IOWA STATE UNIVERSITY

Learning Communities and Student Engagement

A Longitudinal Study of Iowa State University 2000-2003 National Survey of Student Engagement Data and Learning Community Participation

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Executive Summary

In Spring 2004, the Vice Provost for Undergraduate Programs at Iowa State University asked the Research Institute for Studies in Education (RISE) to conduct an analysis of ISU longitudinal National Survey of Student Engagement data. One specific area of inquiry was a desire to examine whether participation in a learning community at ISU is linked with student engagement, gains in educational outcomes, and overall satisfaction.

The results of this analysis indicate that for first-year students, participation in a learning community is associated with higher levels of student engagement, more positive perceptions of the campus environment, and gains in practical competence (i.e., analyzing problems, acquiring work-related skills, using technology, and working effectively with others). When controlling for the influence of significant covariate variables (e.g., parent education, campus residence, enrollment status, age, and survey year), first-year students who participated in a learning community had higher adjusted mean scores for ten of twelve factors considered in this study.

In contrast to the findings regarding the influence of learning community participation on first-year students' level of engagement, gains in educational outcomes, and overall satisfaction, the results indicated no differences in these factors for senior students based on learning community participation.

Finally, a comparison based on learning community type indicated that students who participated in learning communities that combined course-based experiences with a residential component reported the highest levels of student engagement, perceptions of campus environment, and gains in learning outcomes.

Introduction

Since the spring of 2000, the National Survey of Student Engagement (NSSE) project has surveyed undergraduates at four-year colleges and universities. The purpose of the project is to provide data to colleges and universities to use for improving undergraduate education. "As a survey, NSSE annually gathers information directly from students about the extent to which they engage in sound educational practices. In this regard, the NSSE project documents and describes key dimensions of quality in undergraduate education. NSSE also aims to improve the college experience. Because the survey results point to things than an institution can do something about – almost immediately – NSSE data create an occasion for talking about and helping campuses focus on what matters to student learning" (NSSE 2002 Annual Report, p. 8).

In the Spring semesters of 2000-2003, a random sample of Iowa State University (ISU) freshmen and seniors participated in the NSSE by completing a Web survey entitled, *The College Student Report* (view survey at <www.iub.edu/~nsse>). On the survey, students indicated how frequently they engage in behaviors that are highly correlated with many important learning and personal development outcomes of college. They also provided opinions about the institution they attend.

The NSSE staff provide institutions with benchmark scores, which are compilations of individual items that represent a common theme—level of academic challenge, active and collaborative learning, student interaction with faculty, enriching educational experiences, and supportive campus environment. An institution receives a benchmark score for each theme and a comparison of the institution's overall benchmark scores to other institutions. While these benchmarks of effective educational practice provide important information related to the levels of student engagement at ISU compared to other institutions, the NSSE Annual Reports highlight that the variance in student engagement is much greater within individual institutions than between institutions. Therefore, an institution's average benchmark score on each of the five areas of effective educational practice provides only a limited amount of information regarding student and institutional performance. One implication of this observation is that improvement in the overall quality of undergraduate education can be realized by focusing on factors related to the engagement of individual students at ISU (NSSE 2003 Annual Report).

It is widely recognized that student engagement in educationally purposeful activities inside and outside of the classroom is a precursor to high levels of student learning and personal development (American College Personnel Association [ACPA], 1994, Study Group on the Conditions of Excellence in American Higher Education, [Study Group], 1984). Learning communities represent one example of an intentionally structured activity that helps students experience deep learning that is personally relevant. By encouraging students to connect ideas from different disciplines and to engage in ongoing social interaction with other students, learning communities offer strong potential for powerful educational practice. Therefore, it is important to examine the evidence to determine the effectiveness of learning communities.

In Spring 2004, the Vice Provost for Undergraduate Programs at ISU asked the Research Institute for Studies in Education (RISE) to conduct an analysis of the longitudinal NSSE data. This report seeks to examine whether participation in a learning community at Iowa State University is linked with student engagement in educationally purposeful activities, self-reported gains in educational outcomes, and overall satisfaction with the college experience.

Focus of This Report

Zhao and Kuh (2004) examined the relationship between participating in a learning community and measures of student engagement from 365 four-year institutions that participated in the 2002 NSSE. Based on the national study conducted by Zhao and Kuh, and using data from the ISU 2000 – 2003 NSSE, this report examines the following research questions concerning first-year and senior students at ISU.

1. What is the relationship between participating in a learning community and students' academic performance?
2. What is the relationship between participating in a learning community and student engagement in a range of educationally productive activities, including academic effort (study time), academic integration, active and collaborative learning, interaction with faculty members, diversity-related activities, and the extent to which classes emphasize higher-order thinking?

3. What is the relationship between participating in a learning community and students' perceptions of the degree to which their campus supports their academic and social needs, the quality of academic advising, and satisfaction with their college experience?
4. What is the relationship between participating in a learning community and students' self-reported gains in personal and social development, practical competence, and general education?
5. What types of students are more and less likely to participate in a learning community (Zhao & Kuh, 2004)?

This research extends beyond these five research questions to consider how the influence of learning communities on student engagement might differ based on various factors. In particular, the following questions consider how other factors combine with learning community participation to influence student engagement.

6. Does the relationship between participating in a learning community and student engagement, perceptions of campus environment, and gains in learning outcomes differ based on college?
7. What is the relationship between learning community type (i.e., course-based, residential, both) and student engagement, perceptions of campus environment, and gains in learning outcomes?
8. What is the relationship between participating in a learning community and student engagement, perceptions of campus environment, and gains in learning outcomes when controlling for intervening variables?

Methods

Sample

Each survey year of NSSE 2000-2003 has a national sample comprised of freshman and senior students who were randomly selected from electronic files provided by participating four-year colleges and universities. This report, however, considers only the Iowa State University sample for each survey year, without comparison to students at other institutions that participated in NSSE.

Table 1 provides information regarding the ISU sample for each survey year. In the spring of each survey year, a random sample was selected and invited to complete *The College Student Report* on the Web. For each survey year, the standard sample size was determined by NSSE project staff based on the number of undergraduates enrolled at the institution. There was one exception to this standard sample size. For the NSSE 2003 administration, ISU participated in a random oversampling of seniors to provide additional information at the college level.

Table 1: Iowa State University NSSE 2000-2003 Sample and Response Rate Information

Survey Year	ISU First-year Students			ISU Senior Students			ISU Overall	Participating Doctoral/Research Extensive Institutions
	Sampled	Completed Survey	Response Rate	Sampled	Completed Survey	Response Rate	Response Rate	Response Rate
2000	500	179	35.8%	500	166	33.2%	34.5%	39.0%
2001	900	313	34.8%	900	341	37.9%	36.3%	41.0%
2002	1000	391	39.1%	1000	303	30.3%	34.7%	36.0%
2003	1000	354	35.4%	3678	1466	39.9%	38.9%	39.0%
Total	3400	1237	36.4%	6078	2276	37.4%	37.1%	38.8%

In terms of demographic characteristics, the ISU samples were somewhat unrepresentative in terms of gender and college. Therefore, using records from the Institutional Research Office, the sample was weighted to ensure that first-year and senior respondents were representative of the ISU population in terms of gender and college for the spring semester of the relevant survey year. Unless noted otherwise, the results presented in this report represent the weighted sample. Table 2 provides information regarding the gender and college of ISU first-year student survey respondents. The table provides both the unweighted number of survey respondents and the corresponding weighted sample. Table 3 provides similar information for senior student respondents.

Table 2: Demographic Characteristics of Iowa State University First-year Survey Respondents Students by Survey Year (Unweighted and Weighted)

	2000 First-year				2001 First-year			
	Unweighted		Weighted		Unweighted		Weighted	
Student Characteristics	N	%	N	%	N	%	N	%
Gender								
Male	166	49%	181	54%	152	49%	170	56%
Female	176	51%	155	46%	161	51%	136	44%
College								
Agriculture	37	11%	40	12%	47	15%	34	11%
Design	25	7%	31	9%	20	6%	27	9%
Education	19	6%	15	4%	16	5%	20	7%
Engineering	116	34%	84	25%	83	27%	68	22%
Family and Consumer Sciences	7	2%	12	4%	10	3%	11	4%
Business	31	9%	47	14%	30	10%	43	14%
Liberal Arts and Sciences	107	31%	105	31%	102	33%	103	34%

	2002 First-year				2003 First-year			
	Unweighted		Weighted		Unweighted		Weighted	
Student Characteristics	N	%	N	%	N	%	N	%
Gender								
Male	175	45%	218	56%	173	49%	193	55%
Female	216	55%	171	44%	181	51%	159	45%
College								
Agriculture	38	10%	38	10%	31	9%	32	9%
Design	33	8%	36	9%	37	11%	34	10%
Education	19	5%	24	6%	29	8%	23	7%
Engineering	96	25%	95	24%	89	25%	80	23%
Family and Consumer Sciences	14	4%	14	4%	14	4%	16	5%
Business	42	11%	55	14%	33	9%	48	14%
Liberal Arts and Sciences	149	38%	127	33%	121	34%	119	34%

Table 3: Demographic Characteristics of Iowa State Senior Student Survey Respondents by Survey Year (Unweighted and Weighted)

	2000 Senior				2001 Senior			
	Unweighted		Weighted		Unweighted		Weighted	
Student Characteristics	N	%	N	%	N	%	N	%
Gender								
Male	168	53%	173	56%	184	54%	183	55%
Female	149	47%	137	44%	158	46%	148	45%
College								
Agriculture	44	14%	44	14%	50	15%	43	13%
Design	19	6%	24	8%	16	5%	25	8%
Education	31	10%	32	10%	20	6%	34	10%
Engineering	86	27%	61	20%	83	24%	65	20%
Family and Consumer Sciences	13	4%	17	6%	21	6%	19	6%
Business	50	16%	51	17%	58	17%	57	17%
Liberal Arts and Sciences	74	23%	80	26%	94	27%	88	27%

	2002 Senior				2003 Senior			
	Unweighted		Weighted		Unweighted		Weighted	
Student Characteristics	N	%	N	%	N	%	N	%
Gender								
Male	158	52%	167	56%	738	50%	819	56%
Female	145	48%	133	44%	728	50%	647	44%
College								
Agriculture	45	15%	41	14%	184	13%	188	13%
Design	13	4%	24	8%	102	7%	114	8%
Education	20	7%	32	11%	130	9%	146	10%
Engineering	76	25%	62	21%	371	25%	310	21%
Family and Consumer Sciences	19	6%	17	6%	78	5%	88	6%
Business	52	17%	50	17%	239	16%	239	16%
Liberal Arts and Sciences	78	26%	76	25%	362	25%	381	26%

Appendix A and Appendix B provide additional demographic information (e.g., ethnicity, age, parent education, international student status, transfer student status, campus residence, and enrollment) for the Iowa State University 2000-2003 NSSE respondents. Appendix A provides demographic information for freshmen ISU respondents by learning community participation, while Appendix B provides comparable information for senior ISU respondents.

Data

The NSSE instrument measures the degree to which students participate in educational activities that previous research demonstrates are linked to engagement and learning outcomes (e.g., Chickering & Gamson, 1987; Kuh, 2001, 2003). Specifically, NSSE assesses students' experiences in the following areas:

a. Involvement in a range of educationally purposeful in-class and out-of-class activities;
b. Amount of reading and writing;
c. Participation in selected educational programs, such as study abroad, internships, and senior capstone courses, as well as learning communities;
d. Perceptions of the campus environment including the quality of students' relationships with peers, faculty members, and administrators;
e. Student satisfaction with academic advising and their overall collegiate experience (Zhao & Kuh, 2004, p. 120).

The NSSE survey was designed by experts and extensively tested to ensure validity and reliability. The psychometric properties of the instrument are well established (Kuh et al., 2001).

The analysis in this report relies on twelve scales constructed to represent measures of student engagement (six scales: academic effort, higher order thinking, academic integration, active and collaborative learning, student interactions with faculty members, and diversity experiences), quality of campus environment (three scales: supportive campus environment, quality of academic advising, satisfaction), and self-reported learning outcomes (three scales: gains in personal and social development; gains in quantitative, analytical, and work-related skills; and gains in general education). These scales replicate the scales constructed by Zhao & Kuh (2004). Appendix C includes more information about the items that contribute to each measure and the internal scale consistencies.

As described in the introduction to this report, the NSSE project staff provide institutions with a mean benchmark score for five themes that represent areas of effective educational practice. It is helpful to note how the twelve scales discussed in this report relate to the benchmarks of effective educational practice. Three of the scales—active and collaborative learning, student interactions with faculty, and supportive campus environment—replicate the benchmarks that have the same name. Two of the scales—academic effort and higher order thinking—represent subsets of the active and collaborative learning benchmark. Finally, the diversity experiences scale represents a subset of the enriching educational experiences benchmark.

To analyze the data, additional demographic information (e.g., learning community participation, college, cumulative grade point average) was collected from institutional records.

Data analysis

The analysis was conducted in several steps in an effort to answer various research questions. First, to determine the relationship between learning community participation and academic performance, we conducted simple ordinary least squares (OLS) regressions to compare the entering ACT scores and grades (spring semester and cumulative) of students who participated in the learning communities and those who did

not. Because students who elect to participate in learning communities may have a different academic profile (e.g., ACT scores) compared to non-participants, we used multivariate OLS regressions to control for the influence of ACT scores, as well as other possible confounding variables (i.e., age, gender, ethnicity, parent education, international status, transfer status, campus residence, enrollment, and college) on students' spring semester and cumulative grade point average.

Second, to examine the relationship between participating in a learning community and (a) student engagement, (b) perceptions of campus environment, and (c) self-reported learning outcomes, we conducted a series of multiple OLS regressions. We computed y-standardized coefficients (the unstandardized regression coefficient divided by the pooled standard deviation) to estimate the effect sizes for the OLS regression models (Pascarella, Flowers, & Whitt, 2001).

Third, to determine what types of students are statistically significantly more or less likely to participate in a learning community, we used logistic regression analysis. We examined the odds ratio to identify those student groups that had a higher probability of having been in a learning community.

Fourth, we conducted a series of multiple OLS regressions to examine differences in the relationship between participating in a learning community and (a) student engagement, (b) perceptions of campus environment, and (c) self-reported learning outcomes based upon college and learning community type.

Finally, we conducted a series of multiple OLS regressions while controlling for significant covariate variables to determine the unique influence of learning community participation on engagement, perceptions, and learning outcomes.

Results

The purpose of the data analysis was to examine the connection between learning community participation and academic performance, engagement in educationally beneficial activities, perceptions of the campus environment, and self-reported gains in learning outcomes. In addition, the analysis considered which students are most likely to participate in learning communities, differences in the effects of learning community participation based on college, and differences in the effects of learning community participation based on learning community type. In the following sections, we describe the effects of learning community participation in detail.

Academic Performance

Data from the ISU NSSE longitudinal sample (2000 – 2003) provided mixed results regarding differences in students' ACT composite score based on learning community participation. Table 4 illustrates that there were a few differences in students' ACT score based on learning community participation. First-year students participating in learning communities had higher entering ACT scores than their counterparts who did not participate in learning communities in survey years 2001 and 2002. In survey year 2002, senior students who had previously participated in learning communities had higher entering ACT scores than did non-participants. For both first-year and senior students, there were no differences in ACT scores based on learning community participation in survey years 2000 and 2003.

To determine if student ability might affect academic performance, we entered students' ACT scores as a control variable and then added other student characteristics to examine the influence of possible confounding variables on students' spring cumulative grade point averages. Despite some differences in academic profile (ACT score), students in both groups had similar spring cumulative grade point averages. There was one exception to this trend — 2002 respondents to the survey who were first-year students participating in learning communities had a higher cumulative grade point average compared to first-year students who did not participate in learning communities.

When controlling for ACT and individual characteristics (e.g., age, gender, ethnicity, parent's education, international and transfer status, campus residence, enrollment, and college), there were no differences in grades of first-year or senior students based on learning community participation.

In general, the results indicate there is little difference in the grades of first-year and senior students based on learning community status. In the case where first-year students who participated in learning communities had a higher cumulative grade point average (2002), this difference disappeared when controlling for ACT and other individual characteristics. The effect sizes also decrease when controlling for ACT and other individual characteristics, further suggesting that there is little difference in the grades of first-year students based on learning community status.

Table 4: Academic Performance of Students by Classification and Learning Community Participation (NSSE 2000 - 2003 Participants, Weighted)

		First-Year Students					Seniors				
		LC: YES	LC: NO				LC: YES	LC: NO			
Academic Ability	NSSE Survey Year	Mean (SD)	Mean (SD)	Mean Diff.	*p*	Effect Size	Mean (SD)	Mean (SD)	Mean Diff.	*p*	Effect Size
SAT or ACT score*	2000	1189.85 (449.9)	1046.15 (334.9)	143.70	0.183	0.35	No seniors participated in learning communities				
	2001	25.16 (12.05)	15.11 (13.71)	10.05	0.000	0.77	21.30 (17.05)	18.97 (13.33)	2.34	0.525	0.17
	2002	25.15 (9.54)	17.43 (12.55)	7.72	<0.001	0.67	22.47 (11.31)	17.60 (14.58)	4.88	0.014	0.35
	2003	25.44 (8.03)	24.62 (8.07)	0.81	0.370	0.10	25.55 (6.06)	24.95 (5.92)	0.60	0.110	0.10
Spring Cumulative GPA	2000	2.97 (1.52)	2.77 (1.19)	0.20	0.183	0.14					
	2001	3.01 (1.59)	2.80 (1.10)	0.21	0.181	0.15	3.07 (2.02)	3.07 (1.13)	0.00	0.993	0.00
	2002	3.05 (1.13)	2.77 (1.03)	0.28	0.010	0.26	3.11 (0.88)	3.04 (1.26)	0.07	0.675	0.06
	2003	2.94 (1.10)	2.85 (1.05)	0.10	0.409	0.09	3.13 (0.79)	3.07 (0.74)	0.06	0.200	0.08
Spring Cumulative GPA controlling ACT	2000	-	-	0.13	0.432	0.13					
	2001	-	-	-0.05	0.679	-0.05	-	-	0.30	0.350	0.30
	2002	-	-	0.92	0.306	0.92	-	-	-0.23	0.134	-0.23
	2003	-	-	0.02	0.573	0.02	-	-	0.00	0.970	0.00
Spring Cumulative GPA controlling individual characteristics**	2000	-	-	0.03	0.908	0.03					
	2001	-	-	0.08	0.456	0.08	-	-	0.41	0.055	0.41
	2002	-	-	0.06	0.525	0.06	-	-	0.15	0.286	0.15
	2003	-	-	0.07	0.401	0.07	-	-	0.05	0.107	0.05

* Analysis was based on 91% of the data ACT composite scores were missing for 8% of the data.

** ACT score, age, gender, race, parent education, international and transfer status, campus residence, enrollment, and college

Student Engagement, Campus Environment Perceptions, and Learning Outcomes

The primary focus of this report is to consider differences in student engagement that are related to participation in learning communities. The second, third, and fourth research questions for this study (see pp. 3-4) considered the relationship between participating in a learning community and student engagement in a range of educationally productive activities. The subsections below present the results concerning the relationship between learning community participation and student engagement, perceptions of the campus environment, and learning outcomes. Table 6 provides results of the data analysis for each of the individual factors that represent engagement activities, perception of campus environment, and learning outcomes.

Student Engagement

The results in Table 5 indicate that for first-year students, experience with a learning community is associated with higher levels of active and collaborative learning. Similarly, for first-year students, participation in learning communities is positively linked with more frequent interactions with faculty members. These two trends were the same for all four survey years. For three of the four survey years, first-year students who participated in learning communities reported higher levels of engaging in diversity-related activities compared to first-year students who did not participate in learning communities.

The effect sizes associated with factors of student engagement that had statistically significant differences ranged from 0.246 to 0.417, indicating that for first-year students, the influence of the learning community experience was substantial. Not surprisingly, for first-year students, being in a learning community was strongly linked with active and collaborative learning and interaction with faculty members. The relationship between learning community participation and these factors was consistent across all survey years. Additionally, the effect sizes associated with these two factors were the highest for items related to student engagement activities.

For senior students, there was little difference in ratings of student engagement when comparing learning community participants to non-participants. As seen in Table 6, there was only one significant difference in students' engagement behaviors. Specifically, for senior students, experience with a learning community was associated with lower levels of academic effort for survey year 2003. The lack of differences or lower level of engagement for senior students based on learning community participation contrasts with the positive relationship between learning community participation and several other engagement measures found for first-year students.

Table 5. Mean Comparison of Effects of Learning Communities on Engagement Activities, Perception of Campus Environment, and Selected Learning Outcomes (NSSE 2000-2003 Samples Weighted by Gender and College)

	First-Year					Senior				
	Mean comparison of learning community participants vs. non-participants				Range of Y - Standardized Effect Sizes	Mean comparison of learning community participants vs. non-participants				Range of Y - Standardized Effect Sizes
Measure	2000	2001	2002	2003		2000	2001	2002	2003	
Engagement Activities										
Academic Efforts[1]					0.063 to 0.177				**	-0.291 to -0.187
Higher Order Thinking[1]					0.012 to 0.131					-0.247 to -0.076
Academic Integration			**		0.157 to 0.309					-0.065 to -0.117
Active and Collaborative Learning[2]	**	*	**	***	0.278 to 0.417					-0.138 to 0.007
Interactions with Faculty[3]	**	**	**	***	0.306 to 0.386					0.048 to 0.217
Diversity Experiences[4]	**		*	**	-0.031 to 0.328					-0.041 to 0.203
Perception of Campus Environment										
Quality of Academic Advising		***	*	***	0.312 to 0.528					-0.308 to 0.00
Supportive Campus Environment[5]			**	*	0.105 to 0.261					-0.097 to 0.058
Satisfaction		*	**	**	0.134 to 0.333					0.073 to 0.362
Learning Outcomes										
Gains in Personal and Social					0.072 to 0.203					-0.033 to 0.077
Gains in Practical Competence		*	*		0.101 to 0.247					-0.170 to -0.031
General Education Gains					0.031 to 0.142					-0.050 to -0.081

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

[1]Individual questions for this factor are included as part of the NSSE "Level of Academic Challenge" Benchmark

[2]Individual questions for this factor are the same as those in the NSSE "Active and Collaborative Learning" Benchmark

[3]Individual questions for this factor are the same as those in the NSSE "Student Interactions with Faculty" Benchmark

[4]Individual questions for this factor are included as part of the NSSE "Enriching Educational Experiences" Benchmark

[5]Individual questions for this factor are the same as thos in the NSSE "Supportive Campus Environment" Benchmark

Perception of Campus Environment

As seen in Table 5, first-year students who participated in learning communities were more likely to be satisfied with the quality of academic advising and were more positive about the level of satisfaction with their educational experiences compared to first-year students who did not participate in learning communities. These findings were true for three of the four survey years (2001, 2002, 2003). In addition, for two of the four survey years, first-year students who participated in learning communities were more positive about the degree to which the campus was supportive of their academic and social needs.

For first-year students, the effect sizes associated with factors of campus environment perceptions that had statistically significant differences range from 0.260 to 0.528, which indicate that participation in learning communities is related to students' perceptions of academic advising, campus environment, and overall satisfaction. As seen in Table 5, the effect sizes indicate that learning community participation has the greatest impact on first-year students' perceptions of academic advising quality and overall satisfaction.

There were no statistically significant differences in senior students' perception of the campus environment when comparing learning community participants with non-participants.

Learning Outcomes

Table 5 also provides information regarding the comparison of learning outcomes for learning community participants and non-participants. Considering the self-reported gains in learning outcomes, there were no differences in students' self-reported gains in personal and social development or general education gains based on learning community status. For two survey years (2001, 2002), first-year students who participated in learning communities reported significantly higher gains in quantitative, analytical, and work-related skills compared to first-year students who did not participate in learning communities. The modest effect sizes for the difference in quantitative, analytical, and work-related skills indicates that learning community participation has a relatively minor influence on students' self-ratings of learning outcomes.

The comparison of senior students' self-reported gains in learning outcomes resulted in no statistically significant differences between learning community participants and non-participants.

Learning Community Participation

The fifth research question for this study considered which students have participated in learning communities. Table 6 indicates the types of students who are most likely to participate in a learning community. The discussion below highlights demographic characteristics associated with learning community participation across multiple survey years.

First-year students. Because the learning communities at ISU are primarily for traditional-aged first-year students, it is not surprising that younger students are more likely to be involved with learning communities (NSSE 2001, 2003). Other types of first-year students who were more likely to participate in learning communities included

students who live on-campus (NSSE 2002, 2003), major in Agriculture (NSSE 2001 – 2003), and major in Engineering (NSSE 2001, 2002).

Senior students. Several characteristics of senior students were associated with an increased likelihood of involvement with learning communities including: higher parental education (NSSE 2001, 2002), non-transfer student status (NSSE 2002, 2003), and students majoring in Agriculture (NSSE 2002, 2003).

The results of these analyses are not surprising, for several reasons. First, because the learning communities at ISU often involve residential components, it is clear that living on campus is related to learning community participation. Second, several colleges (e.g, Agriculture, Engineering) consistently offer learning community programs, so it follows that students in these colleges are more likely to participate in learning communities. Next, the finding that higher parental education influenced senior participation in learning communities suggests that these students may have a greater understanding of the opportunities available at an institution. Students with parents who have experiences in higher education may have more knowledge of, or may be more likely to encourage, educational opportunities such as learning communities. Finally, we would expect that transfer students are less likely to participate in learning communities, because they enrolled after the time when most students began to enter ISU learning communities.

Table 6: Likelihood that First-Year Students Participate in a Learning Community (NSSE 2000-2003)

Predictors	2000 First-Year Students				2001 First-Year Students				2002 First-Year Students				2003 First-Year Students			
	B	S.E.	Sig.	Odds Ratio	B	S.E.	Sig.	Odds Ratio	B	S.E.	Sig.	Odds Ratio	B	S.E.	Sig.	Odds Ratio
Female	0.273	0.227			0.200	0.298			-0.060	0.253			-0.391	0.275		
Age	0.071	0.151			-0.971	0.482	*	0.379	-0.720	1.157			-1.340	0.420	***	0.262
Parent Education	-				0.280	0.163			0.241	0.140			0.034	0.147		
International Student	-20.991	14486			1.446	1.128			-1.445	1.024			0.436	0.884		
Transfer Student	0.257	0.448			-1.311	0.648	*	0.270	0.505	0.651			0.023	0.555		
White																
Other	-1.727	1.105			-1.072	0.852			-0.374	0.608			1.109	0.836		
Native American	-21.169	40193			-				20.814	40192						
Latino/a	0.242	0.927			0.423	0.656			1.384	0.749			0.430	0.708		
Black	0.561	1			21.265	22755			-1.353	1.178			1.719	0.767	*	5.579
Asian	0.158	0.777			-0.731	0.894			0.691	0.744			1.006	0.664		
Living on-campus	0.462	0.342			0.204	0.365			1.099	0.332	***	3.000	0.861	0.322	**	2.365
Enroll full-time	-21.177	23128			0.601	1.244			1.467	1.639			0.394	1.249		
Arts and Sciences																
Agriculture	Unable to enter college into the mode				1.847	0.428	***	6.342	1.896	0.425	***	6.661	1.842	0.480	***	6.306
Design					0.691	0.552			1.087	0.421	**	2.965	-0.166	0.461		
Education					1.112	0.603			1.861	0.552	***	6.427	0.820	0.465		
Engineering					1.385	0.369	***	3.994	1.380	0.319	***	3.976	1.332	0.346	***	3.789
Family and Consumer Sciences					1.056	0.715			1.066	0.592			0.590	0.627		
Business					1.040	0.466	*	2.831	1.297	0.389	***	3.659	-0.148	0.511		
Model Fit																
-2 Log likelihood	447.55				358.15				454.54				388.72			
Model chi-square (df)	23.80 *				58.86 ***				64.84 ***				71.799 (17) ***			
Cox & Snell R^2	0.07				0.18				0.16				0.19			
Negelkerke R^2	0.09				0.24				0.21				0.26			
% Correct Prediction	53.8%				68.4%				69.0%				73.1%			

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

Influence of Learning Communities by College

As noted earlier, the influence of learning community participation is notable for first-year students. Therefore, the examination of the influence of learning community participation by college considered only first-year students. We conducted a series of multiple OLS regressions to examine differences in the relationship between participating in a learning community and (a) student engagement, (b) perceptions of campus environment, and (c) self-reported learning outcomes based upon college. This analysis considered the main effects of college and learning community participation on the twelve factors that represent engagement, campus environment perceptions, and learning outcomes. The analysis indicated that there was a statistically significant main effect for college and a statistically significant main effect for learning community participation for three of the engagement activity factors: academic integration, active and collaborative learning, and interactions with faculty. As seen in Figures 1 to 3, there are notable differences in the estimated marginal means, with learning community participants having higher means compared to non-participants for each college. The exceptions to this trend are the lower means for learning community participants in Education and Family and Consumer Sciences for the student interactions with faculty factor.

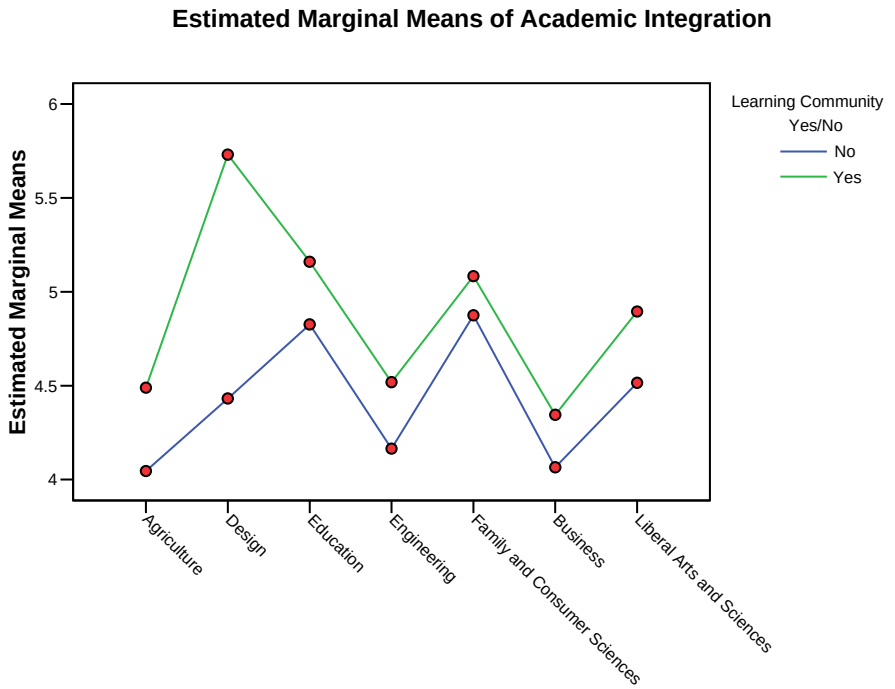

Figure 1: Estimated Marginal Means of Academic Integration by Learning Community Participation and College

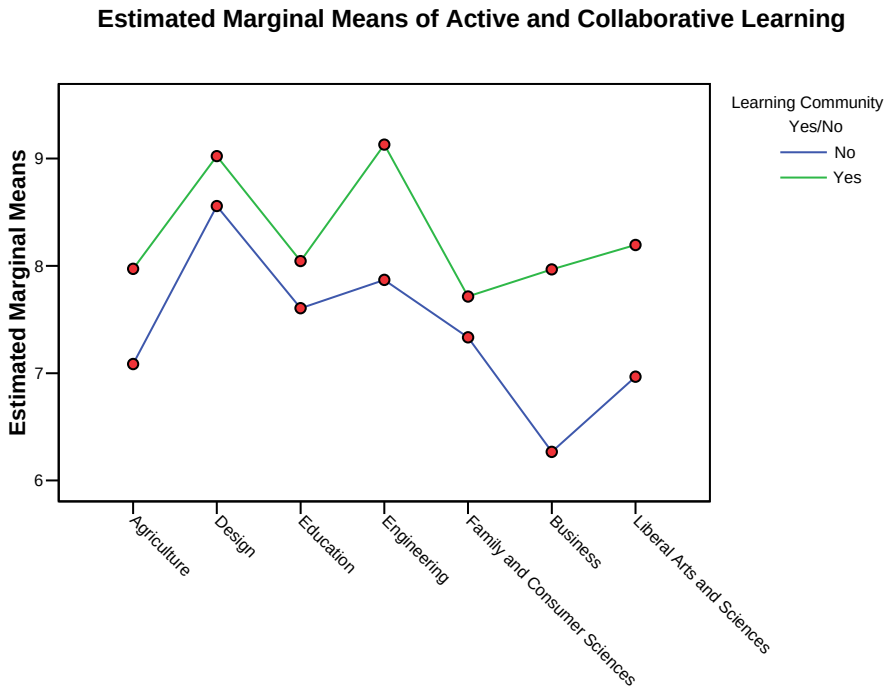

Figure 2: Estimated Marginal Means of Active and Collaborative Learning by Learning Community Participation and College

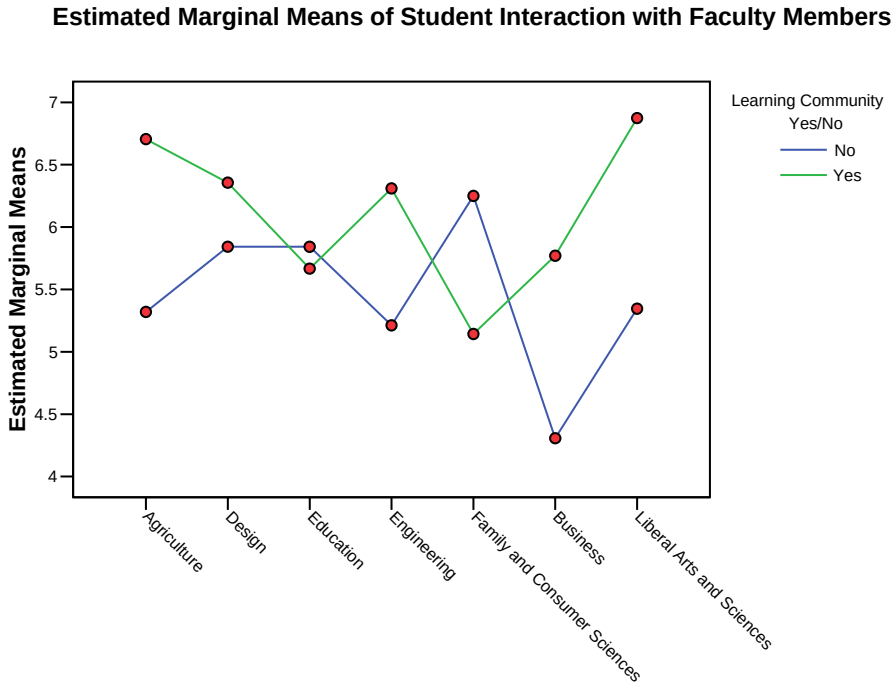

Figure 3: Estimated Marginal Means of Student Interaction with Faculty Members by Learning Community Participation and College

Influence of Learning Community Type

To determine the relationship between learning community type (i.e., course-based, residential, both) and student engagement, perceptions of campus environment, and gains in learning outcomes, we conducted a series of multivariate OLS regressions. This examination considered the effects of different learning community types, while controlling for differences in survey years (cohort effects). At ISU, learning communities can be described as course-based (interactions primarily occur during activities associated with the course), residential (students share a common living area within a designated residence hall floor), or both (combination of course-based and residential). Because the previous analysis of learning community participation on student engagement provided limited results regarding senior students (see Table 5), the discussion of the influence of learning community type only considers first-year respondents to the 2000-2003 NSSE surveys.

For the combined NSSE 2000 to 2003 samples, the first-year participation in various learning community types is as follows: Did not participate in a learning community (n = 760), participated in a course-based learning community (n = 249), participated in a residential learning community (n = 31), and participated in a learning community that is both course-based and residential (n = 373).

As seen in Table 7, learning community type had a statistically significant effect on each measure of student engagement, perception of campus environment, and learning outcomes. The analyses indicated that students who participate in learning communities that combine course-based experiences with a residential component are more engaged, have more positive perceptions of the campus environment, and have higher gains in learning outcomes compared to students who are not in learning communities. Figure 4 illustrates the positive effect of participating in learning communities that combine course-based experiences with residential experiences. The figure provides an estimated marginal mean (estimated mean controlling for the influence of survey year) for each of the twelve factors considered in this study.

For two items, higher-order thinking and general education gains, there was a statistically significant difference only when comparing means for students who participated in learning communities categorized as “both” with means for students who participated in residential learning communities. It is important to note that the small number of students who participated in residential-only learning communities (n = 31), makes it difficult to draw firm conclusions from these comparisons.

Table 7. Effects of Learning Community Type[1] for First-year Students Controling for Survey Year

Measure	Difference between LC types	Significantly separate from no LC
Engagement Activities		
Academic Efforts[2]	**	Both > No learning community
Higher Order Thinking [2]	**	Both > Residential
Academic Integration	*	Both > No learning community
Active and Collaborative Learning [3]	***	Both & Course-based > No learning community
Interactions with Faculty [4]	***	Both > No learning community and Course-based
Diversity Experiences [5]	***	Both > No learning community, Course-based, & Residential
Perception of Campus Environment		
Quality of Academic Advising	***	Both > No learning community & Residential, Course-based > No learning community
Supportive Campus Environment [6]	**	Both > No learning community
Satisfaction	***	Both > No learning community & Residential
Learning Outcomes		
Gains in Personal and Social	*	Both > No learning community
Gains in Practical Competence	***	Both > No learning community & Residential
General Education Gains	*	Both > Residential

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

[1]Learning community type is based on primary learning community membership indicated in Registrar's data

[2]Individual questions for this factor are included as part of the NSSE "Level of Academic Challenge" Benchmark

[3]Individual questions for this factor are the same as those in the NSSE "Active and Collaborative Learning" Benchmark

[4]Individual questions for this factor are the same as those in the NSSE "Student Interactions with Faculty" Benchmark

[5]Individual questions for this factor are included as part of the NSSE "Enriching Educational Experiences" Benchmark

[6]Individual questions for this factor are the same as those in the NSSE "Supportive Campus Environment" Benchmark

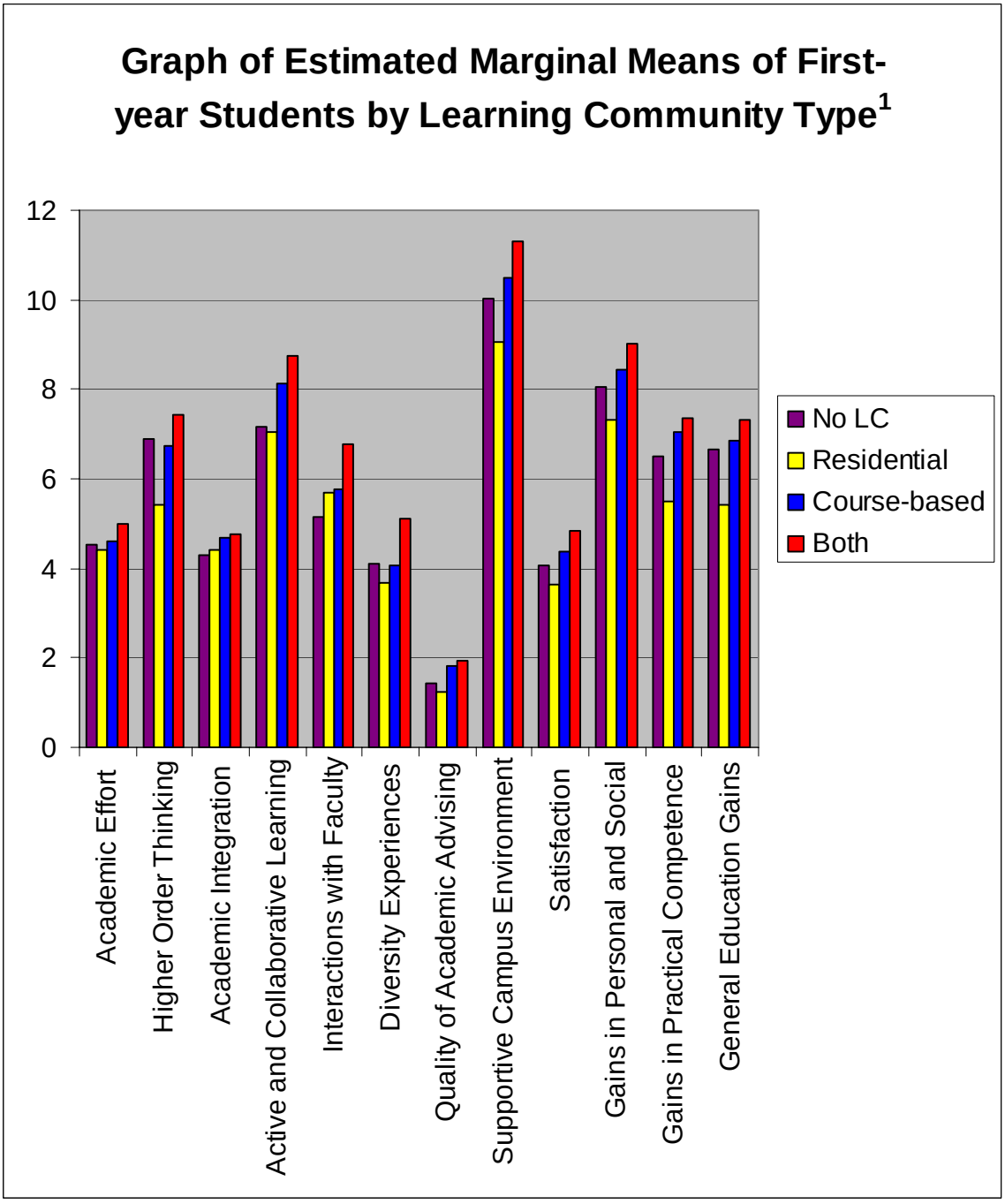

Figure 4. Graph of First-Year Estimated Marginal Means on Engagement Measures by Learning Community Type

[1]The scale for each factor is different based on the number of questions that comprise the factor. Differences in estimated marginal means between factors is related to differences in scale. Readers should examine Appendix C to examine the number of survey items that contribute to each of the student engagement measures.

Effect of Learning Community Participation when Controlling for Covariates

The last research question considered the relationship between participating in a learning community and student engagement, perceptions of campus environment, and gains in learning outcomes, when controlling for intervening variables. A series of multiple OLS regressions provided information regarding statistically significant covariates—factors that have a significant influence on the variability in engagement, satisfaction, and learning outcome scores. Specifically, the variables of survey year, age, parent's education, international student status, transfer student status, ethnicity, campus residence, and enrollment level had a direct effect on the dependent variables of interest.

Table 8 provides the results of this analysis for first-year students. The last column in the table compares means based on learning community participation. For each of the statistically significant differences indicated with an asterisk, students participating in learning communities had a higher estimated marginal mean compared to students who did not participate in learning communities. As seen in the table, when controlling for significant covariates, learning community participation results in statistically significantly higher mean scores for ten of the twelve factors considered in this study. While Table 5 previously provided evidence that learning community participation has a significant effect on six of the twelve factors (i.e., active and collaborative learning, interactions with faculty, diversity experiences, perceptions of academic advising quality, perceptions of supportive campus environment, and overall satisfaction), Table 8 indicates that when controlling for significant covariates, learning community participation demonstrates a significant influence on additional areas of student engagement and learning outcomes, including academic effort, academic integration, social and personal gains, and gains in practical competence.

Table 8. Effects of Learning Community Controling for Significant Covariates (First-year students only)

Measure	Significant Covariates	Comparison of Learning Community Participation vs. Non-participation
Engagement Activities		
Academic Efforts	Parent education, Campus residence, Enrollment	*
Higher-Order Thinking	Campus residence, Enrollment, Age	
Academic Integration		**
Active and Collaborative Learning		***
Interactions with Faculty	Parent education, International status, Enrollment	***
Diversity Experiences	Campus residence, Transfer status, Ethnicity, Age	*
Perception of Campus Environment		
Quality of Academic Advising	Transfer status, age	*
Supportive Campus Environment		**
Satisfaction	Enrollment, Transfer status, age	***
Learning Outcomes		
Gains in Personal and Social	Enrollment, Age, Survey year	*
Gains in Practical Competence	Campus residence, Enrollment	***
General Education Gains	Campus residence, Enrollment	

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

The presence of significant covariates indicates that future analysis might consider the differential impact of learning community participation based on covariate factors. For example, two of the engagement measures are significantly influenced by parents' level of education. Figure 5 provides a graph of the estimated marginal means of student interactions with faculty. This figure controls for the influence of other covariates (international status, enrollment status), providing an estimated score by learning community participation status and parental education. One important conclusion drawn from this figure is that students who participate in learning communities have a higher interaction with faculty members, regardless of parental education. In other words, when controlling for covariate variables, students whose parents have lower education and participate in learning communities reported more interactions with faculty than did non-learning community participants whose parents have a higher education level. Additional efforts to consider significant covariates may provide important information that helps to direct future learning community initiatives and efforts.

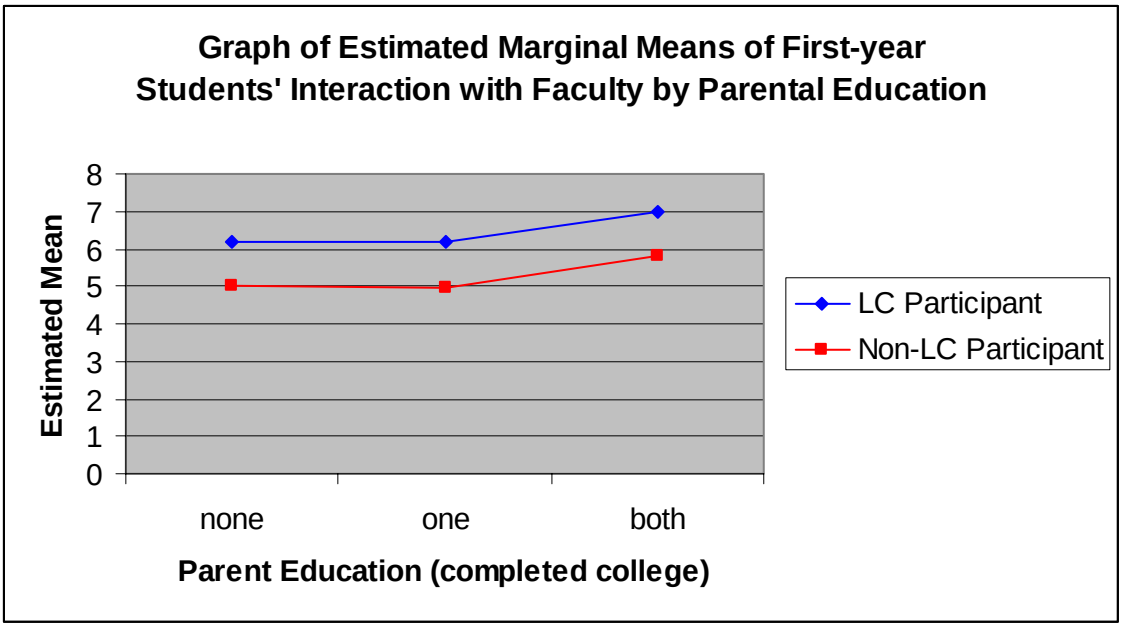

Figure 5: Estimated Marginal Means of First-year Students' Interaction with Faculty by Parental Education and Learning Community Participation

Another variable that warrants additional consideration is gender. A series of multiple OLS regressions provided information regarding the effect of gender on the twelve dependent engagement measures. Results indicated that females had higher scores in the areas of academic effort, supportive campus environment, and gains in personal and social development in comparison to males. In contrast, males reported higher levels of active and collaborative learning and gains in analytical skills in comparison to females.

Discussion of Results

Positive effects of learning community participation

The results of the data analysis support previous institutional (ISU) and national research indicating the benefits of participating in learning communities. For first-year students, participation in a learning community is associated with several engagement activities, including increased active and collaborative learning, more interactions with faculty, and increased diversity experiences. Similarly, learning communities are connected with higher satisfaction with the quality of academic advising, more positive ratings of the campus environment with regard to support for academic and social needs, and overall satisfaction with the experience at the institution. Finally, for two survey years, first-year students' participation in a learning community was connected with gains in quantitative, analytical, and work-related skills. These findings provide additional information regarding the ways that the ISU learning community experience influences students' academic and social experiences.

In addition to the differences mentioned above, when controlling for the influence of significant covariate variables (e.g., parent education, campus residence, enrollment status, age, and survey year), first-year students who participate in the learning in communities have higher mean scores in the areas of academic effort, higher-order

thinking, and gains in personal and social competence compared to first-year students who did not participate in a learning community.

Previous research on the ISU learning community experience indicates that students who participate in learning communities have a higher retention rate (http://www.iastate.edu/~learncommunity/Fall2003Retmemo.pdf). The findings from this study offer possible insight into the ways that the learning community experience influences students' retention decisions.

Lack of Learning Community Effects in the Senior Year

It is important to note that the effects of learning community participation, while consistent across several survey years for first-year students, did not continue into the senior year. This finding contrasts with national research, which suggests that early learning community experiences may encourage students to continue engagement activities throughout college (Zhao & Kuh, 2004). The finding that there was no difference in senior's engagement activities, perceptions of the campus environment, and self-reported gains in learning outcomes based upon learning community participation might be related to a timing issue. The NSSE instrument asks students to comment on their experience at the institution during the current school year. Seniors who participated in learning communities completed their learning community experience three or four years earlier. Therefore, it seems less likely that seniors' learning community experiences would have an effect on their engagement behaviors and self-ratings in a current academic year.

The finding that in 2003 (oversampled survey year), seniors who participated in learning communities reported significantly lower academic effort compared to senior non-learning community participants might provide another reason for the lack of positive learning community effects in the senior year. It may be that the benefits of learning community participation such as the exposure to active and collaborative learning and increased interaction with faculty members creates an expectation that future courses and experiences will offer similar opportunities. As students leave the learning communities and begin to complete coursework that is relevant to their major, it may be that the level of academic challenge and engagement is lower compared to students' expectations.

Engagement Activities and Learning Outcomes with No Effects

The results of this study indicated that for two engagement measures (academic efforts and higher-order thinking), there were not significant differences based on learning community participation except when controlling for covariate variables (i.e., parent education, campus residence, enrollment, and age). This lack of differences holds for both first-year and senior students. The items related to academic effort (number of hours per week preparing for class, frequency of having worked harder than you thought you could, extent the institution emphasizes spending significant amount of time on academic work) and higher-order thinking (the extent coursework emphasized analyzing, synthesizing, making judgments, and applying theories) represent aspects of academic challenge across students' entire experience at the institution. While learning community participation has a clear connection with other engagement activities (e.g., active and collaborative learning, interactions with faculty), learning community courses represent

only a portion of the academic experiences related to the level of academic challenge. Therefore, it may be less likely that participation in a learning community would influence the extent to which students are academically challenged in other courses.

These two engagement measures (academic efforts and higher-order thinking) are subsets of items related to the NSSE benchmark entitled "Level of Academic Challenge." The Iowa State University NSSE results from the past four years (2000-2003) indicate that ISU first-year and senior students have a Level of Academic Challenge benchmark score that is below the mean score for both doctoral/research extensive institutions and all NSSE participating institutions. Combined with the results of this study, which indicated no effect of learning community participation on measures related to "Level of Academic Challenge," the ISU NSSE longitudinal results indicate a need to find ways to influence the level of academic challenge at the institution. The learning community initiative at ISU could have an indirect effect on the quality of students' academic efforts and the extent to which coursework emphasizes higher-order thinking skills through efforts to promote faculty development and increase awareness of effective teaching and learning strategies associated with learning communities. In addition, if learning communities challenged students to increase academic efforts and engage in higher-order thinking, students could carry these expectations to future classes.

In addition to the two engagement measures discussed above, there were no differences in two learning outcomes measures (gains in personal/social development and gains in general education) based upon learning community participation. This finding is true for both first-year and senior students. However, when controlling for the influence of significant covariate variables (i.e., enrollment, age, survey year), first-year students who participated in learning communities had a higher estimated marginal mean on gains in personal and social development compared to individuals who did not participate in learning communities. Although learning community participation was associated with several positive engagement behaviors such as active and collaborative learning and frequent interactions with faculty, the lack of differences in learning outcome measures may indicate that additional efforts could be made to promote students' personal development and ability to write, speak, and think. In other words, learning communities may look for ways to capitalize on their current strengths to create a substantive impact on the way that students think about themselves, communicate with others, and process information.

Learning Community Type

The type of learning community has an effect on measures of student engagement, perceptions of campus environment, and learning outcomes. Specifically, for ten of the twelve factors considered in this study, students who participated in learning communities that combine course-based experiences with a residential component reported greater engagement, more positive perceptions of the campus environment, and more gains in learning outcomes compared to students who did not participate in a learning community. For two factors, student interactions with faculty and diversity experiences, students participating in combined course-based and residential learning communities had higher means compared to both non-learning community participants and students who participated in course-based learning communities. These findings suggest that combining course-based and residential experiences in learning

communities is a successful strategy that enhances students' engagement, perceptions of the campus environment, and learning.

Future Research

It is important to highlight the positive effects of learning communities. The results of this analysis indicate that university leaders should consider ways to enhance and continue the successful efforts of learning communities at ISU. The information from this study should be triangulated with other research concerning the effectiveness of learning communities in an effort to determine what aspects of the learning communities contribute to students' educational experiences and satisfaction.

Previous research suggests that some form of learning communities may be more educationally effective than others (Lenning & Ebbers, 1999). Information is needed to determine how different forms of learning communities impact different types of students. As Zhao and Kuh (2004) indicated, "Linking participation in learning communities with institutional records about student academic progress and other college experiences could yield promising insights into how to structure more effectively other aspects of the college program for certain groups of students" (p. 131). One strategy to gather additional data that would be helpful in analyzing the impact of learning communities is to oversample first-year students in the next administration of the NSSE at ISU. This strategy would provide a robust sample that could help to examine specific aspects of learning communities that are associated with gains in engagement activities, perception of campus environment, and learning outcomes.

Limitations

This research shares many of the limitations outlined by Zhao and Kuh (2004). One limitation relates to the reliability of several scales used in this study. While the twelve factors have a high degree of conceptual consistency and provide a more complete analysis relative to the five NSSE benchmark scores that typically are provided to institutions, some scales have marginal Cronbach alpha coefficients. Specifically, the alpha coefficients associated with Academic Effort and Academic Integration are marginal and should be interpreted with caution.

Because the gain measures used in the NSSE are based on self-reported data, students may report gains in college using different baselines relative to their openness to college (Pascarella, 2001). Therefore, the findings related to gains and satisfaction should keep this in mind.

Finally, participation in a learning community influences student development in complex ways (Zhao & Kuh, 2004). Pike (2000) suggested that learning communities do not affect student gains directly, but rather provide an environment that facilitates student growth. While the data from this study indicate that participation in a learning community is associated with several engagement factors for first-year students, these effects most likely are indirect.

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Appendix A. Demographic Information of Freshmen Iowa State University NSSE 2000-2003 Respondents by Learning Community Participation (Unweighted)

	2000 Participated in Learning Community				2001 Participated in Learning Community				2002 Participated in Learning Community				2003 Participated in Learning Community			
	YES		NO		YES		NO		YES		NO		YES		NO	
Student Characteristics	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Gender																
Male	76	45%	90	52%	74	50%	78	47%	84	47%	91	43%	79	55%	94	45%
Female	94	55%	82	48%	73	50%	88	53%	93	53%	123	57%	65	45%	116	55%
Race/Ethnicity																
White	157	93%	152	93%	132	92%	144	94%	154	90%	187	94%	117	85%	188	93%
Black	4	2%	2	1%	3	2%	0	0%	1	1%	5	3%	8	5%	3	2%
Native American	0	0%	1	1%	0	0%	0	0%	1	1%	0	0%	0	0%	0	0%
Asian	5	3%	6	4%	3	2%	3	2%	8	5%	4	2%	7	5%	7	4%
Latino/a	3	2%	3	2%	6	4%	6	4%	8	5%	3	2%	6	4%	4	2%
Age																
19 or younger	81	48%	87	51%	141	96%	141	85%	175	99%	210	98%	138	96%	164	78%
20-23	74	44%	64	37%	6	4%	17	10%	2	1%	3	1%	5	4%	41	20%
24-29	10	6%	18	11%	0	0%	6	4%	0	0%	1	0%	0	0%	4	2%
30-39	3	2%	2	1%	0	0%	2	1%	0	0%	0	0%	0	0%	1	1%
40-55	2	1%	0	0%	0	0%	0	0%	0	0%	0	0%	1	1%	0	0%
Over 55	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%
Parent Education																
Neither parent graduated from college	No information on parents' education				40	27%	52	34%	45	26%	61	30%	49	36%	82	40%
One parent graduated from college					47	32%	45	29%	38	22%	57	28%	38	26%	54	26%
Both parents graduated from college					59	40%	58	37%	88	51%	88	43%	50	35%	69	33%
International Students																
International Students	0	0%	7	4%	3	2%	3	2%	3	2%	7	3%	6	4%	7	3%
US Students	170	100%	165	96%	144	98%	163	98%	174	98%	207	97%	138	96%	203	97%
Transfer Students																
Native Students	160	94%	157	92%	142	97%	140	88%	171	97%	203	97%	131	96%	188	92%
Transfer Students	11	6%	13	8%	4	3%	19	12%	5	3%	7	3%	6	4%	17	8%
Campus Residential Students																
On-campus Students	153	90%	143	84%	126	86%	121	76%	157	89%	161	77%	114	83%	135	66%
Off-campus Students	17	10%	28	16%	20	14%	38	24%	19	11%	49	23%	23	17%	70	34%
Enrollment Status																
Full-time	167	98%	171	100%	145	99%	156	98%	175	99%	207	99%	136	99%	200	98%
Part-time	3	2%	0	0%	1	1%	3	2%	1	1%	3	1%	1	1%	5	2%
College																
Agriculture	27	16%	10	6%	32	22%	15	9%	26	15%	12	6%	21	15%	10	5%
Design	10	6%	15	9%	9	6%	11	7%	16	9%	17	8%	10	7%	27	13%
Education	12	7%	7	4%	8	5%	8	5%	12	7%	7	3%	13	9%	16	8%
Engineering	63	37%	53	31%	47	32%	36	22%	54	31%	42	20%	52	36%	37	18%
Family and Consumer Sciences	3	2%	4	2%	6	4%	4	2%	7	4%	7	3%	5	4%	9	4%
Business	17	10%	14	8%	15	10%	15	9%	22	12%	20	9%	7	5%	26	12%
Vet Med					0	0%	5	3%								
Liberal Arts and Sciences	38	22%	69	40%	30	20%	72	43%	40	23%	109	51%	36	25%	85	41%

Appendix B: Demographic Information of Senior Iowa State University NSSE 2000-2003 Respondents by Learning Community Participation (Unweighted)

	2000 Participated in Learning Community				2001 Participated in Learning Community				2002 Participated in Learning Community				2003 Participated in Learning Community			
	YES		NO		YES		NO		YES		NO		YES		NO	
Student Characteristics	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Gender																
Male	0	0%	168	53%	6	55%	178	54%	27	47%	131	53%	168	43%	570	53%
Female	1	100%	148	47%	5	45%	153	46%	30	53%	115	47%	227	58%	501	47%
Race/Ethnicity																
White	1	100%	271	90%	9	90%	281	92%	53	96%	210	92%	362	94%	874	90%
Black	0	0%	6	2%	0	0%	4	1%	1	2%	2	1%	9	2%	19	2%
Native American	0	0%	1	0%	0	0%	2	1%	0	0%	1	0%	2	1%	5	1%
Asian	0	0%	17	6%	1	10%	16	5%	0	0%	13	6%	9	2%	48	5%
Latino/a	0	0%	5	2%	0	0%	2	1%	1	2%	3	1%	5	1%	22	2%
Age																
19 or younger	1	100%	164	52%	1	9%	8	2%	0	0%	1	0%	0	0%	5	1%
20-23	0	0%	122	39%	10	91%	247	75%	56	98%	190	77%	391	99%	829	77%
24-29	0	0%	19	6%	0	0%	46	14%	0	0%	36	15%	2	1%	149	14%
30-39	0	0%	6	2%	0	0%	17	5%	1	2%	13	5%	2	1%	52	5%
40-55	0	0%	3	1%	0	0%	13	4%	0	0%	6	2%	0	0%	34	3%
Over 55	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	0	0%	2	0%
Parent Education																
Neither parent graduated from college	No information on parents' education				0	0%	116	36%	12	21%	103	43%	130	33%	443	42%
One parent graduated from college					3	27%	90	28%	12	21%	72	30%	107	27%	287	27%
Both parents graduated from college					8	73%	114	36%	32	57%	66	27%	153	39%	317	30%
International Students																
International Students	0	0%	29	9%	0	0%	24	7%	2	4%	25	10%	5	1%	91	9%
US Students	1	100%	287	91%	11	100%	307	93%	55	96%	221	90%	390	99%	980	92%
Transfer Students																
Native Students	1	100%	209	66%	11	100%	205	63%	53	95%	141	58%	383	98%	561	54%
Transfer Students	0	0%	107	34%	0	0%	119	37%	3	5%	102	42%	7	2%	488	47%
Campus Residential Students																
On-campus Students	1	100%	44	14%	4	36%	50	15%	14	25%	34	14%	101	26%	163	16%
Off-campus Students	0	0%	272	86%	7	64%	274	85%	42	75%	208	86%	289	74%	883	84%
Enrollment Status																
Full-time	1	100%	281	89%	11	100%	295	91%	56	100%	233	96%	378	97%	987	94%
Part-time	0	0%	35	11%	0	0%	29	9%	0	0%	10	4%	12	3%	62	6%
College																
Agriculture	0	0%	44	14%	1	9%	49	15%	19	33%	26	11%	76	19%	108	10%
Design	0	0%	19	6%	0	0%	16	5%	2	4%	11	4%	31	8%	71	7%
Education	1	100%	30	9%	1	9%	19	6%	2	4%	18	7%	30	8%	100	9%
Engineering	0	0%	86	27%	4	36%	79	24%	14	25%	62	25%	113	29%	258	24%
Family and Consumer Sciences	0	0%	13	4%	1	9%	20	6%	1	2%	18	7%	19	5%	59	6%
Business	0	0%	50	16%	1	9%	57	17%	9	16%	43	17%	48	12%	191	18%
Liberal Arts and Sciences	0	0%	74	23%	3	27%	91	27%	10	18%	68	28%	78	20%	284	27%

Appendix C. Survey Items Contributing to Student Engagement Measures

Factor	Cronbach's alpha: National NSSE 2002	ISU NSSE 2003	ISU NSSE 2002	ISU NSSE 2001	ISU NSSE 2000
Academic Effort · Number of hours spent preparing for class (studying, reading, writing, doing homework or lab work, analyzing data, rehearsing, and other academic activities) · The frequency of having worked harder than you thought you could to meet an instructor's standards or expectations · significant amounts of time studying and on academic work	0.53	0.44	0.43	0.45	0.51
Higher Order Thinking · Coursework emphasized: Analyzing the basic elements of an idea, experience, or theory, such as examining a particular case or situation in depth · Coursework emphasized: Synthesizing and organizing ideas, information, or experiences into new, more complex interpretations and relationships · Coursework emphasized: Making judgments about the value of information, arguments, or methods, such as examining how others gathered and interpreted data · Coursework emphasized: Applying theories or concepts to practical problems or in new situations	0.80	0.79	0.81	0.77	0.75
Academic Integration · Worked on a paper or project that required integrating ideas or information from various sources · Included diverse perspectives (different races, religions, genders, political beliefs, etc.) in class discussions or writing assignments · when completing assignments or during class discussions	0.62	0.60	0.59	-	-
Active and Collaborative Learning . Asked questions in class or contributed to class · Made a class presentation · Worked with other students on projects during class · Worked with classmates outside of class to prepare class assignments · Tutored or taught other students (paid or voluntary) · others outside of class (students, family members, coworkers, etc.) · Participated in a community-based project as part of a regular course	0.64	0.64	0.63	0.66	0.62

Appendix C. Survey Items Contributing to Student Engagement Measures (continued)

	Cronbach's alpha				
Factor	National NSSE 2002	ISU NSSE 2003	ISU NSSE 2002	ISU NSSE 2001	ISU NSSE 2000
Student Interactions with Faculty Members	0.76	0.71	0.72	0.69	0.74
· Discussed grades or assignments with an instructor					
· Talked about career plans with a faculty member or advisor					
· Discussed ideas from your readings or classes with faculty members outside of class					
· Worked with faculty members on activities other than coursework (committees, orientation, student life activities, etc.)					
· Received prompt feedback from faculty on your academic performance (written or oral)					
· Work on a research project with a faculty member outside of course or program requirements					
Diversity Experiences	0.66	0.63	0.61	0.59	0.56
· Had serious conversations with students of a different race or ethnicity than your own					
· Had serious conversations with students who are very different from you in terrms of their religious beliefs, political opinions, or personal values					
· Emphasize: Encouraging contact among students from different economic, social, and racial or ethnic backgrounds					
Supportive Campus Environment					
· Emphasize: Providing the support you need to help you succeed academically	0.77	0.74	0.77	0.76	0.72
· Emphasize: Helping you cope with your non-academic responsibilities (work, family, etc.)					
· Emphasize: Providing the support you need to thrive socially					
· Quality: Your relationships with other students					
· Quality: Your relationships with faculty members					
· Quality: Your relationships with administrative personnel and offices					
Quality of Academic Advising					
· academic advising you have received at your institution?	-	-	-	-	-

Appendix C. Survey Items Contributing to Student Engagement Measures (continued)

Factor	Cronbach's alpha: National NSSE 2002	ISU NSSE 2003	ISU NSSE 2002	ISU NSSE 2001	ISU NSSE 2000
Gains in Personal and Social Development	0.85	0.84	0.81	0.82	0.76
· Contributed to: Developing a personal code of values and ethics					
· Contributed to: Understanding people of other racial and ethnic backgrounds					
· Contributed to: Understanding yourself					
· Contributed to: Learning effectively on your own					
· Contributed to: Solving complex real-world problems					
· Contributed to: Voting in local, state, or national elections					
· Contributed to: (Your) contributing to the welfare of your community					
Gains in Quantitative, Analytical, and Work-Related Skills	0.73	0.74	0.75	0.71	0.73
· Contributed to: Analyzing quantitative problems					
· Contributed to: Acquiring job or work-related knowledge and skills					
· Contributed to: Using computing and information technology					
· Contributed to: Working effectively with others					
Gains in General Education	0.80	0.80	0.77	0.77	0.78
· Contributed to: Writing clearly and effectively					
· Contributed to: Speaking clearly and effectively					
· Contributed to: Acquiring a broad general education					
· Contributed to: Thinking critically and analytically					
Satisfaction	0.79	0.79	0.76	0.75	0.75
· How would you evaluate your entire educational experience at this institution?					
· If you could start over again, would you go to the same institution you are now attending?					