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Analysis of Supportive Campus Environments and First-Generations-Student Learning Outcomes

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Analysis of Supportive Campus Environments and First-Generations-Student
Learning Outcomes

A Dissertation Presented for the
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DEDICATION

The crafting of a dissertation is a difficult and lonely task, even more so while being newly married, starting a new job, having a first child and renovating a new home. Luckily through the unwavering support of my wife Chris and both our families we saw the challenge eventually fulfilled. As a result, I dedicate this dissertation to my wife Chris and the light of both our lives, baby Rose. Without Chris's support and the extra motivation to be a role model for Rose making it through to the end would have certainly been in greater doubt.

ACKNOWLEDGEMENTS

ABSTRACT

This research utilized ten years of National Survey of Student Engagement (NSSE) data to identify differences between first- and non-first-generation students' relationship with supportive campus environment variables and learning outcomes. The dataset included 3,796 non-first-generation and 1,844 first-generation students that attended a research intensive public institution between 2003 and 2011. The main dependent variable was a composite measure of student learning gains across four areas: writing, speaking, thinking critically and analyzing numerical or statistical information. The results indicated that while supportive campus environments are critical for all students, first-generation students showed higher and more consistent statistical associations with campus environment variables measuring faculty and peer relationships as compared to non-first-generation students that showed highly significant relationships with variables measuring support from campus administration or support personnel. This finding could lend support to theories that first-generation students come to campus with less social capital related to the inner workings of university environments and as a result rely more heavily on peer and faculty relationships for increased learning outcomes as compared to non-first-generation students.

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CHAPTER I

INTRODUCTION AND STATEMENT OF THE PROBLEM

Introduction

The number of high school graduates enrolling in college has increased steadily over the last 25 years. In 1990 college student enrollment numbers totaled approximately 12 million; by 2013 that number had increased 46 percent to 17.5 million. This increase in enrollment is expected to continue over the course of the next decade, with projections surpassing 20 million active college students (National Center for Educational Statistics [NCES], 2014). These historic and future increases are in large part due to degree attainment becoming an ever more vital component for career success, as well as continuing efforts to increase access to higher education (NCES, 2017).

This expansion of enrollment has great potential to produce positive effects for individuals and the economy at large, but is not absent certain challenges. Larger enrollments are creating a more diverse student population resulting in greater proportions of students from previously lesser represented demographics (Strayhorn, 2006; NCES, 2015). Increasingly, one of the most common demographics includes enrollees who are the first in their families to earn a college degree, or what is referred to in higher education circles as first-generation students.

A formal definition of first-generation students, as outlined in the Higher Education Act, refers to individuals whose parents or primary care giver did not complete a baccalaureate degree (Higher Education Act, Amendment of 1998). This subset of students is estimated to represent nearly a third of all college enrollees, or approximately 6.5 million students (Strayhorn, 2006; NCES, 2014). First-generation students often differ from the average undergraduate in a number of ways and can face greater challenges to degree completion than their non-first-generation

peers do (Choy, 2001; Ishitani, 2006; Nunez and Cuccaro-Alamin 1998; Pike & Kuh, 2005; Soria & Stebleton, 2012). A study of first-generation students by Nunez and Cuccaro-Alamin (1998) highlights these students' unique characteristics and challenges. The authors noted that first-generation students tended to come from lower income families, to be minorities, to be older on average when compared to non-first-generation students, and to have lower graduation rates, with close to half no longer enrolled or not having completed a degree after five years of college attendance. Additional evidence of this trend was provided by a study of 1,747 students enrolled at a public university in the Midwest (Ishitani, 2006). The 1,016 first-generation students in the sample had a 71% higher risk of dropping out of school after their first year of college when compared to students with two college-educated parents. The same result was found even while holding variables such as family income, race, and high school GPA constant.

Based on their study, Nunez and Cuccaro-Alamin (1998) also found differences in social and academic integration of first-generation college students. The authors described academic integration as a composite measure of variables designed to track academic activity outside of the classroom. These included variables such as the frequency with which students met with an advisor, participated in study groups, or spoke with faculty. Similarly, social integration was described by the authors as a combination of several measures designed to track social engagement, including participation in school clubs, involvement in student assistance programs, or meeting with faculty socially, outside of the classroom. Students' level of interaction or engagement has been found to be related to academic and social achievement in higher education and, as such, is linked to a wide variety of positive student outcomes (Kuh, 2009a). Engagement activities found to have strong connections to increasing positive student outcomes include, for example, student-faculty interactions, hours studying, peer interactions and participation in extracurricular activities (Astin, 1977; Astin, 1984; Chickering & Gamson, 1987; Carini, Kuh &

Klein, 2006; Coates, 2003; Feldmen & Newcobb, 1969; Kuh, 2001; Department of Education, 1982; Pascarella & Terenzini, 2005). Nunez and Cuccaro-Alamin, in quantifying these variables, found that first-generation students had lower integration levels than non-first-generation students for both social and academic measures.

Further evidence of first-generation students' lack of campus integration comes from studies focusing on the engagement of first-generation students. Pike and Kuh (2005) worked to better understand differences between first- and non-first-generation students' engagement levels and any effect this difference might have on first-generation students' outcomes, such as intellectual development or learning. In analyzing data from 1,127 students, of which 439 were first-generation, the authors noted that "first-generation students were less engaged overall and less likely to successfully integrate diverse college experiences; they perceived the college environment as less supportive and reported making less progress in their learning and intellectual development" (p. 289). The authors also found that integration into college experiences and perceptions of a supportive campus environment had a direct impact on student learning. Grayson (1997) discovered similar variances in campus engagement through analysis of 1,849 traditional and first-generation students designed to measure impacts on GPA. His findings revealed that while involvement in campus activities had positive, statistically significant returns for both groups, non-first-generation students had higher GPAs and higher levels of campus involvement than first-generation students. Lastly, Filkins and Doyle (2002) provided further support for the positive effects involvement in certain campus activities can have for first-generation students. The authors focused on the relationship between engagement patterns and various student reported gains, including (1) general education skills, (2) vocational and workplace skills, and (3) personal and social development. Data from 1,910 students across six schools showed certain engagement variables had a greater power to predict affective and

cognitive skill growth for first-generation as compared non-first-generation students. These variables included interactions with faculty, active and collaborative learning techniques, and support for social activities. Filkins and Doyle's results, in combination with Pike and Kuh (2005), suggest, ironically, that first-generation students likely benefit more than their peers from engaging in various collegiate activities but, unfortunately, tend to engage at lower levels.

First-generation students vary from their non-first-generation peers not only in terms of certain demographic characteristics, but also, as discussed above, in the manner in which first-generation students engage with their college environment. A potential explanation for the differences between first- and non-first-generation students' engagement patterns, in particular, may relate to the issue of social and academic capital.

Coleman (1990) defined social capital as "… the set of resources that inhere in family relations and in community social organizations and that are useful for the cognitive or social development of a child or a young person'' (p. 300). In the case of first-generation students, their parents have not had the experience with higher education that would allow them to share gained knowledge, not only concerning what college is about, but also how to be successful, academically and socially. Pascarella, Pierson, Wolniak and Terenzini (2004) examined social capital along with engagement levels of first-generation students and the effect these variables had on cognitive development. The authors concluded that the lower levels of social capital possessed by first-generation students, when compared with that of their non-first-generation peers, directly resulted in an inherent handicap when confronted with making decisions regarding academic and social paths for the betterment of their college careers, which could be seen in their lower levels of engagement. This was especially true for undertakings covering non-course related interactions with peers, such as participating less in extracurricular and athletic activities than non-first-generation students. Soria and Steblenton (2012) provide

support for these conclusions when analyzing the effect of various levels of first-generation students' academic engagement on retention. The authors concluded that first-generation students' lack of social and academic capital led them to struggle to assimilate into college environments and engage academically, often triggering them to drop out of college.

Statement of the Problem

First-generation students are projected to continue to be a significant portion of the U.S. undergraduate population (NCES, 2014) for the foreseeable future. Research has suggested that first-generation students vary from non-first-generation in several ways, including demonstrating lower levels of engagement with their campus environments (Choy, 2001; Pike & Kuh, 2005). This variance is present even though student engagement in academic and social activities has proven to contribute to a wide variety of positive educational outcomes for all students, with researchers' findings suggesting these effects may be more dramatic for first-generation student populations (Filkins & Doyle, 2002; Kuh, 2001). A lack of social capital has been identified as a significant factor effecting first-generation students' outcomes, including engagement levels (Pascarella, Pierson, Wolniak & Terenzini, 2004). It is reasonable to hypothesize that institutional support for engagement activities, as measured through supportive campus variables, could potentially reduce the negative effects associated with first-generation students' lack of social capital and, as a result, increase engagement, leading to increased positive outcomes for first-generation students. Studies focusing on engagement have included results that speak to the importance of institutional support for undergraduate students at large (Filkins & Doyle, 2002; Pike & Kuh, 2005). Unfortunately, no studies are present that specifically identify and analyze the impact varying levels of environmental support measures have on learning outcomes for first-generation students when compared to non-first-generation students. The research proposed here will work to extend the literature regarding first-generation students

by exploring this connection and in doing so provide a better understanding of the relationship between these two variables.

Purpose of the Study

The purpose of this study is to analyze the relationship between supportive campus measures and student learning outcomes for first generation students and non-first generation students to determine if variances are present. In doing so, first-generation and non-first-generation students' self-reported measures on the level of supportive campus environment variables present will be compared. This will be followed by an analysis on the relationship between supportive campus environment measures and learning outcomes for first-generation students as compared to non-first-generation students

Research Questions

The research questions guiding this study are:

Q1: Do first-generation students' perspectives on the level of supportive campus environment differ significantly from those of non-first-generation students?

Q2: Do first-generation students' perspectives on the level of supportive campus environment affect student learning outcomes differently from non-first-generation students after controlling for other student characteristics?

Significance

While research focusing on first-generation students is robust, analysis centering on first-generation students' experiences as compared to the experiences of non-first-generation students while at college is limited (Padget, Johnson & Pascerella, 2012; Pike & Kuh, 2005). This is especially true for analysis focusing discretely on the relationship between institutional support for engagement activities and its effect on first-generation student learning outcomes.

Consequently, through the process proposed in this research, this study will work to extend current literature centered on first-generation students' college experiences to include a targeted analysis on measures quantifying institutional support and student learning outcomes.

     In combination with adding to the current body of literature discussing first-generation students, the outcomes of this analysis could prove highly tangible for higher education leaders. Current research suggests that first-generation students come to college with lower levels of social capital than their peers. Consequently, mechanisms designed to provide for a supportive campus environment and encourage campus integration are most likely even more important to first-generation student success than the success of non-first-generation students. It is the hope that the findings of this study will provide higher education administrators with the knowledge to create programs designed to include practices that most contribute to first-generation student success.

CHAPTER II

LITERATURE REVIEW

Introduction

The purpose of this study is to analyze the relationship between supportive campus measures and student learning outcomes for first generation students and non-first generation students to determine if variances are present. This chapter will provide a review of literature, beginning with a discussion of the demographics defining first-generation students, followed by an overview on how first-generation students perform in college as compared to their peers. Next, because supportive campus environment measures have been found to be closely linked to student engagement and often are included as part of a larger operational definition of student engagement studies that demonstrate the benefits engagement provides for students, a review of research on engagement will be presented. This will be followed by a review of literature related to the role social capital plays in student success and how a lack of social capital could serve as a significant challenge for first-generation students. Finally, research indicating the importance of supportive environments as a factor in first-generation success in college will be presented. This will be complimented with a discussion on the need for additional research to provide a narrower examination of the link between first-generation students' learning outcomes and supportive campus environment measures.

First-Generation Students

A formal definition of first-generation college students, as outlined in the Higher Education Act, refers to individuals whose parents or primary caregiver did not complete a baccalaureate degree (Higher Education Act, Amendment of 1998). This subset of students represented nearly a third of all college enrollees, or approximately 6.5 million students (Strayhorn, 2006; NCES, 2013). In spite of comprising such a large proportion of the

undergraduate college population, first-generation students vary from the larger student body in terms of demographic makeup, drop out at higher rates, and score lower on college success measures (Choy, 2001;Horn & Berktold, 1998).

A 2001 study commissioned by the U.S. Department of Education, National Center for Education Statistics (NCES), focused on first-generation students' access, persistence, and success, demonstrating variances in demographics and success indicators from the larger population (Choy, 2001). The data used in the research was derived from three national surveys: 1) The National Educational Longitudinal Study (2000), 2) The Beginning Postsecondary Students Longitudinal Study (1998), and 3) The Baccalaureate and Beyond Longitudinal Study (1997). The inclusion of these data resources allowed for a robust examination of first-generation students beginning prior to enrollment in post-secondary education and concluding several years after college graduation. In speaking to general demographic differences, Choy (2001) noted that, when compared to non-first-generation students, first-generation students were significantly more likely to come from low socioeconomic backgrounds and to be from minority groups, especially Hispanic or African-American. First-generation students were also older on average than typical undergraduates and more likely to be working and living off campus.

Choy (2001) also found that when compared to students whose parents have a bachelor's degree, first-generation students were twice as likely to drop out of college after their first year, and once they left college, were significantly less likely to return. Horn and Berktold (1998), when analyzing the patterns and characteristics of students who did not return to college for their second year, supported this finding. The authors utilized data from the *Beginning Post-Secondary Longitudinal Study* in assessing reasons for student departure. They noted that first-generation status was a significant contributor to student departure, with 23% of first-generation

students failing to return for their second year as compared to 10% of students whose parents had a college degree.

Additional research completed by Chen and Carroll (2005) and Cragg (2009) noted similar variances between first-generation and non-first-generation dropout rates. Chen and Carroll (2005) analyzed first-generation persistence rates by utilizing data from the *Postsecondary Education Transcript Study (PETS) of the National Education Longitudinal Study of 1988* (NELS:88) covering a period from 1992 to 2000. He noted that roughly 4 out of 10 first-generation students who enrolled in college during the period of the study left college without a degree by 2000. Similarly, Cragg (2009), using data from the *Beginning Postsecondary Study: 1996/2001* to quantify variables that influence the probability of graduation, found having college educated parents significantly increased students' probability of graduation.

Ishitani, in 2003, provided more detail on the dropout rates of first-generation students by focusing on when first-generation students were most in danger of leaving college. The study included a sample of 1,747 students at a four-year public university in the Midwest with 58 percent, or 1,016 students, being designated as first-generation. When analyzing the likelihood of attrition of first-generation students as compared to their peers, several variables such as family income, race, gender, and high school GPA were held constant, allowing the researcher to focus solely on the first-generation variable. The author used event history modeling as the basis for the analysis, which provides the level of risk for departure after each semester. Relative level of risk of departure for first-generation as compared to non-first-generation students was also constructed.

The model results indicated that first-generation students were 9 percent less likely than their peers with two college educated parents to still be enrolled after the first semester, and 22

percent less likely after the sixth semester. The researcher also found that first-generation students had a 71 percent higher risk of attrition in the first year than that of similar students with two college educated parents (Ishitani, 2003). In discussing the results, Ishitani suggested increasing social and academic integration might help to reduce first-generation student dropout rates, since first-generation students often struggle to adapt to college life.

The research presented so far evidences several differences in first-generation students' demographics and retention rates (Cragg, 2009; Chen, 2008; Ishitani, 2003; Choy, 2001). Studies designed to gauge the performance of first-generation students while at college in areas such as integration, critical thinking, writing or other performance measures, also indicated discrepancies in the performance between first- and non-first-generation students (Padgett, Johnson & Pascarella, 2012; Strayhorn, 2006; Chen, 2005; Pascarella, Pierson, Wolniak & Terenzini, 2004; Nunez & Cuccaro-Alamin,1998).

Nunez and Cuccaro-Alamin (1998) analyzed integration levels of first-generation students in a study sponsored by the US Department of Education and designed to better understand first-generation experiences and educational outcomes. The researchers utilized data from the 1989/90 *Beginning Postsecondary Longitudinal Study,* a national study which focused on first time college enrollees. The survey followed up on the original 1989 cohort in 1992 and 1994 to gauge students' academic and social experiences as well as degree attainment and enrollment status.

The authors found that the likelihood of being enrolled after four years for a first-generation student was lower than their peers, specifically, 55 versus 76% for students with parents who both had bachelor degrees. The authors also noted that first-generation students were more likely to be older, married, and enrolled part-time. In terms of first-generation student

integration, the researchers developed academic and social integration index scores based on student answers to questions focused on their level of involvement. Academic measures included the frequency with which students met with advisors, talked with faculty, attended academic lectures, and participated in study groups. Social measures included responses to how frequently students went places with friends, participated in institutional clubs, had contact with faculty outside of class, and participated in student assistance programs (Nunez & Cuccaro-Alamin, 1998).

The results indicated that overall, first-generation students had lower levels of academic and social integration than their non-first-generation peers, and as the level of parental education increased, so too did the levels of integration. Specifically, first-generation students were less likely, 23 versus 33 percent, to have high levels of academic integration and more likely to have low levels of integration, 30 versus 19 percent, when compared to students whose parents had some college education. This trend was repeated with respect to social integration measures, with first-generation students being less likely to have high levels of social integration, 17 versus 29 percent, and more likely to have low levels of social integration, 38 versus 19 percent, when compared to students whose parents had some college education (Nunez & Cuccaro-Alamin, 1998).

Padgett, Johnson, and Pascarella (2012) added to the understanding of the activities of first-generation students. The purpose of the study was to analyze the influence parental education had on cognitive and personal benefits derived from college attendance for first-generation students. The authors used data from 19 institutions that participated in the Wabash National Study of Liberal Arts Education in 2006 and 2007. In total, 2,609 students were included in the analysis, representing 16.2 percent of all incoming freshmen at the 19 institutions, of which 692 had parents who did not have college degrees. The method used was

multivariate regression with cognitive ability, critical thinking, literacy, and moral development as dependent variables and parental education as the primary independent variable. The model also controlled for a range of background, institutional type, academic experience, and nonacademic experience variables.

The results across various levels of parental education indicated that cognitive development had a conditional relationship to being a first-generation student. However, moral development and attitudes towards literacy proved to differ significantly between first and non-first-generation students, with first-generation students scoring much lower. This led the authors to suggest that "first-generation students are significantly at a disadvantage in cognitive and psychosocial measures as compared to students whose parents have higher levels of education" (Padgett, Johnson & Pascarella, 2012, p. 252).

A similar study completed by Terenzini, Springer, Yaeger, Pascarella and Nora (1996) also sought to better understand the influence being a first-generation student has on cognitive growth. The study utilized data from *National Study of Student Learning* (NSSL) that includes responses from 2,685 students who entered college in 1992, of which 825 were first-generation. The dependent variables were composed of results from the Collegiate Assessment of Academic Proficiency (CAAP), which includes items designed to measure reading, math, and critical thinking. The independent variables were composed of five categories: background characteristics, academic experiences, curricular experiences, out of class experiences, and institutional characteristics. Ordinary least squares regression was used to complete the analysis (Terenzini, et al., 1996)

The results indicated that first-generation students often interacted with their universities differently than non-first-generation students. This included less contact with faculty members,

fewer hours spent studying, less likelihood of participating in honors programs, and more hours spent off campus. In terms of reading, math, and critical thinking skills, the study found that first-generation students scored lower on all three measures at the onset of their academic careers. In summary, the authors noted that first-generation students in general netted lower gains from their academic experiences, due in large part to being disadvantaged from the beginning. They also suggested that since first-generation students interacted differently with their institutions than did traditional students, programs designed to increase student performance needed, perhaps, to be tailored to first-generation student populations (Terenzini, et. al., 1996).

Lastly, studies designed to measure academic performance through GPA or course completion provide some additional context on how first-generation students vary from their peers (Strayhorn, 2006; Chen, 2005). Strayhorn (2006) studied the effect background, pre-college, and college characteristics have on GPA for first-generation versus non-first-generation students. The research included data from *the Baccalaureate and Beyond Longitudinal Study (B&B:93/97)* with responses from 11,192 individuals, using student GPA as the dependent variable. Independent variables included a host of background characteristics, enrollment patterns, and other student activities, for example, number of institutions attended and hours worked per week. The hierarchical regression analysis showed that 22 percent of the variance in GPA could be accounted for by first-generation status, thus confirming the significant role first-generation status plays in student GPA. The researcher's analysis also showed that membership in a minority group, for example African-American, further negatively impacted college performance and that being a member of a minority and a first-generation student can result in a "double disadvantage" (p. 98). Strayhorn (2006) also noted that students who were more academically integrated were more likely to have higher GPAs. Given that first-generation

students are more likely to be from minority groups and to struggle with academic integration, these are telling results.

As studied by Chen (2005), first-generation students enroll and complete coursework differently from non-first-generation students. Chen focused on what first-generation students study in college and how they perform as compared to non-first-generation students. PETS data from NELS:88 was used to generate a sample of roughly 7,400 students with 21 percent, or 1,554 students, being first-generation. Much like previously mentioned studies, initial analysis showed that nearly half of all first-generation students had left without completing a degree as compared to only a fourth of non-first-generation students, and that backgrounds of first-generation students placed them at higher risk of departure (Chen, 2005; Ishitani, 2003).

In analyzing enrollment patterns, Chen (2005) found that 55 percent of first-generation students took at least one remedial course as compared to 27 percent of non-first-generation students. First-generation students were also much more likely to have not declared a major after their first year, and when they did declare, were much less likely to be majoring in math or science oriented fields. First-generation students also completed fewer credits on average after the first year, 18 credits as compared to 25 for non-first-generation students. Unfortunately, this trend continued. After four years of college, first-generation students accounted for only 66 credits on average as compared to 112 for their non-first-generation peers. Finally, Chen (2005) noted that performance as measured by GPA was also lower for first-generation students. Moreover, this variance was consistent across a variety of majors, with first-generation students underperforming in math, science, computer science, languages and history fields compared to their non-first-generation peers.

Given the evidence that first-generation students drop out at higher rates than their peers, first-generation students as a group appear not to be deriving the full benefits a college education can provide (Cragg, 2009; Ishitani, 2003; Choy, 2001; Horn, 1998; Nunez & Cuccaro-Alamin, 1998). Moreover, when first-generation students do persist in their educational journey, they seem to perform at lower levels than their peers with respect to overall GPA, credit accumulation and integration levels (Padgett, Johnson & Pascarella, 2012; Strayhorn, 2006, Pascarella, Pierson, Wolniak & Terenzini, 2004; Choy, 2001).

Research pointing to these trends has been present for decades, however, even minor gains do not appear to have been achieved (Ishitani, 2006; Tinto, 2006). Tinto (2006), in a study reviewing the state of retention research in order to make recommendations for future focus areas, noted that data from the National Center for Education Statistics (NCES) covering a period of ten years prior to the publication of the study showed no significant gain in student retention rates. Possibly even more alarming is that this same data suggested that the gap between low income students, a defining characteristic of first-generation students, and more well-to-do students appeared to be growing. These trends were present despite dramatic increases in published research and institutional attention in the form of increased resource allocation for retention related practices. Tinto suggested that this was in large part a byproduct of ineffective institutional practices that are not designed specifically to address the unique challenges of students with characteristics in common with first-generation students. He also suggested that student engagement was a critical element that should be addressed by institutions so as to increase overall student success and could possibly have an even greater impact on low income students when compared to traditional enrollees (Tinto, 2006).

As alluded to by Tinto (2006), certain elements associated with activities that occur while first-generation students are on campus could work to counteract some of these negative

outcomes. Research focusing on student activities and how university environments influence these activities resides largely in the field of student engagement (Kuh, 2002). The research reviewed suggested that engagement is a critical element in the success of all students with the possibility of having increasingly positive effects for first-generation students (Trowler, 2010, Carini, Kuh & Klien, 2006; Zhao & Kuh, 2004; Kuh 2001, 2003; Astin, 1984). Consequently, studies focused on student engagement in general and analysis on engagement and first-generation students will be presented in the next section.

Student Engagement

Student engagement in its essence represents the time and energy students put into activities that have been proven to contribute to positive student outcomes, such as increases in critical thinking, retention, and reading comprehension, to name a few. Student engagement also includes the manner in which universities encourage and facilitate these activities (Kuh, 2001). The research underlining this definition has evolved through extensive empirical analysis over decades to form the current student engagement research knowledge base (Trowler, 2010; Kuh, 2009; Tinto 2006). This research has demonstrated important links between certain student behaviors and positive outcomes, including learning gains, psychological well-being, and even post-graduate activities like civic involvement (Lewis, Hueber, Malone, & Valois, 2010; Miller & Butler, 2010; Ishitani & McKitrick, 2010; Bruggink & Siddiqui, 1995; Astin, 1984; Pace, 1982).

Current student engagement research is aided by an expansion of the availability of engagement data through the growth in popularity of National Survey on Student Engagement (NSSE) in the late 1990s and early 2000s. NSSE, through a combination of federal funding and institutional support, spread to include responses from thousands of institutions national wide. This created a resource for data that had simply not been present previously (Kuh, 2009). This

resource facilitated the expansion of engagement research and increased the knowledge base supporting the positive effects student engagement can have on students (Kahu, 2011; Lewis, Malone, & Valois 2011; Kuh, 2010; Miller & Butler, 2010; Trowler, 2010; Pascarella, 2006).

An example is provided by Kuh, Cruce, Shoup, Kinzie and Gonyeas in 2008 through a research effort sponsored by the Lumina Foundation for Education. The study worked to determine if engagement could be linked to persistence and grades with a further breakdown of potential differences associated with race. The authors used roughly 11,000 NSSE responses from 18 institutions, including four Historically Black Colleges and Universities and three Hispanic Serving Institutions. The dataset was divided into seniors and first year students, including 5,000 seniors and 6,000 freshmen with responses from issuances of NSSE from 2000 to 2003 (Kuh, et. al., 2008).

In constructing the regression models, engagement was operationalized by identifying variables associated with time spent studying, time spent in co-curricular activities, and an overarching engagement measure composed of 19 NSSE items. The analysis began with the general effects of variables measuring background characteristics on GPA for freshmen; however, once engagement was added to the model, the explained variance for first year student grades increased by 14 percent to a total of 42 percent. While holding numerous pre-college variables and other college influences constant, student engagement in educationally purposeful activities had a statistically significant effect on first year grades. Specifically, a one-standard-deviation-increase in engagement allowed for a student's GPA to rise by .04 points. Utilizing a similar process for seniors, the results were almost identical. However, the effect was greater for Hispanic students, representing a .11 increase with each standard deviation (Kuh, et. al., 2008).

In contrast to the somewhat modest effects engagement had on GPA, the effect on persistence was overwhelming. After controlling for background characteristics, other college experiences, academic achievement and financial aid, a one-standard-deviation-increase in engagement moved the odds up 17 percent that a student would persist to the second year. In targeting the minority focused institutions, the authors discovered that African-American students benefited more from high levels of engagement. As African-American students' engagement levels moved passed the mean, they were more likely to persist than other racial groups represented in the dataset, which included White, Hispanic/Latinos and Asian/Pacific Islanders (Kuh, et. al., 2008).

These findings strongly suggested that engagement had a positive effect on two critical student outcomes, GPA and first year persistence. Moreover, the findings appear to reinforce the notion that engagement effects vary by student characteristics and may have increased effects for certain minority populations. This could prove to be of critical importance to first-generation students given their tendencies to have lower on average GPAs, greater struggles staying enrolled during the first year of college, and a tendency to represent minority populations (Cragg, 2009; Strayhorn, 2006; Ishitani, 2003; Choy, 2001; Horn, 1998; Nunez & Cuccaro-Alamin, 1998).

Carini, Kuh and Klien in 2006 examined the extent to which engagement was associated with experimental and traditional measures of academic performance by assessing whether students with similar SAT scores but varying levels of engagement performed differently on certain learning measures. These learning performance measures include an assessment tool developed by RAND Corporation and the Council for Aid to Education that takes into account students' pre-college capabilities, GRE scores, and college GPA when determining learning gains for students. This was done by the creation of baselines for students derived from these

scores, then tracking growth in learning from the baseline. The authors also included analysis of how institutions differed in their ability to facilitate student engagement activities that contributed to increases in student learning. The sample was derived from 14 participating four-year institutions with varying missions involving 1,058 students spread out fairly evenly over all four years of college. In order to measure engagement, the NSSE survey was administered to all the students participating in the study.

Engagement was operationalized by clustering variables from the NSSE into measures of effective educational practices. These included: level of academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences, and supportive campus environment. In combination with these groupings, the authors incorporated a number of composite variables designed to measure other areas of engagement, including institutional emphasis on good practices, reading and writing skills, quality of relationships with peers, faculty and administration, higher order thinking, student-faculty interaction, and integration of diversity into coursework (Carini, Kuh & Klien, 2006).

Correlation analysis was used to measure the strength of the relationship between the three learning measures and student engagement. Engagement measures were found to have small but statistically significant positive correlations to RAND and GRE scores. Specifically, level of academic challenge, supportive campus environment, and institutional emphasis on good practices all showed correlations of .10 or higher to RAND scores. The output also showed reading, writing and gains in practical competence were significant and correlated with GRE at .13 and .16. Similar to the results for GRE and the RAND assessment, GPA showed numerous positive significant correlations to engagement measures, with active and collaborative learning (.13), student-faculty interaction (.13) and supportive campus environment (.08) representing some of the strongest relationships. The authors also included an examination of the correlation

between students who scored highest and lowest on the SAT and the effect engagement had on their learning outcomes. The results showed the lower performing students benefited more from engagement, with supportive campus environment, quality of relationships and student-faculty interaction showing correlations of .20 or greater. (Carini, Kuh & Klien, 2006).

In examining institutional differences, the correlations between engagement and performance outcomes appeared strongest for 3 of the 14 schools, two liberal arts colleges and a HBCU, suggesting that these institutions were better able to convert engagement into increased student performance. In order to determine whether these within-school differences were statistically significant, the highest performing colleges were compared with institutions on the opposite end of the spectrum, those showing low correlations between engagement and the selected outcome measures. Results showed that increases in student engagement levels in the highest performing schools did in fact have a statistically significant increase on the RAND test and GRE results, with the largest effects being contributed by student faculty interaction and supportive campus environment measures (Carini, Kuh & Klien, 2006).

These two previously mentioned studies provide support for the positive impact of engagement and the important role institutions play in facilitating engagement; however, they don't specifically speak to first-generation students (Carini, Kuh & Klien, 2006; Kuh, et al. 2008). Fortunately, additional studies have included focused analysis of the relationship between engagement and first-generation students (Filkins & Doyle, 2002; Soria & Stebleton, 2012; Grayson, 1997).

Filkins and Doyle (2002) examined the impact of engagement as measured by students' levels of active learning, interaction with faculty and student-peer interaction on first-generation and low income students' cognitive and affective development. The population for the study

came from the 2001 NSSE survey and included data from six urban institutions with 1,910 respondents, of which 909 identified as first-generation and 537 as low income, with some being represented in both groups. At the onset, the authors used factor analysis to identify the most influential elements associated with the 20 engagement activities included in the NSSE survey. This process resulted in active learning and student peer interaction being combined into one measure to form active and collaborative learning. Consequently, active and collaborative learning and student-faculty interaction became the main independent variables. This same process was repeated with students' self-reported estimates of gains, resulting in three dependent variables: general education, vocational and workplace skills, and personal/social development (Filkins & Doyle, 2002).

Stepwise regression was used as the main analytical technique with an overall model including the entire sample and with several individual models for low income, non-low-income, first-generation and non-first-generation students. The models included several control variables, including race, gender, part- or fulltime enrollment status, and the year of the student. The inclusion of these variables as control elements helped to concentrate the analysis of the effect the chosen independent variables had on cognitive and affective development. The authors also included variables designed to measure how supportive the campus environment was for students, noting that these measures had been linked to student academic and social gains (Filkins & Doyle, 2002).

Control items were entered into the model first, followed by institutional support measures, and finally the main independent variables. The overall model was able to account for between 23 and 34 percent of the change in the three gain scores that included general education, vocational and workplace skills, and personal and social development. The authors noted that supportive campus environment measures provided the largest increase in explanatory power,

accounting for roughly 20 percent of the overall variance across all the models. As stated by the authors, this indicates that "when students perceive their institution's environment to be supportive of their intellectual efforts, they are more likely to exhibit gains in the appropriate areas" (Filkins & Doyle, 2002, p. 15).

With respect to first-generation students, the authors noted that according to the beta weights of the model output, these students benefited on average more than their non-first-generation peers from engagement activities across the various models. This appeared to be especially true for active and collaborative learning and supportive campus environment measures (Filkins & Doyle, 2002). These findings provide further evidence of the importance of engagement, especially for first-generation students and the positive impact supportive campus environments can have on student gains (Kuh, et al. 2006; Tinto, 2006; Pascerella & Terenzini, 2005; Filkins & Doyle, 2002; Kuh, Pace & Vesper, 1997).

Soria and Stebleton's (2012) research provided additional information related to the patterns of engagement of first-generation students by analyzing how varying levels of engagement affect the retention rates of first-generation students as compared to non-first-generation students. The research addressed two areas: 1) whether first-generation students are less likely to persist to their second year, and 2) if significant differences are present between first- and non-first-generation students' academic engagement (Soria & Stebleton, 2012). The analysis utilized data from the *Student Experience in the Research University* (SERU) survey completed by students attending a large Midwest public university in the spring of 2010. A total of 5,364 students were sent the survey, of which 1,568 produced usable data, with 401 being first-generation and 1,167 being non-first-generation students.

The dependent variable for the retention analysis was whether students persisted to their second year, with logistic regression used to conduct the analysis. To address the second focus area concentrated on whether significant differences in engagement were present, the researchers divided the sample into first- and non-first-generation students to facilitate the use of *t-tests*. Multiple regression was then used to further identify differences in patterns between the two groups, with engagement measures being the dependent variable. Engagement was operationalized by using several measures designed to gauge students' activities, including faculty interaction, participation in academic related activities, frequency of contribution to class discussion, bringing up ideas from other classes during discussions, and asking questions during class. In order to more narrowly identify the contribution of first-generation status to any variances identified in engagement patterns or the odds of retention, control variables were also utilized in both the logistic and regression models, including gender, social class, race, sense of belonging, campus climate and cumulative GPA average (Soria & Stebleton, 2012).

Results of the persistence model inclusive of the control variables indicated that being a first-generation student reduced the odds of continuing to the second year of college by 45 percent when compared to non-first-generation students, which is consistent with other first-generation focused retention studies (Cragg, 2009; Chen, 2005; Ishitani, 2003). The results of the *t-test* comparing levels of engagement between the two groups showed modest but significant differences in engagement measures. Specifically, on average, first-generation students interacted with faculty less, asked fewer questions in class, and contributed less to class discussions. Turning to the regression model, the authors found that while controlling for demographic and academic performance measures, first-generation students' sense of belonging was the only variable that consistently predicted student engagement, emphasizing again the importance of campus environment as a contributing factor to student success (Soria &

Stebleton, 2012; Carini, Kuh, & Klien, 2006; Kuh, et al. 2008; Tinto, 1993, 2006; Pascerella & Terenzini, 2005).

In discussing the findings, the authors commented that lower levels of engagement are likely a result of first-generation students' lack of social capital or understanding of how to be successful on college campuses. More specifically, social capital is defined as a collective knowledge built on generations of experiences and achievement that are passed almost unknowingly through social interaction, and is heavily influenced by one's immediate family (Bourdieu, 1986). In the case of first-generation students, this can be a significant hurdle, due to their parents' limited knowledge concerning the activities and environments that define university life and how to be successful in these environments. The authors suggested that increasing interactions both of an informal and formal nature between faculty and students could help to reduce the effects of low social capital levels (Soria & Stebleton, 2012).

Research indicates that engagement can have significant positive effects for students in general and quite possibly even more so for first-generation students (Soria & Stebleton, 2012; Carini, Kuh & Klien, 2006; Kuh, et al. 2008; Tinto, 2006; Pascerella & Terenzini, 2005; Filkins & Doyle, 2002; Grayson, 1997). Specifically, the combined conclusions presented by Filkins and Doyle (2002) and Soria and Stebleton (2012) suggest that first-generation students can benefit significantly from engagement, but unfortunately may be doing so at lower levels than their peers (Engle & Tinto, 2008).

One possible explanation for first-generation students' lower levels of engagement is that they do not know how to effectively engage with their university environments prior to arriving on campus. The root of this problem could be the limited post-secondary experience resident in the families of first-generation students, resulting in limited social capital being passed to

students concerning how to succeed once at college. In support of this theory, social capital as a critical element of student success and perceived to negatively affect first-generation students will be explored in the next section.

Social Capital

Social capital theory has its roots in the field of sociology and in large part is defined by the research of Bourdieu in the late 1980s. Bourdieu worked to better understand the differences witnessed in academic achievement of children originating from varying social classes. He theorized that outside of economic advantages, less tangible forms of equity were being passed between members of higher classes. This equity came in the form of a collective knowledge built on generations of experiences and achievement that are passed almost unknowingly through social interaction. He called this information social capital. Bourdieu suggested that a person's accumulation of social capital is defined by the size, experiences, and capabilities of their social network. Thus, the greater the size and capabilities of the network, the greater social profit one can attain. However, the immediate or extended members of one's family often had the most influence on the availability or access to social capital (Bourdieu, 1986). It can be theorized, then, that first-generation students are less likely to have access to social capital, including knowledge about college and how to be successful in that environment, given their tendency to come from lower socioeconomic backgrounds and to not have parents who have attended higher education institutions.

Coleman (1988) was one of the first researchers to quantify the effects of social capital on student performance, specifically its contribution to dropout rates of high school students. In defining social capital, Coleman referenced economic theory, suggesting that, like other forms of capital, social capital allowed a specific actor to achieve a certain action that in its absence would not be possible. He suggested the most significant difference between social capital and other

forms, such as human or monetary capital, was that the accumulation of this asset depended

solely on social structures external to the individual actors and that while certain forms of social

capital may be critical to the achievement in one area, they could be less useful in another.

Coleman applied this framework to the social capital resident in family structures, suggesting

family background, a variable often included in educational research, actually had three

components: financial capital, human capital, and social capital. He argued that financial capital

was an accounting of family wealth, human capital a measure of parents' education or skills, and

social capital the connection between the parents and children in terms of the level of emphasis

placed on education and the parents' commitment to passing on their human capital. Coleman

perceived that the gaining of social capital and the level of human capital present were often

related (Coleman, 1988).

Coleman's research utilized 4,000 randomly selected responses from the 1987 issuance of

the *High School and Beyond* dataset. His broad theory was that social capital could be measured

through variables that track the creation of human capital in children by their parents and that

this measure of social capital affects dropout rates. The social capital variables included: the

number of children such that a larger family can negatively impact the parents' ability to

facilitate human capital due to competing demands, whether a family was single parent or not,

the parents' expectation for college or not, the frequency of discussions with parents about

personal matters, type of school (private, public or religious) and the number of changes in

school. A composite measure capturing socioeconomic status of the household and race were

also included as control variables in the model (Coleman, 1988).

In working to quantify the effect of social capital, Coleman theorized that family size

would negatively impact the parents' ability to develop social capital due to the competing

demands of the multiple children in the household. His findings demonstrated that families with

four or more children had a 6.4 percent higher chance of their children dropping out than did families with only one child. Coleman was also able to quantify the effect of moving and having to restart a social network. He found that one move increased the likelihood of departure from school by roughly 6 percent and two moves by more than 10 percent. Lastly, Coleman suggested that the type of school students attended often influenced social capital levels. He noted that students attending religious oriented institutions had significantly lower dropout rates than public or even other private schools. He theorized that this was the result of the tight knit community associated with religious based schooling in combination with the extensive support networks that accompany religious environments (Coleman, 1988). Coleman's findings helped to push additional research into the impact social capital can have on student success.

A more contemporary study by Kim and Schneider (2005) similarly operationalizes social capital in assessing the influence social capital plays in college attendance by measuring the strength of the relationship between parents and children and to what extent their educational goals are aligned. The authors theorized that increases in social capital would have a positive effect on acceptance into four- versus two-year schools and access to selective institutions.

The authors used data from the *National Educational Longitudinal Study* that included information on college students from 1988 to 1994. Barron's index on college selectivity and acceptance at a four-year or two-year college served as the dependent variables in the model. The primary independent variable was constructed from 10th graders' college aspirations and the alignment with their parents' expectations, along with measures of family composition in terms of size or single parent status, and an index measure of parental and child interaction levels (Kim & Schneider, 2005).

Logistic regression was used as the main statistical technique in addressing the impact of social capital on college acceptance. The results showed that, excluding other effects, students who had fewer siblings, more conversations with their parents about college, and higher scores on the interaction index were significantly more likely to attend a two- or four-year institution versus not attending. When focusing on variables contributing to attending two-year versus four-year institutions, only parental education had a significant effect. Finally, in addressing institutional selectivity, the authors found that family income, parents' educational attainment, and alignment of student ambitions with parental expectations all had significant effects on gaining acceptance to a highly selective college (Kim & Schneider, 2005). Kim and Schneider's work supports much of the theories proposed by Bourdieu (1986) and Coleman (1988) on the important role social capital can play on educational achievement. Furthermore, the authors note that family income and education are factors in the development of social capital. This suggests that first-generation students could be at a disadvantage since they have less access to highly educated individuals and often come from lower than average socioeconomic standing (Nunez & Cuccaro-Alamin, 1998; Choy, 2001).

Israel, Beaulieu and Hartless (2001) support Kim and Schneider's (2005) emphasis on the importance education and family income can have on the development of social capital. The authors' research explored the role communities and families have in developing social capital to facilitate youth education achievement. In doing so, they defined social capital as the composition of supportive networks and interactions that are present in the family and community of students and how these networks can facilitate or inhibit action (Israel, et al., 2001).

The authors utilized data gathered by the *National Educational Longitudinal Study* (NELS) issued in 1988 in combination with U.S. census data from 1990. The study's dependent

variable, education achievement, was operationalized through a composite measure composed of public school test scores on standardize tests, student grade point average, and student retention. Variables designed to measure the development of social capital included family income, parents' education level, ethnicity, gender, number of children in the household, and level of interaction between parents and children. Two composite measures for nurturing environment and monitoring student effort were also included. Nurturing environment variables included the parents' expectation for the child to attend college, whether the child discussed school matters with the parents, and whether the child talked with the parents about plans for school. Monitoring efforts included whether the parents checked on homework, how much the parents limited TV watching, and the amount of time children spent home alone after school. Hierarchical linear and mixed regression models were used to complete the analysis (Israel, et al., 2001).

Their initial results showed that family education and income level proved to be predictors of higher performance on all three educational achievement measures, independent of social capital variables. Once social capital variables were added to the model, the influence of these variables was reduced, but remained significant, suggesting an interaction effect between social capital measures and family education and income level. Specifically, discussions with parents on school matters, parents' expectations for their children to attend college, limiting TV time, spending less time alone after school, fewer family moves, and smaller numbers of siblings as measures of social capital potential all positively affected education achievement. The authors also note that communities defined by large minority populations negatively affected social capital levels and as result reduced educational achievement.

In conclusion, the authors stated that their findings provided further evidence that social capital available inside families is directly related to educational achievement and that families

defined by higher income and educational levels are more likely to exhibit the behaviors outlined by the social capital variables included in the study (Israel, et al., 2001).   This provides further commentary on not only the importance of social capital, but also the disadvantage that first-generation students may have given the absence of certainly demographic variables that facilitate the development of social capital (Putham, 1995; Alesina & La Ferrera, 2000; Glaeser, Laibson & Sacerdote, 2002; Rupasingha, Goetz, & Freshwater, 2006).

Rupasingha, et al., (2006) worked to better understand these potential variances in social capital by focusing on identifying U.S. county level variables that contribute to social capital development. Leaning on previous research that identified the presence of community organizations such as sports clubs, labor unions, civic groups, religious establishments, or political and business organizations as an index of social capital development, the researchers created a nationwide county-level metric for social capital as the dependent variable (Putham, 1993; Alesina & La Ferrera, 2000). In combination with these variables, indicators measuring percentages of persons who voted in the presidential elections, the number of charitable organizations present, and the response rate to the Census Bureau were also included as dependent factors. Independent variables included ethnic divisions or ethnic homogeneity, income and income inequality, education, community attachment, the changing role of women, marriage and family, age, suburbanization, employment type, and homeownership. The researchers used U.S. Census data from two periods, 1980 to 1990 and 1990 to 1997 for the analysis (Rupasingha, et al., 2006).

The authors developed ordinary least square regression models for both Census time periods. The results indicated that of all the variables included in the models, education was the most powerful indicator of social capital presence, representing the highest standardized beta coefficient of .740 for both time periods, suggesting that as education level of the population

increased so did access to social capital. Education was followed by average age of the county

and community attachment (average length of time living in the county). Income levels also had

a positive impact on social capital, but not to the levels associated with education (Rupasingha,

et al., 2006). The results of this analysis confirm early work on the critical contribution

education levels have on the development of social capital (Coleman, 1988; Putham, 1995;

Ferrara, 2000; Israel, et al., 2001; Glaeser et al., 2002) and provide further evidence to the

challenges facing first-generation students who, by definition, operate in environments with

fewer highly educated individuals (Choy, 2001).

A final study by Pascarella, Pierson, Wolniak & Terenzini (2004) used this potential lack

of social capital as theoretical framework while specifically focusing on first-generation students

and the effects varying levels academic engagement can have on student outcomes. The authors

theorized that lower levels of social capital hinder students' ability to participate in campus

engagement activities designed to facilitate integration into college environments and, as a result,

negatively affect cognitive development. In addressing this theory, the authors sought to

measure differences between first-generation students and their peers' demographic makeup.

This was followed by comparisons of cognitive, psychosocial status attainment outcomes.

Finally, analysis was completed to assess whether academic and nonacademic experiences

influencing these outcomes were different for first-generation as compared to other college

students (Pascarella et al., 2004).

To operationalize these topics, the authors separated first-generation students and non-

first-generation students. Levels of engagement in campus activities was then quantified and

used as a metric for social capital in order to determine the effect engagement levels had on

student outcomes. The data used for the analysis came from the *National Study on Student

Learning*, which measured college students attending 18 institutions for a period of three years

from 1992 to 1995. After three follow up surveys in 1993, 1994 and 1995, the final dataset used in the analysis consisted of 1,052 students. The authors noted that since the response rate dropped with each subsequent follow up, weights were added to allow for the original demographic makeup of the 1992 survey to be maintained. The study design included nine dependent variables, four of which were measures of student learning, four were psychosocial in nature, and a final variable assessed degree aspirations. The major independent variable was first-generation status which the authors divided into three subcategories: high parental education (both parents bachelors), moderate (one parental with bachelors) and first-generation (no parents with a bachelors). Numerous control variables were also included, covering four categories: demographics, institutional characteristics, college academic experiences, and college non-academic experiences (Pascarella et al., 2004)

Multiple regression was the primary analytical technique used for the analysis. Similar to Kim and Schneider (2005), Pascarella et al. (2004) found that first-generation students were disadvantaged in terms of access to selective colleges, with attendance levels significantly lower than those from families that fall into higher educational level categories. They also found that first-generation students completed fewer courses, were less involved in extracurricular activities, and had significantly lower levels of non-course related interactions with their peers. In addressing the primary research question, the net effects of engagement for first-generation students as compared to their peers, the authors found that first-generation students tend to derive significantly larger benefits from various engagement-based activities than did non-first-generation students, despite lower participation rates. This included both non-academic and academic activities. The results also showed that activities outside the college environment, particularly working, had larger negative effects for first-generation than non-first-generation students (Pascarella et al., 2004).

The authors assert that the results clearly point to social capital having a dramatic effect on the decisions of first-generation students and their experiences once enrolled. They further explained that this disadvantage may hinder first-generation students from making the best decisions for their success, which includes increasing engagement and peer interactions from which first-generation students often derive greater positive outcome gains than their peers (Pascarella et al., 2004; Padgett, Johnson, & Pascarella, 2012).

Social capital appears to be advantageous to a number of positive life outcomes, especially educational attainment (Bourdieu, 1986; Coleman, 1988; Putham, 1995; Pascarella et al., 2004; Kim & Schneider, 2005; Rupasingha, Goetz & Freshwater, 2006; Padgett, Johnson, & Pascarella, 2012). This is a troubling conclusion since demographics suggest that first-generation students have less potential to develop social capital prior to entering college (Putham, 1995; Alesina & La Ferrera, 2000; Glaeser, Laibson & Sacerdote, 2002; Rupasingha, Goetz & Freshwater, 2006). A potential solution to this issue could be modification of college environments or programs to be more responsive to this lack of social capital. The next section will explore this theory by reviewing literature on how supportive campus environments can positively impact first-generation students and the need for additional research concentrating on the connection between supportive campus environment measures and first-generation student learning outcomes.

Supportive Campus Environments

Research reinforcing the positive influence supportive campus environments have on student outcomes is readily available. One of the more well-known publications comes from Tinto in 1987, updated 1993, that centers on student attrition. Tinto both synthesized research studies covering several decades and analyzed national data through the then U.S. Office of Education to draw support for his theories. Tinto (1993) argued that student attrition is a result

of an "…absence of social and intellectual integration…" (p.204). Tinto's theory states that this removal or lack of integration into a university community is analogous to the patterns in which humans depart from a variety of societal settings. He further suggested that departure results in alienation and an inability to benefit from the positive outcomes associated with integration into a community (Tinto, 1993).

Tinto proposed that university environments play a critical role in facilitating integration, especially for those students who are more likely to find themselves on the boundaries that define social integration (Attinasi, 1989; Tinto, 1993). He commented that a university's capacity to reach out and make contact with its students is a defining characteristic of a healthy culture by empowering individuals to succeed through finding a societal niche or cultural subgroup on campus. This can be increasingly important for minority or other lesser represented populations in order for these students to avoid feeling alienated or outside of the mainstream practices occurring on campus. As a result, it is the responsibility of university administration to ensure that the prevalent or mainstream social identity of the college does not exclude or alienate those individuals who enter at its periphery by creating supportive measures to facilitate integration into college life (Simpson, Baker & Mellinger, 1988; Tinto, 1993). This empowerment works to increase student retention and eventual academic success. Unfortunately, variances in this cultural cornerstone are present between campuses and manifest themselves in the underlining values of universities, resulting in higher dropout rates and lowered academic performance for those institutions characterized by relatively less supportive campus environments (Fleming, 1984; Pascarella & Terenzini, 1995, 2005; Tinto, 1993).

Tinto outlines several critical elements that should be present in academic programs to facilitate student success and establish supportive campus environments capable of ushering success for students regardless of demographic makeup. First, that practices are committed to

educating all of the student body and do not simply focus on the university's mainstream population. This is accomplished by creating avenues that are diversified based on students' characteristics to allow for engagement with both peers and faculty in the pursuit of academic achievement. Next, environments are defined by placing the welfare of their students ahead of all other institutional goals. Tinto outlined this as a responsibility of the entire university community, and when effectively orchestrated, produces an environment of caring which spreads to all corners of university life, creating seemingly endless possibilities for positive student engagement. Lastly, effective educational environments must be committed to the development of social and educational communities to which all students are allowed to integrate. In doing so, processes need to be in place that continually reach out to students in a variety of settings to establish personal bonds between students, faculty and administration (Tinto, 1993).

Another foundational publication that speaks to the importance of university environments comes from Pascarella and Terenzini (2005). *How College Affects Students,* originally published in 1991, is a synthesis of nearly 2,600 student focus studies published in the 1970s and 80s. The 2005 update used the conclusions of the original work as a validating metric when again reviewing an expansive body of research published between 1989 and 2000. The theoretical framework associated with both texts is student outcome focused. As a result, the text included dedicated chapters on research that focused on understanding higher education's impact on development of verbal, quantitative and subject matter knowledge, cognitive skills, attitudes and values, psychosocial changes, moral development, economic impacts, and quality of life after college. In doing so, the effects of college environments were often included in the literature reviews specific to these outcomes (Pascarella and Terenzini, 2005).

Verbal, quantitative, and subject matter competence, as a first example, were affected by university environments. Institutions that heavily emphasize scholarship and learning were more

capable of having positive influences on these learning focused outcomes (Arnold, Kuh, Vesper & Schuh, 1990; Kuh, Pace & Vesper, 1997; Watson & Kuh, 1996). Advances for students in areas such as understanding science and technology or art and history were all influenced by environmental factors. This was true even while holding other variables such as academic preparation, educational aspirations, socioeconomic status, race, and work responsibilities constant. Pascarella and Terenzini further suggested that the quality of social interactions, as a measure of supportive environments, improved verbal, quantitative and subject matter competence. Kuh, Pace and Vesper (1997) supported this assertion when noting that the more students suggested that their interactions with peers, administrators and faculty were friendly and helpful, the more intellectual gains were seen. Finally, there appears to be evidence that institutional environments free of racism or gender bias are better able to foster these types of educational advancement, especially for minority students (Gallos, 1995; Silverber & Hall, 1996). These findings were often still present even once measures for academic quality of the institutions, study habits, and skills when entering college were held constant (Pascarella & Terenzini, 2005).

University environments appeared also to influence the broader measure of cognitive and intellectual growth. Universities that focused on scholarship and learning developed as an environmental characteristic showed greater cognitive and intellectual growth (Pascarella & Terenzini, 2005). This appeared to be especially true for universities that encouraged high levels of student-faculty contact or when faculty members were oriented toward student development (Terenzini, Springer, Yaeger, Pascarella, & Nora, 1994).

Finally, in exploring the category of personal development, Pascarella and Terenzini (2005) again found evidence of the influence of college environments. Personal development is often a composition of elements that include value and moral development, self-understanding,

getting along with different groups of people and/or developing healthy habits (Pace, 1984).

Pascarella and Terenzini found that cultural elements associated with college environments had a

more positive effect than did general university structural features, such as private versus public.

This included the cultural experiences that define a college campus, such as those present at

Historically Black Colleges and the unique subcultures that are present on many university

campuses, such as Greek life, sports teams, or political- and policy-focused organizations. The

authors suggested that having access and taking advantage of these environmental elements

significantly increased personal development (Berger & Milem, 2000; Pascarella & Terenzini,

2005; Smart & Hamm, 1993).

The authors closed by stating that the net effect of the differences between college

environments on student learning outcomes is smaller than the effects seen within colleges;

however, university environments still heavily influence student learning outcomes in the areas

of verbal, quantitative and subject matter competence, intellectual growth, and personal

development. Several items listed among the most important factors include a sense by the

students that the university is supportive of their needs, creation and encouragement of

opportunities for involvement with both peers and faculty, and the development of pathways to

optimize the process of psychosocial adjustment and maturity. The findings hold true even when

controlling for several university-level variables such as selectivity, public versus private, size,

and Carnegie classification (Pascarella & Terenzini, 2005).

Both Tinto (2003) and Pascarella and Terenzini (2005) provide compelling evidence that

increases in supportive campus environment measures can lead to positive student outcomes.

However, linking supportive campus environments directly to increases in student engagement is

not discretely addressed. This connection is made through several sources beginning with Kuh,

Kinzie, Schuh and Whitt in 2005. The authors took a case study approach to better

understanding why certain schools consistently perform better when compared to their peers on the National Survey on Student Engagement, NSSE. The book summarizes the research effort in completion of the Documenting Effective Educational Practices, or DEEP project. The project's stated purpose is to "…identify and document what strong-performing colleges and universities do to promote student success, which we defined as higher-than-predicted graduation rates and better-than-predicted student engagement scores on the NSSE" (p. xii). This included information on 20 colleges and universities that met the selection criterion.

Though these colleges varied greatly from small private institutions, such as Sewanee, to major research universities, like the University of Michigan, the authors noted similar patterns in which the educational environments were created. This included clear pathways for student success and providing necessary support for students to understand and utilize these pathways. Features of these pathways included early warning systems that allow for intervention for students who might be showing signs of struggling and adoptive programs that could be continuously altered based on student feedback in order to meet emerging needs or concerns. Finally, performance standards that align with the students' capability were seen as a critical factor in creating highly supportive environments (Kuh, et. al., 2005).

On the importance of campus environments, the authors note, "That students perform better and are more satisfied at colleges that are committed to their success and cultivate positive working and social relationships among different groups on campus" (p. 214). The authors also comment that these institutions all create environments that encourage heathy relationships with other students, faculty, and the larger administration. Kuh et al., (2005) suggested that these environments are critical in facilitating student engagement, especially for students who are in greater need of guidance and support, as is often the case for first-generation students.

Another example came from Pike and Kuh (2005) that connected supportive campus environments and engagement while also focused on first-generation student data. The authors sought to better understand the college experiences of first- and second-generation students to quantify variances in engagement patterns and how these variances might affect learning and intellectual development. Especially relevant was the inclusion of variables that measured student perceptions of the environment and how these perceptions might influence engagement patterns (Pike & Kuh, 2005).

The study focused on three primary questions: 1) Are the relationships between engagement and learning outcomes the same for first- and second-generation students? 2) Are differences present between first- and second-generation students in terms of their engagement levels and gains in learning and intellectual development? and 3) are any differences between first- and second-generation students a direct result of first-generation status?

Data was provided through 3,000 responses to the fourth edition of the College Student Experience Questionnaire (CSEQ), originally constructed by Robert Pace to measure quality of student effort (Pace, 1984). By focusing on first year students and eliminating any missing values, the dataset was reduced to a sample of 1,127 students. The research method chosen was multi-group structural equation modelling. The authors noted that using the multi-group method aids in identifying differences between individual groups and assessing if direct or indirect relationships are present. The conceptual framework of the study assumed that academic and social engagement increased positive student outcomes and that as supportive campus environment levels increased, so did engagement levels (Pike & Kuh, 2005).

Overall, the results indicated that first- and second-generation students differed significantly in learning outcomes and college experiences. Specifically, first-generation

students reported significantly lower levels of academic and social engagement and had less favorable perceptions of the college environment, resulting in lower academic gains. Moreover, the authors stated that for both groups, perceptions on the level of supportive college environment and integration were directly related to gains in learning and intellectual development. This study provides additional evidence on the importance of supportive campus environments in facilitating engagement and offers more directed support on how this link may be exceedingly important for first-generation students (Pike & Kuh, 2005).

Supportive campus environments appear to be a key component for student success with specific linkages to retention, engagement, cognitive growth, verbal and quantitative capability, and personal development (Fleming, 1985; Martin, 1990; Pascarella & Terenzini, 1995, 2005; Tinto, 1993, 2002). Moreover, supportive environments perform an even more important role for underrepresented student populations, including first-generation students (Kuh, Kinzie, Schuh, & Whitt, 2005; Pike & Kuh, 2005)

In conclusion, first-generation students are currently a significant proportion of the undergraduate student population, but often have lower levels of performance on a variety of student learning outcome measures as compared to their non-first-generation peers (Padgett, Johnson & Pascarella, 2012; Strayhorn, 2006; Chen, 2005; Pascarella, Pierson, Wolniak & Terenzini, 2004; Nunez & Cuccaro-Alamin, 1998). First-generation students also demonstrate lower levels of engagement on average and have increased difficulty integrating into college environments as compared to their peers. This pattern is present despite the significant benefits student engagement has for first-generation students (Soria & Stebleton, 2012; Carini, Kuh & Klien, 2006; Kuh, et al. 2006; Tinto, 2006; Pascerella & Terenzini, 2005; Filkins & Doyle, 2002; Grayson, 1997). A potential explanation for this is a lack of social capital when entering the complex and challenging environments seen on most college campuses (Bourdieu, 1986;

Coleman, 1988; Putham, 1995; Alesina & La Ferrera, 2000; Glaeser, Laibson & Sacerdote, 2002; Rupasingha, Goetz & Freshwater, 2006). However, supportive campus environments have been shown to have significant positive effects for all students and even more so for certain minority populations. As a result, better understanding the impact that supportive campus environments have to counteract the negative outcomes associated with lower social capital could provide a mechanism for improving outcomes of first-generation students (Berger & Milem, 2000; Kuh, Kinzie, Schuh, & Whitt, 2005; Kuh, Pace & Vesper, 1997; Pascarella & Terenzini, 2005; Pike & Kuh, 2005; Tinto, 2002). Unfortunately, discrete analysis targeting the connection between supportive campus environments and learning outcomes for first-generation students is currently very limited. Consequently, the research proposed here will work to fill this gap in the available literature.

CHAPTER III

METHODS AND PROCEDURES

Introduction

This chapter details the research methods and procedures used to examine both first- and non-first-generation students' perspectives on supportive campus measures, the relationship these variables have with student learning outcomes, and how this relationship may differ between these two groups of students. Specific to these intentions, this study seeks answers to the following questions:

Q1: Do first-generation students' perspectives on the level of supportive campus environment differ from those of non-first-generation students?

Q2: Do first-generation students' perspectives on the level of supportive campus environment affect student learning outcomes differently from non-first-generation students after controlling for other student characteristics?

Research Design

A survey research design was chosen to allow statistical data and analysis to be used in determining effects of environmental support measures on outcomes for first and non-first-generation students. Data was gathered through cluster sampling of pre-existing datasets on undergraduate seniors. These datasets were generated through issuances of the National Survey on Student Engagement, (NSSE) at the university being studied between 2002 and 2014. This single institution was used both to provide a control mechanism for student perceptions on the level of campus support for engagement activities and due to the limits associated with the access to engagement records from other institutions. During this timeframe, the university being studied participated in the survey every year from 2002 to 2011, then switch to an every

three year rotation, including the latest issuance in 2014. This time period was chosen to ensure a robust enough dataset could be derived to achieve meaningful statistical results.

The NSSE includes a wide variety of variables designed to measure student engagement as well as higher education outcome measures. Questions designed to gauge students' perceptions on the level of supportive campus environment present and quantify students' gains in knowledge and skills development will be the two key components of this analysis. Demographic information, including whether students are first-generation or not, will be used to further cluster the sample and serve as control mechanisms as appropriate.

Population and Sample

The population for this study included seniors between the years of 2005 to 2014. NSSE surveys are designed for freshmen and senior undergraduate students. As a result of the proposed research questions, which include variables measuring the contribution of higher education to knowledge and skill development, it was decided focusing on the senior survey would allow for the most robust measures in this area. Consequently, the sample will be composed exclusively of seniors from the university being studied who participated in the NSSE between 2005 and 2014.

Sample Data

In answering the research questions data was used from issuances of the National Survey on Student Engagement, NSSE at a large public research institution in the southeast from 2002 to 2013. Access to this data was granted after completion of the Institutional Review Board (IRB) process. This included yearly issuances from 2002 to 2011 and a final issuance in 2014 resulting in 11 years of survey data totaling 6,469 participants. However, due to significant changes in the structure of the survey questions between 2002 and 2003 and again between 2011 and 2013 the

results from 2002 and 2013 were removed from the analysis in order to ensure consistency of the variables being analyzed. Furthermore, large sections of missing or incomplete data throughout the remaining nine years included in the analysis further reduced the dataset. The final dataset after correcting for these issues was still rather large at 5,643 responses from 2003 to 2011. Including 1,847 first generation students and 3,796 non first-generation students. A summaries of the variables in the dataset are provided in table 3.1 for first-generation students and table 3.2 for non-first-generation students.

In comparing the two tables several similarities and differences appear between first and non-first-generation students. Beginning with the similarities, the composite scores for the four student outcomes measures were very similar. The average for non-first-generation students was 66.27 and the average for first-generation students was only slight hirer at 67.62. In looking at the individual scores used to generate the composite outcome measure both groups are again very similar with students suggesting that the institution contributed quite a bit to their ability to write (gnwrite), speak (gnspeak), and analyze quantitative problems (gnquant) with mean scores nearing three out of four in all cases. Moreover, both groups on average ranked the university contribution to their ability to think critically and analytically (gnanaly) higher than the other three outcomes measures with a mean score of 3.26 for non-first-generation and a mean score of 3.28 for first-generation students.

The primary focus of the study, the support campus environment benchmark, proved to be identical between the two groups at 44.2 on a scale of 1 to 100. It is worth noting that the national average published in 2012 by NSSE for very high research institutions participating in the survey was 58.1, as a result the supportive campus environment benchmark score for the university being studied was rather low. The 44.2 score aligned with the 25th percentile of all scores in the very high research activity classification.

Table 3.1
Study Data Descriptive Statistics First-Generation

Variable Label	Mean	Std Dev	Max	Min	Freq	%
DEPENDENT VARIABLE						
Composite Outcome Score	67.62	22.69	100	0	1,844	
gains writing			3	0		
Very Little =0					75	4.1%
Some = 1					437	23.7%
Quite a bit = 2					759	41.2%
Very Much = 3					573	31.1%
gains speaking			3	0		
Very Little = 0					115	6.2%
Some = 1					460	25%
Quite a bit = 2					750	40.7%
Very Much = 3					519	28.2%
gains quantitative skills			3	0		
Very Little = 0					109	5.9%
Some = 1					475	25.8%
Quite a bit = 2					680	36.9%
Very Much = 3					580	31.5%
gains analytical thinking			3	0		
Very Little = 0					43	2.3%
Some = 1					231	12.5%
Quite a bit = 2					745	40.4%
Very Much = 3					825	44.7%
INDEPENDENT VARIABLES						
academic preparation			3	0		
Zero -15 hours = 0					761	41.3%
11-15 hours = 1					371	20.1%
16-20 hours = 2					301	16.3%
More than 20 hours = 3					410	22.6%
co-curricular activities			3	0		
Zero hours = 0					928	50.3%
1-5 hours = 1					538	29.2%
6-10 hours = 2					194	10.5%
More than 10 hours = 3					184	10.0%
enrollment status			1	0		
Less than fulltime=0					224	12.2%
Fulltime = 1					1,620	87.9%
international			1	0		
No = 0					1,803	97.8%
Yes = 1					41	2.2%
live now			2	0		
Dormitory, within walking = 0					431	23.4%
Within driving distance = 1					1374	74.5%

Table 3.1 continued
Study Data Descriptive Statistics First-Generation

Variable Label	Mean	Std Dev	Max	Min	Freq	%
Fraternity/Sorority house = 2					39	2.1%
race			3	0		
White = 0					13	.7%
African American = 1					53	2.9%
Hispanic = 2					132	7.2%
Other = 3					1,468	79.6%
supportive campus environment benchmark	44.2	17.65	91.7	0		
sex			1	0		
Male = 0					760	41.2%
Female = 1					1,084	58.8%
social activities			3	0		
Zero -10 hours = 0					554	30.0%
11-15 hours = 1					572	31.0%
16-20 hours = 2					366	19.6%
More than 20 hours = 3					352	19.0%
transfer			1	0		
Started here = 0					985	53.4%
Started elsewhere = 1					859	46.6%
work hours			3	0		
Zero -5 hours = 0					450	24.4%
6-20 hours = 1					409	22.18%
21-30 hours = 2					485	26.30%
More than 30 hours = 3					500	27.11%

Table 3.2
Study Data Descriptive Statistics Non-First-Generation

Variable Label	Mean	Std Dev	Max	Min	Freq	%
DEPENDENT VARIABLES						
Composite Outcome Score	66.27	22.08	100	0	3,796	
gains writing	2.92		3	0		
Very Little =0					209	5.5%
Some = 1					944	24.9%
Quite a bit = 2					1,586	41.8%
Very Much = 3					1,057	27.8%
gains speaking			3	0		
Very Little = 0					264	7%
Some = 1					1091	28.7%
Quite a bit = 2					1499	39.5%
Very Much = 3					942	24.8%
gains quantitative skills			3	0		
Very Little = 0					189	5%
Some = 1					1003	26.4%
Quite a bit = 2					1420	37.4%
Very Much = 3					1184	31.2%
gains analytical thinking			3	0		
Very Little = 0					89	2.3%
Some = 1					523	13.8%
Quite a bit = 2					1504	39.6%
Very Much = 3					1686	44.4%
INDEPENDENT VARIABLES						
academic preparation			3	0		
Zero -15 hours = 0					1697	44.7%
11-15 hours = 1					817	21.5%
16-20 hours = 2					585	15.4%
More than 20 hours = 3					697	18.4%
co-curricular activities			3	0		
Zero hours = 0					1224	32.2%
1-5 hours = 1					1370	36.1%
6-10 hours = 2					609	16.0%
More than 10 hours = 3					593	7.0%
enrollment status			1	0		
Less than fulltime=0					3,529	93.0%
Fulltime = 1					267	7.0%
international			1	0		
No = 0					3,729	98.2%
Yes = 1					67	1.8%
live now			2	0		
Dormitory, within walking = 0					1512	40.0%
Within driving distance = 1					2177	57.3%

Table 3.2 continued
Study Data Descriptive Statistics First-Generation

Variable Label	Mean	Std Dev	Max	Min	Freq	%
Fraternity/Sorority house = 2					107	2.8%
race			3	0		
White = 0					16	.4%
African American = 1					111	2.9%
Hispanic = 2					146	4.0%
Other = 3					3191	86.6%
supportive campus environment benchmark	44.2	17.2	91.7	0		
sex			1	0		
Male = 0					1,637	43.1%
Female = 1					2,159	56.9%
social activities			3	0		
Zero -10 hours = 0					887	23.4%
11-15 hours = 1					1130	30.0%
16-20 hours = 2					795	21.0%
More than 20 hours = 3					984	26.0%
transfer student			1	0		
Started here = 0					2,782	73.3%
Started elsewhere = 1					1,014	26.7%
work hours			3	0		
Zero -5 hours = 0					1184	31.2%
6-20 hours = 1					1136	30.0%
21-30 hours = 2					913	24.0%
More than 30 hours = 3					563	15.0%

The number of hours per week spent on academic preparation (acadpr01) was also similar between the two groups with 36.9 percent of non-first-generation and 36.4 percent of first generations students preparing between 11 and 20 hours a week. Enrollment fulltime (enrlment) was the large majority for both groups with non-first-generation students attending fulltime 93 percent of the time and first-generation 87.9 percent. International student status (internat) was very small in both populations with only 1.8 percent for non-first-generation and 2.2 percent for first-generation. Sex was again similar with female students representing larger proportions in each group, 56.9 percent for non-first-generation and 58.8 percent for first-generation. Hours spent on social activities (social) show very consistent patterns with 50 percent of both groups spending between 6 to 15 hours per week.

The racial profiles of the two groups were slightly different with white being the majority at 86.6 percent for non-first-generation and 79.6 percent for first-generation for both groups but African American students represented a slightly smaller proportion of non-first-generation students at 4.0 percent as compared to the 7.2 percent for first-generation students.

Larger differences between the groups were also present. Beginning with the number of hours spent on co-curricular activities (concurrr01) per week, the results showed over 80 percent of first-generation students spent five or less hours per week as compared to 68 percent of non-first-generation students spending five or less hours per week. Where students started their education (enter) also showed differences with 73.3 percent of non-first-generation students starting at the university being studied as compared to only 53.4 percent of first-generation students. Also, first-generation students lived further from campus (live now) with 16 percent living within walking distance as compared to 29.8 percent of non-first-generation students. First-generation students also were more likely to work with 24.9 percent reporting working zero hours as compared to 31.2 percent of non-first-generation students. Moreover, not only did first-

generation students work at higher rates but also worked more hours with 20 percent of students

working 30 or more hours as compared to only 9.4 percent of non-first-generation students.

It is also worth noting that over the eight years included in the dataset representation of

first-generation versus non-first-generation as a percentage of responses remained fairly stable.

First-generation students averaged 33 percent and non-first-generations 67.2 percent with a

standard deviation of only 3.3 as seen in table 3.3.

Table 3.3
Percentage of First and Non-First-Generation Students by Year

Year	Percentage First-Generation	Percentage Non-First-Generation
2003	34.3%	65.7%
2004	33.0%	67.0%
2005	33.6%	66.4%
2006	28.2%	71.8%
2007	35.5%	64.5%
2008	31.5%	68.5%
2009	32.3%	67.7%
2010	34.0%	66.0%
2011	32.5%	67.5%

Instrument Validity and Reliability

Validity speaks to accuracy of model and survey design such that the results can be

trusted to measure what they are intended to measure. Reliability concentrates on consistency of

data results, for example if similar groups of people are given identical surveys, then we should

expect to see similar results. In the presence of validity and reliability, research findings can be

trusted to answer the proposed research questions. For the purposes of this research, validity and

reliability of NSSE and resulting data is necessary.

Reliability

NSSE primarily utilizes the processes of internal consistency to assess the reliability of

the survey. According to Huck (2012), consistency is essential to demonstrate the reliability of a

testing instrument. Consistency in its simplest form can be shown by giving the same sample

group a test twice, with a period of time between tests, and examining the results to see if

differences are present. Should the result be similar, it can be said that the instrument shows

consistency and thus reliability. Consistency can also be measured outside of a test/re-test

scenario by quantifying the internal consistency of individual questions or subsets of questions

inside an instrument (Huck, 2012). This technique essentially gauges the level to which

responses by participants with similar backgrounds vary in unison, suggesting uniformity among

the subgroups being measured. This is the method NSSE staff have chosen to use and is being

measured via Cronbach's Alpha. NSSE cites McMillan and Schumacher (2001) when stating

that any Cronbach's Alpha result lower than .70 should be further examined. The table 3.4

tracks the internal consistency of supportive environment measures and self-reported learning

gains that cover the four learning variables mentioned for seniors for the years that were

available and are included in the analysis. This included data from 2008 through 2011 and 2014.

The results indicated acceptable levels for all years and variables.

Table 3.4
Internal Consistency Measures

Year	Supportive Environment	Learning Gains
2008	.82	.85
2009	.80	.84
2010	.80	.84
2011	.80	.84
2014	.89	Not Available

Validity

Validity at its core is about accuracy of the instrument to measure what it is intending to

measure (Huck, 2012). Validity can be measured in several different ways. NSSE cited seven

discrete techniques used to validate the survey instrument, including response process validity,

content validity, construct validity, concurrent validity, predictive validity, known groups

validity, and consequential validity (NSSE, 2016).

Response validity is a measure of the extent to which test takers show that they fully

understand the survey as the researchers intended. While there is no quantitative measure of this

type of validity, NSSE conducts interviews and hosts focus groups to assess this validity

perspective (NSSE, 2016).

Content validity works to determine if an instrument accounts for all the unique facets of

any given construct. Again, there is no statistical measure associated with content validity;

consequently, NSSE relies on experts in the field to provide consultation on necessary changes

(NSSE, 2016).

Construct validity measures the extent to which an instrument correlates with a theorized

construct that it claims to measure. NSSE approached this analysis by completing factor analysis

on the deep learning scales that are designed to measure many of the same concepts included in

NSSE. The results indicated the two approaches measured very similar concepts, with a few of

the outcomes having nearly perfect loading factors. To dispute this positive result, the analysis

was completed only on 2009 data and was specific to the deep learning outcomes framework

(NSSE, 2016). Consequently, this analysis is rather limiting in terms of assessing the overall

construct validity of the survey.

Concurrent validity simply measures the level of correlation of similar surveys issued

during roughly the same period of time. NSSE again documented a single study that focused on

using elements in the Beginning College Survey of Student Engagement (BCSSE) to predict

NSSE indicators. The analysis conducted on 2009 data found a significant relationship between

the BCSSE variables associated with academic perseverance and expected academic engagement

and the NSSE academic challenge indicator. This suggested the BCSSE variables designed to measure engagement at the pre-college level can, in certain scenarios, predicted NSSE engagement levels allowing for concurrent validity to be confirmed.

Predictive validity is the ability of an instrument to be able to estimate or predict scores on a criterion measure in an anticipated manner. NSSE listed several studies that show the instruments' ability to predict academic success in a variety of forms and retention. This suggested the survey had predictive validity (NSSE, 2016).

Known groups validity tracks an instrument's ability to fluctuate according to patterns established by previous research related to the content area and specific to subgroups, such as the difference present between men versus women. Again citing a single study, NSSE stated that the instrument is able to detect differences between subgroups, including parental education, which was critical to the research questions proposed for this study (NSSE, 2016).

Lastly, consequential validity measures the extent to which the survey results can be used to improve the area of focus, for example, to increase the quality of undergraduate education. NSSE summarized a document that details how institutions have used the data to enhance their campus operations, with emphasis in four main areas: accreditation, accountability, strategic planning and program assessment (NSSE, 2016).

Supportive Environment and Student Learning Outcome Indicators

Researchers supporting the NSSE project have worked to classify the survey results into categories representing various areas of student engagement. This process was completed through empirical and conceptual analysis efforts over a period of several years. The total of 47 survey questions composing engagement indicators were categorized into four themes: academic challenge, learning with peers, experience with faculty, and campus environment. These four

themes are intended to be applicable to various types of institutions regardless of mission or classification, and to provide a clearly defined, although somewhat correlated, framework of undergraduate engagement (Campbell & Cabrera, 2011). The four high level themes also include ten subcategories, which are listed under their respective themes in Table 3.5.

Table 3.5
Themes and Engagement Indicators

Themes	Academic Challenge	Learning with Peers	Experience with Faculty	Campus Environment
Engagement Indicators	Higher Order Thinking; Reflective and Integrated Learning; Learning Strategies; Quantitative Reasoning	Collaborative Learning; Discussions with Diverse Others	Student Faculty Interaction; Effective Teaching Practices	Quality of Interactions; Supportive Environment (SE)

Note. Adapted from National Survey on Student Engagement (2015). Engagement Indicators & High-Impact Practices. Retrieved from nsse.indiana.edu/links/institutional reporting

The focus of this research was on the supportive environment (SE) engagement indicator listed under campus environment. This particular engagement indicator included a series of measures focused on determining the level of emphasis institutions placed on creating supportive campus environments, these six items are listed below.

- envsuprt – Providing support to help students succeed academically (1=Very Little, 2=Some, 3=Quite a bit, 4=Very much)

- envsocal – Providing support to be involved socially (1=Very Little, 2=Some, 3=Quite a bit, 4=Very much)

- envnacad – Helping students manage their non-academic responsibilities (work, family, etc.) (1=Very Little, 2=Some, 3=Quite a bit, 4=Very much)

- envstu – Relationships with other students (1:7,1=Unfriendly, Unsupportive, Sense of alienation, 7= Friendly, Supportive, Sense of belonging)

- envfac– Relationships with faculty members (1:7, 1=Unavailable, Unhelpful, Unsympathetic, 7= Available, Helpful, Sympathetic)

- envadm – Relationships with administrative and office personnel (1:7, 1=Unhelpful, Inconsiderate, 7= Rigid, Helpful, Considerate, Flexible)

Using these six of these eight items, a composite score was generated, referred to as the supportive environment engagement indicator. This is done by converting the component items into a 100-point scale then averaging them together resulting in student level indicator scores (NSSE, 2010).

NSSE also tracks student learning outcomes by asking students the level to which their institutions have contributed to their knowledge, skills, and personal development. This is done through ten individual items. While engagement has been linked to a wide variety of higher education outcomes, a significant amount of research has shown clear connections between student engagement and learning focused outcomes (Trowler, 2010). Consequently, the student learning outcome dependent variable was composed of a subset of four items that are most analogous to learning centered outcomes in the student gains section of the survey. These measures also offered a different approach to analyzing the impacts of supportive campus environments. Previous research has shown tendencies toward analyzing overall engagement levels instead of a composite measure of student learning gains. Lastly, across the ten years of survey data these four elements were also the most consistently present in the survey questions. The four items listed below that are quantified on a scale from 1 to 4 (1=Very little, 2= Some, 3= Quite a bit, 4= Very much). A composite score generated from these four items was created and used in the analysis.

- pnwrite – Writing clearly and effectively

- pnspeak – Speaking clearly and effectively

- pnanaly – Thinking critically and analytically

- pnquant – Analyzing numerical and statistical information

The other critical element for this study is the variable that identifies first-generation students. The NSSE included as part of the background and demographic section "What is the highest level of education completed by either of your parents (or those who raised you)?" (NSSE, 2014, p. 8). The possible responses include: Did not finish school, High school diploma or G.E.D., Attended college but did not complete degree, Associates degree, Bachelor's degree, Master's degree, or Doctoral or professional degree. This question is immediately followed by an automatic classifier that labels any student whose parent(s) have completed less than a bachelor's degree as a first-generation student. This label served as the operational definition for first-generation students for this study.

Data Collection

Data needed for the study is currently present at the Office for Institutional Research and Assessment (OIRA) at the university being studied. Communications with leadership in OIRA verified that this was the case and that the information was provided when requested.

Data Analysis

Data exploration was completed in alignment with the proposed research questions. The open source statistical computer program, R version 3.3, was used to complete the analysis. R has grown in popularity in the last decade to the point that in 2015 it was the second most frequently used statistical tool for research publication (Muenchen, 2015). The open source and online publication capability of this program also allows for an ease of replication and expanded visibility into the analytical techniques utilized during the research process. Finally, because R is

computer language, subsequent years of data can be easily added to the dataset and the analysis

rerun using the code created during this analysis.

Data integrity was examined through several sources. Measures of central tendency along

with descriptive statistics were generated to better understand the variables and allowed for the

identification of any data cleansing necessary prior to beginning statistical procedures.

Research Question 1

In addressing the first question that centered on the differences between first-generation

and non-first-generation students' perspectives on the level of supportive environment, an

independent samples t-test was employed. By means of the methodology discussed previously, a

supportive environment engagement indicator composite score was generated for each student.

The normality of these scores, serving as the dependent variable, was examined to determine its

appropriateness for the two-independent sample t-test analysis.

The samples were then divided into two groups, non-first-generation and first-generation

students to allow for comparison of engagement indicator scores. The hypothesis for this analysis

was that first-generation students would perceive the campus as less supportive, resulting in

lower than average scores with μ_1 being non-first-generation and μ_2 being first-generation. The

null hypothesis was H_0: $u_1 - u_2 = 0$, or that no difference between the sample means is present and

the alternative hypothesis (H_a) $u_1 - u_2 \neq 0$ or that u_1 is not the same as u_2.

Two assumptions were met prior to completing the analysis: (1) that the samples are

independent and (2) the variances of the two populations are equal or homogeneity of variance

assumption (Hinkle, Wiersma, & Jurs, 2003). The first assumption was met by the process of

dividing the sample by the first-generation variable with no individuals be included in both

groups. The homogeneity of variance assumption was tested using a Levene's test. The

Levene's test result was interpreted with a *p* value higher than .05 meaning the homogeneity

variance has been satisfied or that the null hypothesis, that the variances in the populations from

which the samples were selected are assumed equal, can fail to be rejected (Hinkle, Wiersma &

Jurs, 2003).

After the homogeneity variance assumption was met, the level of significance, the

probability of making Type I error, was established at a .05 level. The degree of freedom needed

to seek appropriate critical values is computed as $n_1 + n_2 - 2$ (Hinkle, Wiersma, & Jurs, 2003).

When interpreting the output of the *t*-test, if the resulting value is higher than the established

critical value, rejection of the null hypothesis occurs meaning that non-first-generation students

perceive the university as having a more supportive environment.

To further explore any differences that might be present between first and non-first-

generations perceptions on the level of supportive campus present the individual measures used

to generate the benchmark mark score were also compared using the same *t*-test procedure

described above. Due to having several dependent variables a Bonferroni correction was used to

determine if significant variances were present. This process requires dividing the chosen

significance level by the number of dependent variables in order to guard against the increase

likelihood of committing Type I error. This analysis includes a significance level of .05 which

was then divided by six resulting in an adjusted significance level of .008 to be used for

interpreting the *t*-test results for the individual variables used to generate the supportive

environment benchmark score.

Research Questions 2

The second research question focused on how variables measuring levels of emphasis

placed on supportive environment factors affected student outcomes for first and non-first-

generation students after controlling for other student level variables. The analytical technique used to answer this question was multiple linear regression. In addition to the assumptions discussed in Research Question 1 above, a number of assumptions particular to multiple linear regression were addressed.

A linear relationship between the dependent and independent variables needed to be determined. This was done through an examination of residual plots. Similarly, homoscedasticity, which is the assumption that the standard error of the estimate of the conditional distributions are equal (Hinkle, Wiersma, & Jurs, 2003), was assessed using the same graph to determine if the residuals are randomly scattered around 0. As for multicollinearity, variance inflation factors (VIF) were calculated for each of the independent variables. VIF values for variables at or above five are considered to be problematic.

Moving forward with the analysis, multiple linear regression was used due to the nature of the question which sought to explain the relationship between student learning outcomes and perceptions of emphasis placed on supportive environment measures. A composite measure generate from four student learning outcomes variables (writing clearly and effectively, speaking clearly and effectively, thinking critically and analytically, and analyzing numerical and statistical information) served as the dependent variables with the measures associated with supportive environment as the independent variables. Several control variables were also included, which are listed below. These control, or dummy variables, were used to more discretely evaluate the relationship between the dependent and main independent variable.

- academic preparation (acadpr01)- Number of hours preparing for class (0=0, 1=1-5, 2=6-10, 3=11-15, 4=16-20, 5=21-25, 6=26-30, 7=More than 30 hours)

- co-curricular activities (concurr01) – Participating on co-curricular activities (organizations, campus publications, student government, social fraternity/sorority, etc.) (0=0, 1=1-5, 2=6-10, 3=11-15, 4=16-20, 5=21-25, 6=26-30, 7=More than 30 hours)

- cohort effect – Covers the years included in the student (2003=0, 2004=1, 2005=2, 2006=3, 2007=4, 2008=5, 2009=6, 2010=7, 2011=8

- enrollment status (enrlment) – Student is fulltime or part-time (0= less than fulltime,1=fulltime)

- international student (internat) – Whether student is international (0=No, 1=Yes)

- live now – Where student is currently living (0=On campus, 1=Residence within walking distance of campus, 2=Residence within driving distance, 3=Fraternity or sorority house)

- race – Race of the student (0 =American Indian or Alaska Native, 1 = Asian, 2=Black or African American, 3=Hispanic or Latino, 4=Native Hawaiian or Other Pacific Islander, 5=White, 6=Other, 7= Multiracial, 8=I prefer not to respond.

- sex – Institutional reported sex (0=Male , 1=Female)

- social activities (social05) – Number of hours relaxing and socializing (watching TV, partying, etc.) (0=0, 1=1-5, 2=6-10, 3=11-15, 4=16-20, 5=21-25, 6=26-30, 7=More than 30 hours)

- transfer (enter) – Transfer status (0=started here, 1=started elsewhere)

- work hours (work1)– Combines workon and workoff campus variables to one work variable tracking the number of hours students are working for pay (0=0, 1=1-5, 2=6-10, 3=11-15, 4=16-20, 5=21-25, 6=26-30, 7=More than 30 hours)

To determine if any variances in the relationship between student outcomes and emphasis placed on supportive environment measures were present between first and non-first-generation students separate regression models were completed using first-generation student data followed

by non-first-generation student data. The resulting P-values and coefficient output associated with the two models were used to identify significantly relationships between the variables included in the study and student learning outcomes. R^2 values were used to assess the overall fit of the models. The two models were then compared in order to identify differences between the two groups.

The regression models were analyzed with the null hypothesis being that supportive campus environment measures and their relationship to student learning outcomes would show no differences between first and non-first-generation students. The alternative hypothesis was that the supportive campus environment measures and their relationship with student learning outcomes varied between first and non-first-generation students.

Delimitation

The sample data that used for the study is from a single institution. While in some ways this allowed for a measure of control, it also limited generalizability of the results, meaning that even if strong relationships were discovered between first-generation-students' outcomes and perceptions of the emphasis placed on supportive environment measures, this would only hold true inside the narrow scope of the single university being analyzed.

Limitations

The data included is a result of a survey and as such relied on the accuracy of self-reported measures. While these types of measures have been found to be reliable, there remains the possibility that the data that was analyzed may be biased. However, NSSE stated that the data included satisfies criteria that allows for accuracy and that the educational gains measured are in alignment with other evidence on student accomplishment, such as achievement tests (Kuh, 2001). The models used to address the second research question included several control

variables, but is constrained by the content included in the NSSE. Consequently, variables that could have significant influence on the outcome of the results were potentially not included in the model. Lastly, NSSE staff issued the surveys based on a population file sent by participating universities. This file can either be a sample of freshmen and seniors or represent entire populations. The file for this research included the census of freshmen and seniors. Despite this potentially large population, response rates to the survey were lower than national averages, which lead to unobserved selection bias resulting in the diversity and scope of the sample being hindered, which again can reduce generalizability.

Another source of limitations is the potential lack of validity and reliability of the NSSE instrument (Campbell & Cabrera, 2011; Dowd, Sawatzky, & Korn; 2011; Porter, 2009). In large part, much of the criticism of the NSSE instrument has been directed at the composite measures used to generate the engagement benchmarks. Detractors of these composite measures state that the benchmarks are correlated and thus do not measure individual aspects of engagement, resulting in a lack of construct validity (Campbell & Cabrera, 2011; Porter, 2009). This conclusion was generated through confirmatory factor analysis that showed considerable overlap between the benchmarks (Campbell & Cabrera, 2011).

Moreover, researchers showed that the NSSE instrument lacked predictive validity. The survey, along with measures of student engagement, also included variables quantifying student outcomes. Campbell and Cabrera (2011) noted that the benchmarks were unable to predict student GPA, which is not included as a student outcome measure in the survey. However, this suggests that the instrument cannot be used to predict certain outcome measures, meaning predictive validity could not be verified.

Porter (2009) also noted that the Cronbach's alpha levels designed to assess the reliability of the NSSE benchmarks often fell below acceptable levels. Porter (2009) found that roughly 40 percent of the NSEE benchmarks did not meet the .70 Cronbach's Alpha level that is typically considered acceptable.

Also the data included in the analysis was derived from a single institution. Meaning the generalizability of the research findings to other institutions is limited. This is especially true for university that are not in the same Carnegie classification of doctoral university with high research activity as is the case for the university being studied.

The analysis was also limited due to the low response rate of seniors, the target demographic of this research, with an average rate of roughly 15 percent of those surveyed for the years included in the analysis. It also should be noted that do to the manner in which the data was gathered definitive knowledge on when surveyed students transferred to the university cannot be ascertained, as a result, responses may vary depending on how long students have been on campus prior to completing the survey.

Finally, the university being studied had on average rather low supportive campus environment measures. This could reduce the generalizability of the findings as most university campuses on average have higher levels of supportive campus environments meaning any conclusions drawn from the findings might only be applicable to campuses with low supportive engagement scores.

Ethical Considerations

Prior to gaining access to the data necessary to complete the analysis, the Institutional Review Board process was completed. The manner in which the data was cataloged at the OIRA makes individual identification impossible, ensuring anonymity can be maintained. To further

ensure data security, the information was stored on a password protected research-dedicated PC that includes up to date antiviral software.

Summary

This chapter included research questions, the design of the study, information about the population sample, and an overview of the statistical procedures. Data was gathered through the university's OIRA and is available as a result of the university's participation in NSSE during the periods from 2002 to 2014. The population will consist of undergraduate seniors who completed NSSE between 2002 and 2014. Significance testing and multivariate regression will be the primary statistical tools used to answer the research questions. Delimitations, limitations and ethical concerns were also discussed.

CHAPTER IV

RESULTS

Introduction

The purpose of this study was to analyze the relationship between supportive campus

measures and student learning outcomes for first- and non-first-generation students to determine

if variances were present. In doing so the study addressed the following two questions:

Q1: Do first-generation students' perspectives on the level of supportive campus

environment differ significantly from those of non-first-generation students?

Q2: Do first-generation students' perspectives on the level of supportive campus

environment affect student learning outcomes differently from non-first-generation

students after controlling for other student characteristics?

This chapter details the findings of the data analysis used to address the above research

questions across two sections. The chapter begins with analysis and results used to answer the

first research question aimed at quantifying differences between perceptions of environmental

support measures of first-generation versus non-first-generation students. The final section

presents the results of the regression analysis used to quantify the effects of environmental

support measures on student learning outcomes.

Research Question 1

The first research question was designed to compare first- and non-first-generation

students' support campus environment measures. In order to properly address this question

homogeneity of variance of the two samples must be determined. This was accomplished

through the Levene's Test for Homogeneity of variance. The results showed a p-value of .14

surpassing the .05 necessary to meet the assumption of equal variances. Normality of the two

samples was also addressed through Fisher-Pearson coefficient of skewness that assesses the symmetrical shape of the data with output below -.5 indicating highly left-skewed data and output above .5 indicating data highly skewed to the right. The skewness output for the supportive campus benchmark for non-first-generations students was .026 and for first-generation student data the skewness was .016 indicating both samples represented normally shaped datasets.

The results of the two-independent sample t-test designed to assess if significant differences between the supportive campus benchmark scores for first-generation versus non-first-generation students. The test resulted in a p-value of .945, suggesting that a significant difference between composite benchmark scores for two groups was not present. As a result, the analysis failed to reject the null hypothesis that first-generation students perceive their campus environments as less supportive than non-first-generation students.

The individual variables contributing to the supportive campus benchmark were also analyzed to determine if scores from each of the six variables comprising the benchmark were related to first-generation status. The same process was used as described for the composite benchmark measure with independent t-tests being used for each of the six contributing variables. A Bonferroni correction of the p-value was necessary due to the multiple dependent variables increasing the likelihood of type I error which falsely rejects the null hypothesis. This correction divides the p-value by the number of dependent variables to account for this increase resulting in a p-value level of significance of .008. The results are given in table 4.1 and show first-generation students perceiving significantly less support to be involved socially than non-first-generation students and believing their relationships with other students are significantly worse than their non-first-generation peers, though differences in both case were rather small.

Table 4.1

t-test Results for Individual Supportive Campus Variables

Variable	P-Value	Average First Generation	Average Non-First Generation
envsuprt	.42	2.7	2.7
envsocal**	.003	2.0	2.1
envstu**	.000	5.3	5.6
envnacad	.80	1.7	1.7
envfac	.8	5.1	5.1
envadm	.02	4.1	4.3

***p < .001, **p < .008, *p < .01

Research Question 2

The second research question focused on if supportive campus environment measures effected student learning outcomes. The statistical technique used to address this question was multiple regression. Several assumptions were again met prior to completing the analysis. Tests of the variables included in the study for normality and multicollinearity revealed that the highest variance inflation factor (VIF) was 1.34, indicating that none of the variables included in the analysis showed signs of multicollinearity and as a result no variables were removed from the final model. A linear relationship between the dependent and independent variables was assessed using residual plots which showed consistent variability of the student learning outcome dependent variable across all the independent variables included in the analysis. Furthermore, consistency of error variance was evaluated both by creating a histogram of residual values and through use of the Breusch-Pagan test. The histogram of residual values showed a clear normal pattern. The Breusch-Pagan test, which assesses the degree to which modelling errors were uncorrelated and uniform, deploys Chi-Square as the evaluation procedure with p-values below .05 allowing for the rejection of the null hypothesis of homoscedasticity thus verifying the assumption of heteroscedasticity. The results of this test showed a value well below the .05 threshold resulting in the rejection of the null hypothesis and equal variances of the error terms to

be assumed.

Prior to beginning the regression analysis correlation tables were generated for both first-
and non-first-generation students in order to identify relationships between the variables included
in the study. The results are seen in tables 4.2 and 4.3.

Table 4.2
Bivariate Correlations between First-Generation Student Learning Outcomes and Studied Independent
Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Student learning outcome											
2. Academic prep	.11										
3. Co-Curricular activities	.04	.01									
4. Transfer	.00	.03	-.22								
5. Enrollment status	.05	.10	.13	-.15							
6. International student	.04	.07	.01	.09	.01						
7. Live now	.00	-.04	-.10	.20	-.10	.01					
8. Race	.03	.00	-.05	.05	-.03	.02	.00				
9. Supportive campus environ.	.47	.01	.15	.00	.04	.08	-.04	.03			
10. Social activities	-.02	-.01	.06	-.13	.00	.00	-.09	.00	.04		
11. Cohort effect	.00	.06	.03	-.02	.08	.00	.02	.00	.07	.05	
12. Work hours	.06	-.16	-.04	.10	-.24	.05	.14	.01	-.02	.10	-.09

Table 4.3
Bivariate Correlations between Non-First-Generation Student Learning Outcomes and Studied
Independent Variables

	1	2	3	4	5	6	7	8	9	10	11
1. Student learning outcome											
2. Academic prep	.11										
3. Co-Curricular activities	.11	.05									
4. Transfer	-.06	.00	-.22								
5. Enrollment status	.03	.07	.08	-.13							
6. International student	.00	.01	-.02	.06	.00						
7. Live now	.00	-.07	-.07	.15	-.10	-.02					
8. Race	.03	-.02	.01	-.02	.00	-.06	.03				
9. Supportive campus environ.	.44	.05	.16	-.04	.05	-.04	-.05	.02			
10. Social activities	.02	-.05	.03	-.06	.04	-.06	-.04	.01	.01		
11. Cohort effect	.06	.08	.03	-.05	.05	-.05	-.01	.00	.08	.02	
12. Work hours	.00	-.09	-.09	.12	-.22	.12	.14	-.01	-.02	-.10	.07

The results indicated that the supportive campus benchmark for both first- and non-first-generation students had by far the strongest correlations with student outcomes at .47 and .44 respectfully. Outside of the supportive campus benchmark no other variables had even moderate correlations with student outcomes. For both groups working longer hours was correlated with attending part-time and being a transfer student had a negative relationship with being involved in co-curricular activities, however both correlations were rather weak.

Moving forward with the regression models, to better understand the explained variance contribution of the independent measures, the variables were added through a four-step process. First, only variables quantifying demographic characteristics were used. This was followed by the addition of NSSE variables excluding the supportive campus environment measures. The NSSE benchmark measuring supportive campus environment was then added. Finally, the supportive campus environment benchmark was decomposed and the individual variables used to generate the benchmark were added to the analysis. The results of this four-step process are seen in tables 4.4, 4.5, 4.6 and 4.7.

The results of the analysis for the first model produced limited explanatory power with adjusted R-squared levels for both first-generation and non-first-generation students at .01, or 1 percent of the variance in learning outcomes explained by the independent variables. The year or cohort effect variables produced the most consistently significant relationships with student learning outcomes for both first- and non-first-generation students, meaning that variances in outcomes are influence by the year from which these data were produced.

Moving forward to the second model, the addition of non-supportive campus NSSE variables including academic preparation, co-curricular activities, living location, hours of social

Table 4.4
Regression Model Results Including only Demographic Variables

Predictor Variables	First-Generation				Non-First-Generation			
	Unstand Coeff	StndC oeff	Stnd Error	Sig	Unstand Coeff	Stnd Coeff	Stnd Error	Sig
transfer student (enter)								
Started here=0								
Started elsewhere=1	.6187	0.027	.047		-2.739	-0.124	.037	***
enrollment status								
Fulltime=0								
Less than fulltime=1	3.529	0.156	.072	*	1.924	0.087	.064	
international student								
No=0								
Yes=1	8.217	0.362	.163	*	3.799	0.172	.125	
race								
White=0								
African American=1	.457	0.020	.091		1.855	0.084	.037	
Hispanic=2	.129	0.006	.174		-3.686	-0.167	.173	
Other=3	-4.670	-0.206	.075	**	-3.185	-0.144	.052	**
sex								
Male=0								
Female=1	2.200	0.097	0.047	*	-.925	-0.042	.032	
cohort effect								
2003 = 0								
2004 = 1	.7966	0.035	.145	*	-.888	-0.040	.103	
2005 = 2	7.296	0.322	.132	*	4.145	0.188	.095	*
2006 = 3	7.835	0.345	.141	*	3.911	0.177	.096	
2007 = 4	7.360	0.324	.132	**	2.830	0.128	.096	
2008 = 5	7.487	0.330	.121	**	5.112	0.232	.086	**
2009 = 6	9.123	0.402	.123	**	5.323	0.241	.088	**
2010 = 7	8.583	0.378	.120	**	5.390	0.244	.087	**
2011 = 8	7.623	0.336	.122	**	5.152	0.233	.088	**
Intercept Term	-.207	-0.511	.099		-.510	-0.207	.129	
Adjust R Squared	.01				.01			

***p < .001, **p < .01, *p < .05

Table 4.5
Regression Model Results Including Demographics and Non-Supportive Environment NSSE Variables

Predictor Variables	First-Generation				Non-First-Generation			
	Unstand. Coeff	Stnd. Coeff	Stnd. Error	Sig	Unstand. Coeff	Stnd. Coeff	Stnd. Error	Sig
academic preparation (acad01)								
Zero -15 hours = 0								
11-15 hours = 1	2.671	0.118	1.431		3.341	0.151	0.933	***
16-20 hours = 2	2.289	0.101	1.542		5.235	0.237	1.054	***
More than 20 hours = 3	5.799	0.256	1.412	***	6.113	0.277	0.992	***
co-curricular activities (concurr01)								
Zero hours = 0								
1-5 hours = 1	2.689	0.119	1.273		2.795	0.127	0.896	**
6-10 hours = 2	0.838	0.037	1.867		4.406	0.200	1.133	***
More than 10 hours = 3	2.915	0.128	1.907		5.635	0.255	1.158	***
transfer student (enter)								
Started here=0								
Started elsewhere=1	1.066	0.047	1.150		-1.907	-0.086	-2.236	*
enrollment status								
Less than fulltime=0								
Fulltime=1	2.277	0.100	1.722		1.013	0.046	0.692	
international student								
No=0								
Yes=1	7.610	0.335	3.072	*	3.706	0.168	1.345	
live now								
Dormitory, within walking = 0								
Driving distance = 1	0.339	0.015	1.316		0.657	0.030	0.859	
Frat/Sorority house = 2	-0.697	-0.031	3.823		-2.356	-0.107	-1.064	
race								
White = 0								
African American = 1	0.267	0.012	2.105		0.969	0.044	0.520	
Hispanic = 2	-.078	-0.003	3.957		-4.202	-0.190	-1.105	
Other = 3	-5.037	-0.222	1.717	**	-3.301	-0.150	-2.878	**
sex								
Male=0								

Table 4.5 continued
Regression Model Results Including Demographics and Non-Supportive Environment NSSE Variables

Predictor Variables	First-Generation				Non-First-Generation			
	Unstand. Coeff	Stnd. Coeff	Stnd. Error	Sig	Unstand. Coeff	Stnd. Coeff	Stnd. Error	Sig
Female=1	2.200	0.097	1.089	*	-0.848	-0.038	-1.174	
social activities								
Zero -10 hours = 0								
11-15 hours = 1	1.015	0.045	1.358		1.764	0.080	1.789	
16-20 hours = 2	0.853	0.038	1.544		0.967	0.044	0.899	
More than 20 hours = 3	-0.011	0.000	1.588		1.226	0.056	1.193	
work								
Zero -5 hours = 0								
6-20 hours = 1	0.272	0.012	1.565		0.504	0.023	0.553	
21-30 hours = 2	0.395	0.017	1.501		0.889	0.040	0.915	
More than 30 hours = 3	-0.072	-0.003	1.550		1.814	0.082	1.542	
cohort effect								
2003 = 0								
2004 = 1	1.155	0.051	3.308		-0.475	-0.022	-0.209	
2005 = 2	7.639	0.337	3.001	*	4.547	0.206	2.175	*
2006 = 3	7.689	0.339	3.214	*	4.109	0.186	1.936	
2007 = 4	7.152	0.315	2.995	*	3.212	0.145	1.518	
2008 = 5	7.588	0.334	2.760	**	5.028	0.228	2.643	**
2009 = 6	9.299	0.410	2.816	***	5.417	0.245	2.784	**
2010 = 7	8.578	0.378	2.730	**	5.314	0.241	2.795	**
2011 = 8	7.458	0.329	2.793	**	4.811	0.218	2.491	*
Intercept Term	52.726	-0.656	3.524		55.068	-0.507	2.550	
Adjust R Squared			.02				.03	

$***p < .001, **p < .01, *p < .05$

Table 4.6
Regression Model Results Including all Predictor Variables

Predictor Variables	First-Generation				Non-First-Generation			
	Unstand. Coeff	Stnd. Coeff	Stnd. Error	Sig	Unstand. Coeff	Stnd. Coeff	Stnd. Error	Sig
academic preparation (acad01)								
Zero -15 hours = 0								
11-15 hours = 1	2.576	0.114	1.272	*	3.030	0.137	0.843	***
16-20 hours = 2	3.387	0.149	1.371	*	4.934	0.224	0.952	***
More than 20 hours = 3	5.421	0.239	1.256	***	5.138	0.233	0.897	***
co-curricular activities (concurr01)								
Zero hours = 0								
1-5 hours = 1	0.206	0.009	1.137		-0.001	0.000	0.815	
6-10 hours = 2	-1.413	-0.062	1.663		1.178	0.053	1.029	
More than 10 hours = 3	-2.077	-0.092	1.710		0.605	0.027	1.060	
transfer (enter)								
Started here=0								
Started elsewhere=1	-0.268	-0.012	1.024		-2.372	-0.107	0.770	**
enrollment status								
Less than fulltime=0								
Fulltime=1	2.178	0.096	1.531		0.577	0.026	1.322	
international student								
No=0								
Yes=1	1.247	0.055	3.303		-0.217	-0.010	2.493	
live now								
Dormitory, within walking = 0								
Driving distance = 1	1.663	0.073	1.171		1.163	0.053	0.691	
Frat/Sorority house = 2	-0.137	-0.006	3.398		-2.611	-0.118	2.000	
race								
White = 0								
African Amer. = 1	-1.079	-0.048	1.872		-2.125	-0.001	1.685	
Hispanic = 2	0.700	0.031	3.517		-0.020	-0.131	3.433	
Other = 3	-3.087	-0.136	1.528	*	-2.901	-0.096	1.037	*

Table 4.6 continued
Regression Model Results Including all Predictor Variables

Predictor Variables	First-Generation				Non-First-Generation			
	Unstand. Coeff	Stnd. Coeff	Stnd. Error	Sig	Unstand. Coeff	Stnd. Coeff	Stnd. Error	Sig
supportive environment benchmark	0.598	0.465	0.027	***	0.556	0.433	0.019	***
sex								
Male=0								
Female=1	0.814	0.036	0.970		-1.849	-0.084	0.654	**
social activities								
Zero -10 hours = 0								
11-15 hours = 1	-0.397	-0.018	1.209		1.282	0.058	0.891	
16-20 hours = 2	-0.741	-0.033	1.374		0.426	0.019	0.972	
More than 20 hours = 3	-1.823	-0.080	1.414		0.943	0.043	0.928	
cohort effect								
2003 = 0								
2004 = 1	-0.531	-0.023	2.940		-0.657	-0.030	1.877	
2005 = 2	5.811	0.256	2.668	*	4.752	0.215	2.052	*
2006 = 3	5.423	0.239	2.858		3.308	0.150	1.888	
2007 = 4	5.759	0.254	2.662	*	2.730	0.124	1.917	
2008 = 5	5.451	0.240	2.454	*	4.443	0.201	1.911	**
2009 = 6	6.224	0.274	2.506	*	4.802	0.218	1.719	**
2010 = 7	5.342	0.235	2.431	*	3.488	0.158	1.757	*
2011 = 8	4.516	0.199	2.486		2.710	0.123	1.719	
work hours								
Zero -5 hours = 0								
6-20 hours = 1	-1.200	-0.053	1.393		-0.421	-0.019	0.823	
21-30 hours = 2	0.178	0.008	1.334		0.433	0.020	0.878	
More than 30 hours = 3	-0.563	-0.025	1.378		1.462	0.066	1.063	
Intercept Term	32.209	-0.396	3.268		35.585	-0.277	2.397	
Adjusted R Squared			.23				.21	

*** $p < .001$, ** $p < .01$, * $p < .05$

Table 4.7
Regression Model Results Including all Variables with Benchmark Variable Disaggregated

Predictor Variables	First-Generation				Non-First-Generation			
	Unstand. Coeff.	Stnd. Coeff.	Std. Error	Sig.	Unstand. Coeff.	Stnd. Coeff.	Stnd. Error	Sig.
academic preparation (acad01)								
Zero -15 hours = 0								
11-15 hours = 1	2.325	0.102	1.271		2.948	0.134	0.838	***
16-20 hours = 2	3.299	0.145	1.368	*	4.884	0.221	0.948	***
More than 20 hours = 3	4.905	0.216	1.257	***	4.619	0.209	0.897	***
co-curricular activities (concurr01)								
Zero hours = 0								
1-5 hours = 1	0.021	0.001	1.142		-0.537	-0.024	0.816	
6-10 hours = 2	-1.725	-0.076	1.683		0.368	0.017	1.036	
More than 10 hours = 3	-1.846	-0.081	1.728		-0.034	-0.002	1.071	
transfer (enter)								
Started here=0								
Started elsewhere = 1	0.347	0.015	1.027		-1.728	-0.078	0.771	*
enrollment status								
Less than fulltime=0								
Fulltime=1	1.548	0.068	1.531		0..704	0.032	1.317	
international student								
No=0								
Yes=1	2.575	0.113	3.289		0.291	0.013	2.480	
live now								
Dormitory, within walking = 0								
Driving distance = 1	1.564	0.069	1.167		0.986	0.045	0.687	
Frat/Sorority house = 2	0.901	0.040	3.395		-3.133	-0.142	1.995	
race								
White = 0								
African American = 1	-0.521	-0.023	1.872		0.540	0.024	1.678	
Hispanic = 2	0.831	0.037	3.512		-1.456	-0.066	3.417	
Other = 3	-3.021	-0.133	1.523	*	-1.671	-0.076	1.032	

Table 4.7 continued
Regression Model Results Including all Variables with Benchmark Variable Disaggregated

	First-Generation				Non-First-Generation			
Predictor Variables	Unstand. Coeff.	Stnd. Coeff.	Std. Error	Sig.	Unstand. Coeff.	Stnd. Coeff.	Stnd. Error	Sig.
sex								
Male=0								
Female=1	0.738	0.033	0.967		-2.238	-0.101	0.653	***
social activities								
Zero -10 hours = 0								
11-15 hours = 1	-0.029	-0.001	1.203		1.184	0.054	0.886	
16-20 hours = 2	-0.669	-0.029	1.371		0.408	0.018	0.969	
More than 20 hours = 3	-1.900	-0.084	1.406		0.598	0.027	0.926	
cohort effect								
2003 = 0								
2004 = 1	-0.258	-0.011	2.925		-0.766	-0.035	2.041	
2005 = 2	5.965	0.263	2.657	*	4.878	0.221	1.877	**
2006 = 3	4.506	0.199	2.845		3.301	0.150	1.907	
2007 = 4	5.532	0.244	2.648	*	2.861	0.130	1.901	
2008 = 5	5.029	0.222	2.451	*	4.550	0.206	1.712	**
2009 = 6	6.168	0.272	2.502	*	4.757	0.215	1.749	**
2010 = 7	5.630	0.248	2.424	*	4.074	0.185	1.712	*
2011 = 8	4.508	0.199	2.477		2.849	0.129	1.738	
work hours								
Zero -5 hours = 0								
6-20 hours = 1	-1.258	-0.055	1.388		-0.429	-0.019	0.818	
21-30 hours = 2	-0.082	-0.004	1.329		0.363	0.016	0.874	
More than 30 hours = 3	-0.830	-0.037	1.374		1.840	0.083	1.059	
envsuprt								
0 = Very little								
1	10.895	0.480	1.961	***	9.662	0.438	1.386	***
2	15.778	0.695	2.041	***	15.353	0.695	1.444	***
3 = Very much	24.103	1.062	2.344	***	21.792	0.987	1.666	***
envstu								
0 = Unfriendly								
1	1.495	0.066	1.134		4.296	0.195	0.790	***
2 = Friendly	4.730	0.208	1.367	***	6.164	0.279	0.892	***

Table 4.7 continued
Regression Model Results Including all Variables with Benchmark Variable Disaggregated

Predictor Variables	First-Generation				Non-First-Generation			
	Unstand. Coeff.	Stnd. Coeff.	Std. Error	Sig.	Unstand. Coeff.	Stnd. Coeff.	Stnd. Error	Sig.
envfac								
0 = Unavailable								
1	3.609	0.159	1.302	**	2.169	0.098	0.887	*
2	7.228	0.319	1.417	***	4.146	0.188	0.948	***
3 = Available	10.101	0.445	1.817	***	5.740	0.260	1.239	***
envsocal								
0 = Very little								
1	3.526	0.155	1.232	**	2.384	0.108	0.849	**
2	5.322	0.235	1.580	***	3.752	0.170	1.049	***
3 = Very much	12.687	0.559	2.579	***	8.005	0.363	1.735	***
envacad								
0 = Very little								
1	0.119	0.005	1.175		0.455	0.021	0.775	
2	3.165	0.140	1.889		4.116	0.186	1.247	***
3 = Very much	0.139	0.006	2.843		4.454	0.202	2.218	*
envadm								
0 = Unhelpful								
1	1.453	0.064	1.337		3.185	0.144	0.892	***
2	2.410	0.106	1.416		3.994	0.181	0.948	***
3 = Helpful	1.057	0.047	1.476		3.469	0.157	1.009	***
Intercept Term	33.930	-1.485	3.553		35.901	-1.376	2.595	
Adjusted R Squared			.24				.22	

$***p < .001, **p < .01, *p < .05$

activities and hours working, did very little to improve the overall fit of the model. Adjusted R-squared measures increased to 2 and 3 percent of variance explained for first- and non-first-generation students. Differences between the two groups centered on two variables: academic preparation and participation in co-curricular activities. Academic preparation proved to have a highly significant relationship at all levels for non-first-generation students, but only at the highest level of first-generation students. Participation in co-curricular activities had no statistical relationship with student learning outcomes for first-generation students, but was highly significant (p-value < .01) at all levels for non-first-generation students.

Once the supportive campus environment benchmark was added, the models improved significantly as seen in table 4.8. First-generation students' learning outcome variance explained increased to 23 percent and non-first-generation student variance explained grew to 21 percent. The supportive campus benchmark had a highly significant relationship with student learning outcomes, with a p-value of less than .001, and represented by far the largest standardized coefficient for both groups. In this third model, the only other variable that had consistently significant relationships with the dependent variable for both groups was academic preparation. Co-curricular activities had no statistical significance for either group and the overall significance of the cohort variable was greatly reduced. However, for non-first-generation students, being a transfer student or female still had significant negative effects on student learning outcomes.

The last model included a disaggregation of the six supportive campus environment measures used to generate the benchmark score. The model produced almost identical R-squared totals with 24 percent of the variance explained for first-generation and 22 percent for non-first-generation students. However, pattern variances were seen in the statistical

Table 4.8
Model Adjusted R Squared Results (Variance Explained)

	First-Generation Adjusted R-Squared	Non-First-Generation Adjusted R-Squared
Model 1: Demographics	.01	.01
Model 2: Demo+Non-Environ NSSE Items	.02	.03
Model 3: Demo+All NSSE Items	.23	.21
Model 4: Demo+All NSSE Items (Environment Benchmark Decomposed)	.24	.22

relationships of these six variables and the student learning outcomes for the two groups, meaning that different supportive campus environment variables influenced student learning outcomes for first-generation and non-first-generation students. Non-first-generation students had highly significant relationships with student learning outcomes at every level for the variable measuring the quality of relationships with administrative or office personnel (envfac), as compared to first-generation students, who had none at any level. Similarly, non-first-generation students showed significant relationships for the level of support for managing nonacademic responsibilities (envnacad) but again no relationship was seen for first-generation students.

In noting similarities, both models indicated that support to help students succeed academically appeared to be the most important supportive campus environment factor, with consistent levels of high significance throughout the variable and larger standardized coefficients than any other variables included in the models. Relationships with faculty were also significant at all levels for both groups, with first-generation students showing higher standardized coefficients than that of non-first-generation students, meaning that high-quality relationships could have more of a positive impact on learning outcomes for first-generation students. Relationships with other students were significant for both groups, but at only the

highest level for first-generation students as compared to both levels for non-first-generation students. Finally, several variables proved to have almost no relationship for either group, suggesting these variables did not impact student learning outcomes. These included: number of hours worked, race, number of hours spent on co-curricular activities, and part-time versus full-time enrollment.

Lastly, to further explore any potential differences between first- and non-first-generation students, analysis was conducted with the composite dependent variable measuring student learning outcomes deconstructed. This allowed for individual regression models for each of the four measures for both first- and non-first-generation students to be completed and compared. The results showed very little difference in the relationship patterns between first- and non-first-generation students and the individual learning outcome gains. Consequently, no additional insight into pattern differences between the two groups could be gained.

CHAPTER V

DISCUSSION AND CONCLUSION

Introduction

First-generation students vary from non-first-generation students in several ways, including demonstrating lower levels of student engagement (Choy, 2001; Pike & Kuh, 2005; Ishitani, 2006). This phenomenon is present even though student engagement in academic and social activities has proven to contribute to a wide variety of positive educational outcomes, including increased student learning outcomes in areas such as critical thinking, quantitative reasoning, and reading and writing (Lewis, Hueber, Malone, & Valois, 2010; Miller & Butler, 2010; Ishitani & McKitrick, 2010; Bruggink & Siddiqui, 1995). The positive effects of engagement are also potentially greater for first-generation populations when compared to their peers, making student engagement an ever more important factor for first-generation student learning outcomes (Filkins & Doyle, 2002; Kuh, 2001). In working to understand this variance between first- and non-first-generation student engagement levels, researchers have suggested that lower levels of social capital, or first-generation students having less awareness on how to effectively interact with university environments, could be a contributing factor (Coleman, 1988; Pascarella, Pierson, Wolniak & Terenzini, 2004). A potential solution is for institutions to establish highly supportive campus environments that could increase first-generation student engagement by helping reduce the impact of lower levels of social capital.

Supportive campus environment factors have been demonstrated to increase levels of student engagement leading to increased student learning outcomes (Fleming, 1985; Martin, 1990; Pascarella & Terenzini, 1995, 2005; Tinto, 1993, 2002). However, while studies are present that focus on the importance of supportive campus environments and student learning

outcomes for undergraduate students at large (Filkins & Doyle, 2002; Pike & Kuh, 2005), no studies are available that specifically identify and analyze the relationship varying levels of supportive environment measures have on learning outcomes for first-generation students when compared to non-first-generation students. Consequently, it was the goal of this research to better understand the relationship between student learning outcomes and supportive campus environment measures for first-generation as compared to non-first-generation students in order to providing actionable information to increase first-generation engagement. In doing so, the following research question guided this study:

Q1: Do first-generation students' perspectives on the level of supportive campus environment differ significantly from those of non-first-generation students?

Q2: Do first-generation students' perspectives on the level of supportive campus environment affect student learning outcomes differently from non-first-generation students after controlling for other student characteristics?

The design of the study was quantitative and utilized data covering a ten-year period from 2003 to 2012 from a large public research university in the southeast. These data were the result of this university's participation in the National Survey on Student Engagement (NSSE) during that period. The sample included 1,844 first-generation and 3,796 non-first-generation seniors. The dependent variables used in the analysis was a composite measure of four student learning outcome variables, including: student gains in writing, quantitative reasoning, analytical thinking, and speaking. The main independent variables were the supportive campus environment measures including: support to succeed academically, support to be involved socially, support for managing other non-academic responsibilities, quality of relationships with students, quality of relationships with faculty, and relationships with administrative or office

personnel. Numerous additional control and demographics variables were also included in the analysis. The methodology used involved a two-sample *t*-test to address the first question centered on determining if differences between supportive campus benchmarks were present. A series of regression models were developed to address the second question in order to identify variances in the relationship between student learning outcomes and supportive campus environment variables for first-generation students when compared to non-first-generation students. The following chapter will provide a summary of the study findings, a discussion of these findings and their implications, an overview of the conclusions, and end with recommendations for future research.

Summary of Findings

Research Question 1

In answering this research question, a supportive campus benchmark score was generated for both first- and non-first-generation students included in the sample. This score was used as an aggregate measure of students' perception on the quality of the supportive environment present on campus. The benchmark included six NSSE variables that gauged students' viewpoints on various supportive campus environment factors. Once the sample was divided into first- and non-first-generation students, the benchmark score for each group was the focal point in determining if significant differences between the groups was present. The results of the two-independent sample *t*-test indicated a p-value above .05, meaning variances between the two groups were marginal and that no significant difference between first-generation and non-first-generation students' supportive campus benchmark scores could be identified.

However, when the six individual variables contributing to the benchmark scores were analyzed using the same procedure, differences between first- and non-first-generation students

were discovered. Specifically, two of the six measures, perception of support for social

activities (envsocal) and the quality of relationships with other students (envstu), both had

statistically significant lower values for first-generation when compared to non-first-generation

students, suggesting that differences in perspectives on supportive campus environment

measures were present between the two groups.

Support for involvement socially (envsocal) measures students' belief that effective

mechanisms are in place to allow for social integration into college environments. According to

the findings, fewer first-generation students believed this to be true when compared to non-first-

generation students. Similarly, quality of relationships (envstu) with other students is a measure

of the extent to which students believe they have low or high-quality relationships with their

fellow classmates. Again, first-generation students believed they had lower-quality

relationships with their peers than those of non-first-generation students.

Research Question 2

In total, four regression models were developed to address the second research question.

In the final two regression models, which included all the possible independent variables, the

supportive campus environment benchmark was significantly related to student learning

outcomes (p-value < .001). Additionally, no other variable had higher standard coefficients for

either first- or non-first-generation students than the supportive campus benchmark. Also, by

adding the variables in blocks, the contribution of groups of independent variables was able to

be measured. As was seen in table 4.8, a large increase in the total explained variance in student

learning outcomes for both first- and non-first-generation student learning outcomes occurred as

a result of adding the supportive campus environment measures into the regression models.

Without the inclusion of the supportive campus environment measures, the highest level of

explained variance in the dependent student learning outcome variable was 2 percent for first-generation and 3 percent for non-first-generation. Once the supportive campus environment variables were added, the variance explained increased to 24 percent for first-generation and 22 percent for non-first-generation students, suggesting that these variables alone explained roughly 20 and 19 percent respectively of the total variance seen in learning outcome levels. Meaning that despite the overall explanatory power of the model being rather low, it can be determined that supportive campus environments are critically important to student learning outcomes for both first- and non-first-generation students explaining a fifth of the total variance. Moreover, the coefficients were positive, suggesting that as supportive campus environments improve so do student learning outcomes.

Initially, the results indicated that no variances between the groups and the impact supportive campus environment benchmark scores had on student learning outcomes could be identified. However, once the variables comprising the supportive campus benchmark were disaggregated, differences between first and non-first-generation students became clear. Pattern variances between first-generation and non-first-generation centered primarily on two of the six supportive campus environment measures: support for dealing with other non-academic responsibilities (envnacad) and the quality of relationships with administrative and office personnel (envadm). First-generation students' perspectives on support of dealing with non-academic responsibilities had no statistically significant relationships with learning outcomes at any level, as compared to non-first-generation students who had significant relationships with learning outcomes on two of the three possible factor levels. Non-first-generation standardized coefficients were also consistently larger at all levels of the variable. These finding suggested that regardless of whether universities have exceptionally high or low levels of support for

managing non-academic responsibilities, no impact on first-generation learning outcomes would be seen and that the opposite would be true of non-first-generation students.

This divergence was even more pronounced for the variable designed to measure the quality of relationships with university administrative and office personnel (envadm). Administrative relationships were rated on a scale from one to seven, with one being low quality and seven being high-quality. As was the case with many of the variables in the study envadm was refactored into a four-level variable based on the quartile distribution. In this format, non-first-generation students proved to have highly significant (p-value < .001) associations with the quality of relationships with administrative personnel at every factor level, as compared to first-generation students who showed no significant relationships at any level. Non-first-generation standardized coefficients were also again consistently higher than those of first-generation students. This variance between the two groups can be interpreted as first-generation students learning outcomes not being impacted by the quality of the relationships they have with administrative or office personnel, as compared to non-first-generation students learning outcomes that appear to be positively impacted with increases in the quality of relationships they have with administrative or office personnel.

In addition to the supportive campus environment variables, several other variables provided insight into how first- and non-first-generation students vary in terms of factors that influenced student learning outcomes. The results for students' transfer status (enter), academic preparation (acad01) and gender all represented differences. Transfer status had a highly significant (p-value < .001) and negative effect on the student learning measure for non-first-generation students, but no relationship for first-generation students. This suggests that

transferring colleges could have a negative impact on non-first-generation students learning outcomes.

Students' academic preparation levels also had varying relationships with the dependent variable. Non-first-generation students presented with highly significant relationships (p-values < .001) at all levels of the variable, as compared to first-generation, which only showed a significant relationship at the highest variable level that aligns with 20 or more hours of academic preparation per week. The finding indicated that non-first-generation students had more significant relationships with smaller changes in the number of hours dedicated to academic preparation then did first-generation students, though overall the differences were rather small.

Lastly, being female proved to be highly significant (p-value < .01) and negative for non-first-generation students' outcomes but no relationship for first-generation students was present meaning that being female could potential negative effect non-first-generation student learning outcomes. To summarize, the results suggested that being a non-first-generation female transfer student could lead to significantly lower student learning outcomes and that first-generation students did not benefit as consistently from increasing hours of academic preparation as non-first-generation students.

Discussion

The purpose of this study was to first determine if differences existed between first- and non-first-generation students' perceptions on the level of supportive campus environment present. Analysis was also completed on the relationship between supportive campus measures and student learning outcomes for first-generation students and non-first-generation students to determine if variances were present. The first part of the study revealed that when composite

measures designed to quantify supportive campus environments are disaggregated, first-generation students view their campus as less supportive for engaging in social activities and believe their peer relationship are of lesser quality than that of non-first-generation students. This would seem to provide support for theories presented on first-generation students struggling to fully engage with the university. Specifically, Pascarella's et al,. (2004) findings demonstrated that first-generation students had lower participation rates in non-academic activities and significantly lower levels of non-course related interactions with peers. The findings of this research in combination with Pascarella's et al,. suggests that first-generation students continue to feel, at least at some level, isolation from the larger university ecosystem. This could relate to the nature of first-generation students enrollment that is defined by longer working hours, higher transfer rates and greater part-time attendance than non-first-generation students.

The second part of the analysis showed that first- and non-first-generation students had differing statistical relationships with the student learning outcomes. First-generation students' learning outcomes had no statistical connection to support for dealing with other non-academic responsibilities (envnacad) and the quality of relationships with administrative and office personnel (envadm), as compared to non-first-generation that had highly significant and consistent relationships.

In considering a rationale for why these differences were present, a review of the supportive campus environment variables is necessary. The six variables designed to measure supportive campus environment can be divided into two categories. The level of support for certain environmental factors is the first category and includes variables quantifying support to be involved socially, to succeed academically, and to identify structures for dealing with other

non-academic responsibilities. The second category of variables measures quality of relationships, including relationships with other students, faculty members, and administrative personnel and offices. Both groups of variables included measures targeting three distinct layers of the university ecosystem: social strata, academic strata, and administrative strata. The pattern differences between first- and non-first-generation students are primarily found in the administrative strata of the variables, with first-generation student learning outcomes having no relationship with these measures and non-first-generation student learning outcomes representing highly significant and consistent relationships.

This means that first-generation student learning outcomes are not impacted by varying levels of support for non-academic responsibilities and quality of relationships with administrative or office personnel, which is in direct contrast with the results seen for non-first-generation students. This is surprising, as first-generation students are often more in need of support for managing responsibilities outside of the normal scope of academic related challenges of undergraduate education. This is a result of being more likely to need financial support, have families, work longer hours, be transfer students, be attending part-time and represent a minority group (Choy, 2001) all of which could necessitate utilization of non-academic support services. Moreover, under the assumption that first-generation students were in higher need of these types of services, the relationships had with administrative personnel working to provide these services should have an impact on learning outcomes, but again there was no relationship. This paradox lends support for research focused on the consequences of first-generation students' lowered levels of social capital.

First-generation students arrive on campus with less knowledge of how to successfully navigate university landscapes, which is partly a result of not having an immediate family

member to provide guidance, or what is known as a lack of social capital (Coleman, 1988; Putham, 1995; Ferrara, 2000; Israel, et al., 2001; Kim & Schneider, 2005). Examples include foundation work by both Bourdieu (1988) and Coleman (1988) that demonstrated social capital gains can be directly related to the knowledge resident inside one's immediate family. This was also true of more contemporary analysis complete by Israel, Beaulieu and Hartless (2001) and Kim and Schneider (2005) that added measures of income variations and the impact community knowledge had on social capital development.

It is possible that this lack of social capital explains the contrasting relationship between the administrative strata of supportive campus environment variables and first-generation student learning outcomes when compared to non-first-generation students. First-generation student learning outcomes may have no statistical associations with supportive campus environment variables that are connected to university administration functions because these types of environmental factors require more intimate knowledge of university operations.

As a result, whether first-generation students have high quality relationships with administrative personnel, or not or view the level of support to be high or low for non-academic responsibilities, has no bearing on their learning outcomes because first-generation students may simply not know how to properly access and utilize administrative services designed to help them succeed. In contrast, non-first-generation students likely benefited from a parent or guardian providing direction based on their own experiences of how to effectively interact with the university and as a result showed statistically significant associations with learning outcomes.

The findings of this study also provide evidence for the importance of highly supportive campus environments for all students. The supportive campus environment variables

contributed the most to the variance explained in student learning outcomes for both first-generation and non-first-generation students by a large margin. This is consistent with research completed by Filkins and Doyle (2002) in a study focusing on the effects of engagement on first-generation students' cognitive and affective development. The authors noted that supportive campus environment variables accounted for roughly 20 percent of the overall variance across all the models included in the analysis, noting that "when students perceive their institution's environment to be supportive of their intellectual efforts, they are more likely to exhibit gains in the appropriate areas" (Filkins & Doyle, 2002, p. 15). These results are also in alignment with well-known research concentrating on student success. This includes research by Tinto (1993) that posits clear positive associations between campus integration. Tinto commented that by making social and academic activities a way of life for college students, universities can increase learning and retention. Pascarella and Terenzini (2005) in *How College Affects Students* also documented that verbal, quantitative and subject matter competence were all effected by the quality of university environments.

The analysis also reinforced the importance of faculty relationships for both groups, but especially for first-generation students. First-generation students' learning outcomes had strong statistical relationships with quality of relationships with faculty, including standardized coefficients that were nearly double those of non-first-generation students at all levels of the variable. Though faculty relationships were shown to be important for all students, given the assumption of first-generation students' lack of social capital, faculty members most likely play an even more important role in first-generation student success. This finding provides support to engagement research completed by Carini, Kuh and Klien (2006) that included results documenting that students who are less prepared to meet the challenges associated with college

life benefited more from faculty interaction on academic performance measures, such as GPA, than did their peers.

However, the results did conflict with selected items included in previous engagement research. As an example, Pike and Kuh in 2005 suggested that first-generation students reported significantly less favorable perceptions of their college environment, resulting in lower academic gains. The results of this study indicated that first-generation students were more likely to perceive their environments as less supportive for certain measures, but actually reported slightly higher gains in learning outcomes than non-first-generation students. Given that Pike and Kuh's research included a broad cross-section of institutions, it is possible that the inconsistency is a result of the focus of this research on a single institution and, as a consequence, may not be aligned with a larger national trend. Alternatively, it is possible that institutional practices have worked to close the gap in first-generation student engagement, resulting in improved outcomes for students. Future research that includes a more discrete measure of academic success, such as GPA, could work to address this question.

It is also important to note that a large percent of the variance in student learning outcomes for both groups has been left unexplained. The largest percentage of variance explained for first-generation students was 24 percent and for non-first-generation students was 22 percent suggesting the 76 percent for first- and 78 percent for non-first-generation learning outcome variance is explained by other variables not included in the model. This most likely means that some significant factors influencing student learning outcomes for both groups were not identified by this analysis. It is recommended that future research include additional variables to help better understand the total variance in student learning outcomes.

Finally, two very different populations in terms of demographics and other university-level variables such as transfer status or how students spent their time became evident. Beginning with hours worked, more than half, 52 percent, of first-generation students worked a minimum of 16 hours per week as compared to only 38 percent of non-first-generation students. First-generation students were also more likely to belong to a minority group, with 20 percent being non-white as compared to 13 percent for non-first-generation students. Possibly, as a result of the increased hours working as compared to non-first-generation students, first-generation students were also more likely be attending part-time, with 12 percent attending part-time as compared to only 7 percent of non-first-generation students. Despite none of these having a direct significant relationships with student learning outcomes it is important to recognize that these measurements painted unique student population pictures. Both Choy (2001) and Nunez and Cuccaro-Alamin (1998) found similar variances, noting that first-generation students often worked more hours and were more likely to be from minority populations. As a result, it is rational to assume that first-generation students currently entering higher education are defined by characteristics that are largely unchanged from what was described in the late 1990s and early 2000s.

Overall consistent with engagement research, supportive campus environments were closely linked to increasing student learning outcomes for both first- and non-first-generation students. However, first-generation students had more consistent and highly significant associations in relation to learning outcomes that were less directly related to university administrative structures when compared to their non-first-generation peers. This result could lend support for the theory that, as a result of reduced social capital, first-generation students are simply less aware of how to effectively interact with the administrative structures of the

university. Also, similar to previous research, student characteristics and how time is spent varies between the first and non-first-generation students, creating two rather unique student body populations.

<div align="center">**Implications**</div>

Higher Education Institutions

The National Center for Education Statistics (NCES) estimates that 30 percent of all secondary education students are first-generation (NCES, 2015). The data used in this study was gathered from several years of undergraduates who attended a large research-intensive public institution in the southeast. In alignment with the overall higher education student population, 32 percent of students included in the sample were first-generation, meaning this demographic could represent roughly a third of the student body from which the sample was drawn. Given these national trends and verification of the potential number of first-generation students on any one campus by the sample used in for this analysis it is likely that a large number of universities with similar populations of first-generation students are present and could benefit from the findings of this study.

The findings of the study indicated that when compared to the experiences of non-first-generation students, first-generation students perceived the quality of their relationships with peers to be worse and university support for engaging in social activities to be lower. Though the differences were small, the second factor is supported through the variable measuring co-curricular involvement that showed on average first-generation students spent fewer hours per week on co-curricular activities than did non-first-generation students. To confront this issue, the universities must recognize that first-generation students have unique needs when compared to the larger student population. The findings included here, and an overwhelming body of

previous research, reinforces this reality. In response, many universities are developing first-generation departments or programs in order to provide adoptive support services that serve to develop community among these students and align more directly with their unique needs.

An example of a possible approach that is tailored toward high-need students was presented by Bettinger and Baker (2011). The authors used data from over 13,000 part-time or non-traditional students who participated in coaching sessions provided by InsideTrack. InsideTrack is a private company that specializes in delivering enhanced student advising at regular intervals to not only give advice on academic registration, but also to help students develop a clear vision of their goals, provide guidance on how to connect long-term goals to daily activities, and give support to students in developing life skills, such as time management, self-advocacy, and study habits. The analysis used multiple regression inclusive of a control group of students who did not receive the services to assess the effectiveness of those students enrolled in the InsideTrack coaching program. The results showed a 15% increase in retention rates and increases in learning outcomes of those in the program after 12 months, as compared to students who did not participate. These outcomes remained, even once control variables measuring high school GPA, SAT or ACT scores, gender, place of residence, scholarships, math and English remediation were added, suggesting that the program had a significantly positive effect on this sub-population of students (Bettinger and Baker, 2011).

The results of this analysis also produced differing patterns in the relationships between supportive campus environment measures and student learning outcomes for first- and non-first-generation students. This was especially true between university support for dealing with other nonacademic activities and the quality of relationships with administrative personnel. The lack of a significant relationship between support for non-academic activities has rather direct

implications. In consideration that first-generation students often work longer hours, are more likely to have family responsibilities, and often depend more on financial assistance, the assumption would be that the quality of support for non-academic activities would have an impact on first-generation student learning outcomes; however, this was not the case. Consequently, universities that have large populations of first-generation students need to assess the level of awareness of their first-generation student population on support services that are currently available and potentially measure the effectiveness of these services in supporting this large subset of students.

A potential vehicle to increase awareness is student orientation. Almost every university across the country offers an orientation program designed to prepare and inform both parents and their students for college life. Often, this includes specialty programs for transfer or international students. It seems like a missed opportunity to not include, at a minimum, targeted information sessions directed toward first-generation students and their parents that highlight the administrative mechanisms in place to help students succeed. It may also be worth considering an entirely separate orientation schedule or program designed for first-generation students in light of the continued issue with dropout and low persistence rates (Ishitani, 2006).

Lastly, first-generation students' learning outcomes had highly significant relationships with the quality of relationships with faculty including standardized coefficients that were nearly double those of non-first-generation students at all levels of the variable. Though faculty connections were shown to be important for all students, given the assumption of first-generation students' lack of social capital, faculty most likely play an ever more important role in first-generation student success. As a result, programs designed to educate faculty members should consider custom content that speaks to the important role faculty members play in first-

generation student success. Furthermore, universities should evaluate processes, structures, or programs that by intention or happenstance reduce the potential for first-generation students to interact with faculty members. It could be that the best solution to support first-generation students' learning is to create incentives and encourage what most faculty members enjoy: working to help students succeed.

Primary Education Advising and First-Generation Students

The findings of this research could serve in an advisory capacity for personnel working in the primary education ecosystem as to the type of college environment that might be best suited for first-generation students. The literature reviewed and study findings both provide support for the theory that first-generation students benefit from high levels of engagement, which can be facilitated through highly supportive campus environments that lessen the impacts of first-generation students' reduced levels of social capital. Consequently, those working in high schools, community colleges, or in any other capacity that provides counsel to first-generation students on the types of institutions in which to enroll, should consider that colleges or universities with highly supportive campus environments most likely create a more advantageous atmosphere for first-generation student success.

<div align="center">

Conclusions

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The findings of this research allow for several conclusions to be drawn, including that first-generation and non-first-generation students are unique student body populations. A significant amount of research supports this conclusion and no findings included here work to contradict this reality. Consequently, universities cannot assume student support activities designed for the entire student population will be effective for first-generation students. Next, first-generation students' learning outcomes appear to not depend on supportive campus

environment factors that include interactions with administrative support structures. This can likely be attributed to first-generation students coming to campus with less social capital than their peers; as a result they are less aware of how to fully leverage university structure for their benefit as compared to non-first-generation students. Lastly, faculty appear to be critically important to first-generation student learning outcomes. This could again provide support for first-generation students' lack of social capital and the need to lean more on faculty guidance than non-first-generation students.

Recommendations for Future Research

The findings of this research suggest some interesting future research possibilities. Given the variance in patterns of association between supportive campus environment measures and student learning outcomes of first-generation versus non-first-generation students, a logical next step would be to include a more discrete measure of student performance. The student learning measures included in this study are provided by the students themselves as an assessment of their growth in specified areas. As a result, the responses may be biased and inclusion of a more direct measure of student performance could work to further substantiate the findings of the current study. Specifically, graduation rates would be especially important for any future research, as numerous studies have shown first-generation students remain at higher risk of dropping out of college when compared to their peers (Chen, 2005, Cragg, 2009, Ishitani, 2003). Additionally, in a separate study, the use of a measure of student academic performance while in attendance, such as college GPA, as the dependent variable would also help to further understand the impact supportive campus environment variables can have on first-generation student success.

A study that had the benefit of matching data that measured the performance of students when first entering college as freshmen and then again as seniors before graduation would be an excellent addition to the literature. A model could then be designed to provide insights on what factors most contributed to student learning outcomes while students were in attendance. This would allow for changes over time to be quantified and the impacts of various environmental variables to be better measured.

Given that the university being studied had below-average supportive campus environment levels in spite of a wide variety of student support programs and wide-reaching budget capacity, future analysis focusing on the cost-benefit of campus activities designed to enhance university environments for first-generation students should be considered. Giving university administrations more discrete knowledge on not just the value of supportive campus environments but also what types of programs or activities can best increase the quality of supportive campus environments from an investment perspective would be incredibly valuable and could potentially result in increased student learning outcomes for first-generation students.

Future research should also include analysis on the effect of supportive campus environment levels on first-generation student learning outcomes for students attending campuses of varying size and focus. It is likely that smaller colleges with lower faculty-to-student ratios could serve as more effective destinations for first-generation students. This is in large part a result of the findings in this research that re-emphasize the importance of student-faculty interaction for first-generations students. However, in order to validate these assumptions, analysis would need to be completed that includes data from schools of varying complexity to see if differences are present.

Also, since nearly 50 percent of the first-generation student population included in the sample were transfer students, the overall learning gains associated with their time on campus is less certain. This means that many of the students could be enrolled for short periods of time, effecting their exposure and opinions on the university's environment. Information detailing when students transferred, under what conditions, and how their previous educational environment impacted learning gains, would be valuable data and would allow for increased precision of the analysis. This information could be used to complete a similar study that reduced the sample data to include only students who were on campus for at least two years to ensure adequate exposure to the university environment. The result could help shed light on the impact supportive campus environments have on learning outcomes for a significant portion of the student body population that often face more obstacles in their path to academic success.

Finally, a connection between the results seen in this study and a lack of social capital for first-generation students can only be indirectly proposed. Any further research that focuses on this connection should include a measure of social capital that can be discretely quantified in order to better measure the contribution to first-generations student learning outcomes. This could include data on students' home and community environments prior to arriving on campus as described by Kim and Schneider in 2005.

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