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Is Retention Enough? Learning and Satisfaction of First-Generation College Seniors

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Cover Page Footnote

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Is Retention Enough? Learning and Satisfaction of First-Generation College Seniors

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INTRODUCTION

Higher education researchers, practitioners, and administrators understand the attrition risk of traditional-age, first-generation college students. These students typically retain and graduate at lower rates than their continuing-generation peers. Practitioners have identified many ways to address these issues, resulting in a larger percentage of first-generation students graduating from four-year institutions. Graduation rates are important measures of institutional effectiveness as well as an overall reflection of access to American higher education. Higher education leaders however, need to better understand the entire undergraduate experience of first-generation undergraduate students in terms of their engagement, learning, and satisfaction. The quality of the overall, long-term learning experience is an important indicator of how effective institutions are in achieving their missions. Because first-generation students often experience college differently (due to external factors such as lower socioeconomic status, living with their family and commuting to campus, family obligations with younger siblings), they may be less satisfied at the end of the four-year experience and score lower on standardized direct measures of learning (than their continuing-generation peers). Retention and graduating more first-generation college students may not be enough. The results from this study suggest that there is no difference in student satisfaction or direct measures of learning, despite differences in the ways first generation students engaged with the campus community.

LITERATURE REVIEW

Engagement, Learning, and Satisfaction of First-Generation Students

An examination of the research literature confirms the relationship between what students do in college and successful college outcomes (Astin,

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1993; Kuh, Kinzie, Buckley, Bridges, & Hayek, 2006; Pascarella & Terenzini, 2005). Student engagement involves a reciprocal relationship between the quality of the student effort (Pace, 1980) and how the institution promotes student learning opportunities, both in and outside of the classroom (Kuh, 2001; Wolf-Wendel, Ward, & Kinzie, 2009; Woosley, & Shepler, 2011).

Much of the previous research in the area has focused on retention and graduation rates, urging practitioners to provide more of the engagement opportunities proven to influence the percentage of students successfully retained and graduated, like learning communities and undergraduate research opportunities (Ishitani, 2006; Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008). Practitioners have begun to better understand the attrition risk of first-generation students and targeted their efforts towards retention. When students participated in educationally purposeful activities in the first year of college, the negative effects of demographics, precollege characteristics and prior academic achievement greatly diminished. The influence of parents' education level, an example of a precollege characteristic, essentially "disappeared" (Kuh, Cruce, Shoup, Kinzie, & Gonyea, 2008, p. 555). Surprisingly, there is limited research studying the effects of various types of student engagement on direct measures of student learning (Arum & Roksa, 2010; Pascarella, et al., 2004; Terenzini, Springer, Yaeger, Pascarella, & Nora, 1996; Pascarella, Pierson, Wolniak, & Terenzini, 2004) and student satisfaction (Kim & Sax, 2009; Lohfink & Paulsen, 2005), especially at time of degree completion over a four-year undergraduate college experience. Researchers have typically only demonstrated the positive effects of engagement on student learning gains and other outcomes through student self-report instruments such as the National Survey of Student Engagement (NSSE) (Gordon, Ludlum, & Hoey, 2008; Kuh, 2003a; Pike, 2006a). Student satisfaction is even less frequently researched; however, it is also an important predictor of student learning and success (Kuh, et al., 2006).

Student engagement has long been viewed as an important part of understanding the college students' experience (Wolf-Wendel, et al., 2009). As research in this area developed, scholars have discovered that different student subpopulations experienced engagement efforts in distinct ways. Pascarella, et al. (2004) found that first-generation students experienced college differently than continuing-generation students because of unique family characteristics which often require them to work more hours off-campus for pay, commute to campus, and choose a major which leads to immediate employment. Practitioners must better understand this difference to optimize learning and satisfaction of first-generation students through targeted institutional efforts.

Studies show that parents without a postsecondary experience lack the social and cultural capital to provide support during the process. First-generation students therefore struggle with "navigating the higher education landscape" due

to lack of access to “financial, informational, and social networks” (Saenz, et al., 2007, p. 3). Continuing-generation students, on the other hand, have greater social and cultural capital from “family relationships and social networks” (Pascarella, et al., 2004, p. 252). Vargas (2004) found that first-generation students’ parents often fail to make the enrollment process a priority for their children, in terms of the necessary preparation for standardized tests and completing the applications to appropriate institutions. The reasons typically stem from a failure to understand the process, and/or to make associations between career goals and educational requirements. Choy (2001) found first-generation families less frequently attend planning activities such as financial aid seminars and college visits. African American and Hispanic families, especially those with low income, overestimate the tuition costs, while underestimating the availability of financial aid (Tym, McMillion, Barone, & Webster, 2004). Choy (2001) also found students whose parents had not attended college received no additional help and guidance from their high school. First-generation students cite cost-related reasons such as receiving financial aid, location (ability to live at home and commute) and work opportunities (either on-campus or off-campus) as key factors in choosing an institution (Nunez & Cuccaro-Alamin, 1998).

Researchers have studied these differences in terms of overall student engagement, as well as academic and social integration (Soria, & Stebleton, 2012; Tinto, 1993). Pike and Kuh (2005) concluded that first-generation college students were generally less engaged in their overall education than continuing-generation students and first-generation students in many cases failed to understand both the importance of co-curricular or extracurricular activities and how to become involved in such activities, often making them high risk for attrition.

Research demonstrates institutional efforts to intervene early with first-generation students proved highly effective in terms of retention. Programs such as freshman seminars, small classes where faculty members validate a student’s ability to do college-level work, proved “compensatory” or more meaningful to first-generation students than continuing-generations (Kuh, et al., 2008, p. 549). While researchers have demonstrated the positive effects of interventions on persistence and retention, less is known about differences in student satisfaction between the groups. There is a need for additional research to better understand engagement in the overall four-year experience and how various types of engagement influence satisfaction and direct measures of learning for first-generation students.

In terms of student learning, differences in the collegiate experience between first-generation and continuing-generation students failed to translate into substantial differences in student learning outcomes in the first and second year (Pascarella, et al., 2004; Terenzini, et al., 1996). Arum and Roksa (2010),

found similar results in a longitudinal study of 2,300 four-year college students from 24 private and public institutions in the first two years of college. The research tracked a cohort at the beginning of the freshman year in 2005, tested again in 2007 at the end of the sophomore year. The instrument used as a direct measure of learning was the Collegiate Learning Assessment (CLA), a 90-minute writing task-based exam, which provides standardized scores in critical thinking, analytical reasoning, problem solving, and written communication. Figure 1, demonstrates that first-generation students started with lower CLA scores and gained less over the first two years than students with parents holding a graduate or professional degree (after controlling for aptitude with ACT or SAT scores). High school preparation and college experiences however, accounted for 40% of the gap; when removed, first-generation status was no longer statistically significant. Because there is limited research addressing direct measures of first-generation student learning in the senior year, additional study is needed to focus on final learning outcomes at the end of the college experience.

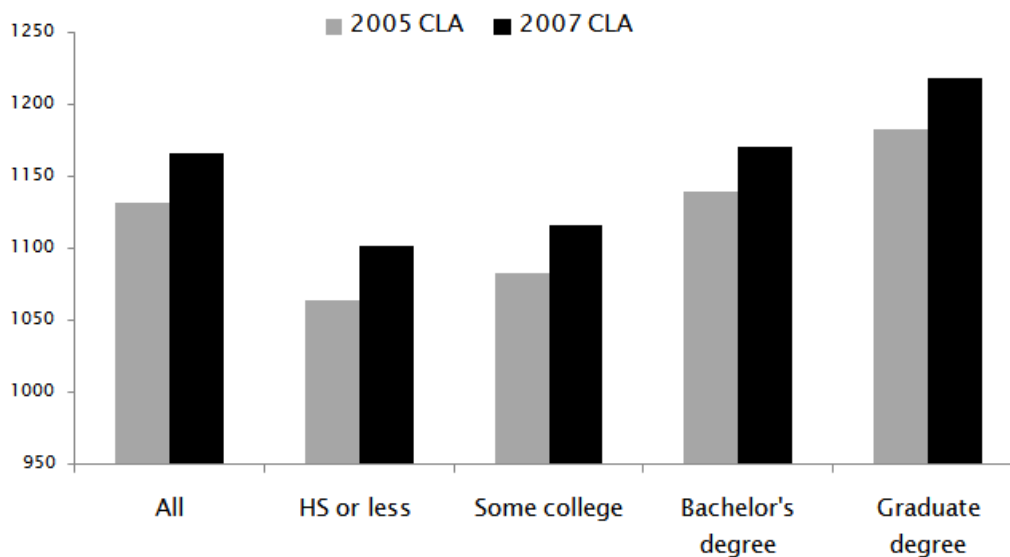


Figure 1. Arum and Roska (2010) based on a 2005-2007 student with a standard deviation of 187. Collegiate Learning Assessment (CLA) scores on the y axis by parent education level on the x axis.

In terms of student satisfaction, Kuh, et al. (2006) summarized satisfaction research over the past two decades. The college environment influenced satisfaction scores more than precollege characteristics (Astin, 1993). The majority of college senior students rated the overall experience at least “good” with less than 5% rating the experience as “poor” (NSSE, 2005). Satisfaction

scores remain only modestly researched however, especially comparing first-generation to continuing-generation students in terms of satisfaction with their overall college experience.

Most student satisfaction scores improve as the number of quality interactions with peers and faculty members increase (Kuh, et al., 2006). Pascarella and Terenzini (2005) concluded however that effects of college experiences on outcomes are conditional and thus engagement trends vary across student groups. Because the overall college experience of first-generation students varies from continuing-generation students, satisfaction scores may vary as well. First-generation students' satisfaction may be more contingent upon academic integration in terms of frequency and quality of the classroom interactions, rather than the social and co-curricular experiences important for continuing-generation students. An important research question is to determine the college experiences which influence first-generation satisfaction.

To summarize, emphasis on first-year programs which focus primarily on retention is not sufficient. School leaders need a better understanding of the entire four-year experience of first-generation students in terms of engagement, learning, and satisfaction. The quality of the overall, long-term learning experience both inside and outside of the classroom is an important indicator of institutional effectiveness. Important to note, for instance, that graduating more first-generation students from four-year institutions, while a laudable goal, does not necessarily indicate the same quality learning experienced by continuing-generation students. For example, first-generation students who earned baccalaureate degrees typically received lower grades and were less likely than continuing-generation students to enroll in graduate school (Chen, 2005; Choy, 2001; Nunez & Cuccaro-Alamin, 1998; Pascarella, et al., 2004).

RESEARCH DESIGN

A quantitative, ex post facto research design was used to compare measures at the end of the four-year experience of first-generation students in terms of engagement, learning, and satisfaction to continuing-generation-student students at a single institution. The research was conducted using full-time undergraduate students participating in either one or both of the following two instruments. The NSSE is a short questionnaire which indirectly measures learning through the students' self-reported perceptions of their collegiate experience (both in and outside of the classroom). The Educational Testing Service Measure of Academic Proficiency and Progress (ETS MAPP) is a direct measure of general education student learning.

The conceptual framework used for the study was the Astin input-environment-outcome (I-E-O) model (1970), which serves as a tool to better understand student development while in college (see Figure 2).

Inputs represent student characteristics at the time of entry. Environment addresses various educational and co-curricular experiences to which a student was exposed as well as relationships with peers, faculty and staff members. Outcomes focuses on student characteristics after the student experienced the collegiate environment (spring of the senior year of college). Because of the complexity of the student experience during college, the model was a tool to assess student growth holistically. The premise of the model involves understanding students at point of entry to determine whether the collegiate experience influences student outcomes.

Key considerations for first-generation student learning in the first year of college are: living on-campus (direct effect with greatest influence); parents education level (indirect); integration of diverse experiences (direct); academic and social engagement (indirect mediated by integration, which is the extent students incorporate information from coursework into conversations with others on-campus); education aspirations (indirect); and perceptions of the college environment (direct). These findings are adapted from a combination of models from Astin I-E-O (1970), Pascarella (1985), and Pike and Kuh (2005), using measures such as NSSE benchmarks (LAC Level of Academic Challenge, ACL Active and Collaborative Learning, SFI Student-Faculty Interaction, EEE Enriching Educational Experience, SCE Supportive Campus Environment).

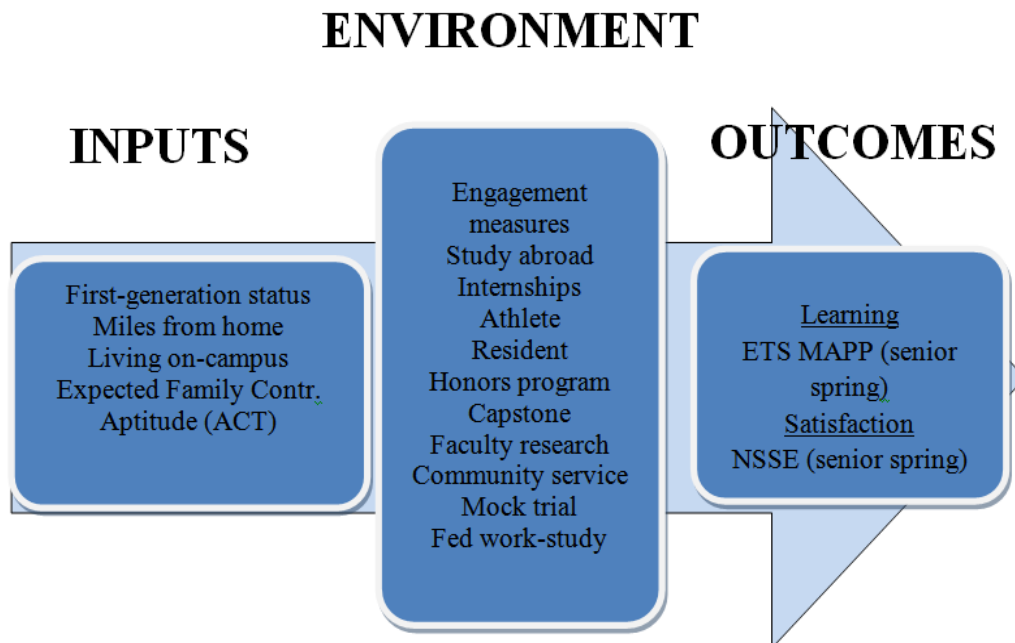


Figure 2. ASTIN I-E-O MODEL

The premise of these models is based on research that student engagement in educationally purposeful activities positively influences learning (Astin, 1993; Pascarella & Terenzini, 1991). Other characteristics and influences were added as a summary for the literature, not as an exact indication of variables considered in the Pike and Kuh (2005) study. No study can consider all of these variables simultaneously; however, each institution's administration and faculty can consider the appropriate variables for measuring outcomes of its first-generation student population. For this project, variables considered included: (a) inputs – parents' education level, expected family contribution (EFC), academic preparation (ACT composite score), miles from home, and living on-campus; (b) environment experiences – educationally purposeful activities, high impact practices (AAC&U, 2007) or institution specific experiences, academic challenge, active and collaborative learning, student-faculty interactions, enriching educational experiences, supportive college environment, quality of relationships with students, faculty members and administrative offices and personnel, diverse experiences; and (c) outcome measures – learning and satisfaction.

RESEARCH QUESTIONS

Given conclusions drawn from the relevant literature and the modified model presented, the following research questions are derived:

1. Does a statistically significant difference exist in senior measures of learning between first-generation and continuing-generation students?
2. Do senior NSSE benchmark scores (engagement variables) significantly predict senior measures of learning for first-generation and/or continuing-generation students?
3. Does a statistically significant difference exist in senior satisfaction measures between first-generation and continuing-generation students?
4. Do Pike “scalelets” generate a better predictive model of senior satisfaction than the engagement variables from high impact practices/university-specific activities?
5. Is the quality of relationships (with other students, faculty members, and administrative personnel and offices) a significant predictor of senior satisfaction for first-generation and/or continuing-generation students?
6. Is the quality of relationships (with other students, faculty member, and administrative personnel and offices) a significant predictor of senior measures of learning for first-generation and/or continuing-generation students?

METHOD

Population and Sample

The research setting was a small private university located in a large Midwestern metropolitan area. University enrollment included over 2000 full-time undergraduate students, and nearly 700 graduate students, with over 1000 of the undergraduate students living on campus in residence halls. The vast majority of undergraduate students were traditional age (18-23 years of age), with approximately 40% of these students reporting first-generation status. The university defined a first-generation student as one with neither parent completing a baccalaureate degree. The institution’s NSSE selected peers (25 small private schools used for benchmarking purposes) reported less than 30% first-generation students (using the same definition to determine first-generation status) (NSSE, 2009).

The institution currently offers over 50 undergraduate degree programs (all bachelor’s degrees) and over 20 graduate programs, mostly Master’s degrees; two doctorate practitioner degrees (physical therapy known as DPT, nurse practice as DNP) are also offered. The most popular undergraduate degree

programs are nursing (BSN), business administration, psychology, accounting, biology, and communication.

Data Collection

During designated spring semesters, the institution invited the entire senior population to participate in the NSSE. The university began NSSE testing in the spring 2002.

The institution also administered the ETS MAPP exam in senior seminar courses during spring semesters. Administrators randomly sampled these seminar courses by inviting course instructors to offer ETS MAPP testing during class sessions when they would be absent. All senior students were tested in each seminar class. Approximately 50 senior participants comprised the entirety of the respondents in the fall of 2006 and the spring of 2007. The overall university population was 345 seniors (spring 2007). In the fall of 2007, the institution intentionally increased its sample size to include over 100 seniors each spring. Table 1 represents the populations used for both NSSE and ETS data collections.

ETS MAPP testing began in the 2006-2007 academic year to prepare for a regional accreditation visit in 2008. The purpose was to establish an external assessment which could be used to compare the institution's students with similar institutions across the nation. There were many general education internal methods of assessing the school's ten general education outcomes, as well; however, these methods needed to be triangulated with an external reference. The institution continued to administer the ETS MAPP, gaining over 100 participants for each class to better represent the institution's student population. Similar to NSSE results, ETS MAPP data were very consistent across cohorts (see Table 1). Therefore combining NSSE and ETS MAPP results across multiple years proved appropriate for increasing respondent size for statistical methods of this study.

TABLE 1
STUDENT RESPONSE RATE FOR NSSE AND ETS MAPP, 2002-2010

	<i>NSSE (seniors)</i>		<i>ETS MAPP (seniors)</i>	
	<i>Resp.</i>	<i>Pop.</i>	<i>Resp.</i>	<i>Pop.</i>
SP02	107	320		
SP03	90	433		
SP04	82	382		
SP05	219	582		
SP06	170	497		
SP07	142	345	72	345
SP08			54	350
SP09	170	367	111	367
SP10			105	306
<i>Total</i>	<i>980</i>	<i>2926</i>	<i>342</i>	<i>1368</i>
<i>Response rate</i>	<i>33%</i>		<i>25%</i>	

Data Sources

Three primary sources of data provided the information for the study. The university's student information system (SIS) provided data for many of the input variables such as the estimated family contribution (EFC) from the U.S. federal government application for financial aid (FAFSA), ACT scores, and miles from campus to permanent home. The second data source was NSSE, a survey collecting self-reported student information from freshmen and seniors in four-year institutions. The third source was the ETS MAPP, a direct measure of student learning in general education, scoring skills in math, critical thinking, reading and writing, as well as contextual discipline scores in social science, natural science, and humanities. The university administered the ETS MAPP abbreviated online form, which consists of a series of multiple choice questions completed in a 40 minute period under the supervision of a proctor in one of the university's computer labs.

Table 2 presents a summary of the statistical methods used for the six research questions.

RESULTS

Table 2 provides the methods used for each research question. Table 9 summarizes the results from all research questions. Key findings are represented in the following paragraph as summaries of each analysis. Results from research questions number one, two and six are presented first, bundled together because of their questions focus on student learning measures. Results from the remaining research questions focus on student satisfaction, and thus are presented after the learning measures.

Research Question One: Does a statistically significant difference exist in senior measures of learning between first-generation and continuing-generation students? A one-way MANCOVA was used comparing first-generation students to continuing-generations students with two levels of the independent variable (IV) and seven senior ETS MAPP scores (dependent variables (DVs) which include skill sub-scores in critical thinking, reading, writing and math, as well as context-based sub-scores in humanities, social science and natural sciences). The MANCOVA controlled for academic preparation with ACT composite score (covariate). The Astin model (1970) suggested accounting for variance in inputs or precollege characteristics. In this case, controlling for precollege academic preparation (inputs) makes possible an equitable comparison of senior test scores (outcomes) for the two groups near the end of the four-year college experience (environment). The sample consisted of first-generation and continuing-generation students from the following senior classes: spring 2007 ($n = 72$); spring 2008($n = 54$); spring 2009 ($n = 111$); and spring 2010 ($n = 105$). The total sample was 342 senior students.

As displayed in Table 3, no significant difference exist in direct measures of student learning (ETS MAPP total score and seven sub-scores) between first-generation and continuing-generation college seniors ($n = 342$). This conclusion was made after controlling for academic preparation (ACT composite score), which was significantly related to ETS MAPP scores ($p < .01$).

TABLE 2
SUMMARY OF VARIABLES USED IN RESEARCH QUESTIONS

<i>Q</i>	<i>Input / Independent Variables</i>	<i>Environmental Variables or Covariables</i>	<i>Outcome Variables</i>	<i>Analysis Technique</i>
1	First-generation status	Acad. prep. (ACT composite score)	Seven ETS MAPP scores	MANCOVA
2	First-generation status, acad. prep. (ACT composite score), EFC, miles from home, living on-campus in the freshman year	Five senior NSSE benchmarks	ETS MAPP total score	Multiple regression
3	First-generation status	Acad. prep. (ACT composite score)	Two senior NSSE satisfaction items	MANCOVA
4A	First-generation status, acad. prep. (ACT composite score), EFC, miles from home, living on-campus in the freshman year	12 Pike “scalelets”	Combined senior NSSE satisfaction score	Multiple regression
4B	First-generation status, acad. prep. (ACT composite score), EFC, miles from home, living on-campus in the freshman year	High impact/ university-specific activities	Combined senior NSSE satisfaction score	Multiple regression
5	First-generation status, acad. prep. (ACT composite score), EFC, miles from home	Three NSSE quality of relationship items	Combined senior NSSE satisfaction score	Multiple regression
6	First-generation status, acad. prep. (ACT composite score), EFC, miles from home, living on-campus in the freshman year	Three NSSE quality of relationship items, combined senior NSSE satisfaction score, NSSE combined quality of relationship and satisfaction score.	ETS MAPP total score	Multiple regression

Research Questions Two and Six: Do senior NSSE benchmark scores (engagement variables) significantly predict senior measures of learning for first-generation and/or continuing-generation students? Is the quality of relationships (with other students, faculty members, and administrative personnel and offices) a significant predictor of senior measures of learning for first-generation and/or continuing-generation students?

TABLE 3**COMPARISON OF ADJUSTED MEANS OF ETS MAPP SUB-SCORES FOR FIRST-GENERATION AND CONTINUING-GENERATION STUDENTS (N = 288)**

	<i>First-generation</i>	<i>Continuing-generation</i>
ETS MAPP Total Score (400-500 point scale)	459.40	456.55
ETS MAPP Writing (100-130 point scale)	117.54	116.69
ETS MAPP Reading (100-130 point scale)*	123.16	121.51
ETS MAPP Math (100-130 point scale)	115.11	115.37
ETS MAPP Critical Thinking (100-130 point scale)	115.50	115.18
ETS MAPP Humanities (100-130 point scale)	118.31	117.65
ETS MAPP Social Science (100-130 point scale)*	117.62	116.08
ETS MAPP Natural Science (100-130 point scale)	118.81	118.39
Cumulative College GPA (0-4 point scale)	3.36	3.36

Note. ETS MAPP mean scores were adjusted from MANCOVA with covariate ACT composite score. * $p < .05$.

Senior engagement variables, NSSE benchmarks (LAC, ACL, EEE, SCE, SFI), were not significant ($p < .05$) predictors of learning measures (ETS MAPP total score) for first-generation or continuing-generation students ($n = 75$). Senior engagement variables, student ratings of NSSE quality of campus relationships (other students, faculty members, and administrative offices and personnel), were also not significant ($p < .05$) predictors of learning measures (ETS MAPP total score) for first-generation or continuing-generation students ($n = 75$). As displayed in Table 4, first-generation status was positively related ($\beta = .25$ with NSSE benchmark model and $\beta = .31$ with NSSE quality of relationship model) to senior learning measures (ETS MAPP total score) when the sample was limited to only students who completed a FAFSA (where EFC was available ($n = 39$)). In this smaller sample, first-generation students had greater financial need, with 42.8% Pell eligible (EFC $< \$5273$) compared to 13.3% of continuing-generation students. The $M_{FG} = \$14,584$ EFC was substantially lower than $M_{CG} = \$27,033$.

Note that the relationship between learning measures and first-generation status was positive; first-generation students performed better on senior learning measures (ETS MAPP total score) when sample size was limited to the students with greater financial need. Other than an expected strong relationship between academic preparation (ACT composite) and ETS MAPP total score ($\beta = .69$), no other precollege characteristic or input was significantly related ($p < .05$) to learning measures.

TABLE 4

**MODEL CONSIDERING NSSE QUALITY OF CAMPUS RELATIONSHIPS AS
PREDICTORS OF ETS MAPP TOTAL SCORE (STUDENTS WITH EXPECTED
FAMILY CONTRIBUTION DATA EFC) (N= 39)**

<i>Predictor Variables of</i>	<i>Step</i>	<i>B</i>	<i>SEB</i>	<i>β</i>	<i>t</i>	<i>p</i>
Constant	1	368.01	16.46		22.35	.000
ACT Composite		3.74	.61	.70	6.13	.000
Living On-campus in Freshman Year		-6.75	4.09	-.19	-1.65	.108
EFC		.00	.00	-.22	-1.98	.056
Miles from Home		-1.25	1.43	-.10	-.87	.390
Constant	2	371.22	20.85		17.80	.000
ACT Composite		3.65	.68	.68	5.38	.000
Living On-campus in Freshman Year		-7.12	5.27	-.20	-1.35	.187
EFC		.00	.00	-.18	-1.43	.163
Miles from Home		-1.03	1.55	-.08	-.66	.512
NSSE Quality of Campus Relationships with Other Students		-.11	2.34	-.01	-.05	.964
NSSE Quality of Campus Relationships with Faculty Members		-.65	3.05	-.04	-.21	.834
NSSE Quality of Campus Relationships with Adm. Personnel & Offices		1.11	2.43	.11	.46	.651
NSSE Composite of Three Qual. of Rel. with Two Satisfaction Scores		-.46	.65	-.48	-.71	.481
NSSE Composite Score for Two Satisfaction Items		.39	.39	.49	1.02	.314
Constant	3	360.30	19.37		18.60	.000
ACT Composite		3.86	.62	.72	6.21	.000
Living On-campus in Freshman Year		-6.89	5.71	-.02	-.12	.905
EFC		-.00	.00	-.14	-.29	.772
Miles from Home		-.37	1.4	-.03	-.26	.799
NSSE Quality of Campus Relationships with Other Students		1.45	2.21	.11	.66	.52
NSSE Quality of Campus Relationships with Faculty Members		-2.40	2.85	-.15	-.84	.407
NSSE Quality of Campus Relationships with Adm. Personnel & Offices		2.10	2.24	.21	.94	.357
NSSE Composite of Three Qual. of Rel. with Two Satisfaction Scores		-.58	.59	-.60	-.98	.335
NSSE Composite Score for Two Satisfaction Items		.48	.35	.59	1.353	.186
First-Generation Status		11.78	4.35	.31	2.71	.011

Note. For step 1, $R^2 = .590$ (adjusted $R^2 = .554$). For step 2, $R^2 = .619$ (adjusted $R^2 = .517$). For step 3, $R^2 = .696$ (adjusted $R^2 = .601$).

In summary of student learning measures, senior ETS MAPP scores were strongly associated with precollege academic preparation (ACT composite). This is reasonable because each assessment is a standardized direct measure of general education skills and content knowledge in a multiple choice question format. First-generation status was a positive predictor of learning only when non-FAFSA submitters (presumably less financially needy students) were excluded. No other precollege characteristic or environment variable was associated with learning. When considering the entire student sample, no difference was found in senior learning measures between first-generation and continuing-generation students ($p < .05$).

Research Question Three: Does a statistically significant difference exist in senior satisfaction measures between first-generation and continuing-generation students?

In terms of NSSE senior satisfaction items ($n = 171$), there was no significant difference ($p < .05$) between first-generation students ($M_{FG} = 113.05$ evaluate your entire educational experience and $M_{FG} = 107.66$ would you go to the same institution) and continuing-generation students ($M_{CG} = 116.65$, $M_{CG} = 110.99$, respectively). Academic preparation (ACT composite) was used as a control variable; however, there was no significant relationship to NSSE satisfaction scores ($p = .696$) (see Table 5).

TABLE 5**COMPARISON OF ADJUSTED MEANS OF NSSE SATISFACTION ITEMS FOR FIRST-GENERATION AND CONTINUING-GENERATION STUDENTS (N= 171)**

	<i>First-generation</i>	<i>Continuing-generation</i>
<i>Evaluate Your Entire Educational Experience at this Institution.</i>	113.05	116.65
<i>Would You Go to the Same Institution You Are Now Attending?</i>	107.66	110.99

Note. ETS MAPP mean scores were adjusted from MANCOVA with covariate ACT composite score.

Research Questions Four and Five: Is the quality of relationships (with other students, faculty members, and administrative personnel and offices) a significant predictor of senior satisfaction for first-generation and/or continuing-generation students? Are any other environmental variables (NSSE items or high impact practices) significant predictors of senior satisfaction for first-generation and/or continuing-generation students?

Because first-generation status was not significant ($p < .05$) in any of the senior satisfaction models, the quality of campus relationships was equally important to first-generation and continuing-generation students. Quality of campus relationships (students, faculty members, and administrative offices and personnel) was a strong predictor of NSSE composite satisfaction score (combined two items); with an adjusted $R^2 = .405$, each NSSE relationship item had a significant partial regression coefficient ($p < .05$) (see Table 6).

As displayed in Table 7, when considering additional environmental variables from NSSE items and high impact practices in a separate model (Research Question Four), four NSSE Pike “scalelets” were significant environmental variables, predicting NSSE composite satisfaction score with significant partial regression coefficients ($p < .05$): interpersonal environment ($\beta = .59$); varied education experience ($\beta = -.18$); higher order thinking skills ($\beta = .14$); and support for student success ($\beta = .17$). The Pike “scalelet” interpersonal environment score is the same as NSSE quality of campus relationships and thus showed an expected very strong relationship with satisfaction. Varied education experience had a surprisingly negative relationship with satisfaction; students responded with lower ratings of foreign language coursework ($p < .05$), and learning community experiences at a higher error threshold ($p < .1$); a positive relationship existed with attending campus events and activities ($p < .05$); however, the overall Pike “scalelet” was negatively related to satisfaction. Higher

order thinking skills, a positive relationship with satisfaction ($p < .05$), is a student's rating of his/her ability to analyze, apply, and make judgments about concepts and information presented in coursework. The Pike "scalelet," support for student success, was a significant predictor of satisfaction because of students' perceived academic support from the university ($p < .05$), rather than social or nonacademic support (also items in the composite score).

As shown in Table 8, the final satisfaction model considered high impact practices/university-specific activities, none of which were significant predictors of satisfaction ($p < .05$). This model considered variables such as senior capstone experience, study abroad, and research with a faculty member. Because first-generation status was not significantly related to satisfaction ($p < .05$), significant environment variables similarly influenced the first-generation and the continuing-generation student group. No precollege characteristics or inputs were significantly related to satisfaction ($p < .05$).

TABLE 6

MODEL CONSIDERING NSSE QUALITY OF CAMPUS RELATIONSHIPS AS PREDICTORS OF NSSE COMPOSITE SATISFACTION SCORE (N = 175)

<i>Predictor Variables Considered</i>	<i>Step</i>	<i>B</i>	<i>SEB</i>	<i>β</i>	<i>t</i>	<i>p</i>
Constant	1	111.12	12.18		9.12	.000
ACT Composite		.01	.49	.00	.03	.978
Miles from Home		-1.33	1.18	-.09	-1.13	.260
Living On-campus in Freshman year		2.16	3.21	.05	.67	.501
EFC		.43	.97	.04	.44	.659
Constant	2	31.64	11.98		2.641	.009
ACT Composite		.413	.39	.07	1.07	.285
Miles from Home		-1.60	.90	-.11	-1.78	.077
Living On-Campus in Freshman Year		-1.92	2.54	-.05	-.75	.452
EFC		-.54	.75	-.04	-.72	.472
NSSE Quality of Campus Relationships with Other Students		.13	.03	.27	3.83	.000
NSSE Quality of Campus Relationships with Faculty Members		.19	.04	.32	4.48	.000

NSSE Quality of Campus Relationships with Adm. Personnel & Offices		.10	.03	.26	3.89	.000
Constant	3	31.52	12.43		2.535	.012
ACT Composite		.41	.39	.07	1.07	.287
Miles from Home		-1.60	.91	-.11	-1.77	.079
Living On-campus in Freshman year		-1.91	2.56	-.05	-.74	.458
EFC		-.53	.78	-.04	-.68	.500
NSSE Quality of Campus Relationships with Other Students		.13	.03	.27	3.81	.000
NSSE Quality of Campus Relationships with Faculty Members		.19	.04	.32	4.47	.000
NSSE Quality of Campus Relationships with Adm. Personnel & Offices		.10	.03	.26	3.87	.000
First-Generation Status		.10	2.65	.00	.04	.969

Note. For step 1, $R^2 = .010$ (adjusted $R^2 = -.013$). For step 2, $R^2 = .433$ (adjusted $R^2 = .409$). For step 3, $R^2 = .433$ (adjusted $R^2 = .405$).

In summary of student satisfaction, campus relationships were found to be strong positive predictors of student satisfaction. Other significant yet less influential environment predictors included higher order thinking skills and academic support for student success. A negative relationship was found between varied education experiences such as rating of foreign language coursework. The statistically significant environmental predictors were significant regardless of first-generation status ($p < .05$).

In subsequent analyses, first-generation students worked more hours for pay (47% vs. 39% reported working 16 or more hours per week); however, the variable was not significantly related to learning measures ($p = .644$). Overall both groups worked a substantial number of hours per week, but without an effect on the ETS MAPP total score. First-generation students had greater financial need, with 42.8% Pell eligible (EFC < \$5273) compared to 13.3% of continuing-generation students. The $M_{FG} = \$14,584$ EFC was substantially lower than $M_{CG} = \$27,033$. Cumulative grade point average (GPA) was the same for both first-generation and continuing-generation students (GPA=3.36 on a 4.0 scale). This is consistent with results of this study's considered learning measures (ETS MAPP total score and sub-scores). This is in contrast to the literature however, which indicates that first-generation who earn baccalaureate degrees typically earn lower

grades during the undergraduate experience and are less likely than continuing-generation students to enroll in graduate school (Chen, 2005; Nunez & Cuccaro-Alamin, 1998; Pascarella, et al., 2004). Because this study was a direct measure of student learning, differences in precollege and environmental factors were anticipated. However, only first-generation status and academic preparedness ACT composite (both precollege characteristics) were significantly related to learning, with no environmental variables, which was unanticipated. In other studies of direct measures of learning, variables such as hours worked, faculty expectations and relationships, and academic preparation, were demonstrated to be significant predictors (Arum & Roksa, 2010).

TABLE 7

REGRESSION COEFFICIENTS PIKE “SCALELETS” AS PREDICTORS OF NSSE SATISFACTION (N = 175)

<i>Predictor Variables Considered</i>	<i>Step</i>	<i>B</i>	<i>SEB</i>	<i>B</i>	<i>t</i>	<i>p</i>
Constant	1	111.1	12.19			
		3			9.12	.000
ACT Composite		.01	.49	.00	.03	.978
Living On-Campus in Freshman Year		2.16	3.21	.05	.67	.501
EFC (in 6 categories)		.43	.97	.04	.44	.659
Miles from Home		-1.33	1.18	-.09	-1.13	.260
Constant	2	42.80	14.71		2.91	.004
ACT Composite		.502	.37	.08	1.36	.176
Living On-Campus in Freshman Year		-1.75	2.37	-.04	-.74	.462
EFC (in 6 categories)		-.77	.72	-.06	-1.06	.290
Miles from Home		-.39	.90	-.03	-.43	.667
Higher Order Thinking Skills		.15	.07	.14*	2.08	.039
Collaborative Learning Experience		.02	.09	.01	.18	.860
Course-Related Interactions with Faculty		-.13	.08	-.12	-1.56	.120
Out-of-Class Interactions with Faculty		.05	.03	.12	1.56	.121
Use of Information Technology		.10	.08	.09	1.16	.246
Diversity		-.12	.06	-.12	-1.88	.063
Varied Educational Experiences		-.22	.08	-.18**	-2.87	.005
Support for Student Success		.16	.07	.17	2.27	.025
Interpersonal Environment (quality of campus relationships)		.70	.09	.59***	8.21	.000
Course Challenge		-.07	.06	-.07	-1.08	.281
Writing		-.17	.10	-.11	-1.77	.079
Active-Learning Experiences		.03	.08	.03	.42	.672
Constant	3	43.07	15.04		2.86	.005
ACT Composite		.50	.37	.08	1.35	.178
Living On-Campus in Freshman Year		-1.77	2.39	-.04	-.74	.460
EFC (in 6 categories)		-.79	.76	-.07	-1.04	.301
Miles from Home		-.39	.90	-.03	-.44	.663
Higher Order Thinking Skills		.15	.07	.14*	2.08	.040
Collaborative Learning Experience		.02	.09	.01	.19	.853
Course-Related Interactions with Faculty		-.13	.08	-.12	-1.56	.121

Out-of-Class Interactions with Faculty	.05	.03	.12	1.55	.122
Use of Information Technology	.10	.08	.08	1.15	.252
Diversity	-.12	.06	-.13	-1.87	.063
Varied Educational Experiences	-.22	.08	-.18**	-2.86	.005
Support for Student Success	.16	.07	.17*	2.25	.026
Interpersonal Environment (quality of campus relationships)	.70	.09	.59***	8.13	.000
Course Challenge	-.06	.06	-.07	-1.06	.289
Writing	-.17	.10	-.11	-1.76	.081
Active-Learning Experiences	.03	.08	.03	.427	.670
First-generation status	-2.44	2.56	-.01	-.10	.924

Note. Regression coefficients taken from Pike “scalelets” prediction model. Precollege characteristics and first-generation status were also considered. * $p < .05$. ** $p < .01$. *** $p < .001$.

Academic preparedness (ACT composite) influenced direct measures of senior learning. Regarding first-generation status, first-generation seniors did not score significantly lower than continuing-generation seniors ($p < .05$). Similarly, Arum & Roksa (2010) found first-generation negatively associated with learning (CLA writing) in the second year, however high school preparation and college experiences accounted for 40% of the gap and when removed, first-generation status was no longer statistically significant.

In a final analysis of engagement variables, a MANOVA was completed where first-generation students were compared to continuing-generation students, using two levels of the IV (first-generation student group, continuing-generation student group) with five DVs (NSSE benchmarks). An assumption was tested to determine if the covariance matrices generated by each level of the IV was equal. The Box’s test of equality of covariance matrices was insignificant ($p = .33$), but the Bartlett’s test of sphericity was significant ($p < .001$); thus a MANOVA was warranted. The overall results of the MANOVA were not significant. No significant effect of first-generation status was found on DVs (NSSE benchmarks: LAC; ACL; SFI; EEE; and SCE) as follows: Hotelling’s trace = .021, $F(5,165) = .69$, $p = .632$. Thus, no significant difference existed in the overall multivariate tests of NSSE benchmarks between first-generation students and continuing-generation students. There was no need for further analysis of individual NSSE benchmarks because none were significantly differently ($p = .185$). Thus, no difference existed in engagement variables between first-generation and continuing-generation senior students ($p < .05$).

TABLE 8
REGRESSION COEFFICIENTS OF HIGH IMPACT PRACTICES/UNIVERSITY-SPECIFIC ACTIVITIES (N = 174)

<i>Predictor Variables Considered</i>	<i>Step</i>	<i>B</i>	<i>SEB</i>	β	<i>t</i>	<i>p</i>
Constant	1	111.09	12.19		9.12	.000
ACT Composite		.01	.49	.00	.02	.988
Living On-campus in Freshman year		2.39	3.22	.06	.74	.458
EFC (in 6 categories)		.40	.97	.03	.41	.680
Miles from Home		-1.29	1.18	-.09	-1.09	.275
Constant	2	104.50	15.38		6.80	.000
ACT Composite		.16	.50	.03	.32	.749
Living On-campus in Freshman year		.125	3.58	.00	.04	.972
EFC (in 6 categories)		.77	1.02	.06	.75	.452
Miles from Home		-1.57	1.20	-.10	-1.31	.194
Capstone Senior Experience		-1.06	1.88	-.05	-.56	.575
Study Abroad		.96	1.86	.04	.51	.608
Research with a Faculty Member		-2.49	1.80	-.11	-1.38	.169
Volunteer Service		2.57	1.85	.11	1.39	.165
Learning Community (Honors, <i>Brown</i> Scholars, Mock Trial)		-3.46	3.47	-.08	-.10	.320
Athlete		3.35	4.26	.06	.79	.433
Work Study Position		4.55	3.89	.10	1.17	.245
Constant	3	109.18	15.68		6.96	.000
ACT Composite		.19	.50	.03	.38	.707
Living On-campus in Freshman year		-.54	3.60	-.01	-.15	.881
EFC (in 6 categories)		.31	1.07	.03	.29	.776
Miles from Home		-1.69	1.20	-.11	-1.40	.163
Capstone Senior Experience		-1.18	1.88	-.05	-.63	.53
Study Abroad		.78	1.85	.03	.42	.674
Research with a Faculty Member		-2.44	1.80	-.11	-1.36	.177
Volunteer Service		2.73	1.84	.12	1.48	.141
Learning Community (Honors, <i>Brown</i> Scholars, Mock Trial)		-4.06	3.48	-.10	-1.17	.245
Athlete		4.06	4.27	.08	.95	.343
Work Study Position		4.27	3.89	.09	1.10	.273
First-generation status		-4.96	3.48	-.12	-1.42	.156

TABLE 9
SUMMARY OF ANALYSES FOR SIX RESEARCH QUESTIONS

<i>Research Question</i>	<i>Analysis</i>	<i>Results</i>
Does a statistically significant difference exist in senior measures of learning between first-generation and continuing-	MANCOVA: 7 ETS MAPP sub-scores by student first-generation status with ACT composite as covariate.	No significant difference between first-generation and continuing-generation students on adjusted ETS MAPP sub-scores.

<p>generation students? Do senior NSSE benchmark scores (engagement variables) significantly predict senior measures of learning for first-generation and/or continuing-generation students?</p>	<p>Multiple regression using (a) 4 input variables; (b) 5 NSSE benchmark scores; and (c) student first-generation status predicting ETS MAPP Total Score.</p>	<p><u>Model 1.</u> Containing students with EFC data: Significant positive predictors were ACT composite score and student first-generation status. <u>Model 2.</u> Containing students without EFC data: Significant positive predictor was ACT composite score.</p>
<p>Does a statistically significant difference exist in senior satisfaction measures between first-generation and continuing-generation students? Do Pike “scalelets” generate a better predictive model of senior satisfaction than the engagement variables from high impact practices/university-specific activities?</p>	<p>MANCOVA: 2 NSSE items by student first-generation status with ACT composite as covariate.</p> <p>Multiple regression using (a) 4 input variables; (b) 12 Pike “scalelets” or 7 high impact practices/university-specific activities; and (c) student first-generation status predicting combined senior NSSE satisfaction score.</p>	<p>No significant difference between first-generation and continuing-generation students on adjusted NSSE satisfaction items.</p> <p><u>Model 1.</u> Pike “scalelets” were 3 significant positive predictors: interpersonal environment; higher order thinking skills; and support for student success. One negative predictor: varied education experience. <u>Model 2.</u> High impact practices/university-specific activities were not significant.</p>
<p>Is the quality of relationships (with other students, faculty members, and administrative personnel and offices) a significant predictor of senior satisfaction for first-generation and/or continuing-generation students?</p>	<p>Multiple regression using (a) 4 input variables; (b) 3 NSSE quality of campus relationships; and (c) student first-generation status predicting combined senior NSSE satisfaction score.</p>	<p>All 3 NSSE quality of campus relationship items were significant positive predictor of combined senior NSSE satisfaction score.</p>
<p>Is the quality of relationships (with other students, faculty members, and administrative personnel and offices) a significant predictor of senior measures of learning for first-generation and/or continuing-generation students?</p>	<p>Multiple regression using (a) 4 input variables; (b) 5 NSSE quality of campus relationships and satisfaction items; and (c) student first-generation status predicting ETS MAPP Total score.</p>	<p><u>Model 1.</u> Containing students with EFC data: Significant positive predictors were ACT composite score and student first-generation status. <u>Model 2.</u> Containing students without EFC data: Significant positive predictor was ACT composite score.</p>

DISCUSSION

Recommendations for Practitioners and Policymakers

The strongest conclusion of the study is the positive influence of campus relationships on senior student satisfaction, regardless of parents’ education level. For most administrators and faculty members, this finding would certainly be expected. The strength of the influence on reported student satisfaction (adjusted $R^2 = .405$), a critical component to the student experience at a small private

institution where faculty members typically have better opportunities to build personal relationships with their students, is important to consider.

This particular finding from the study may help faculty members better justify time spent getting to know their students personally, given the importance of student satisfaction as an outcome. Certainly smaller classes at private liberal arts institutions facilitate building campus relationships. Faculty members who focus on teaching and relationships with their students can better justify this time allocation, knowing their efforts influence student satisfaction. A satisfied student is more likely to be retained and graduate from the institution, and later become an engaged and generous alumna/alumnus. Administrators, practitioners, and policymakers need to continue to allocate funding at small private institutions to ensure sufficient numbers of full-time faculty members, where class sizes can remain small enough to foster an environment where each student has a personalized experience. First-generation students need to be affirmed that they can do college level work early in the undergraduate experience (Pascarella, et al., 2004; Pike and Kuh, 2005; Terenzini, et al., 1996).

Other factors which influenced senior satisfaction (again regardless of first-generation or continuing-first-generation status) were higher order thinking skills ($\beta = .14$), support for student success ($\beta = .17$), and varied education experience (a negative predictor with $\beta = -.18$). While the strength of these predictor variables on student satisfaction was much smaller than campus relationships, there are considerations for practitioners and policymakers. Higher order thinking skills reflects the perceived coursework emphasis the university places on analyzing, applying and making judgments of information, concepts and ideas. Faculty members must clearly articulate these goals for each course, instilling confidence in the students that they will develop these skills. This conclusion suggests the importance of effective communication of the institution's student learning outcomes, both at the course and program level. In terms of support for student success, administrators should look more closely at academic support such as advising and tutoring, given that items representing social and nonacademic support for students did not influence student satisfaction. In fact, the literature suggests that first-generation students value academic integration and academic support more than social issues. This is consistent with the study's findings, in this case for both continuing-generation and first-generation students. Because over one third of students work 16 hours or more per week and over one half of the students live off-campus, the findings suggest that academic support is critical for students' satisfaction, given their busy schedules. Students establishing strong relationships with advisors (typically faculty members within the degree program), falls under this umbrella of the importance of campus relationships.

Finally, varied educational experiences was a negative predictor of student satisfaction, but this stemmed from the institution not having a foreign language requirement and the consequent of low student enrollment in these courses. Student involvement in learning communities was also very limited to only a few honors students; this opportunity may need to be expanded in the future. In fact, a house system is currently under consideration at the institution. Items such as attending campus events were positively related to student satisfaction. This Pike “scalelet” is best analyzed with a separate model looking at the individual survey items which influence student satisfaction.

In terms of environmental variables, no differences existed in first-generation and continuing-generation students, with two exceptions, Pike “scalelet” interpersonal environment (quality of campus relationships) and Pike “scalelet” support for student success. In each case, continuing-generation students reported stronger experiences than first-generation students. Because these variables were not significantly different between the two student groups when in context with outcome models (satisfaction and learning), the findings were mitigated. Nevertheless, practitioners and policymakers should look at these scores at the institution level to determine if there is cause for concern. Often first-generation students will focus on academic engagement opportunities through relationships with their faculty members. They may be less engaged overall (especially in traditional co-curricular experiences such as intramurals or varsity sports), but the activities they do participate in can prove more meaningful to them than continuing-generation peers (Pascarella, et al., 2004; Pike and Kuh, 2005; Terenzini, et al., 1996). For example, faculty led learning communities within an academic school or department may be particularly helpful.

When considering student learning, no environment or precollege variables were significant predictors, with the exception of academic preparation (ACT composite), which was not significantly different for first-generation and continuing-generation students. Academic preparation was a very strong predictor, which was expected. Because the learning measure was similar (the ACT compared to the ETS MAPP), the idea of academic preparation is certainly larger than only one measure, the ACT composite. However, practitioners and policymakers need to make note of the finding because it is reasonable to assume that if the ACT composite score greatly influences the ETS MAPP, it will also be a stronger predictor of assessments used for admission to graduate school such as the standardized Graduate Record Examination (GRE).

In subsequent modeling, first-generation status was a significant yet weak positive predictor of ETS MAPP. This sample was much smaller ($n = 39$), considering only those students who submitted a FAFSA (the presumably higher financial need students). However, it is important to note that while EFC did not significantly influence learning in any of the models, first-generation status

became significant when the sample was limited to only the higher need group. First-generation in this group did have a substantially lower EFC than continuing-generation students, yet performed better on ETS MAPP senior exam. Practitioners can consider this a confirmation of the freshman and sophomore literature concluding first-generation students do not make fewer gains or perform worse on standardized measures when they have a similar college experience as continuing-generation students. The literature is consistent in indicating that success in college is more related to the student experience rather than a precollege characteristic such as first-generation status. Targeted programs in the early college years (such as fostering peer-mentor relationships and first-generation learning communities) should help ensure that these students receive additional support if they need it, as well as fostering quality faculty relationships, even if the students' work hours off-campus and family obligations are more substantial.

The future of effective engagement practices may lie in developing programs targeted at specific student groups campus-wide in the first and second year and encouraging faculty members to customize the experience within each academic department in the students' remaining undergraduate years. Literature suggests that the types of engagement and their effectiveness vary by department in the overall undergraduate experience (Brint, et al., 2008). Based on the finding of this study, empowering department chairs to foster an environment where strong relationships are built, will influence student satisfaction. What works for each academic department can best be determined by the faculty members within each department. Additional studies are needed by discipline, where faculty members investigate the precollege and environment variables which influence student learning and student satisfaction within the major during the entire undergraduate experience.

For this small institution, ironically the hypothesis was that first-generation students could not learn as much or be as satisfied in the senior year because of their family obligations while living at home, working more hours for pay, and having more limited time for study outside of class. However, private schools more often have faculty members committed to developing relationships with students through advising and teaching, as well as allocating resources which encourage second-year persistence of high-risk students. Keeping students continuously enrolled in this environment was enough to ensure no difference in satisfaction or learning in the senior year. This affirms the small private school model and should encourage faculty to continue to develop personal relationships with undergraduate students.

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