A Study of NSSE Results by Academic Division: 2009 – 2011

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Purpose of the Study

Too often the results of assessments like the National Survey of Student Engagement (NSSE) are presented only at the aggregated level of the entire college. While this may provide the 20,000 foot view of important issues in effective educational practices and outcomes, it less often provides information that is actionable at the level of academic divisions or programs. For a small college like Hilbert, this may unavoidable due to the relatively small numbers of students who are involved in any given assessment effort. There may simply be too few numbers to meaningfully disaggregate the data by divisions or programs. Thus the results from the NSSE are presented annually at the Winter Faculty Institute meeting, discussed briefly and thereafter shelved along with other such 'large-scale' assessments.

The purpose of this study, then, is to examine a combined sample of NSSE responses across three years of data collection. By using the combined data it is possible to reach subgroup sizes that permit analyses by academic division within the college, however, the numbers are still too small in many cases to drill down as far as each degree-granting academic program. Still, using the Division level to explore NSSE results may provide more specific, and possibly actionable, information for faculty to consider.

NSSE Overview

The National Survey of Student Engagement (NSSE) is an annual survey of first-year and senior college students at four-year institutions measuring students' self-reported participation in educational activities that prior research has associated with high levels of learning and development. The survey is administered by the Indiana University Center for Postsecondary Research in cooperation with the Indiana Center for Survey Research. Student responses to individual items are used to generate five benchmarks of effective educational practice: Level of Academic Challenge (AC), Active and Collaborative Learning (ACL), Student-Faculty Interaction (SFI), Enriching Educational Experiences (EEE), and Supportive Campus Environment (SCE). In addition to these benchmarks, several scales and 'scalelets' (focused measures consisting of four or five items) have been developed and validated for use in supplemental analyses. These scales provide scores in areas associated with deep approaches to learning (Laird, Shoup & Kuh, 2005), overall student satisfaction, and gains in personal and social development, practical competencies, and general education. Pike's 'scalelets' (Pike, 2006) allow even more focused analyses of engagement in terms of course challenge, writing, active learning, collaborative learning, course-related and outside-of-class interactions with faculty, use of technology, emphasis on diversity, varied educational experiences, support for student success, and interpersonal environment.

The NSSE at Hilbert College

Hilbert College has participated annually in the NSSE beginning in the spring of 2009 through the spring of 2012 as part of a Title III grant to aid in bolstering student success. The first administration of the survey was conducted locally with a paper version distributed nonrandomly to classes with large numbers of first-year students or seniors. Since then Hilbert has used the web+ mode which draws a

random sample from the population of freshmen and seniors enrolled from the fall semester, who are then invited to participate by email at their student email addresses beginning relatively early in the spring semester. Follow-up invitations continue throughout the semester including a final mailed paper version to nonresponders.

As shown in the table below, students' response rates were considerably higher in the 2011 administration. In large part this was due to a concentrated effort by faculty to encourage students to participate, often by providing reminders in class for students to check their email accounts for the NSSE invitations.

Academic Year	Class category	Number enrolled in Fall of NSSE Year	Number in NSSE sample	NSSE Completers	NSSE Response Rate	% of all students in enrolled
2008-2009	*First-year*	353	47	47	100%	13.3%
	Seniors	199	14	14	100%	7.0%
2009-2010	*First-year*	306	220	31	14.1%	10.1%
	Seniors	200	107	28	26.2%	14.0%
2010-2011	*First-year*	364	242	84	34.7%	23.1%
	Seniors	200	132	59	44.7%	29.5%
All Years	*First-Year Totals*	1023	509	163	32.0%	15.9%
	Senior Totals	599	253	101	39.9%	19.8%

The 100% response rate in 2008-2009 was due entirely to the mode of administration being a local, paper version handed out in specific classes. Although this sample must be recognized as nonrandom and therefore questionably representative of the student population that year, the data has been retained for further aggregate analyses.

Characteristics of 2011 NSSE Responders
The 2011 NSSE administration provided the largest and therefore, presumably, most representative sample of Hilbert students. Comparing NSSE respondents to the overall spring 2011 student population it can be seen in the table below that the sample of First-year NSSE respondents was somewhat more likely to include part-time, white, female resident students. The senior NSSE responders were also more likely to include part-time and white students as well as students with transfer credits.

Characteristics	Spring 2011 NSSE Responders		Spring 2011 Student Population	
	First-year	*Seniors*	*First-year*	*Seniors*
Part-time	17%	31%	7%	22%
Female	65%	69%	46%	67%
White (non-Hispanic)	70%	93%	66%	84%
On-campus Resident	43%	11%	38%	12%
Transfer Student	0%	47%	6%	31%
Traditional (less than 24 yrs. old)	97%	53%	91%	59%

Important to consider for the analyses of NSSE responses by Academic Divisions is the distribution of responses by division for the pooled sample across all three administrations. The following table presents the numbers of first-years and seniors by division for the combined fall semesters of 2008, 2009 and 2010 and the numbers NSSE participation rates by Division for that same period.
It can be seen that NSSE participation roughly mirrors the distribution of students across the divisions with a somewhat higher participation rate from students in the Social Science and Criminal Justice/Forensic Science Divisions.

2009-2011	First-years			Seniors			Totals		
	N students	*N of NSSE responses*	*Participation Rate*	*N students*	*N of NSSE responses*	*Participation Rate*	*N students*	*N of NSSE responses*	*Participation Rate*
Arts & Sciences	71	10	14.08%	26	4	15.38%	97	14	14.43%
CJ/FSI	496	93	18.75%	257	45	17.51%	138	753	18.33%
Professional Studies	166	27	16.27%	224	31	13.84%	390	58	14.87%
Social Sciences	198	41	20.71%	87	21	24.14%	285	62	21.75%

An examination of the demographic characteristics of NSSE responders by Division revealed a significant association only for transfer status by academic division: $\chi^2 (3) = 17.56$, p<.001. This association appears to be almost entirely a function of the much higher numbers of transfer students represented in the Professional Studies Division (70.59%) NSSE responders relative to the other Academic Divisions. No other Division had more than 27% transfer students among NSSE responders.

Benchmarks of Effective Educational Practice
NSSE results are presented annually to each participating institution in terms of five Benchmarks of Effective Educational Practice as well as responses to individual survey items. The benchmarks are based on 42 key survey items that relate to undergraduate activities and experiences shown to be powerful contributors to learning and personal development (see Appendix A). The five benchmarks are:

Level of Academic Challenge (LAC)
Active and Collaborative Learning (ACL)

Student-Faculty Interactions (SFI)
Enriching Educational Experiences (EEE)
Supportive Campus Environment (SCE)

Mean benchmark scores provide a method for institutions to compare their students' responses to those of students at other participating institutions, including customized comparison groups. While benchmark scores are calculated for each student responder, NSSE only reports benchmark means at the aggregated level of the institution, therefore comparisons across subgroups of students at different institutions are not typically provided.

Supplemental Scale Scores

Over the past several years NSSE users and researchers have developed and validated supplemental scales to address questions that go beyond the five benchmarks of effective educational practice (Indiana Center for Postsecondary Research, 2012). In the following sections of this report several of the more widely accepted of these supplemental scales have been applied to Hilbert College's aggregated NSSE data covering the period 2009 – 2011. As noted earlier the quality of Hilbert's NSSE data is not even across this period, largely due to a nonrandom local administration in 2009, and a smaller than desired response rate the following year, 2010. Of the three administrations, the most recent in 2011 appears to offer the most positive psychometric qualities. For the purposes of the following analyses, all of the freshman and senior data from all three NSSE administrations will be used in a combined database. Multi-year trend analyses would be viewed rather cautiously because of the noted sampling issues and is not included in the present study. On the other hand the analyses based on the aggregated data are expected to be enhanced by the larger total sample.

Results for the following supplemental scales are computed post-hoc based on Hilbert College's NSSE data only. Comparisons to scores of students at other institutions are not available. Scores for each supplemental scale are calculated to be represented on an underlying scale of 0 to 100 based on a formula corresponding to that used to calculate benchmark scores.

NSSE provides SPSS syntax for four sets of supplemental scales. This syntax may then be applied to an institution's data to produce the additional scale scores. These supplemental scales are described below.

Deep Approaches to Learning

Deep approaches to learning are thought to be "represented by a personal commitment to understand the material which is reflected in using various strategies such as reading widely, combining a variety of resources, discussion of ideas with others, reflecting on how individual pieces of information relate to larger constructs or patterns, and applying knowledge in real world situations" (Laird, Shoup & Kuh, 2005, p.4). Deep learning is contrasted with 'surface-level processing' which is thought to focus on content using rote learning strategies. Laird, Shoup & Kuh (2005) identified 12 NSSE items to create a measure of deep learning comprised of three subscales and 2 version of a total score. The three subscales, identified through exploratory and confirmatory factor analysis, were labeled higher-order learning, integrative learning, and reflective learning. Higher-order learning items address students'

perception that their academic work emphasizes advanced thinking skills such as analysis and synthesis. Integrative learning items assess the extent to which students participate in activities that demand integrating ideas and information from various sources including peers. The reflective learning items emphasize students' engagement in activities that investigate their own thinking and encourage applications of new learning into other aspects of their lives.

> Higher Order Thinking subscale (4 items)
> Integrative Learning subscale (5 items)
> Reflective Learning subscale (3 items)
> Deep Learning version 1 (average of the 12 items)
> Deep learning version 2 (mean of the 3 subscales)

Satisfaction Scales

Two subscales from the NSSE provide measures of overall student satisfaction with their undergraduate experience. The first, Overall Satisfaction, is a recalculated average of two items which ask student to evaluate their educational experience on a scale from poor to excellent, and the second item asks whether, if starting all over again, they would choose to attend the same institution (definitely no to definitely yes).

The second satisfaction subscale uses the same two items as above and adds four additional items that ask specifically about the quality of relationships with other students, faculty members, and administrative personnel and offices as well as the quality of academic advising.

Gains Scales

Another set of subscale syntax available from NSSE aims to measure the degree to which students report having made gains in a variety of personal, practical, and general education competency areas as a result of their undergraduate education. Separate subscale scores may be computed from the institutional data for:

Gains in Personal and Social Development (7 items)
> Looks at gains students reported making in personal and social areas and the extent to which Hilbert helped facilitate those gains, e.g., understanding oneself and those of different backgrounds, voting in elections, contributing to one's community, becoming a self-learner, and developing personal values and/or a deepened sense of spirituality.

Gains in Practical Competence (5 items)
> Composite of general competencies frequently sought by employers such as real-world problem-solving, using technology, working with others, & analyzing quantitative problems.

Gains in General Education (4 items)
> Items that ask students to reflect on the extent to which Hilbert College has contributed to acquiring general education skills such as writing, speaking, and critical thinking.

Pike's Scalelets

In an effort to provide a mechanism for disaggregating NSSE results into more useful and focused measures of students' experiences at an institution, Pike (2006) developed eleven 'scalelets' that can be derived from the NSSE data. These scalelets are generally comprised of scores from three to four NSSE items and are intended to point to more actionable areas or issues than may be possible from the NSSE benchmark scores. Pike's scalelets are:

a. Course Challenge (4 items)
b. Writing (4 items)
c. Active Learning (3 items)
d. Collaborative Learning (4 items)
e. Course-Related Interactions with Faculty (3 items)
f. Out-of-class Interaction with Faculty (3 items)
g. Use of Information Technology (3 items)
h. Emphasis on Diversity (3 items)
i. Varied Educational Experiences (9 items)
j. Support for Student Success (3 items)
k. Interpersonal Environment (3 items)

Scores for each the supplemental scales described above were calculated for each Hilbert NSSE responder from the past three survey administrations and added to the combined database. Each case in the database represents a unique respondent. As the initial freshmen class sampled in spring of 2009 is just now expected to be his or her senior year in spring 2012, no student had as yet been surveyed more than once on the NSSE.

Analyses

Analyses of the NSSE benchmark and supplemental scores by academic division were conducted by a series of ANOVAs using IBM SPSS Statistics, version 19. Post-hoc comparison tests (two-tailed) were applied using Hochberg's GT2 procedure which is considered more appropriate when group variances are equivalent but sample sizes are very different. Equivalency of variances was assessed by Levene's test. In the occasional exception to the assumption of equal variances the Games-Howell post-hoc procedure was used (Field, 2009). Hochberg's procedures can tolerate fairly large differences in sample sizes as is apparent between academic divisions in this dataset. However, this procedure is also very conservative and so it is possible that some significant differences between mean scores of academic divisions may not have been detected (Type II errors). Results are reported in the tables that follow in terms of group mean scores, degrees of freedom, F statistics and significance levels.

Results

The following table presents the mean scores for the NSSE benchmarks and supplemental scales by academic division with the overall Hilbert NSSE population means and standard deviations for comparison. While no divisional score for any of the benchmarks and scales exceeded one standard deviation above or below the Hilbert mean, those scores that were at least one-half of a standard deviation different are highlighted. These differences were only seen for scores of students from the Arts & Sciences Division who scored above the Hilbert mean in: Active & Collaborative Learning, Student-Faculty Interactions, Enriching Educational Experiences, Deep Learning: Higher Order Thinking, Deep Learning: Integrative Learning, both Deep Learning summary scores, Gains in Personal and Social Development, Collaborative Learning Experiences, Course and Out-of-Class Interactions with Faculty, and Use of Information Technology. While these differences are not necessarily statistically significant, it is notable that this Division's students scored higher on average on so many of the NSSE scales. One possibility is that since the Arts & Sciences Division is the smallest sample the responses are from a self-selective group of students who wanted to provide highly positive feedback about their educational experiences. While this hypothesis cannot be ruled out by the current analyses, it is noted that the response rate within the Arts & Sciences Division was not unreasonably different from any other division (14.4% compared to 19.8% overall). Therefore one would have to assume that A&S students with positive experiences were more likely to complete the NSSE and those with less positive experiences were actually less likely to respond than was true for any other division.

Two of the NSSE benchmark scores showed significant differences across academic divisions. There was a significant effect of Academic Division on Active & Collaborative Learning, $F(3,198) = 3.93$, $p<.01$, and on Enriching Educational Experiences, $F(3,188) = 3.42$, $p<.05$. Post-hoc comparisons revealed that students in students from the Professional Studies Division scored significantly higher on ACL than did students from the CJ/FSI Division, mean difference = 7.26, $p<.05$ and students from the Social Science Division score significantly higher than did CJ/FS students on EEE, mean difference = 7.74, $p<.05$.

From the Deep Learning scales, only the Reflective Learning subscale showed a significant effect, $F(3,259) = 2.65$, $p<.05$. Post-hoc comparisons indicated that this between groups effect was significant for Social Science students scoring higher than CJ/FSI students, mean difference = 10.19, $p<.05$.

No significant between group differences were found on the three Gains scales or two Satisfaction scales.

From the variety of Pike's scalelets, four showed significant between group effects: Collaborative Learning Experiences, $F(3,264) = 5.49$, $p<.001$; Course-Related Interactions with Faculty, $F(3,255) = 3.20$, $p<.05$; Use of Information Technology, $F(3,245) = 3.82$, $p<.01$; and Emphasis on Diversity, $F(3,248) = 2.56$, $p<.05$. For three of these effects the only post-hoc differences between groups were found in Arts & Sciences division students scoring higher than students in the CJ/FSI Division: Collaborative Learning Experiences (mean difference = 20.66, $p<.001$); Course-Related Interactions with Faculty (mean difference = 19.95, $p<.05$); and Use of Information Technology (mean difference = 16.35, $p<.05$). The effect for Emphasis on Diversity was apparently the result a significant difference between the Social

Sciences and Professional Studies Divisions with social Sciences students scoring significantly higher (mean difference = 13.22, p<.05).

Apparently, while there are some significant differences in the experiences of students within different academic divisions, on the whole the experiences could be said to be remarkably similar. Still those differences may be worth a closer look by the respective faculty.

In considering differences in student experiences by academic divisions it may be instructive to look just at the NSSE responses from seniors who have been at Hilbert longer. The above results combine the experiences of seniors with freshmen and it is reasonable to assume that some effective educational practices take time to bear fruit. On that reasoning, a further set of analyses was conducted using only the senior responses by academic division. Admittedly, the sample sizes are much reduced by looking only at senior responders, especially for an already small sample from the Arts & Sciences Division.

The results of these additional ANOVAs showed that the group effect for Division on the benchmark Active & Collaborative Learning with Arts & Sciences students scoring higher than CJ/FSI persisted even when looking only at seniors' responses, $F(3,83) = 4.27$, p<.01 (mean difference = 20.22, p<.05). A new group effect was seen on the Supportive Campus Environment benchmark, $F(3,79) = 3.21$, p<.05, with CJ/FSI seniors reporting significantly higher scores than did student from the Professional Studies Division (mean difference = 11.56, p<.05).

Just looking at seniors' NSSE responses, no group effects by division were seen for scales of Deep Learning, Gains, or Satisfaction.

Three of Pike's scalelets showed significant effects: Collaborative Learning Experiences, $F(3,97) = 4.67$, p<.01, with Arts & Sciences scores higher than CJ/FSI; Emphasis on Diversity, $F(3,92) = 5.58$, p<.001, with Social Sciences higher than Professional Studies; and Support for Student Success, $F(3,92) = 5.38$, p<.01, with CJ/FSI scores higher than those from Professional Studies.

Mean Scores for NSSE Benchmarks and Supplemental Scales by Academic Division and Hilbert Total: Combined Data from 2009, 2010, & 2011

	Arts & Sciences	CJ/FSI	Professional Studies	Social Sciences	Hilbert Mean	Standard Deviation
# Responses	14	138	58	62	272	
LAC	61.77	54.17	54.05	57.44	55.25	14.42
ACL	55.29	43.09	50.35	49.08	46.74	15.85
SFI	59.72	40.18	42.58	44.63	42.65	20.52
EEE	40.12	28.84	28.18	36.58	31.01	17.11
SCE	72.57	69.94	65.88	70.31	69.14	18.66
Deep-HigherOrderThinking	83.33	69.92	68.39	69.63	70.18	22.95
Deep- Integrative	69.23	56.63	58.79	60.41	58.57	19.45
Deep-Reflective	59.83	52.78	58.62	62.96	56.74	24.63
Deep-V1	71.58	60.18	61.96	64.34	62.08	17.88
Deep-V2	70.80	59.93	61.93	64.28	61.89	18.11
Gains-Practical	76.92	71.36	73.67	71.44	72.18	21.85
Gains-Personal	62.09	53.78	56.01	58.63	55.80	23.77
Gains-GenEd	81.41	79.64	78.13	78.02	79.02	21.54
Overall Satisfaction	79.49	79.95	82.14	71.73	78.56	24.29
Overall Satisf-Plus Campus Environ.	82.05	79.38	81.20	73.96	78.71	17.49
Course Challenge	63.04	59.04	63.64	62.28	61.00	14.50
Writing	52.56	45.83	47.84	47.75	47.04	13.62
Active-Learning Exp.	54.70	49.36	53.37	50.19	50.68	17.92
Collaborative Learning Exp.	57.69	37.03	42.39	42.49	40.43	19.45
Course-Relate SFI	69.23	49.28	52.98	52.73	51.87	22.90
Out-of-class SFI	41.03	26.42	31.61	29.96	29.13	22.00
Use of Info-Tech	81.48	65.13	67.84	73.68	68.50	21.19
Diversity Emphasis	57.27	54.20	49.62	62.84	55.29	26.67
Varied Educational Experiences	25.06	21.05	19.71	23.30	21.46	17.54
Support for Student Success	52.14	60.93	53.64	61.49	58.94	26.00
Interpersonal Environment	83.76	77.23	80.27	74.39	77.59	18.15

Note: No Division's mean score was more than one standard deviation above or below the mean for all Hilbert students for any of the above scales or benchmarks and no Division's mean score was less than ½ standard deviation below the overall mean.