Validating the National Survey of Student Engagement Against Student Outcomes: Are They Related?

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While there exist many examples of institutional use of the results of the National Survey of Student Engagement (NSSE), there is a relative paucity of research explicitly linking student outcomes to responses on the survey. A major Doctoral-Extensive institution in the Southeast recently conducted a large-scale implementation of the National Survey of Student Engagement (NSSE). We have linked multiple years of NSSE responses to several student outcomes: freshman retention, GPA, pursuit of graduate education, and employment outcome upon commencement/degree conferral. Our research finds minimal explanatory power in the NSSE benchmarks for these outcomes. A statistically-derived model from the individual NSSE items shows greater promise, although there are difficulties in replicating the model for previous student cohorts.

Introduction

A large body of research on student learning has concluded that students who are actively involved in academic and co-curricular activities gain more from their college experience than students who are not as involved (Pascarella and Terenzini, 1991, 2005; Astin, 1977, 1993). Research on student engagement has engendered a national debate among higher education scholars and practitioners. Chickering and Gamson (1987) most famously described seven principles of good practice in undergraduate education, noting that effective educational practice includes:

- student-faculty contact
- cooperation among students
- active learning
- receiving prompt feedback
- student time on task
- communication of high expectations
- respect for diverse talents and ways of learning

In addition to these practices, effective educational outcomes are associated with an institutional environment that is "…perceived by students as inclusive and affirming and where expectations for performance are clearly communicated and set at reasonably high levels" (NSSE, 2003).

The National Survey of Student Engagement (NSSE) has developed an instrument that is designed to measure student engagement and the degree to which institutions provide students with an effective learning environment (Kuh, et al. 2001; Kuh 2001a). The survey uses a well-developed, validated set of items directed at a variety of student behaviors and experiences related to engagement. A major component of the way NSSE results are reported is through its benchmark scales. These scales are informed partially by an empirically derived grouping of survey items as well as an intuitive understanding of concepts proposed by Astin's (1984) theory of student involvement, and by Chickering & Gamson's (1987) work (Kuh, et al. 2001).

The five NSSE benchmarks—Level of Academic Challenge, Active and Collaborative Learning, Student-Faculty Interaction, Enriching Educational Experiences, and Supportive Campus Environment—serve as the framework around which the NSSE annual reports are organized. The benchmarks, essentially unweighted indices of items, are intended to be a useful tool for internal evaluation, and are also used to facilitate comparisons among other institutions and institutional types (Kuh, 2001).

The benchmarks, however, are not the only way to look at NSSE data. Alternative, empirically derived scales have been developed from the data. For example, Zhao and Kuh (2004) created scales to measure perceived gains in social, practical, and academic competence. Similarly, Pike (2004a), based on Wainer and Kiely's (1987) testlet concept, developed a set of "scalelets"—an alternative grouping of items that further disaggregates the NSSE benchmarks' conceptual domains. The scalelets were developed as a way to provide actionable unit and institution-level information on engagement.

In addressing NSSE data, institutions need to be mindful of the desired goals they have for their students and themselves. The goal of an institution should not be to achieve higher NSSE benchmark scores for the sake of doing so, but rather to gain keener insight into the relationship between student engagement (as measured by NSSE) and the desired outcomes the institution has for its students. "Success" has different meanings for different institutions, and the means by which success may be measured will vary as well. For example, academic success can be defined by persistence and graduation. Success can also be defined by whether or not a graduate is able to pursue a meaningful career as a result of their education or if the graduate reports satisfaction with their college experience. Success for some students may not even include graduation, but rather the attainment of marketable skills (Pfeiffer, 1998).

Institutions have a variety of means to actually measure the degree to which its students achieve these goals. For example, academic success might be measured by grades or graduation rates. Job satisfaction can be gauged by responses to alumni surveys. Student satisfaction can be assessed by retention rates, student self-reports, or even contributions to the institution's alumni association (Pascarella and Terenzini, 2005).

Given the demonstrated connection as reported in the literature between engagement and positive student experience, and the intended design of NSSE in measuring this engagement, one would expect to find associations between NSSE results and measures of desired outcomes. While there are many examples of institutions using NSSE to explore the impact of programs that are intended to affect student engagement, there are at present relatively few studies on the relationship between measures of engagement and measures of student outcomes.[1]

Several recent studies have utilized engagement measures similar to the NSSE benchmarks to evaluate self-reported gains in learning outcomes. The earliest of these (Kuh, Pace, and Vesper 1997) is really best described as a research precursor to the NSSE—developing instrumentation to link behaviors to engagement and learning outcomes. Items were taken from the *College Student Experiences Questionnaire* (Pace, 1990) to derive a set of "best practices" scales (faculty-student contact, cooperation among students, and active learning), and a set of "process indicators" for learning (general education and intellectual skills). The research found a very clear connection between the "best practices" and "process indicators." One important area that was not addressed in that study was external validation—comparing these measures against outcome measures external to this single instrument.

A limited foray into combining sources of information internal and external to the NSSE, was a feature of Zhao and Kuh's (2004) study on the impact of learning communities on engagement and academic outcomes. That NSSE-era study furthermore utilized an alternative (non-benchmark) set of measures based on the NSSE survey data—including three learning outcome measures (personal and social development, general education, and practical competence) drawn

[1] For examples of how NSSE is used by institutions, see http://webdb.iu.edu/Nsse/?view=tools/using_nsse_data.

from some of the non-benchmark items on the survey. This research demonstrated that participation in learning communities had an impact on measures of student engagement, as well as between learning community participation and student outcomes (both GPA and self-reported gains). However, these effects were dependent on controlling for initial student differences—the background characteristics of community participants and non-participants had differential impact on student engagement. Zhao and Kuh's study demonstrated that individual behavioral (or intentional) items can be used effectively in predicting outcomes, even across multiple (n=365) institutions with a variety of different programs. It also demonstrated the functional use of non-benchmark measures in evaluating engagement. However, direct connections between broader engagement measures and student outcomes were not investigated.

Kuh, Pace, and Vesper (1997) briefly addressed the differential impact of engagement between institutions. This subject has been explored in many studies, almost all of which show the majority of any differences disappeared when student characteristics were controlled (Pascarella and Terenzini, 1991). Pike, Kuh, and Gonyea (2003) explored a specific and relatively untested effect that institutional mission—proxied by Carnegie classification—may have on engagement. As with much of the prior research, differences were found, but these could be attributed to differences in the student populations among these types of institutions, with no statistical interaction between student and mission. Clearly institutional differences in engagement are impacted in large part by the student body an institution attracts. This may be a product of institution type, but it is also somewhat of a character or reputation issue as well.

A recent study by Carini, Kuh, & Klein (2006) includes one of the most extensive evaluations of the associations of NSSE benchmarks and student outcomes. That research was conducted over 14 institutions of varying characteristics. In evaluating learning outcomes, the authors chose to use more direct measures of academic success (i.e. GPA) and standardized testing to measure ability. The results suggested that there was a link between engagement measures and educational outcomes. However, these statistical associations were quite small and rarely met cutoffs for even small effect sizes. For the whole population, no individual NSSE benchmarks accounted for more than 2% of the variance in their outcome measures. In fact, the best measures came from other NSSE engagement and learning scales. Important to note in this study is that when the students were divided by pre-college ability (as measured by SAT scores), more powerful associations were found between performance and engagement for the *lowest* ability students. Differences between institutions were also noted not just in engagement, but in the connection between engagement and educational outcomes—some producing better than or worse than expected outcomes (see also Kuh, Carini, & Klein, 2004). The authors termed this relationship between engagement and educational outcomes "educational efficiency." This presents an interesting question regarding what is occurring for those institutions with low engagement-outcomes associations to produce "better-than-expected" outcomes. The research also indicates a caveat in using benchmarks: measures of engagement may not associate strongly with outcomes for every institution.

2005 [author's institution] / NSSE Benchmarks - Analysis

For the 2005 administration of NSSE, [author's institution] was able to take advantage of funds provided by the University System of [xxx] to sample our entire first-year and senior populations. With a total response rate of 47.3 percent, we obtained data from 1,244 first-year students and 629 seniors. This robust sample formed the basis for our subsequent exploratory efforts.

In our attempts to link NSSE results with student outcomes, we were limited to what we could plausibly measure in our student population. We do not yet have the ability to conduct a long-term follow-up of students who have taken the NSSE. However, we do routinely conduct baccalaureate and graduate alumni surveys, and hope to include these results in the future. We chose to focus on four indicators of success in our student body: cumulative GPA, first-year retention, job attainment upon graduation, and the decision to pursue a graduate degree. Operationally, we examined the cumulative GPA in the spring semester in which the students completed the NSSE (both first-years and seniors). For retention, a student was considered retained if they returned to [author's institution] for the Fall 2005 semester—we did not look at retention/graduation in the senior respondents, as virtually all seniors either graduated or returned for an additional term. For job attainment and post-baccalaureate education plans, we examined student responses to the [author's institution] Commencement Survey, which is given to students on the day of commencement ceremonies. We recognize the limitations of this measure—many students who do not report employment at graduation are often gainfully employed six months later. Still, since 64% of [author's institution] graduates report employment upon graduation or placement in a graduate program, the data may be deemed a relatively good indicator of eventual success for [author's institution] graduates.

We were interested in examining the following research questions:

1) to what degree are NSSE benchmarks correlated with the student outcomes described above;
2) to what degree are the NSSE scalelets developed by Pike (2004) correlated with student outcomes and;
3) can a model be generated that provides a better fit to student data at [author's institution]? In other words, what NSSE items are most associated with positive student outcomes at the Institute?

Due to the technological focus and high concentration of Engineering programs that characterize [author's institution], we do not expect that the models generated in this paper will necessarily work at other institutions. However, our hope is that other institutions can use these methods to investigate the relationships between NSSE and their student bodies in a similar manner.

The manner in which our analyses proceeded is as follows: first, we examined some of the psychometric properties of the NSSE benchmarks and explored the correlations between the benchmarks and student outcomes. We then looked at the alternative groupings of NSSE items generated by Pike's (2004) work. Next, we used regression analysis (OLS) in an attempt to improve the predictive power of NSSE variables on student outcomes. Our approach here was data driven: we wished to see if there are any NSSE items not presently included in the benchmarks and scalelets that contributed to desired student outcomes. Forward regression was used to generate a "best fit" model for each outcome. Finally, we tested the model on the results of the 2003 NSSE to see if its predictive power held up on a different student cohort.

Reliability of the NSSE Benchmarks

The benchmarks are a blend of theory and empirical analysis, and while they have been adopted by NSSE, the consistency of some of the scales may be an object of concern. Generally when interpreting scales, one wishes to achieve a high level of internal consistency between each of the items in the scale. In other words, one expects that respondents answer similar questions in similar ways. A conventional measure of internal consistency is Cronbach's alpha, a measure of the inter-correlation of the items that make up a scale. An alpha score of .70 is considered

minimally adequate in creating scales.[2] Cronbach's alphas were calculated for the [author's institution] 2005 survey respondents and compared to those generated by NSSE in 2002 to create the original benchmark scales. The results are presented below; bolded values are those that fall below the .70 threshold.

Table 1. Cronbach's Alpha Values for Benchmark Scales: National NSSE and [author's institution] Results

	NSSE 2002		[author's institution] 2005	
Benchmark	**First-Year**	**Senior**	**First-Year**	**Senior**
Level of Academic Challenge	0.74	0.76	**0.66**	**0.68**
Active and Collaborative Learning	**0.64**	**0.65**	**0.58**	**0.58**
Student-Faculty Interaction	0.72	0.75	**0.69**	0.70
Enriching Educational Experiences	**0.54**	**0.64**	**0.57**	**0.53**
Supportive Campus Environment	0.78	0.78	0.70	0.70

As can be seen from the table, measures of internal consistency in the benchmark scores are fair, but noticeably soft in two areas for NSSE and in three areas for [author's institution]: Active and Collaborative Learning, Student-Faculty Interaction, and Enriching Educational Experiences. At [author's institution], Cronbach's alpha scores for the remaining benchmarks are minimally acceptable.

A low alpha does not necessarily mean that the test or scale is bad per se, but rather that there is some concern about the cohesiveness of the scales. This may mean that the scale items insufficiently (or inefficiently) measure the target concept, or that they may be measuring more than one concept. While we will move forward with analysis on these scales, we expect to see that the additional error within the benchmarks may reduce the measurable association with the student outcomes.

Explanatory Power of the NSSE Benchmarks

To explore the association between engagement benchmarks and our student outcomes, an OLS Regression analysis was conducted using the benchmark scales. Using a benchmark-only model to predict GPA, a minor association was found between GPA and all five benchmarks, with an adjusted r-square of .023 for freshmen and .053 for seniors. Looking at individual benchmarks, Freshman GPA had three with significant, albeit minor contributions: Level of Academic Challenge, Active and Collaborative Learning, and Enriching Educational Experiences. Engagement showed a larger impact for seniors, with Student Faculty interaction and Enriching Educational Experiences having the strongest influence on GPA.

Following the analysis run by Carini, Kuh, & Klein (2005), we tested a model controlling for several potentially confounding elements, generally reflecting pre-existing differences or

[2] While there are no absolute criteria in the literature, practitioners usually strive for .70 or above. The minimum level of internal consistency is to some extent dependent upon the goals and objectives of the scale. If a research wishes to be extremely precise in their measurements (such as IQ tests), much higher alpha levels are required. See Nunnally, J.C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.

common predictors of success in college.[3] To avoid excessive R-square deflation and collinearity issues from multiple elements, these factors were combined into a single control variable. Even with this step, the condition index suggests a definite risk of collinearity.[4] With these factors controlled, the scales had a similar result pattern, with minimal impact from the engagement benchmarks.

Table 2. Partial Correlations for Individual Benchmarks with GPA (Regression)

Cumulative GPA	Benchmarks	Std. Beta	Partial Corr.	R^2 for Partial Corr.	Adjusted R^2 for Model
First-Year (Freshmen)					**0.208**
	Control Factor	0.432	0.437	0.1910*	
	Level of Academic Challenge	0.101*	0.099	0.0098	
	Active and Collaborative Learning	0.083*	0.073	0.0053	
	Student-Faculty Interaction	0.007	0.006	0.0000	
	Enriching Educational Experiences	-0.110*	-0.109	0.0119	
	Supportive Campus Environment	0.054	0.057	0.0032	
Seniors					**0.242**
	Control Factor	0.454	0.458	0.2098*	
	Level of Academic Challenge	-0.052	-0.053	0.0028	
	Active and Collaborative Learning	0.075	0.070	0.0049	
	Student-Faculty Interaction	0.080	0.075	0.0056	
	Enriching Educational Experiences	-0.005	-0.005	0.0000	
	Supportive Campus Environment	0.112*	0.120	0.0144	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)

Overall, the benchmarks provide minimal predictive value of academic performance as expressed through GPA. There is a stronger relationship for seniors than freshmen, suggesting that engagement has an influence over the career of the student—something not readily seen after a semester and a half of experience. It is also interesting to note that Enriching Educational Experiences have a significant and negative effect on freshman GPA (but no effect on senior GPA). A reasonable explanation would be that too positive an engaging experience may be detrimental early in a student's career, distracting them from basic studies and adjusting to the [author's institution] campus environment. This explanation is borne out by [author's] (2000) findings that students in learning communities at [author's institution] were retained at a lower rate and exhibited lower performance (GPA) than control group students not involved in learning communities.

Retention analysis focused on the freshmen respondents. Among freshmen, only 66 of the 1244 respondents (5.3%) did not return for the sophomore year, thus (fortunately, from an institutional perspective) limiting the available sample size for this analysis at the outset. Our initial analysis

[3] Variables controlled included: Total SAT score, gender, ethnicity, NSSE 10-major group, parental education, commute distance and full-time/part-time status.

[4] The condition index is the square root of the ratio of the largest eigenvalue (the largest contributor) to the eigenvalue for each successive dimension (variable) added to the model. Levels over 15 suggest a risk of collinearity, and levels over 30 indicate a critical collinearity issue—variables effectively can collapse together.

showed that GPA has a significant association with retention. As a result, we added GPA to the model as an additional control variable.

Only one of the benchmarks exhibited significant beta coefficients in explaining whether or not a student was retained: Supportive Campus Environment. It should be noted that while statistically significant, the association was extremely weak, accounting for only 1.0 percent of the variance.

Table 3. Significant Contributors to Retention (Benchmarks)—All Students (N = 1083)

	Beta	Partial Corr.	Partial R^2	Adjusted R^2 for Model
Retained? (1 = No, 2 = Yes)				**.080***
Control Factor	0.131*	0.133	0.0177*	
GPA	0.202*	0.201	0.0404*	
Level of Academic Challenge	0.004	0.003	0.0000	
Active and Collaborative Learning	0.059	0.048	0.0023	
Student-Faculty Interaction	-0.067	-0.056	0.0031	
Enriching Educational Experiences	-0.028	-0.025	0.0006	
Supportive Campus Environment	0.104*	0.100	0.0100	

* Beta - significant individual contributor ($p < .05$)
* R-square – small or greater effect size (>.03)

A total of 151 senior respondents to NSSE were matched to their responses to questions about their immediate employment and education plans on the [author's institution] Commencement Survey. In this analysis, employment was operationalized as whether or not a student reported having accepted an offer of a full-time (35+ hours per week) employment at the time of commencement. Plans for further education consisted of a four-point set of choices, and was treated as a Likert-type scale of interest in this analysis[5]. Again, NSSE benchmarks made extremely modest contributions to predicting senior outcomes. Table 4 presents the results of the OLS regression models on the two senior outcomes. As can be seen from the table, none of the benchmarks are significantly related to whether or not a student reported having obtained a job upon commencement. In terms of further education, Student Faculty Interaction was significant in whether or not a senior planned to pursue further education.

[5] Future education plans is an ordinal scale of plans and behaviors regarding future education, and to an extent approximates a Likert-type interest scale. Given the poor predictive ability of our logistic models, and the more direct measures of effect size drawn from the OLS regressions, we felt that this would be a more fruitful mode for evaluating the measure-outcome links, at least in terms of the size and direction of the relationships.

Table 4. Significant Associations Between Benchmarks and Senior Outcomes

Dependent Variable	Significant Contributors (p < .05)	Beta	Partial Corr.	R^2 for Partial Correlation	Adjusted R^2 for Model
Reported employment at time of graduation (0 = No, 1 = Yes)					**.247**
	Control Factor	0.496	0.491	0.2411*	
	Level of Academic Challenge	-0.151	-0.158	0.0250	
	Active and Collaborative Learning	0.088	0.085	0.0072	
	Student-Faculty Interaction	-0.015	-0.014	0.0002	
	Enriching Educational Experiences	0.122	0.115	0.0132	
	Supportive Campus Environment	0.023	0.025	0.0006	
Future Education Plans (1 = does not plan to, 2 = considering, 3 = applying, 4 = currently accepted)					**.313**
	Control Factor	0.498	0.510	0.2601*	
	Level of Academic Challenge	0.048	0.052	0.0027	
	Active and Collaborative Learning	0.049	0.050	0.0025	
	Student-Faculty Interaction	0.209*	0.195	0.0380*	
	Enriching Educational Experiences	-0.151	-0.156	0.0243	
	Supportive Campus Environment	0.063	0.068	0.0046	

* - Significant contributor to regression model ($p < .05$)

Taken overall, the NSSE benchmarks provide very little predictive power on the student outcomes of concern. However, as Carini, Kuh and Klein (2005) note, students of higher ability (specifically operationalized as a higher SAT score) benefit less from student engagement elements, compared to those of more median ability. [author's institution] is a high-selectivity institution—the mean SAT total for incoming freshmen for Fall 2005 was 1340. Thus, it is possible that other institutions may find more significant relationships between the benchmarks and student outcomes. For [author's institution], we believe further exploration of NSSE—beyond the benchmarks—is required. We now turn to an exploration of an alternative formulation of the benchmarks created by Pike (2004a), as well as a data-driven approach focusing on the specific NSSE items and their relationship to student outcomes at [author's institution].

Pike's Scalelets

Pike (2004a) introduced an alternative grouping of NSSE items that he termed "scalelets." The scalelets are a set of 12 derived scales—in many ways an extension and refinement of the NSSE benchmarks—designed primarily to provide more concise and actionable data for academic departments within institutions. It is possible that the tighter theoretical concepts as well as the larger number of items included in each scalelet might prove more effective at predicting student outcomes.[6] We recognize that the scalelets were developed as a means for describing results at the academic unit, not individual levels, and thus may not be optimal measures of individual student outcomes.

As with the NSSE benchmarks, Cronbach's alpha was used to measure the internal consistency of the scales. Compared to the NSSE benchmarks, the scalelets demonstrated less internal consistency in the analysis of [author's institution] results. All of the scalelets have alpha coefficients below 0.70, many of them markedly so. The reliability of the scalelets for [author's

[6] The NSSE benchmarks (5 variables) contain 41 items, while Pike's scalelets (12 variables) encompass 46 items.

institution] students are reported in Table 5. The results for [author's institution] are substantially similar to the alphas computed from Pike's original data.

Several explanations may play a role in these results. As Cronbach's alpha can be directly influenced by the number of items involved in each scale, the relatively small number of items in each scalelet—eight of the twelve contain fewer than five items—may be a limiting factor. There may be problems with the formulation of specific benchmarks. Varied Experiences, for example, has the largest number of scale items of the scalelets, and as such might be expected to have a higher alpha, whereas in actuality it has one of the lowest alphas of the set. Almost by definition, the items that comprise this scalelet (such as community service, field experience/practicum, and study abroad), may contain too much variety to coalesce into a unified concept.

Table 5. Scalelet Reliability ([author's institution] 2005 Data)

		Freshmen		Seniors	
Scalelet	**Number of Items**	**N**	**Cronbach's Alpha**	**n**	**Cronbach's Alpha**
Course challenge	5	1111	**0.527**	595	**0.526**
Writing	5	1151	**0.578**	602	**0.597**
Higher-Order Thinking Skills	5	1153	**0.626**	602	**0.642**
Active Learning	3	1179	**0.408**	606	**0.444**
Collaborative Learning	4	1160	**0.437**	605	**0.404**
Course Interaction	3	1159	**0.529**	605	**0.536**
Out of Class Interaction	3	1127	**0.413**	599	**0.554**
Varied Experiences	7	1116	**0.516**	595	**0.488**
Information Technology	2	1179	**0.578**	607	**0.527**
Diversity	3	1110	**0.633**	593	**0.646**
Support of Student Success	3	1110	0.699	595	**0.688**
Interpersonal Environment	3	1125	**0.614**	597	**0.645**

The alpha coefficients suggest that the utility of Scalelets for this sort of individual level evaluation may be somewhat limited. Nonetheless, we have chosen to pursue further analysis to determine whether the additional variables and the more granular typology of engagement encapsulated by Pike's approach contribute to our understanding of engagement and student outcomes.

As with the NSSE benchmarks, we ran an OLS regression using the same control variables, but substituted the Pike scalelets as independent variables. The full results of the regression models are presented in the appendix. In the table below, we present only those variables with statistically significant beta coefficients, the direction of the relationship, and the partial r-square values for each significant variable.

Table 6. Significant Beta Coefficients for Pike Scalelets on Student Outcomes: Direction of Relationship and Partial R-Squared Values[7]

	FY GPA	FY Ret	SR GPA	SR job	SR Edu
Adjusted R-Square for model	.221	.082	.274	.272	.308
Control Variable	+* (.185)	+* (.021)	+* (.206)	+* (.281)	+* (.255)
GPA†		+* (.037)			
Scalelets					
Course challenge	+* (.016)				
Writing					
Higher-Order Thinking Skills					+* (.038)
Active Learning			+* (.009)		
Collaborative Learning					
Course Interaction					
Out of Class Interaction		-* (.005)	+* (.019)		+* (.044)
Varied Experiences		+* (.005)		+ (.035)	
Information Technology	-* (.006)			+ (.033)	
Diversity	-* (.011)			- (.036)	
Support of Student Success					
Interpersonal Environment	+* (.004)	+* (.004)	+* (.014)		

+/- : direction of association (beta)
† : Used in retention model only
* : significant at $p<.05$

[7] Given our available responses, the Pike scalelet models for the senior job and education outcomes are over-specified. Using Green's (1991) rule of thumb, the 13-item scalelet model should have at least 154 respondents to test both the overall model and the individual scalelets within the model. In addition, the number of responses on the employment variable provided insufficient power to claim significance for the reported r-squares. An estimated 271 respondents would be needed to show significance on an r-square of .03. Although this limits the confidence in these specific measures, they are close enough to provide a general shape of the associations that might have been found in a larger sample.

Overall, the scalelets represent a very modest improvement over the NSSE benchmarks in accounting for academic performance. In predicting GPA, the scalelets provide a small, significant accounting of the variance, with an adjusted r-square of .043 for freshmen and .094 for seniors. While there are some scalelets that show significant individual contributions, none of them account for more than two percent of the variance in GPA. The scalelets prove to be insufficient for predicting freshman retention within the [author's institution] environment. While Out of Class Interaction, Varied Experiences and Interpersonal Environment were significant regressors, none of these factors accounted for any more than 0.5 percent of the variance.[8]

The scalelets performed better in predicting outcomes on employment and further education for graduating seniors. Three scalelets—Varied Experiences, Information Technology, and Diversity—were meaningful (but not statistically significant) contributors to whether or not the student reported having a job upon commencement. Two scalelets—Higher-Order Thinking Skills and Out of Class Interaction—were significantly related to the pursuit of a graduate/professional degree. Clearly, many of the academic and co-curricular activities related to interest in further education (such as working with faculty on research projects, discussing career plans with faculty) manifest in the decision to pursue post-baccalaureate education.

While the scalelets are not as psychometrically reliable as the NSSE benchmarks, they do represent a modest improvement in predicting student outcomes at [author's institution]. Unfortunately, a high risk of collinearity in a full scalelet model is nearly unavoidable, due to the fact that many of the scalelets are highly interrelated, particularly between those that are derived from a similar NSSE benchmark.[9]

Back to the Basics: An Exploration of Individual NSSE Items

Given the relatively modest contributions of both the NSSE benchmarks and the Pike scalelets to explaining student outcomes, as a next analytical step we chose to adopt a data-driven approach to explaining student outcomes at [author's institution]. Our goal here was to determine exactly what individual NSSE items were related to student success as operationalized within this paper.

We considered using exploratory factor analysis on the [author's institution] data. Factor analysis would provide a new set of factors from the data, but the factors generated might not be predictive. As such, we felt it would be more sensible to begin by identifying predictors. Creating factors will by nature lose information. We required a predictive set of variables whose performance exceeds that of the benchmarks. Early tests of factor analysis models showed a drastic decline in explained variance from its constituent items, to the point of providing no better explanatory power than that produced by the benchmarks. We determined the models would perform better using the individual items rather than the factors. Therefore, our goal in this exercise was to use the data to create models that best explained our outcomes of interest, with the hope that common elements or patterns would be found among the NSSE variables. We then tested the model generated by the 2005 results on a previous cohort of NSSE respondents.

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[8] It is interesting to note that the sign on Out of Class Interaction is negative—students who spend more time interacting with faculty outside of class were less likely to return. One possible explanation is that students who are considering leaving [author's institution] may be engaging with faculty and advisors regarding alternative educational opportunities. We plan to investigate this relationship further in the future.

[9] While this risk of multicollinearity does suggest a weaker or unstable model, this is not immediately fatal. Others who wish to explore their data using the scalelets in this manner may try to include in the model only those scalelets that are of greatest importance or can be practically addressed by the institution.

We employed forward regression to maximize the explained variance by the models. This method starts with an empty model and adds variables, with the largest individual contributors added first. Additional items are added if they provide a significant increase in the predictive power (R-square) of the model. This approach differs from stepwise regression, in that stepwise regression will also remove items that fail to provide a significant contribution after additional variables are entered into the model (Tabachnick & Fiddel, 1996). The forward regression thus provides a more liberal pool of items by allowing individual contributors to remain, even if they become no longer significant due to intercorrelations with other items in the model. The main concern with this approach is the risk of over-specifying the model.[10] The results of the regression models are presented in Table 7.

Table 7. Significant Beta Coefficients for Individual NSSE Items on Student Outcomes: Direction of Relationship and Partial R-Squared Values

Benchmark Key:

LAC = Level of Academic Challenge
ACL = Active and Collaborative Learning
SFI = Student-Faculty Interaction
EEE = Enriching Educational Experience
SCE = Supportive Campus Environment

	Bench	FY GPA	FY Ret	SR GPA	SR Job	SR Edu
Control variable		+ (.141)	+ (.014)	+ (.160)	+ (.238)	+ (.216)
GPA (For Freshman Retention only)			+ (.028)			
Hours per 7-day week spent preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities)	LAC	+ (.009)				
Coursework emphasized: MAKING JUDGMENTS about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions	LAC				- (.184)	
Asked questions in class or contributed to class discussions	ACL			+ (.018)		
Tutored or taught other students (paid or voluntary)	ACL	+ (.026)		+ (.027)		
Discussed ideas from your readings or classes with faculty members outside of class	SFI	- (.008)				

+/- : direction of association (sign of beta weight)
items are statistically significant contributors to model ($p < .05$)

[10] In addition to being unwieldy, a model with a large number of predictors loses power for detecting significance among individual predictors, as well as for the model as a whole. This can be offset by having a sufficiently large sample of respondents. Over-specification can also contribute to problems with collinearity—individual predictor variables becoming highly overlapped, and fail to produce unique information—suggesting the removal of predictors may be needed. Initial trials using the GPA analysis indicated almost no difference between the stepwise and forward models for freshman GPA; the stepwise model dropped a single variable, but otherwise produced identical results. Also, for most of our exploratory analyses there was a sufficient subject pool to minimize the risks of power loss due to additional variables being considered in the models.

Table 7. Significant Beta Coefficients for Individual NSSE Items on Student Outcomes: Direction of Relationship and Partial R-Squared Values

Benchmark Key:

LAC = Level of Academic Challenge
ACL = Active and Collaborative Learning
SFI = Student-Faculty Interaction
EEE = Enriching Educational Experience
SCE = Supportive Campus Environment

	Bench	FY GPA	FY Ret	SR GPA	SR Job	SR Edu
Talked about career plans with a faculty member or advisor	SFI		- (.006)			+ (.120)
Work on a research project with a faculty member outside of course or program requirements	SFI			+ (.011)		
Used an electronic medium (listserv, chat group, Internet, instant messaging, etc.) to discuss or complete an assignment	EEE	- (.010)				
Practicum, internship, field experience, co-op experience, or clinical assignment	EEE		+ (.005)		+ (.067)	- (.086)
Community service or volunteer work	EEE				+ (.103)	
Study abroad	EEE			+ (.013)		
Quality: Your relationships with other students	SCE		+ (.013)			
Quality: Your relationships with faculty members	SCE	- (.006)		- (.056)		
Institutional emphasis: Providing the support you need to help you succeed academically	SCE	+ (.005)				
Institutional emphasis: Helping you cope with your non-academic responsibilities (work, family, etc.)	SCE	- (.014)				
Come to class without completing readings or assignments		- (.020)				
Mark the box that best represents the extent to which your examinations during the current school year challenged you to do your best work.		- (.009)				

+/- : direction of association (sign of beta weight)
items are statistically significant contributors to model ($p < .05$)

Table 7. Significant Beta Coefficients for Individual NSSE Items on Student Outcomes: Direction of Relationship and Partial R-Squared Values

Benchmark Key:

LAC = Level of Academic Challenge
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	Bench	FY GPA	FY Ret	SR GPA	SR Job	SR Edu
Put together ideas or concepts from different courses when completing assignments or during class discussions						+ (.070)
Number of problem sets (problem-based homework assignments) that take you MORE than an hour to complete		- (.005)		- (.005)		
Exercised or participated in physical fitness activities		- (.004)				
Tried to better understand someone else's views by imagining how an issue looks from his or her perspective				- (.021)		
Hours per 7-day week spent relaxing and socializing (watching TV, partying, etc.)		- (.006)				
Institutional emphasis: Attending campus events and activities (special speakers, cultural performances, athletic events, etc.)			+ (.007)			
Institutional contribution: Acquiring job or work-related knowledge and skills			+ (.004)			
Institutional contribution: Working effectively with others					+ (.092)	
Institutional contribution: Learning effectively on your own		+ (.006)				

+/- : direction of association (sign of beta weight)
items are statistically significant contributors to model ($p < .05$)

There are several findings worthy of note in these results. First, while several items that are found in the NSSE benchmarks are also significant variables in these models, there are quite a few that are not. The benchmarks encompass 41 items. Of these items, only 15 were found to contribute to the student outcomes in one way or another. The remaining 26 benchmark items made no significant explanatory contribution. Secondly, there are an additional 11 items that made a significant contribution to the models' explanatory power that are not found in the benchmarks. Freshman GPA is the outcome best served by the additional items—six of the additional 11 items were found to contribute an additional five percent of the explained variance in this outcome. Third, there are few individual items that provide explanatory power across the several outcomes modeled. For example, only one item (participation in a practicum, internship, field experience,

co-op experience, or clinical assignment) provided explanatory power in freshman retention, senior job attainment and senior further education. No other single item was a significant explanatory factor in more than two of the measured outcomes.

The results of the "best fit" models have generated some interesting and surprising findings for us as well. For example, student-faculty interaction in terms of discussion of readings/ideas with faculty outside of class is negatively related to freshman GPA, as is the student-reported institutional emphasis on helping students cope with non-academic responsibilities. It is possible that students who find themselves in academic or personal difficulties during their first year are more likely to engage in discussions with Institute support personnel like advisors or student affairs counselors. This might explain the negative sign of the beta coefficient in this case. While we were pleased to note that study abroad experiences were positively related to senior GPA, we were perplexed at the negative correlation between senior GPA and ratings of faculty-student relationships. We also note the large and negative relationship between seniors reporting coursework emphasizing making judgments about the value of information and data interpretation and obtaining a job upon commencement. Given that student major is being controlled in this model, the fact that this single item explains over 18 percent of the observed variance definitely merits further investigation.

Table 8. Marginal Improvements in Explanatory Power: Adjusted partial R-squared Contributions to Student Outcomes

	Cumulative GPA (Freshman)	Cumulative GPA (Seniors)	Freshman Retention	Senior Job Attainment	Senior Further Education
Control Variable	.184	.216	.067	.256	.280
NSSE Benchmarks	.024	.026	.009	-.009	.033
Pike Scalelets	.037	.058	.010	.016	.028
Stepwise Regression of individual NSSE items	.101	.114	.035	.228	.138

Table 8 shows the relative contributions to explained variance of the student outcomes of the NSSE benchmarks, Pike's scalelets, and the stepwise regression models on individual NSSE items. As can be seen, the control variables provide a largest amount of explanatory power. However, it also notable the individual NSSE items do a much better job of explaining the student outcomes than do the benchmarks or scalelets. For example, for freshman GPA, the benchmarks explain an additional 2.4 percent of variance over the control variable. The stepwise regression model on individual NSSE items explains an additional 10.1 percent of variance. The regression model does particularly well explaining job attainment upon commencement with the selected NSSE items accounting for 22.8 percent of the variance over and above the controls.

Testing the Models on NSSE 2003

In order to determine whether the results are stable within our institution, we decided to test the models against another student cohort—respondents to the 2003 NSSE. From the 2005 regression equations, we calculated predicted outcome variables based on 2003 responses. The 2003 NSSE was administered to only a sample of enrolled students, resulting in a smaller pool of respondents (N=641 versus N=1873 in 2005). Because of the interaction of sample size and item count, we realized from the beginning that the adjusted R-squares would be markedly lower for 2003. Our decision to proceed was prompted by the notion that this potential reduction in predictive power would function as a stringent test of the models.

Some adjustments in the coding of the items were made due to differences in the wording of several NSSE items during this period.[11] Due to the smaller sample size, we were not able to test the model on senior job attainment nor senior further education plans. Table 9 compares the performance of the regression models for the 2003 and 2005 cohorts. For both years, the overall R-square is presented, along with the marginal contributions in explained variance for the control variables and the NSSE items generated from the 2005 data. As can be seen, the model seems to hold up fairly well when used to predict 2003 freshman GPA. The model, which explained 10.5 percent of the variance in the 2005 GPA, explained 8.4 percent of the variance for the 2003 freshman cohort. However, the model fared substantially worse in explaining senior GPA. The 2005 model explained 11.4 percent of senior GPA variance, but in 2003, the adjusted R-square was negative (-.015)—essentially, the NSSE variables simply introduced more noise into the equation. Freshman retention, which was not very well modeled in 2005, also had a negative adjusted R-square value in the 2003 model.

The failure of two of the models generated in 2005 to work with 2003 (senior GPA and freshman retention) data is troubling. Of particular concern is the failure of the model to explain senior GPA. The control variables did a better job explaining variance in 2003 than did the NSSE items. While it is possible that some there is some environmental difference between the two samples, we know of no major institutional changes that might account for the differential performance of the models. We plan to attempt a similar analysis on data collected in our next NSSE administration (tentatively set for Spring 2007). However, our tentative conclusion is that the NSSE variables identified in the models have a decidedly mixed level of validity within our institution.

[11] In 2005, NSSE added some additional affirmative response choices to the variety of co-curricular and extra-curricular experiences items. We chose to modify the 2003 responses by re-weighting the affirmative responses based on the ratio of affirmative responses in 2005. Items that appeared in 2005 but not in 2003 were eliminated from the 2005 model for the purposes of generating the appropriate beta coefficients for the 2003 model. These items included how often a student: “tried to better understand someone else's views by imagining how an issue looks from his or her perspective” and how frequently a student “learned something that changed the way you understand an issue or concept.”

Table 9. Testing the 2005 Models: Adjusted Partial R-squared Contributions to Student Outcomes for 2003 and 2005 [author's institution] NSSE Data

	2003	2005
Freshman GPA	N=350	N=1074
Model R-Square	.211	.284
Control Adjusted R-Square	.127	.179
Regression Variable contribution (18 items)	.084	.105
Senior GPA	N=214	N=461
Model R-Square	.242	.309
Control Adjusted R-Square	.257	.195
Regression Variable contribution (11 items)	-.015	.114
Freshmen Retention	N=350	N=1074
Model R-Square	.016	.102
Control + GPA Adjusted R-Square	.080	.067
Regression Variable contribution (10 items)	-.064	.035

Discussion

Our goals in this project were to investigate the relationship between NSSE benchmark scores and student outcomes at [author's institution], as well as further illuminate the ways in which NSSE can be used to describe and explain student success. We continue to believe that the National Survey of Student Engagement is a valuable tool for institutional self-reflection. However, we also recognize the limitations of the NSSE benchmarks as indicators of effectiveness. While there is some linkage between items that comprise the benchmarks and our operationalized outcomes, there exists notable room for improvement. We believe that an approach that eschews domain scales in favor of targeting the specific elements that are most directly related to outcomes offers superior explanatory power and predictive validity. However, even this approach has mixed results. While the model generated fairly stable results in explaining freshman GPA, it did not provide such stability for freshman retention or senior GPA.

Another potential explanation for our findings may lie in the nature of the comparisons being pursued. As Pike (1996) demonstrated, there exists an ambiguous relationship between self-reported learning outcomes and objective test results. By extrapolation, the use of NSSE items to predict objective student outcomes may be a similar situation, and it may be that the low predictive power of self-reports to gauge student outcomes all but precludes their serious usage in this vein.

We recognize that the results obtained here are not generalizable, and we encourage other institutions to conduct similar analyses. Through such investigations, institutions can get beyond the basic numbers to more thoroughly specify the nature of engagement within the college environment. Institutions must determine for themselves what policy changes are warranted from the data. Revealing the relationship between what students tell us through NSSE and how this relates (or does not relate) to issues such as academic performance, retention, persistence and future career success is a vital next step in the scholarship of student engagement.

Putting the NSSE benchmarks to the empirical test is particularly important given the political and policy pressures that exist on disclosure of institutional performance on student surveys such

as the NSSE. It is quite understandable that the public we serve desires accurate information about the nature of the educational experience provided by institutions as well as measurable indicators of student success. However, we are skeptical that the NSSE benchmarks provide this service. In his foreword to the 2005 NSSE Annual Survey Results, Russ Edgerton argues that the NSSE benchmarks could be viewed as measures of institutional traits—similar perhaps to the Myers-Briggs personality inventory. However, unlike the popular personality profile, the benchmarks provide a quantitative measure of these traits. Edgerton believes that these benchmark values should be publicized as an institutional scorecard to bolster their reputations for "effectiveness." Yet, we caution that one should beware of "benchmark blinders"—the assumption that the benchmarks provide a reliable and scalable index of comparison among institutions. One must consider the issue of meaningful scales. How much "better" or "more effective" is an institution that scores 65 on the Level of Academic Challenge Benchmark than one that scores a 60?

Furthermore and perhaps more important, the analyses conducted here and elsewhere (Zhao and Kuh, 2004; Carini, Kuh and Klein, 2006) call into question the conclusion that the benchmarks are a valid and reliable indicator of institutional effectiveness. As Pike (1996: 111) aptly cautions, "A very real danger is that a public hungry for simple answers to complex questions will forget that self-reports of learning and academic development are not precisely the same as more traditional measures of the same outcomes, and draw erroneous conclusions about the quality and effectiveness of postsecondary education." If nothing else, the analysis suggests that using the benchmark scales would produce less informative results than the items selected from them through regression analysis. These types of measures may be of greater importance and utility than the benchmarks, and should be addressed by institutions, at least for internal evaluation. In the end, we believe that the benchmarks are best utilized as descriptions of character, not ability. If institutions are to use NSSE benchmarks in a public way to distinguish themselves from others, it would be far better to remove the quantitative aspects of the scales from the discourse and instead focus on how the benchmarks describe the qualitative characteristics of the educational experience that is a resultant of the interaction between the personality of the student and the personality of the institution.

References

Astin, A. (1977). *Four critical years.* San Francisco: Jossey-Bass.

Astin, A. W. (1991). *Assessment for excellence: The philosophy and practice of assessment and evaluation in higher education.* American Council on Education Series on Higher Education. Washington/New York: American Council on Education and Macmillan.

Astin, A. W. (1993). *What matters in college? Four critical years revisited*. San Francisco: Jossey-Bass.

Carini, R. M., Kuh, G. D., & Klein, S. P. (2006). Student engagement and student learning: Testing the linkages. *Research in Higher Education, 47,* 1-32.

Chickering, A. W., & Gamson, Z. F. (1987). Seven principles for good practice in undergraduate education. *AAHE Bulletin, 7(3),* 3-7.

Edgerton, R (2006). Foreword: the past and future of NSSE. In *Dimensions of Student Engagement: 2005 Annual Survey Results,* 2-5. Bloomington, IN: Indiana University Center for Postsecondary Research and Planning.

[Author's Reference Placeholder]

Green, S.B. (1991). How many subjects does it take to do a regression analysis? *Multivariate Behavioral Research, 26,* 499-510.

Kuh, G.D. (2001). *The National Survey of Student Engagement: Conceptual framework and overview of psychometric properties*. Bloomington, IN: Indiana University Center for Postsecondary Research.

Kuh, G. D., Carini, R. M., & Klein, S. P. (2004). *Student engagement and student learning: Insights from a construct validation study.* Paper presented at the Annual Meeting of the American Educational Research Association. San Diego, CA.

Kuh, G. D., Hayek, J. C., Carini, R. M., Ouimet, J.A., Gonyea, R.M., & Kennedy, J. (2001). *NSSE technical and norms report*. Bloomington, IN: Indiana University Center for Postsecondary Research and Planning.

Kuh, G. D., Kinzie, J., Schuh, J. H., Whitt, E. J., & Associates (2005). *Student success in college: Creating conditions that matter*. San Francisco: Jossey-Bass.

Kuh, G. D., Pace, C. R., & Vesper, N. (1997). The development of process indicators to estimate student gains associated with good practices in undergraduate education. *Research in Higher Education, 38,* 435-454.

Nunnally, J.C. (1978). *Psychometric Theory* (2nd ed.). New York: McGraw-Hill.

Pace, C. R. (1990). *College Student Experiences Questionnaire, Third Edition.* Los Angeles: University of California, Center for the Study of Evaluation.

Pascarella, E.T., & Terenzini, P.T. (1991). *How college affects students*. San Francisco: Jossey-Bass.

Pascarella, E.T., & Terenzini, P.T. (2005). *How college affects students: A third decade of research* (Vol. 2). San Francisco: Jossey-Bass.

Pfeiffer, J.J. (1998). From Performance Reporting to Performance-Based Funding: Florida's Experiences in Workforce Development Performance Measurement. *New Directions for Community Colleges*, 1998:104, 17-28.

Pike, G. R. (1996). Limitations of Using Students' Self-Reports of Academic Development as Proxies for Traditional Achievement Measures. *Research in Higher Education, 37,* 89-114.

Pike, G. R. (2004a). *The Dependability of NSSE Scalelets for College- and Department-Level Assessment*. Paper presented at the annual meeting of the Southern Association for Institutional Research. Biloxi, MS.

Pike, G. R.(2004b). Measuring quality: A comparison of U.S. News Rankings and NSSE benchmarks. *Research in Higher Education*, 45, 193-208.

Pike, G. R., Kuh, G. D., & Gonyea, R. M. (2003). The relationship between institutional mission and students' involvement and educational outcomes. *Research in Higher Education*, 44, 241-261.

Rosenthal, R. & Rosnow, R. L. (1991). *Essentials of behavioral research: Methods and data analysis (2nd ed.).*New York: McGraw Hill.

Tabachnick & Fidell (1996). *Using Multivariate Statistics, Third Edition*. New York: HarperCollins.

Wainer, H., & Kiely, G. L. (1987). Item clusters and computer adaptive testing: a case for testlets. *Journal of Educational measurement, 24,* 185-201.

Zhao, C. & Kuh, G. D. (2004). Adding value: Learning communities and student engagement. *Research in Higher Education*, 45, 115-138.

NSSE Benchmark Models

Freshman GPA (Cumulative GPA, Spring 2005)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.430	0.185	0.184	0.619	0.185	245.482	1	1080	< .001
2	.461	0.212	0.208	0.6101	0.027	7.444	5	1075	< .001

1: Predictors: (Constant), GPA Control (Unstandardized Predicted Variable)

2: Predictors: (Constant), GPA Control (Unstandardized Predicted Variable), Enriching Educational Experiences, Supportive Campus Environment , Level of Academic Challenge (adjusted), Student-Faculty Interaction, Active & Collaborative Learning

Partial correlations for individual Benchmarks with GPA (regression)

Benchmarks	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
First-Year (Freshmen)				**0.208***
Control Factor	0.432*	0.437	0.1910*	
Level of Academic Challenge	0.101*	0.099	0.0098	
Active and Collaborative Learning	0.083*	0.073	0.0053	
Student-Faculty Interaction	0.007	0.006	0.0000	
Enriching Educational Experiences	-0.110*	-0.109	0.0119	
Supportive Campus Environment	0.054	0.057	0.0032	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)

Senior GPA (Cumulative GPA, Spring 2005)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.467	0.218	0.216	0.46378	0.218	128.574	1	462	< 0.001
2	.502	0.252	0.242	0.45595	0.034	4.203	5	457	0.001

1: Predictors: (Constant), GPA Control (Unstandardized Predicted Variable)

2: Predictors: (Constant), GPA Control (Unstandardized Predicted Variable), Enriching Educational Experiences, Supportive Campus Environment , Level of Academic Challenge (adjusted), Student-Faculty Interaction, Active & Collaborative Learning

NSSE Benchmark Models (cont'd)

Senior GPA (Cumulative GPA, Spring 2005) (cont'd)

Benchmarks	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Seniors				**0.242***
Control Factor	0.454*	0.458	0.2098*	
Level of Academic Challenge	-0.052	-0.053	0.0028	
Active and Collaborative Learning	0.075	0.070	0.0049	
Student-Faculty Interaction	0.080	0.075	0.0056	
Enriching Educational Experiences	-0.005	-0.005	0.0000	
Supportive Campus Environment	0.112*	0.120	0.0144	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)

Freshmen Retention

Model Summary

					Change Statistics				
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	R Square Change	F Change	df1	df2	Sig. F Change
1	.169	.028	.028	.210	.028	31.46	1	1073	< 0.001
2	.262	.069	.067	.205	.04	46.239	1	1072	< 0.001
3	.286	.082	.076	.204	.013	3.033	5	1067	0.01

1: Predictors: (Constant), Control – Retained (Unstandardized Predicted Value)

2: Predictors: (Constant), Control - Retained (Unstandardized Predicted Value), Spring GPA (cumulative)

3: Predictors: (Constant), Control - Retained (Unstandardized Predicted Value), Spring GPA (cumulative), Enriching Educational Experiences, Supportive Campus Environment , Level of Academic Challenge (adjusted), Student-Faculty Interaction, Active and Collaborative Learning

	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Retained? (1= No, 2 = Yes)				**.076***
Control Factor	0.128*	0.130	0.0168	
GPA	0.192*	0.191	0.0365*	
Benchmarks				
Level of Academic Challenge	0.006	0.005	0.0000	
Active and Collaborative Learning	0.062	0.050	0.0025	
Student-Faculty Interaction	-0.071	-0.059	0.0034	
Enriching Educational Experiences	-0.029	-0.026	0.0007	
Supportive Campus Environment	0.106*	0.102	0.0103	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)

NSSE Benchmark Models (cont'd)

Senior: Job Placement at Graduation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.514	.264	.256	.394	.264	33.705	1	94	< 0.001
2	.542	.294	.247	.397	.03	0.764	5	89	0.578

1: Predictors: (Constant), Employment Control (Unstandardized Predicted Variable)

2: Predictors: (Constant), Employment Control (Unstandardized Predicted Variable), Enriching Educational Experiences, Supportive Campus Environment , Level of Academic Challenge (adjusted), Student-Faculty Interaction, Active & Collaborative Learning

Benchmarks	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Reported employment at time of graduation (0 = No, 1 = Yes)				**.247***
Control Factor	0.496*	0.491	0.2411*	
Level of Academic Challenge	-0.151	-0.158	0.0250	
Active and Collaborative Learning	0.088	0.085	0.0072	
Student-Faculty Interaction	-0.015	-0.014	0.0002	
Enriching Educational Experiences	0.122	0.115	0.0132	
Supportive Campus Environment	0.023	0.025	0.0006	

Senior: Plans For Further Education

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.535	.287	.280	.801	.287	47.389	1	118	< 0.001
2	.590	.348	.313	.782	.061	2.124	5	113	0.068

1: Predictors: (Constant), Continuing Ed Control (Unstandardized Predicted Variable)

2: Predictors: (Constant), Continuing Ed Control (Unstandardized Predicted Variable), Enriching Educational Experiences, Supportive Campus Environment , Level of Academic Challenge (adjusted), Student-Faculty Interaction, Active & Collaborative Learning

Benchmarks	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Future Education Plans (1 = does not plan to, 2 = considering, 3 = applying, 4 = currently accepted)				**.313***
Control Factor	0.498*	0.51	0.2601*	
Level of Academic Challenge	0.048	0.052	0.0027	
Active and Collaborative Learning	0.049	0.05	0.0025	
Student-Faculty Interaction	0.209*	0.195	0.0380*	
Enriching Educational Experiences	-0.151	-0.156	0.0243	
Supportive Campus Environment	0.063	0.068	0.0046	

NSSE—Scalelets

Freshman GPA (Cumulative GPA, Spring 2005)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.430	.185	.184	.61914	.185	245.482	1	1080	< 0.001
2	.480	.231	.221	.60495	.046	5.271	12	1068	< 0.001

1: Predictors: (constant) GPA control (Unstandardized Predicted Value)...

2: Predictors: (Constant), GPA control (Unstandardized Predicted Value), Support of Student Success, Writing, Varied Experiences, Higher-Order Thinking Skills, Information Technology, Course challenge, Interpersonal Environment, Diversity, Out of Class Interaction, Active Learning, Collaborative Learning, Course Interaction

Scalelet	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
First-Year (Freshmen)				**.221***
Control Factor	0.427*	0.430	0.1849*	
Course challenge	0.125*	0.128	0.0164	
Writing	-0.014	-0.013	0.0002	
Higher-Order Thinking Skills	0.053	0.052	0.0027	
Active Learning	0.060	0.056	0.0031	
Collaborative Learning	0.062	0.056	0.0031	
Course Interaction	-0.010	-0.008	0.0001	
Out of Class Interaction	0.023	0.021	0.0004	
Varied Experiences	0.014	0.014	0.0002	
Information Technology	-0.078*	-0.074	0.0055	
Diversity	-0.109*	-0.106	0.0112	
Support of Student Success	0.005	0.005	0.0000	
Interpersonal Environment	0.061*	0.061	0.0037	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)

NSSE—Scalelets (cont'd)

Senior GPA (Cumulative GPA, Spring 2005)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.467	.218	.216	.46378	.218	128.574	1	462	< 0.001
2	.543	.295	.274	.44626	.077	4.082	12	450	< 0.001

1: Predictors: (constant) GPA control (Unstandardized Predicted Value)...
2: Predictors: (Constant), GPA control (Unstandardized Predicted Value), Support of Student Success, Writing, Varied Experiences, Higher-Order Thinking Skills, Information Technology, Course challenge, Interpersonal Environment, Diversity, Out of Class Interaction, Active Learning, Collaborative Learning, Course Interaction.

Scalelet	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Seniors				**.274***
Control Factor	0.447*	0.454	0.2061*	
Course challenge	0.067	0.072	0.0052	
Writing	-0.026	-0.026	0.0007	
Higher-Order Thinking Skills	-0.066	-0.068	0.0046	
Active Learning	0.098*	0.096	0.0092	
Collaborative Learning	0.033	0.032	0.0010	
Course Interaction	-0.046	-0.042	0.0018	
Out of Class Interaction	0.144*	0.139	0.0193	
Varied Experiences	0.037	0.041	0.0017	
Information Technology	-0.079	-0.081	0.0066	
Diversity	-0.085	-0.091	0.0083	
Support of Student Success	0.02	0.021	0.0004	
Interpersonal Environment	0.118*	0.12	0.0144	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)

NSSE—Scalelets (cont'd)

Freshmen Retention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.169	.028	.028	.21	.028	31.46	1	1073	< 0.001
2	.262	.069	.067	.205	.04	46.239	1	1072	< 0.001
3	.299	.089	.077	.204	.021	2.014	12	1060	0.02

1: Predictors: (Constant), Control - Retained (Unstandardized Predicted Value)

2: Predictors: (Constant), Control - Retained (Unstandardized Predicted Value), Spring GPA (cumulative)

3: Predictors: (Constant), Control - Retained (Unstandardized Predicted Value), Spring GPA (cumulative), Support of Student Success, Writing, Varied Experiences, Higher-Order Thinking Skills, Information Technology, Course challenge, Interpersonal Environment, Diversity, Out of Class Interaction, Active Learning, Collaborative Learning, Course Interaction

	Std. Beta	Partial Corr.	R^2 for Partial Correlation	Adjusted R^2 for Model
Retained? (1 = No, 2 = Yes)				**.082***
Control Factor	0.143*	0.144	0.0207	
GPA	0.196*	0.193	0.0372*	
Scalelets				
Course challenge	-0.01	-0.009	0.0001	
Writing	0.001	0.001	0.0000	
Higher-Order Thinking Skills	0.034	0.031	0.0010	
Active Learning	0.048	0.041	0.0017	
Collaborative Learning	0.02	0.016	0.0003	
Course Interaction	-0.007	-0.005	0.0000	
Out of Class Interaction	-0.085*	-0.073	0.0053	
Varied Experiences	0.072*	0.068	0.0046	
Information Technology	-0.035	-0.031	0.0010	
Diversity	-0.046	-0.042	0.0018	
Support of Student Success	0.054	0.049	0.0024	
Interpersonal Environment	0.066*	0.061	0.0037	

NSSE—Scalelets (cont'd)

Senior: Job Placement at Graduation

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.514	.264	.256	.394	.264	33.705	1	94	< 0.001
2	.610	.372	.272	.39	.108	1.176	12	82	0.314

1: Predictors: (constant) Employment control(Unstandardized Predicted Value)

2: Predictors: (Constant), Employment control (Unstandardized Predicted Value), Support of Student Success, Writing, Varied Experiences, Higher-Order Thinking Skills, Information Technology, Course challenge, Interpersonal Environment, Diversity, Out of Class Interaction, Active Learning, Collaborative Learning, Course Interaction

Scalelet	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Reported employment at time of graduation (0 = No, 1 = Yes)				**.272***
Control Factor	0.521	0.53	0.2809*	
Course challenge	0.039	0.039	0.0015	
Writing	0.007	0.008	0.0001	
Higher-Order Thinking Skills	-0.159	-0.157	0.0246	
Active Learning	0.086	0.084	0.0071	
Collaborative Learning	0.083	0.079	0.0062	
Course Interaction	-0.116	-0.103	0.0106	
Out of Class Interaction	0.008	0.008	0.0001	
Varied Experiences	0.179	0.188	0.0353*	
Information Technology	0.168	0.182	0.0331*	
Diversity	-0.169	-0.19	0.0361*	
Support of Student Success	0.134	0.147	0.0216	
Interpersonal Environment	-0.079	-0.084	0.0071	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)

NSSE—Scalelets (cont'd)

Senior: Plans For Further Education

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.535	.287	.280	.801	.287	47.389	1	118	< 0.001
2	.619	.383	.308	.785	.097	1.386	12	106	0.184

1: Predictors: (constant) Continuing Ed control(Unstandardized Predicted Value)

2: Predictors: (Constant), Continuing Ed control (Unstandardized Predicted Value), Support of Student Success, Writing, Varied Experiences, Higher-Order Thinking Skills, Information Technology, Course challenge, Interpersonal Environment, Diversity, Out of Class Interaction, Active Learning, Collaborative Learning, Course Interaction

Scalelet	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Future Education Plans (1 = does not plan to, 2 = considering, 3 = applying, 4 = currently accepted)				**.308***
Control Factor	0.505*	0.505	0.2550*	
Course challenge	-0.105	-0.110	0.0121	
Writing	-0.024	-0.025	0.0006	
Higher-Order Thinking Skills	0.193*	0.195	0.0380*	
Active Learning	-0.049	-0.047	0.0022	
Collaborative Learning	0.069	0.067	0.0045	
Course Interaction	0.059	0.053	0.0028	
Out of Class Interaction	0.217*	0.210	0.0441*	
Varied Experiences	-0.079	-0.087	0.0076	
Information Technology	-0.045	-0.050	0.0025	
Diversity	-0.081	-0.092	0.0085	
Support of Student Success	0.001	0.001	0.0000	
Interpersonal Environment	0.07	0.075	0.0056	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)

Regression Models

Freshman GPA (Cumulative GPA, Spring 2005)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.433	.188	.187	.616	.188	248.291	1	1074	<0.001
2	.549	.301	.288	.577	.114	9.039	19	1055	<0.001

1: Predictors: (Constant), GPA Control (Unstandardized Predicted Variable)

2: Predictors: (Constant), GPA Control (Unstandardized Predicted Variable)
Tutored or taught other students
Come to class without completing readings or assignments
Institutional emphasis: Helping you cope with your non-academic responsibilities
Quality: Your relationships with faculty members
Discussed ideas from your readings or classes with faculty members outside of class
Institutional contribution: Learning effectively on your own
Used an electronic medium to discuss or complete an assignment
The extent to which your examinations during the current school year challenged you to do your best work
Hours per 7-day week spent preparing for class
Number of problem sets (problem-based homework assignments) that take you MORE than an hour to complete
Worked with faculty members on activities other than coursework
Institutional contribution: Acquiring job or work-related knowledge and skills
Hours per 7-day week spent participating in co-curricular activities
Institutional emphasis: Providing the support you need to help you succeed academically
Exercised or participated in physical fitness activities
Hours per 7-day week spent relaxing and socializing
Asked questions in class or contributed to class discussions
Number of written papers or reports of 20 PAGES OR MORE
Work on a research project with a faculty member outside of course or program requirements

Variables	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Freshmen				**.288***
Control Factor	0.359*	0.376	0.1412*	
Tutored or taught other students	0.147*	0.161	0.0260	
Come to class without completing readings or assignments	-0.127*	-0.142	0.0200	
Institutional emphasis: Helping you cope with your non-academic responsibilities	-0.114*	-0.119	0.0141	
Quality: Your relationships with faculty members	0.076*	0.079	0.0063	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)
Bold items were not included in benchmarks

Regression Models (cont'd)

Freshman GPA (Cumulative GPA, Spring 2005) (cont'd)

Variables	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Discussed ideas from your readings or classes with faculty members outside of class	-0.086*	-0.088	0.0077	
Institutional contribution: Learning effectively on your own	0.074*	0.080	0.0064	
Used an electronic medium to discuss or complete an assignment	-0.086*	-0.098	0.0096	
The extent to which your examinations during the current school year challenged you to do your best work	-0.081*	-0.090	0.0080	
Hours per 7-day week spent preparing for class	0.085	0.093	0.0086	
Number of problem sets (problem-based homework assignments) that take you MORE than an hour to complete	-0.062*	-0.069	0.0048	
Worked with faculty members on activities other than coursework	0.067*	0.072	0.0052	
Institutional contribution: Acquiring job or work-related knowledge and skills	0.060*	0.065	0.0042	
Hours per 7-day week spent participating in co-curricular activities	-0.013	-0.015	0.0002	
Institutional emphasis: Providing the support you need to help you succeed academically	0.068*	0.069	0.0048	
Exercised or participated in physical fitness activities	-0.058*	-0.065	0.0042	
Hours per 7-day week spent relaxing and socializing	-0.067*	-0.075	0.0057	
Asked questions in class or contributed to class discussions	0.056	0.060	0.0036	
Number of written papers or reports of 20 PAGES OR MORE	-0.031	-0.035	0.0012	
Work on a research project with a faculty member outside of course or program requirements	0.028	0.032	0.0010	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)

Bold items were not included in benchmarks

Regression Models (cont'd)

Senior GPA (Cumulative GPA, Spring 2005)

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.467	.218	.217	.463	.218	128.744	1	461	<0.001
2	.593	.351	.331	.428	.133	7.073	13	448	<0.001

1: Predictors: (Constant), GPA Control (Unstandardized Predicted Variable)

2: Predictors: (Constant), GPA Control (Unstandardized Predicted Variable)
Work on a research project with a faculty member outside of course or program requirements
Participated in Study abroad
Quality: Your relationships with faculty members
Hours per 7-day week spent working for pay OFF CAMPUS
Tutored or taught other students
Practicum, internship, field experience, co-op experience, or clinical assignment
Tried to better understand someone else's views by imagining how an issue looks from his or her perspective
Number of problem sets (problem-based homework assignments) that take you MORE than an hour to complete
Asked questions in class or contributed to class discussions
Discussed grades or assignments with an instructor
Learned something that changed the way you understand an issue or concept
Hours per 7-day week spent working for pay ON CAMPUS
Discussed ideas from your readings or classes with others outside of class

Regression Models (cont'd)

Senior GPA (Cumulative GPA, Spring 2005) (cont'd)

Variables	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Seniors				**.331***
Control Factor	0.402*	0.400	0.1603*	
Work on a research project with a faculty member outside of course or program requirements	0.090*	0.105	0.0110	
Participated in Study abroad	0.097*	0.115	0.0132	
Quality: Your relationships with faculty members	0.207*	0.237	0.0563*	
Hours per 7-day week spent working for pay OFF CAMPUS	-0.003	-0.003	0.0000	
Tutored or taught other students	0.142*	0.165	0.0271	
Practicum, internship, field experience, co-op experience, or clinical assignment	0.070	0.083	0.0069	
Tried to better understand someone else's views by imagining how an issue looks from his or her perspective	-0.141*	-0.143	0.0205	
Number of problem sets (problem-based homework assignments) that take you MORE than an hour to complete	-0.057	-0.068	0.0046	
Asked questions in class or contributed to class discussions	0.118*	0.134	0.0178	
Discussed grades or assignments with an instructor	-0.049	-0.056	0.0032	
Learned something that changed the way you understand an issue or concept	0.049	0.048	0.0023	
Hours per 7-day week spent working for pay ON CAMPUS	-0.070	-0.082	0.0068	
Discussed ideas from your readings or classes with others outside of class	-0.073	-0.079	0.0063	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)
Bold items were not included in benchmarks

Regression Models (cont'd)

Freshmen Retention

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.169	.028	.028	.21	.028	31.46	1	1073	< 0.001
2	.262	.069	.067	.205	.04	46.239	1	1072	< 0.001
3	.334	.112	.102	.202	.043	5.152	10	1062	< 0.001

1: Predictors: (Constant), Control - Fr. Retained Unstandardized Predicted Value

2: Predictors: (Constant), Control - Fr. Retained Unstandardized Predicted Value, Spring GPA (cumulative)

3: Predictors: (Constant), Control - Retained (Unstandardized Predicted Value), Spring GPA (cumulative)
Talked about career plans with a faculty member or advisor
Institutional emphasis: Attending campus events and activities (special speakers, cultural performances, athletic events, etc.)
Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values
Practicum, internship, field experience, co-op experience, or clinical assignment
Institutional contribution: Acquiring job or work-related knowledge and skills
Hours per 7-day week spent working for pay OFF CAMPUS
Quality: Your relationships with other students
Received prompt feedback from faculty on your academic performance (written or oral)
Tutored or taught other students (paid or voluntary)
Institutional contribution: Understanding people of other racial and ethnic backgrounds

Variables	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Reported employment at time of graduation (0 = No, 1 = Yes)				**.102***
Control - Fr. Retained Unstandardized Predicted Value	0.120*	0.119	0.0142	
Spring GPA (cumulative)	0.167*	0.166	0.0275	
Practicum, internship, field experience, co-op experience, or clinical assignment	0.066*	0.068	0.0046	
Received prompt feedback from faculty on your academic performance (written or oral)	0.055	0.055	0.0030	
Tutored or taught other students (paid or voluntary)	0.038	0.038	0.0014	
Institutional contribution: Understanding people of other racial and ethnic backgrounds	-0.074*	-0.071	0.0050	
Quality: Your relationships with other students	0.117*	0.115	0.0133	
Hours per 7-day week spent working for pay OFF CAMPUS	-0.012	-0.012	0.0002	
Talked about career plans with a faculty member or advisor	-0.077*	-0.077	0.0059	
Had serious conversations with students who are very different from you in terms of their religious beliefs, political opinions, or personal values	-0.054	-0.054	0.0029	
Institutional contribution: Acquiring job or work-related knowledge and skills	0.066*	0.066	0.0043	
Institutional emphasis: Attending campus events and activities (special speakers, cultural performances, athletic events, etc.)	0.084*	0.084	0.0070	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)
Bold items were not included in benchmarks

Regression Models (cont'd)

Senior: Job Placement at Graduation

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.514	.264	.256	.394	.264	33.705	1	94	<0.001
2	.734	.539	.484	.328	.275	5.625	9	85	<0.001

1: Predictors: (constant) Employment control(Unstandardized Predicted Value)

2: Predictors: (constant) Employment control(Unstandardized Predicted Value)
Practicum, internship, field experience, co-op experience, or clinical assignment
Institutional contribution: Working effectively with others
Coursework emphasized: MAKING JUDGMENTS about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions
Worked with classmates OUTSIDE OF CLASS to prepare class assignments
Community service or volunteer work
Number of written papers or reports of 20 PAGES OR MORE
Institutional emphasis: Attending campus events and activities
Work on a research project with a faculty member outside of course or program requirements
Institutional emphasis: Providing the support you need to help you succeed academically

Variables	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Reported employment at time of graduation (0 = No, 1 = Yes)				**.484***
Control Factor	0.410*	0.487	0.2375*	
Practicum, internship, field experience, co-op experience, or clinical assignment	0.196*	0.258	0.0666*	
Institutional contribution: Working effectively with others	0.256*	0.303	0.0916*	
Coursework emphasized: MAKING JUDGMENTS about the value of information, arguments, or methods, such as examining how others gathered and interpreted data and assessing the soundness of their conclusions	-0.334*	-0.429	0.1840*	
Worked with classmates OUTSIDE OF CLASS to prepare class assignments	0.111	0.146	0.0212	
Community service or volunteer work	0.252*	0.321	0.1028*	
Number of written papers or reports of 20 PAGES OR MORE	-0.114	-0.158	0.0251	
Institutional emphasis: Attending campus events and activities	-0.119	-0.157	0.0246	
Work on a research project with a faculty member outside of course or program requirements	-0.046	-0.064	0.0041	
Institutional emphasis: Providing the support you need to help you succeed academically	-0.035	-0.044	0.0019	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)
Bold items were not included in benchmarks

Regression Models (cont'd)

Senior: Plans For Further Education

Model Summary

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
					R Square Change	F Change	df1	df2	Sig. F Change
1	.535	.287	.280	.801	.287	47.389	1	118	<0.001
2	.665	.442	.418	.720	.156	7.966	4	114	<0.001

1: Predictors: (constant) Continuing Ed control(Unstandardized Predicted Value)

2: Predictors: (constant) Employment control(Unstandardized Predicted Value), Talked about career plans with a faculty member or advisor, Practicum, internship, field experience, co-op experience, or clinical assignment, Put together ideas or concepts from different courses when completing assignments or during class discussions, Hours per 7-day week spent working for pay OFF CAMPUS

	Std. Beta	Partial Correlation	R^2 for Partial Correlation	Adjusted R^2 for Model
Future Education Plans (1 = does not plan to, 2 = considering, 3 = applying, 4 = currently accepted)				**.418***
Control Factor	0.462*	0.465	0.2163*	
Talked about career plans with a faculty member or advisor	0.294*	0.346	0.1197*	
Practicum, internship, field experience, co-op experience, or clinical assignment	-0.239*	-0.293	0.0860*	
Put together ideas or concepts from different courses when completing assignments or during class discussions	0.207*	0.264	0.0697*	
Hours per 7-day week spent working for pay OFF CAMPUS	-0.056	-0.064	0.0040	

* for Beta: Significant contributor to regression model ($p < .05$)
* for R-square: small effect size or greater (>.03)
Bold items were not included in benchmarks