepresented.

When you are talking about participation, if your numbers are small, it is hard to be involved on that level.

What is the most challenging thing that you have had to endure at this institution, what would it be?

That's easy; perception. That has been the greatest challenge. Perception about who you are as an individual. Perception about who you are as a member of a particular group. Obviously, most people can tell that I am a little bit older than the average student and I do belong to a minority group, so immediately, there are certain stereotypes that are associated with those things. I think that especially in the engineering environment, in particular the construction engineering environment, where people of color are grossly underrepresented. Once in a while you might find 4 people of color in classes and you're excited. Perceptions that we are incapable. You have women in a construction environment that are facing the same challenges as an African American male, an environment where the vast majority of the people you are working with belong to the dominant group. Dealing with a lot of those perceptions.

A lot of the kids that come here are from rural areas, they come from states and cities where the vast majority have spent their day the same way that I spend my day, hardly ever seeing a Black face. When I get up in the morning, if I don't look myself in the mirror, I may not see

another Black face for the rest of the day. When I leave to get in my car and get on the road, the faces that are passing me by don't reflect me. You somewhat have to deal with that. I am here by choice. I live in Iowa by choice. I moved here from a state and a city where that was not a problem for me.

Having to deal with the perception that one, you're here, but you don't quite belong. The perception that you might be good, but you're still not good enough. I've always told my kids that no matter what my expectations or anyone else are of you, if you don't have great expectations for yourself, then you're worse than me. Yes, so for myself, I do struggle with perceptions, but win, lose or draw, it's on my terms.

Have you done anything or do you go any place on campus to see someone that looks like you?

The Memorial Union. I've gone down there sometimes for lunch just so I can see the different people walking by. It's not exactly that I like the food down there any more. It's the atmosphere. Once in a while I might see someone I know.

I would say my personality draws to me wherever. On another level, I have some of those days where I decide to walk across campus just to see who I can see. I go over to Parks (Library) and just sit downstairs and people watch. You may see a person that you know from say the McNair Program and you say "what's up, I remember you."

One day I was driving on campus and I thought I recognized a friend of mine driving in front of me from a glimpse in his rearview mirror. I followed his vehicle, flashed my lights, blew my horn, until he finally recognized who I was. I mean, that is how acute the sensitivity is; that all it takes is a shadow of the hue and just a possibility that I know that person. If it turned out not to be him, which it was, at the very least I made a new Black friend.

What has been the one thing that has not been a challenge for you at ISU?

Just meeting people. That hasn't been a challenge. I've still maintained relationships with people I've met on campus. The level of discernment it has given me, in terms of their wants and needs, has been tremendous. Camaraderie. A group feeling that we've maintained. With all of the things that people say about how Blacks interact with each other, mostly negatively, this group of individuals, my friends, are successful after Iowa State. The bonds and ties that we have made at Iowa State. When you come together, it's easy. You can relax. We all have a certain mask that we wear, but ultimately, you can't really hide who you are when you are among your own people.

Coming to commencement. This past summer was the first time I had allowed myself to come to the grand convocation. Being in that environment in Hilton. Just was looking down. I recognized faces, young men and woman, who either had dropped or been dismissed, like in my case, who had come back and finished their degree. I held that image. Come hell or high water I'm gone finish. I'm walking.

Coming to college wasn't a choice. It's an obligation. I have a duty to do this because for my family and for all the members of previous families who couldn't come to the university.

This is Iowa State University. I came to college to get a degree from Iowa State University in the program of study that I'm in. We are living in a global society. I spent most of my formative years outside of the United States, so I have a global sense of who I am and where I stand; right at the center of the earth is me. That is not a selfish thing. It is an understanding that you are not just African, you are not just West Indian, you are not just American, there is so much more out there to who you are. You've got to embrace it and not just go out there and experience.

College is a time to have fun, but it is also a time to put a stamp on who we really are as a member of a minority population.

Success can be measured in different ways for different people. I think for Af. Am., for minority students period, actually finishing this portion of the race is a grand achievement as opposed to being number one in your class. There are far too many of us who have so much baggage to carry; yes I would love to get straight A's in my courses, I'd love to be on the dean's list, but for the responsibilities I have to carry, it is not a realistic option for me. But too many people see that if I can't do that as a minimum that I can't do it at all.

There's a perception that there is not enough of them to matter. That is the perception that I get. In my department, the construction engineering department, I see more Asian students involved in graduate work. I'm like, ok we can go half way around the world and recruit these students into our classrooms, what is the problem with getting students here.

I walked my daughter through the halls of her (high) school one day and showed her the athletic case and we are overly represented there. I then took her to the AP scholar wall and asked her to show me a student of color and there isn't a one on there. It is my goal to have my daughter be that one. I don't think there are many parents who are willing to make that type of demand on their children.

I think one of the biggest things is recognizing that being together doesn't make us less. Because in the larger community there are enough students of the dominant group to have competition set up. We don't have that many numbers, so it is in our best interest to come together and define our needs within the group and see how best the group can help us achieve those ends.

I've met a lot of great people on campus, Dr. Hill, the director of the McNair Program, Dr. Jackson, he has done so much for me on this campus. That man is a wonder. He's amazing. He's inspiring. I can honestly say that one of the main reasons I keep coming back is because of him. If nothing else, I've got to get my undergraduate at least to go and say "I may not have gotten that Masters that you required, but I got this, thanks."

A lot of people come on campus and forget. I know I've come on campus and forgotten really why I was here.

What is your overall perception of Iowa State?

I will be a Cyclone 'til the day I die. Degree or not. I think it has a history and a tradition that welcomes as a minority student, all students. For me to walk on a campus and spend a year in a building that is named after George Washington Carver is awesome. To know that at some point, I actually put my foot on a footprint that he left. These are the inspiring things about Iowa State, maybe that some people know and maybe not enough people know. There are people whose lives have been intertwined with the fabric of Iowa State and I think it is more than an educational experience. It is a life changing experience.

I would tell people to come to Iowa State. The fact that you are a minority student should never deter you. In fact it should be greater motive. If people are looking for mountains to climb and challenges to overcome, what better place than a place where you are underrepresented. What better place than a place where you need to learn how to use your voice.

I make the comparison about the people who leave to city to go out and live in the suburbs. You can put me to live next to the Klu Klux Klan, I really don't care. That would be fine to me because as loud as they'll be talking about who they are, you can be just as assured that I'll be talking about who I am. One way or another one of us is going to shut up and listen and we both might learn something.

Interview 2

Oct. 3, 2007 @ 5:28pm (scheduled for 5:15pm)

2 African American Males-CoE

How do you define success?

Student 1: Success to me is whether or not I meet my goals. So here at Iowa State basically, I set some goals that I wanted to have, a coop before my junior, a job offer before I graduated, I wanted to have this GPA.

Student 2: I think of it as being in the eye of the beholder. Basically when you give it your all, your best effort.

What academic things have you been involved in at Iowa State that have helped you get to the point you are at today?

Student 1: I struggled a little bit my freshman year; I cruised through high school with no problem and when I came to college classes were harder and I was living in the dorms and hanging out with some friends that were a little more distracting than I probably should have.

I got a tutor. I did supplemental instruction. Went to talk to my professors a lot. I also became a tutor and I think that has helped me as well. Getting a tutor was my biggest help. I had a tutor my first four semester, even when I didn't need it. It just helps. It really helps.

Student 2: For me, what contributed to my academics to get me to the point where I am now was mostly asking for help. I tried to surround myself with people that were smart, that knew the material and could break it down for me because sometimes the professors were so far along that when they explained it to you it was like "huh". Also, some different programs on the university level, such as LEAD-Learning through Engineering and Academic Diversity, that was a great program. I would go upstairs to the LEAD room and have tutors up there or have my peers help me out. Whatever you needed help in. Also meeting with teachers.

Student 1: I think the biggest reason I had such a good GPA was because of study groups that I formed on my own with people in my classes. I basically have the same classes with the same 40-50 people and I have six that I do all of my homework with in all of my classes. That has probably been my biggest help.

Did you find it challenging to connect with the students that you formed study groups with?

Student 1: Not too much. There are just so many people in the program that I just found people with similar interests as me even if they didn't look like me I guess. One is of Indian decent, not American Indian but from India. The rest are Caucasian. We all had stuff in common that initially got to start hanging out, then when we realized that we all had similar goals, we started working together. I guess I didn't have too much of a problem.

Student 2: I don't think I had too much of a problem either. I know starting off, me and a lot of other Black engineers that I came in with took a lot of the same basic program courses. Most of them are other majors, so when it comes to me now, I've opened up more and study with other students of other backgrounds, mostly white at this point.

What has been your biggest challenge academically?

Student 1: Mine was probably the initial adjustment to realizing that not only do I have to study but I have to study correctly. In high school I pretty much memorized stuff and that won't cut it. That was probably my biggest adjustment. My high school prepared me well with the course material, but not how to study. I was doing the homework, but not touching it again and reviewing just before the test; when I got the test back I was like "what, I thought I was doing this correctly". Basically figuring out how to study, how much time I have to put in, and figuring out that I needed to get a study group. I didn't have that at all in high school. It was just me.

Student 2: Exactly. That was probably my biggest thing as well, learning how to study. I just really figured out the great thing about studying in groups. If you don't understand

something you can be like “help me” and they are like “aw yeah, I know how to do that”. We help each other. It is a give and take relationship. We pick off each others brains a lot. Not knowing how to study and knowing to look to your peers.

What has helped you to be successful socially?

Student 2: I would have to say over-involvement in organizations. Leaving high school I was also that type of person that volunteered, always in some type of organization. When I came to college it seemed natural to hurry up and get involved. Try to figure out where my niche was on campus and I kinda dabbled and dabbled. I went from GSB, our student government to NSBE-National Society of Black Engineers, Black Student Alliance, Black Cultural Center Task Force. Finally found my niche in two of them. Those have been very beneficial to me socially, interacting with so many different types of people on almost a daily basis. Its been great.

Student 1: I think for me, there were just certain things that I wanted to learn more about or do, like extracurricular that I couldn't do in high school. Like hip-hop dance club. I just wanted to learn that but I ended up becoming the choreographer and figuring out that was a much bigger leadership role than I had thought initially. Tutoring as well, just working on communication skills and stuff like that. Public speaking; I am on a team, so we do a lot of tours, panels and stuff like that has helped a lot. I think I just try to find things that I am passionate about and when I am doing those things take on a leadership role to help develop in those.

Did you live in the dorms? How long did you stay in the dorms?

Student 2: Uh, yes. A total of two years.

Student 1: I just stayed for one year. I was in the LEAD program as well.

Student 2: I actually lived in the Entrepreneurship Learning Community as well.

Why did you leave that setting?

Student 2: When I came here, I had a full tuition scholarship, but not room and board; it was kinda killing me. I had to figure out something quick, so I moved off campus. The main reason for me was cost. I love living in the dorms but...

Student 1: I love the dorms and would recommend it, but I moved to Frederickson for my own room for the sake of not being distracted and having my own luxuries. A little more like home.

Student 2: That was what I did my second year. I got a super single in the dorms. I needed my own space. That was nice.

What type of social support system do you have in place within your college or department with your faculty members?

Student 2: My freshman year I was a little intimidated by my professors. After I got to know a few of my professors, go visit them during their office hours, ask them questions, talk about what they love doing. I think after freshman year I was a lot more comfortable and to this day I talk to my professors on the regular.

Student 1: For me it varies from professor to professor. I think there are some professors that I can relate to and we call each other by first name. Then there are other professors, that are such good researchers that they are so into that, that they are not so into the student part. I can still go talk to them, and I feel comfortable doing it. Overall it's pretty good.

Do you have any type of mentoring relationship with anyone here at Iowa State?

Student 1: We were both CARVER. So freshman year we were required to have a mentor, so we would meet a certain number of times throughout the semester. So I decided to become a mentor the year after that. As far as officially, that was the only thing that I had. There are people that I look up to, like upperclassmen that I want to imitate a little because they had jobs or internships.

Was there anybody to help guide you (mentor)?

Student 2: For me, it's hard for me to say that. I'm a very versatile person. After I do one thing, I will move on to do another. My definition of mentor is somebody you can look to or can take something from as far as knowledge or some type of wisdom. Through my life I've had many official mentors, I'm in the African American alumni mentor program. My mentor is an engineering consultant. He owns his own firm in California. I actually visited him this summer and had the opportunity to work for him for a week. Right now I mentor students as well, both in the Ames Middle School, Ames High School and here at Iowa State.

Do you identify as students of color?

Student 1: Yes.

Student 2: Um Hmm.

Does your identity as a student of color go beyond checking a box on a piece of paper? Do you identify as such on Iowa State's campus?

Student 1: I am unique because I am bi-racial (black and white). I guess when people in the outside world see me, they think of me as a minority. I would say that I check the box and identify that way on campus.

Student 2: I would identify as such. I am a mixture of many races. I am comfortable with it. That is how I was raised. In a predominantly black community. Both of my parents identify as Black. When someone looks at me, they see Black. That is what I identify as, whether I like it or not, that is what I am identified as.

Has your workload prevented you from being more involved on campus?

Student 1: I think being more involved has helped me with my workload. It makes me be more forced to have better time management when scheduling stuff.

Student 2: I think I am kinda of reverse. I think my over-involvement is starting to affect my work. I am really learning to time management for the first time. In high school it was easy. You just went to class. You didn't have to read the book at home. Here it is a all new ball game. I was always good at delegating and prioritizing my time, but I was over-involved. College is a whole other level. It became very hard and it had a toll on my grades.

If you could name your biggest challenge here at Iowa State as a student of color what would it be?

Student 1: That is a hard one for me. I think overall, one reason I picked Iowa State was because of how well they provided a support structure. I came to preview day, which is for engineers; they gave us the red carpet treatment. Besides that, I was in CARVER and LEAD, they provided me tutors. I had a really good support structure, which was one reason why I chose Iowa State. I guess it wasn't really that hard for me to adjust. I think the biggest thing for me was college in general. I grew up in a predominantly white neighborhood anyway, so it wasn't a culture shock for me because I was already used to it.

Student 2: I am not gone say it was a culture shock for me. I was sort of an academic shock. I am a product of Chicago public school systems and I was top 10 in my class when I graduated and I just thought I knew all the stuff. I knew what it was to be known. When I came to college it was the biggest wake up call in my life. It was just like all these guys, everybody was smarter than me. It was kinda tough to deal with coming from being on top and realizing that you are not as smart as you thought you were. I think high school semi-prepared me. I think they would have prepared me if I had done something that was not engineering, something probably in the college of LAS because science and math definitely lacked a lot.

Discussion about weed-out course; math, calculus.

What is the biggest thing you attribute your success to?

Student 1: I would say just my mentality for setting goals and going for them. Being hard working and doing what it takes to meet those things, regardless of the environment I am in. I think I would be successful no matter where I was because of that. I think just the way I

was raised and how I try to get involved and go after things I want has made me how successful I am now.

Student 2: For me, I would have to say a combination of family and friends and the support from them. It was some times I would just call my parents, barely crying. Just 'cause it was like so hard. "I don't think I can handle this, I am about to switch majors, just forget it". It was their support and uplifting words and everything that kinda kept me going little by little. I have very supportive friends. So they made sure I was doing what I need to do. They encouraged me every step of the way. I would just say it is the people I in my life.

Student 2: I think both of our parents prepared us well. Enabled us to take responsibility.

Student 1: I agree. I attribute most of my success to God and my parents. They set me up for success more than anything else.

Are you both first generation?

Student 2: I am first generation.

Student 1: Both of my parents have theology degrees; associates degrees. My mom's father and brother are engineers that went all the way through. But as far as my parents no one on my father's side went to college, except my dad and his associates. My mom has her associates.

Student 2: My grandfather had a technical degree. He doesn't remember in what. He really wasn't present in my life, so I really didn't have no-one to look up to with regard to what college life was like. I had to basically find out for myself.

Did they steer you well in high school?

Student 1: They did enough to make sure we got moving on the process and then they let us go. It was on us to do. They weren't checking in on us. Mine was kind of lacking.

Student 2: Mine was different. I think I had the bomb advisor in high school. I don't think I could have made it to college without them. I think my high school preparation was good, but it was the academics that weren't that good.

Student 1: My high school advising was lacking, but we actually paid someone for that. You go and meet a counselor at a company and they give you a checklist of things to do; FAFSA, pitfalls, etc.

Have you had good advising here at Iowa State or did you have to feel your way a lot of the time?

Student 1: As far as Iowa State goes, we have Engineering Career Services. In Aerospace Engineering, he does well but there is just not enough of him. Overall, they have done well in advising me. Mentors through CARVER and talking to upperclassmen has helped. Just friends. I think I have a good amount of support when it comes to that.

Student 2: I must be lucky or blessed or something cause I honestly can say that I've had some of the bomb advisors here as well. (talked about experiences with advisors, dropped names about those that he's communicated with; Star and Castleberry) I've had good relationships with them.

Student 1: Iowa State also has good seminars; resumes, what's next. I go to some of those now and then. I think they can do more of them.

Overall opinion of Iowa State. If there is one thing you can change what would it be?

Student 1: I do a lot of recruitment here at Iowa State because my experience has been so positive, I guess. You could always have more diversity I guess. I enjoyed living on LEAD because there were Latinos, Blacks, Whites, Asians, all kinds. It was cool to see people all around you from different cultures. To hear different music coming from people's rooms. I really enjoyed that. After I left LEAD there wasn't so much of that on the rest of campus. I would like it if it were a little more diverse.

Student 2: I would have to say my overall experiences have been positive. You have people that are here to help you, people that just live for helping you, it's their job. I think that has been my best experience here, just all of the resources you have available to you. As far as what they can improve on, I agree with ***** 100% on diversity. I think one way to get there is some type of standing multicultural center. The facility we have now, the BCC, is just too small. The facility they are building in the union won't be open until a year from now and that is also going to be too small at 3000 sq ft. I think an actual center, a physical space. Not just for students of color, but a center to educate all students about all different cultures. We promote diversity, but a lot of people don't know why. Nobody says why. I think physically seeing something there and simply words or a little center or place over here (BCC) that nobody really knows about. (shares experiences at other BIG 12 schools that have large multicultural facilities). I think an actual facility will help attract more diverse populations.

Student 1: I think MSA is great, CARVER academy is great and some of the other ones, but I don't think they have as much visibility as they should. Even other things like the Latin Dance Club, stuff like that; more visibility for those multicultural things that we do have, advertise more or stuff like that.

Interview 3

Oct. 4, 2007 @ 5:18pm (scheduled for 5:15pm)

1 Asian American Male (Student 2)-CoE

2 Asian American Females (Student 1 & 3)-CoE

How do you define success?

Stu 1: Knowing that I've put forth all of my effort.

Stu 2 (male): It has a lot to do with the things that I've done to empower others or other people empowering me to do what I can. That is pretty important to me. It's not like getting a project done.

Stu 3: Being able to give back to those that have given things to me.

What are some of the things that you have been involved in at Iowa State that have helped you academically?

Stu 3: I've been involved in IIE. Other clubs like E-week. Just having that frame of mind of organization and scheduling out everything you have to do.

Stu 2: I was also involved in E-week. On top of that getting involved in other organizations outside; like I was a Cyclone Aid for one summer, you get to network with people and that has helped me to meet different types of people and to see things from their point of view. It opens your mind up a lot more to opportunities that are available out there, whether it's school work or not.

Stu 1: For me it is keeping myself busy. I've joined clubs within my major and I also joined clubs outside of my major like the Thai student association club or other cultural clubs. Also, I think the tutoring was helpful during my first year.

Stu 3: Did you get tutored or did the tutoring?

Stu 1: I got tutored and I also got tutored.

Is there anything academically that has hindered you from being successful?

Stu 2: Having to change my major. I changed my major twice. My freshman year, I really enjoyed it. I mean, I really enjoyed it (laugh), socially. It was definitely a learning aspect. I took my time to get caught up on stuff. I don't see it as really a hindrance because without it, I wouldn't be where I am today.

Stu 3: As far as classroom, I am an industrial engineer and many of the things we do is based on teamwork. You know freshman and sophomore year, you don't know as many people, so you don't know their background and how hard they are going to work, so a lot of

times I ended up doing all of the work. At the same time I got all of that back to because I knew how to do all the work on the test.

Stu 1: I had a lot of group projects as well. Some of them don't do the work. You try to get them to come to the meetings but they don't come. You just have to take it on your own or you will never get your work done.

Did you get to pick your own teams a lot or were you put in teams?

Stu 3: We basically picked our own.

Stu 2: There were times where they picked them for you. It did get difficult sometimes, but part of that is learning how to handle the situation.

Stu 1: All of mine they picked for me.

What are some of the things that you have done socially outside of the classroom that have helped you to be successful?

Stu 2: Intramurals was a big one for me. I stayed open minded. First time I ever won an intramurals shirt was in paint ball. I had never played paintball in my entire life. One of my buddies asked me one day if I wanted to play and we ended up winning that day. That was definitely a really good experience for me. Other than that, just finding things to do. There is a lot of free stuff to do on campus. On top of that, a lot of night life too. As long as you stay involved and not get caught up in it, you won't find yourself too far behind.

You said you were in a fraternity?

Stu 2: Yes. That kept me busy. It provided a lot of different aspects of person-person interaction.

Is it a multicultural fraternity? Is it diverse?

Stu 2: The fraternity for the most part is pretty diverse. Ethnic wise, academically. IT definitely opened my mind to how different people worked in different areas.

Stu 1: I've been active in sports clubs, tennis team, volleyball club team. I've done intramurals too. Volunteered at the Y.

Stu 3: I'm a little different. I have a lot of school work to do and I'm not going to lie to you. I don't have much of a social life. I've worked with a professor on a research topic. I also work at a restaurant. That is kinda like my hobby job. I like seeing people interacting. It is a Thai restaurant. It is like a community there. They treat us like their family. I get my social support there. Being there, I get to educate people on my culture a little bit and that is what I really, really enjoy. Also, the Thai student association, I've been really involved in. I've

been in it for the past four years. When people ask us to be involved in other things, like VEISHEA, I am there. I'm not involved in sports though.

Did you find it difficult to get involved at first or did you just jump in? Was there anyone telling you to get involved or did you have to find your way?

Stu 1: I knew I wanted to play sports, but it was a little nerve-racking to go on the first day because you don't know anyone. Coming from high school you know everyone from like grade school. I kinda just got involved because I heard this person was going and they ended up dropping out. Through that, I met more people.

Stu 2: Coming out of high school one of my main goals coming to a university outside of Nebraska was that I knew I was always going to have friends in Omaha that I could always go back to hang out with. I felt that coming to this university gave me the opportunity to start fresh and make new friends. One of my goals when I came in was to get involved right away. Develop relationships and make friends, that's kinda what I did. My freshman year I really enjoyed it. It wasn't just from the social aspect, but also from keeping myself busy and learning how to multi-task. I spent the whole first year learning how to multi-task. Whether it was going through two majors or not, I was able to settle down once that first year passed by.

Stu 3: No one told me to join this or that. But I know that if I didn't keep myself busy I would sit around and wait until the last minute to do things. So I filled my schedule to make myself do things at a certain time so that I wouldn't wait until the last minute.

How is the advising that you've had so far?

Stu 3: My advisor did not have the time. Every time I got in I felt like I needed to get out because he was doing things, just moving about. When I go there, I have to know what I want to ask and then I have to get out. I just can't be there, hang around and ask a couple of more questions. He doesn't have time. He is my academic advisor and a faculty member. Sometimes I go around to other faculty members for help.

Stu 1: I came in underclared and was in the same situation. He didn't really know what was going on at all. But when I declared "industrial" our advisor is great. You can call her on weekends for anything; she knows things inside and out. She is not a faculty member so I think that has a lot to do with it. She is just very heavily involved in what you want to do.

Stu 2: I think during my first couple of years I saw my actual advisor once because every time I went up there he would be busy so I went ahead and talked to the other advisor. So I never had one set advisor. Every since my junior year he has been more available. They made a lot of departmental changes in the ME department as far as advisors and he has been the one that has stuck around since I've been here. He's really good at responding to my emails. If I ever have any questions I just go in there and ask him. We had a pretty good relationship.

Stu 3: Can I add something. When I came in, I was undeclared. He wasn't very accommodating to my needs. I'm an MVP Scholar and I am also an MVP seminar leader. There are a couple of people that are open engineering and they are taking classes, in my opinion, that they shouldn't be taking. I don't understand why they have been put into these classes.

Do you identify as a student of color on campus? Are you involved in cultural organizations?

Stu 1: I think it is because I grew up in the suburbs. When I am back at home I identify more so. My dad is full Japanese and my mom is White

Stu 2: I was in the LEAD program my freshman year, but since then I haven't really participated in much as far as any cultural clubs. I'm Hmong and there aren't any Hmong clubs here. There is APAC and I tried to go and talk to them my freshman year but they weren't very nice to me. Other than that I don't involve myself too much with people of my same race here in school. When I go home, I am involved and speak the language.

What is the most challenging thing about being a student at Iowa State? Academically, socially, ethnically?

Stu 1: I would say for me, it is the fact that you are on your own completely. You have to make decisions for yourself and you decide what classes you are going to take, where you are going to end up in 5 years, you decide what activities you are going to participate in and that determines what you are going to put on your resume. The whole independent thing; growing up.

Stu 2: I agree. The whole independence thing is kind of challenging. Looking back, I am kind of thinking about how I should have structured my schedule a little bit better. I would have been better off and able to graduate in 4 years instead of 4 1/2. That was just the toughest part. Making sure the people you choose as friends are the right people who are going to lead you down the right path and not the other direction...the reason why you came to college.

Stu 3: Not being able to take other classes outside of my degree program because in order to be done in four years I have to take classes at a certain time. I wanted to take something fun like a language class but I can't.

What would be one thing that you attribute your success to?

Stu 2: I always stayed open minded and never limited myself to the things I could band couldn't do or the groups I could and couldn't hang out with. I think keeping that open mind helps build confidence in knowing what you are capable of. I think that has definitely helped me. Being one of five students from my high school to come to Iowa State, I only talk to one of those four other people. I've made great friends, and had great experiences.

Stu 1: I would say my support system. My family. I would come up with random ideas, like I don't want to be an engineer today and the next minute I do, and they would support me. Without their support I don't think I would have been able to make it.

Stu 3: I think for me the most important thing was financial aid. To get a full ride was great. The other thing is, I'm not a quitter. So when I start something I finish. No matter what it is or how hard it is I will finish.

Is your family here with you?

Stu 3: No. I am here by myself. So the whole independence thing was really big for me. (her parents received their degrees in US and then moved back to Taiwan)

What are your overall thoughts about Iowa State?

Stu 1: I think Iowa State is great. Starting from my first weekend of my first year, most people are open-minded and I just really like the atmosphere. I don't have anything negative to say about it.

Stu 3: I love Iowa State. There is a good support system. There are a lot of things to do on campus. I didn't have a car my first years and I always was able to do something.

If there is one thing you would change about Iowa State what would it be?

Stu 1: The only thing I would improve would be about my major. The flexibility in missing a class one semester and not having to go another year in order to take it again. I really can't afford it and I am sure not many college students can.

Stu 3: The only thing I would change would be the lack of flexibility in my major with respect to taking classes.

Interview 4

November 8, 2007 @ 12:15pm (scheduled for 12 pm)

1 African American Female-CoA/ABE

How do you define success?

I probably equate success largely with money. Because usually if you are successful, like in a job, you are going to make a lot of money. Success is just accomplishing whatever you set out to accomplish. So I guess success in a school sense would be to ace a test or if you learn something in a class, it was a successful class.

What are some academic factors that have helped you to be successful?

I was in APEX when I first came in. That may have added to my success because I got an early start here. Coming from my home and high school (New Jersey) I didn't know what to expect from college. Being here that summer allowed me to set up everything for that fall. I feel that helped me with the transition. LEAD also helped because they offered a lot of seminars and workshops on things like resumes and time management and a lot of other stuff. I was also in SSSP. I'm also in the CARVER academy. They all offered workshops on a lot of things.

APEX helped with my transition. CARVER offered two free tutors and offered a mentor. They also offered reimbursements for conferences and stuff like that. It helps because that is less money that had to come out of my pocket. SSSP offered computer use, free printing, free copying, books you could borrow if you didn't have money to buy your books. They also offered free tickets to social events that brought people together. SSSP also offers two tutors. For a while I had tutors for every class. I probably didn't take advantage of the resources as much as I should have but if I need them they were there.

Is there anything academically that has hindered you in any way?

Maybe that LEAD thing, the seminar classes that were like supplemental instruction but you got credit for them. Maybe that a little, just because I had one for every "weed out" course which was time consuming. Other than that, I don't think there was anything that hindered me.

Socially, what type of things have aided you in your success at Iowa State?

I've said many times, that if I had not had the group of friends that I had throughout this time, I don't think I would have failed, but I probably would have been a very unhappy person and probably wouldn't have stayed here. I wouldn't have gone back home, but I would have gone somewhere else.

The group of friends I met in APEX are the group of friends I hang out with now. I am a very social person but I like to be alone to; I like a good quality person, so I don't let a lot of people in my circle of friends. The roommate I had in APEX, *****, I've had as a roommate all my college years. This is the first year we haven't lived together. That was a blessing. I don't know how that worked, but that was cool.

I feel that if I didn't have my group of friends I wouldn't have been here because you don't have anybody else to talk to. I came from a predominantly Black neighborhood and a predominantly Black school, but I was introduced to a lot of different cultures because my parents thought it was important for us to be well rounded individuals.

When people ask me if it was a culture shock when I came here, not so much. Yeah, I am used to seeing a lot of Black people in the community, but it doesn't bother me. I am ok with being here, but I think if I didn't have my friends, I probably wouldn't be here. I can branch out and have different ethnicities be my friends, but I may not have been as comfortable at

first. It hindered me too though. Ames is cool with me for a school, but I probably wouldn't live here afterwards.

I chose not to go to an HBCU because I had heard that they are not as funded, you're not going to get as good of an education and nobody is going to look at you like you got a good education. I went on college tours and I went down south, to like Clark Atlanta, and I went in the lunch room and these girls are completely dressed, stiletto heels, latest fashion. It was like a fashion show. I was like "oh I can't go here." People say that I came to Iowa State to avoid any distractions. That may have been the case, but oh I've found some distractions. My friends are a distraction. They got me through, but they probably were a bit of a distraction as well.

Are there any other things that hindered you socially? Were there things that were or weren't in place that affected you socially?

I wish there were a broader span of things to do socially. There may be things to do, but I think because I don't have a care here that has hindered me. If I did I would be all over the place because I like to do different things. I think there is kind of a good array of things to do, but I am not a going out kind of party person all the time and I feel like pretty much the only thing for people of color to do is to have a party out here. I can go out and party sometimes but for that to be the main source for me to see the majority of the black population on campus, I don't see them that much because I don't feel like going out all of the time.

I feel like the black community here is not really a community. It's just a group of people. Nobody talks to each other, if you have an event and invite people they are going to come with their crew and not expand and talk to nobody else. So people don't schedule anything. People don't try to come to anything unless it is a party. We (her sorority) have tried to schedule like a game night or a study table and things but nobody shows up.

Other than your friends is there anything else that makes up your support system, academically or socially?

I don't have the closest relationship with my family.

Are you an only child?

No. Well, let me give you a brief synopsis. I don't live with my mom. I live with my dad and my stepmom and my brother. There has never been a clear connection between me and my family. It is all broken apart so...I am not an only child, but because the tension that was there before I left and the fact that I don't talk to them a lot because I am here.

They are a support to me because I am going home next week and I will see them. My father is supportive financially sometimes...no he is supportive financially. If I ever need anything I could go to him. They are very supportive financially and they want me to finish. But I would say that my friends here impact my life more than my parents do.

Do you have any type of relationship with any faculty members or anything beyond being in the classroom? Any mentoring relationships?

Well of course I've had mentors, but I've never really gotten close to them. Probably the only person that is close to faculty that I have more than a personal bond with would be *****. She's a member of my sorority and the closest person I can think of to being a faculty member.

Were you mentors through the programs you were involved in?

Yes. Through SSSP. In Carver I had a mentor, a peer mentor.

Have you taken on any mentoring relationships of anyone else?

Yes. I was a Carver mentor for one of the Carver freshman. I am not too big on mentoring because I don't respond to that type of thing. That's not my thing. If I need help I ask. I feel it is pointless for me to try to talk to you if I don't have anything to talk about. With my mentee in Carver, I told her if she needed anything to let me know. But she was so self-sufficient that I didn't need to. I actually had two of them. One of them I still see and talk to every once in a while.

It seems to me that you strongly identify with your ethnic identity based on the things that you've shared with me. Is this correct?

I strongly identify with it because that is what I came from. It was never a question. Although, to be from Jersey and where I am from I am a little different. My friends make fun of me for how I talk. They make fun of me because they say I talk too proper. Its funny 'cause I identify as being Black but sometimes I get flack for the things I do or for the way I am because they don't think I act Black or whatever you want to say.

I noticed that there are a lot of people who are African American that don't identify with anybody on campus. Usually I take it as they grew up in a different environment than what I grew up in. I naturally identify with being Black and they might not because they've never been around that.

I didn't purposefully seek out to find Black people. If I wouldn't have met my group of friends, I don't know if I would have had very many friends.

I felt a difference in the environment here than in Jersey. Everybody speaks here. People smile and I was wondering what is going on. But I didn't feel warmth. I didn't feel included. Nobody made me feel included from any other race. I've had class in which I am the only Black person and I don't feel like any of the White people reached out to me. So I probably don't think I would have had a group of White friends.

I like to incorporate different cultures in my friend group, but coming here I didn't feel like they wanted to be my friend. That's why I said that if I didn't meet these Black people (her friend group) I probably wouldn't have had any friends.

I just started speaking to other people. Being in ITEC was where it started for me to actually begin to speak to a White guy that I had seen in my class because these classes are so small and you see everybody everyday and you get to know them.

What are your overall perceptions of Iowa State?

I don't know. I don't think I will ever identify with Iowa State. I go here, but I never claim to be a Cyclone. I don't go home and say "I'm a Cyclone." I may wear an Iowa State shirt because it was five dollars.

I go here and I am about to leave. That is it. I think it is just a school for me. It has not become a culture for me. I think it may be because it is a predominantly white school and I haven't gotten involved in "Iowa State" functions. I don't do the homecomings, you know what I mean, because I don't feel like they are geared towards me. I go to VEISHEA because it is the thing to do...go get drunk, go eat some food, you know everybody can do that.

This year I've tried to make an effort to go to stuff on central campus only because this is my last year and I haven't done it and I figure I should try to do as much as I can. I still haven't done as much as I could. I think because I haven't participated in many of the activities that I haven't gotten fully into the culture in the four years that I've been here because I don't feel like anything is geared towards us so I don't go.

No other Black run organizations are throwing any events, so I just never quite got into the culture. Anything I went to was something through BSA like Harambe, talent shows and stuff like that. But that is not connected to Iowa State. Anything I've been to socially is through these organizations so I identify with them and not Iowa State. So once I leave I am just Ebony not Iowa State. It's just a school.

If you could change one thing about Iowa State what would it be?

The price. It costs too much to go here. Umm, I don't know. I haven't had any problems with resources because I've always had access to them. I guess if I didn't, I would be complaining about that. I don't know if there is too much that I would change about Iowa State. It's not all that bad and sometimes you can use it to your advantage. For example, if a professor wants to believe that Black people are dumber or whatever you want to believe, and I can benefit from that I will surely benefit from it.

The overall atmosphere. The need for more students of color. Maybe a central meeting place for students of color to go to. Something central campus that celebrates us being here. I feel like things that do involve students of color or diversity issues are outliers. I don't feel

like they are things that are intertwined. Like the whole VEISHEA and Harambe thing. Harambe was an add on. It is not like an integral part of what VEISHEA is even though it occurs at the same time. Now why is that? That's sad. Its like we're here and there are things for us, but they are not a part of the system. They are just add ons. That's why I said I never got into the culture. Everything you do is not through Iowa State, it's not an Iowa State function. It's a greek function or somebody elses thing.

They bring students of color here, but I don't know why students of color leave. I think we may do it to ourselves. A lot of people will leave here because it is boring, they don't have anything to do. I think they do a good job of keeping us here academically, but otherwise they don't.

I think the social component is bigger than they give credit to. I was thinking the other day, if I had not gone to APEX I don't know what I would have done.

...I feel like a lot of Black students that come from predominantly Black places, mainly from Chicago, you don't have a good school system in Chicago. Yeah, they may have a 3.9 and get admitted to Iowa State, but we have no clue what is going on when we get here. All of my classes in high school were accelerated classes. I got here in Engineering, took Physics and failed it three times. I failed it twice and dropped it the third time. I took two years of Physics in high school and I was like I should know all of this, but I didn't. I don't feel like we are at all prepared when we come here. I feel like they get us here from high school because we have good grades, but in actuality we don't know anything...I don't know, if I didn't have (MSA) I wouldn't have made it.

You know, one thing that Iowa State does do bad is advising. The advior I came from over in Engineering, you are strictly a number because it is so big. If I wouldn't have been in APEX I would not have not known anything about the system.

What things in the ABE department have helped you?

In Engineering I didn't have any of my friends in my classes so I didn't have anyone to lean back on if I missed something. But here, I may not know them that well, but atleast I feel comfortable talking to them about classwork. *****(academic advisor) is personable and cool to talk to. Everybody is cool. I think this has been my best move. I finally enjoy going to classes now. I never went to class before.

Interview 5

1 African American Female-CoA/ABE

What does it mean to you to be successful?

Being able to balance financially with what you want versus what you need.

How do you define success with respect to your academic and social involvement at Iowa State?

Well, success will be to graduate and go on in the most experiences with my college years at ISU.

What academic factors have aided in your success at Iowa State University and in the Department of Ag and Biosystems Engineering?

The tutoring services, small classes and the teacher to student ratio.

What academic factors have hindered your success at Iowa State University and in the department of Ag and Biosystems Engineering?

Started in Engineering not really knowing what I wanted to major in.

What social factors have aided in your success at Iowa State University and in the Department of Ag and Biosystems Engineering?

Playing basketball, cards and just hanging out with friends on a regular basis has really helped me out. Being in the classroom with a majority of White students all day is exhausting and lonely. I always feel like I'm being watched or judged; as if I don't really belong. They may be able to relate to me by working on an assignment or project, but they can't relate to me being a Black person or a Black woman for that matter...my friends are the only ones that can relate to me on that level...friends that I met in APEX and through Black sponsored functions such as LEAD study table or MSA tutoring, and other MSA and BSA (Black Student Association) functions.

What is the most challenging thing about being a student at Iowa State? Academically, socially, ethnically?

The most challenging thing is not being able to see as many people that look like you and striving for the same goal.

Do you identify as a student of color on campus (beyond checking the box)? If so, how? If not, why?

Yes because it's clearly looked at by students in any major and hard to establish common ground with other people.

Are you involved in cultural organizations? If yes, which ones and why? If not, why?

BSA. They were the first organization that opened up to me when I first arrived at ISU.

What type of social support system do you have?

The ITEC department. I have the same people in classes and we come together to study and talk about what is going on.

What type of academic support system do you have?

For my classes we have study sessions. We come to class prepared with questions to ask and answer with our peers.

What are your overall thoughts about Iowa State and the Department of Ag and Biosystems Engineering?

Iowa State is a good school and have lots of organizations that support students of color.

If there is one thing you would change about Iowa State and the Department of Ag and Biosystems Engineering what would it be?

Try to connect socially and make students of color more of an acceptance, socially and academically.

APPENDIX D. NSSE DATA

Group Statistics	ethnicit_r ethnicity recode	N	Mean	Std. Deviation	Std. Error Mean
classgrp Worked with other students on projects DURING CLASS	1	74	2.445946	0.967158	0.11243
	2	1066	2.511257	0.909194	0.027847
occgrp Worked with classmates OUTSIDE OF CLASS to prepare class assignments	1	74	3.162162	0.907005	0.105437
	2	1066	3.232645	0.828089	0.025363
tutor Tutored or taught other students (paid or voluntary)	1	74	2.027027	0.843557	0.098062
	2	1066	1.965291	0.890068	0.027261
commproj Participated in a community-based project (e.g., service learning) as part of a regular course	1	74	1.459459	0.705928	0.082062
	2	1066	1.312383	0.58219	0.017831
facgrade Discussed grades or assignments with an instructor	1	74	2.675676	0.812709	0.094476
	2	1066	2.573171	0.84963	0.026023
facplans Talked about career plans with a faculty member or advisor	1	74	2.216216	0.880073	0.102306
	2	1066	2.19137	0.877983	0.026891
facother Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)	1	74	1.905405	0.893951	0.10392
	2	1066	1.767355	0.871189	0.026683
oocideas Discussed ideas from your readings or classes with others outside of class (students, family members, co-workers, etc.)	1	74	2.648649	0.850985	0.098925
	2	1066	2.686679	0.833202	0.025519
divrstud Had serious conversations with students of a different race or ethnicity than your own	1	74	2.932432	0.997683	0.115978
	2	1065	2.430986	0.92031	0.028201
diffstu2 Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values	1	74	2.689189	0.949775	0.110409
	2	1066	2.608818	0.890153	0.027264
intern04 Practicum, internship, field experience, co-op experience, or clinical assignment	1	74	3.067568	0.849352	0.098735
	2	1057	3.117313	0.781809	0.024047

volntr04 Community service or volunteer work	1	74	3.067568	0.926491	0.107702
	2	1057	3.013245	0.859337	0.026432
lrncom04 Participate in a learning community or some other formal program where groups of students take two or more classes together	1	74	2.513514	0.910265	0.105816
	2	1057	2.446547	0.832137	0.025595
resrch04 Work on a research project with a faculty member outside of course or program requirements	1	74	2.689189	0.992101	0.115329
	2	1057	2.405866	0.914365	0.028124
indstd04 Independent study or self-designed major	1	74	2.148649	0.855	0.099392
	2	1057	2.280984	0.727925	0.02239
envstu Quality: Your relationships with other students	1	74	5.608108	1.202937	0.139839
	2	1057	5.864711	1.149627	0.035361
envfac Quality: Your relationships with faculty members	1	74	4.918919	1.459562	0.169671
	2	1058	5.017013	1.294663	0.039803
envadm Quality: Your relationships with administrative personnel and offices	1	74	5.027027	1.629967	0.18948
	2	1057	4.823084	1.498079	0.046078
acadpr01 Hours per 7-day week spent preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)	1	74	4.905405	1.806904	0.210048
	2	1056	4.587121	1.90285	0.058556
workon01 Hours per 7-day week spent working for pay ON CAMPUS	1	74	2.445946	1.614505	0.187682
	2	1056	2.106061	1.540026	0.047391
workof01 Hours per 7-day week spent working for pay OFF CAMPUS	1	74	1.837838	1.775225	0.206366
	2	1055	2.154502	1.898221	0.058441
cocurr01 Hours per 7-day week spent participating in co-curricular activities (organizations, campus publications, student government, fraternity or sorority, intercollegiate or intramural sports, etc.)	1	74	2.5	1.528272	0.177658
	2	1056	2.358902	1.352889	0.041632
social05 Hours per 7-day week spent relaxing and socializing (watching TV, partying, etc.)	1	74	3.662162	1.753877	0.203884
	2	1056	3.712121	1.543826	0.047508
carede01 Hours per 7-day week spent providing care for dependents living with you (parents, children, spouse, etc.)	1	74	1.648649	1.608474	0.186981
	2	1056	1.399621	1.314649	0.040456

envschol Institutional emphasis: Spending significant amounts of time studying and on academic work	1	74	3.243243	0.717889	0.083453
	2	1053	3.050332	0.75416	0.023241
envsuprt Institutional emphasis: Providing the support you need to help you succeed academically	1	74	2.905405	0.813733	0.094595
	2	1053	2.698955	0.79421	0.024475
envdivrs Institutional emphasis: Encouraging contact among students from different economic, social, and racial or ethnic backgrounds	1	74	2.418919	0.979331	0.113845
	2	1050	2.16381	0.865516	0.02671
envnacad Institutional emphasis: Helping you cope with your non- academic responsibilities (work, family, etc.)	1	74	2.108108	0.884688	0.102843
	2	1052	1.714829	0.731543	0.022554
envsocial Institutional emphasis: Providing the support you need to thrive socially	1	74	2.243243	0.807682	0.093891
	2	1051	2.042816	0.798256	0.024623
envevent Institutional emphasis: Attending campus events and activities (special speakers, cultural performances, athletic events, etc.)	1	74	2.608108	0.933656	0.108535
	2	1053	2.538462	0.841922	0.025945
envcompt Institutional emphasis: Using computers in academic work	1	35	3.485714	0.701739	0.118615
	2	481	3.665281	0.575743	0.026252
entirexp How would you evaluate your entire educational experience at this institution?	1	74	2.986486	0.692291	0.080477
	2	1056	3.121212	0.721035	0.022188
samecoll If you could start over again, would you go to the SAME INSTITUTION you are now attending?	1	74	3.189189	0.695892	0.080896
	2	1056	3.292614	0.766961	0.023602

Levene's Test for Equality of Variances		F	Sig.
		Lower	Upper
classgrp	Equal variances assumed	0.768186	0.380964
	Equal variances not assumed		
occgrp	Equal variances assumed	1.41075	0.23518
	Equal variances not assumed		
tutor	Equal variances assumed	0.253413	0.614779
	Equal variances not assumed		
commproj	Equal variances assumed	11.82833	0.000604
	Equal variances not assumed		
facgrade	Equal variances assumed	0.709628	0.399744
	Equal variances not assumed		
facplans	Equal variances assumed	0.160977	0.688334
	Equal variances not assumed		
facother	Equal variances assumed	0.021658	0.883027
	Equal variances not assumed		
oocideas	Equal variances assumed	0.007046	0.933119
	Equal variances not assumed		
divrstud	Equal variances assumed	0.27705	0.598744
	Equal variances not assumed		
diffstu2	Equal variances assumed	0.824059	0.364188
	Equal variances not assumed		
intern04	Equal variances assumed	0.03214	0.857753
	Equal variances not assumed		
volntr04	Equal variances assumed	0.711606	0.39909
	Equal variances not assumed		
lrncom04	Equal variances assumed	2.363264	0.124502
	Equal variances not assumed		
resrch04	Equal variances assumed	0.736048	0.391112
	Equal variances not assumed		
indstd04	Equal variances assumed	3.222094	0.072918
	Equal variances not assumed		
envstu	Equal variances assumed	2.520827	0.112632
	Equal variances not assumed		
envfac	Equal variances assumed	3.720409	0.054001
	Equal variances not assumed		
envadm	Equal variances assumed	0.112221	0.737691
	Equal variances not assumed		
acadpr01	Equal variances assumed	1.768068	0.18389
	Equal variances not assumed		
workon01	Equal variances assumed	3.007619	0.083147
	Equal variances not assumed		
workof01	Equal variances assumed	2.432317	0.119138
	Equal variances not assumed		
cocurr01	Equal variances assumed	2.201779	0.138131
	Equal variances not assumed		
social05	Equal variances assumed	1.968375	0.160896
	Equal variances not assumed		

carede01	Equal variances assumed	6.481836	0.01103
	Equal variances not assumed		
envschol	Equal variances assumed	0.156229	0.692727
	Equal variances not assumed		
envsuprt	Equal variances assumed	0.263777	0.607638
	Equal variances not assumed		
envdivrs	Equal variances assumed	5.771406	0.016451
	Equal variances not assumed		
envnacad	Equal variances assumed	1.102955	0.293844
	Equal variances not assumed		
envsocial	Equal variances assumed	0.786784	0.375264
	Equal variances not assumed		
envevent	Equal variances assumed	2.051245	0.15236
	Equal variances not assumed		
envcompt	Equal variances assumed	6.095225	0.013879
	Equal variances not assumed		
entirexp	Equal variances assumed	3.582561	0.058645
	Equal variances not assumed		
samecoll	Equal variances assumed	3.590916	0.058352
	Equal variances not assumed		

T-Test	t	df	Sig. (2-tailed)	Mean Difference	Std. Error Difference	95% Confidence Interval of the Difference	
	Lower	Upper	Lower	Upper	Lower	Upper	Lower
classgrp	-0.59504	1138	0.551934	-0.06531	0.109759	-0.28066	0.150041
	-0.56387	82.21018	0.57438	-0.06531	0.115827	-0.29572	0.165097
occgrp	-0.70354	1138	0.481865	-0.07048	0.100184	-0.26705	0.126083
	-0.64995	81.67383	0.517551	-0.07048	0.108445	-0.28623	0.145261
tutor	0.57887	1138	0.562791	0.061736	0.10665	-0.14752	0.270988
	0.606564	84.68488	0.545763	0.061736	0.10178	-0.14064	0.264114
commproj	2.070465	1138	0.038634	0.147077	0.071036	0.007701	0.286452
	1.751385	80.04395	0.08371	0.147077	0.083977	-0.02004	0.314196
facgrade	1.00634	1138	0.314466	0.102505	0.101859	-0.09735	0.302358
	1.046034	84.46373	0.29853	0.102505	0.097994	-0.09235	0.297361
facplans	0.235373	1138	0.813962	0.024847	0.105563	-0.18227	0.231966
	0.234886	83.40818	0.814873	0.024847	0.105781	-0.18553	0.235227
facother	1.315929	1138	0.188463	0.138051	0.104908	-0.06778	0.343885
	1.286699	82.91813	0.20178	0.138051	0.107291	-0.07535	0.351451
oocideas	-0.37916	1138	0.704639	-0.03803	0.100302	-0.23483	0.158767
	-0.37225	83.01401	0.710655	-0.03803	0.102164	-0.24123	0.165168
divrstud	4.507025	1137	7.25E-06	0.501447	0.111259	0.283151	0.719742
	4.201209	81.86768	6.72E-05	0.501447	0.119358	0.264	0.738893
diffstu2	0.747752	1138	0.454764	0.080371	0.107484	-0.13052	0.29126
	0.706712	82.15305	0.481745	0.080371	0.113726	-0.14586	0.306601
intern04	-0.52609	1129	0.598929	-0.04975	0.094557	-0.23527	0.135782
	-0.48952	81.89727	0.625783	-0.04975	0.101621	-0.25191	0.152416
volntr04	0.522962	1129	0.601103	0.054323	0.103875	-0.14949	0.258132
	0.489841	82.03759	0.625554	0.054323	0.110898	-0.16629	0.274933
lrncom04	0.665033	1129	0.506165	0.066967	0.100697	-0.13061	0.264541
	0.61512	81.77263	0.540183	0.066967	0.108868	-0.14961	0.283548
resrch04	2.562184	1129	0.01053	0.283324	0.110579	0.06636	0.500287
	2.386704	81.92048	0.019305	0.283324	0.118709	0.04717	0.519477
indstd04	-1.49364	1129	0.13555	-0.13234	0.088599	-0.30617	0.041503
	-1.2989	80.58248	0.197682	-0.13234	0.101882	-0.33507	0.070395
envstu	-1.85054	1129	0.064496	-0.2566	0.138664	-0.52867	0.015464
	-1.779	82.61062	0.078918	-0.2566	0.14424	-0.54351	0.030304
envfac	-0.62468	1130	0.53231	-0.09809	0.157032	-0.4062	0.210014
	-0.56287	81.23875	0.575077	-0.09809	0.174277	-0.44484	0.248646
envadm	1.12546	1129	0.260633	0.203943	0.181208	-0.1516	0.559486
	1.045849	81.86969	0.298709	0.203943	0.195002	-0.18399	0.591873
acadpr01	1.39542	1128	0.163164	0.318284	0.228092	-0.12925	0.765817
	1.459634	84.75192	0.148088	0.318284	0.218058	-0.11529	0.751859
workon01	1.82947	1128	0.067593	0.339885	0.185783	-0.02463	0.704405
	1.755849	82.58242	0.082822	0.339885	0.193573	-0.04515	0.724924
workof01	-1.3929	1127	0.163926	-0.31666	0.227343	-0.76273	0.129398
	-1.47642	85.14056	0.14352	-0.31666	0.214481	-0.7431	0.109772

cocurr01	0.859653	1128	0.390163	0.141098	0.164134	-0.18094	0.463141
	0.773266	81.22078	0.44161	0.141098	0.182471	-0.22195	0.504143
social05	-0.26661	1128	0.789817	-0.04996	0.187385	-0.41762	0.317704
	-0.23864	81.12585	0.811984	-0.04996	0.209346	-0.46648	0.366564
carede01	1.550501	1128	0.121302	0.249027	0.160611	-0.0661	0.564157
	1.301711	79.98243	0.196752	0.249027	0.191308	-0.13169	0.629743
envschol	2.133478	1125	0.033101	0.192911	0.090421	0.015498	0.370323
	2.226872	84.7269	0.028608	0.192911	0.086629	0.020662	0.36516
envsuprt	2.157982	1125	0.03114	0.20645	0.095668	0.018742	0.394158
	2.112895	83.07508	0.037611	0.20645	0.09771	0.012112	0.400788
envdivrs	2.428591	1122	0.015314	0.255109	0.105044	0.049004	0.461215
	2.181609	81.24093	0.032028	0.255109	0.116936	0.022453	0.487766
envnacad	4.404419	1124	1.16E-05	0.393279	0.089292	0.218082	0.568477
	3.735304	80.17811	0.00035	0.393279	0.105287	0.183758	0.6028
envsocal	2.086026	1123	0.037202	0.200427	0.096081	0.011909	0.388945
	2.064847	83.35906	0.042045	0.200427	0.097066	0.007378	0.393475
envevent	0.682782	1125	0.494885	0.069647	0.102004	-0.13049	0.269786
	0.62411	81.56297	0.534297	0.069647	0.111593	-0.15237	0.291659
envcompt	-1.75353	514	0.080107	-0.17957	0.102403	-0.38075	0.021613
	-1.47809	37.40593	0.147756	-0.17957	0.121486	-0.42563	0.066497
entirexp	-1.55777	1128	0.119568	-0.13473	0.086486	-0.30442	0.034966
	-1.61387	84.48631	0.110285	-0.13473	0.08348	-0.30072	0.031269
samecoll	-1.12786	1128	0.259618	-0.10342	0.091699	-0.28335	0.076496
	-1.22732	85.91336	0.223054	-0.10342	0.084268	-0.27095	0.064098

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