AC 2004-1321: IMPACTS OF A COMBINED LIVING-LEARNING COMMUNITY ON ATTITUDES AND COLLEGE ENGAGEMENT OF ENGINEERING FRESHMEN

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Abstract

Preparation for a diverse workforce of engineering graduates suited for professional practice or graduate school is a major challenge to engineering educators. Immense challenges occur during student's first year in higher education where high attrition typically occurs among prospective engineering students. A living-learning community model was developed for engineering students at Washington State University combing residential and academic learning community features as a means for improving retention and academic success in engineering. Living-learning community freshmen shared four classes, lived in a common residence hall, and engaged in facilitated group activities. Self-reporting surveys were used to document attitudes and activities of both learning community and control students at the start and end of their first semester. Results indicated that the living-learning community offers significant benefits toward achieving important goals of these students and produces more positive attitudes about engineering.

Introduction

The purpose of this study was to assess changes in affective and behavioral aspects of student learning during and after participating in a living-learning community (LLC) for engineering freshmen. Common assessments of learning communities regularly include grade point average and retention, and this study is no different; however, an additional measure of attitudes and affective learning attributes as well as satisfaction with their living-learning community was also part of the assessment. It is the latter assessment that is detailed in this paper. Survey results from LLC students and their non-participating peers were compared and reported along with an evaluation of the survey itself (a copy of the survey is included in the Appendix).

Measuring the attitudes and behaviors of students is an often overlooked but extremely important element of learning that occurs during college.[1, 2, 3, 4] Common markers of success – grades and retention – do not give a complete picture of a student's learning. Recently a movement to measure the "missing" aspect of student learning has emerged. Several national instruments including the National Survey of Student Engagement (NSSE), College Student Experience Questionnaire (CSEQ), and the Community College Survey of Student Engagement

(CCSSE) as well as other smaller institution-oriented instruments, [5] have developed assessments designed to measure these aspects of learning. Accreditation organizations and professional associations are beginning to require evidence of student learning and development in all areas of student learning—not just the classroom. Institutions increasingly are expected to assess critical thinking skills, knowledge and cognitive abilities, student attitude development and growth, life skills, student activity involvement, student opportunities for learning, practice, feedback and support, along with student needs, experiences, and levels of satisfaction.

Emerging research on learning communities is showing promise as an instructional method for improving engineering education by increasing academic abilities, attracting participation from women and minorities, and fostering positive attitudes toward college.[6, 7, 8, 9] It is our premise that learning communities, structured specifically for engineering students, can positively and significantly impact affective learning and associated behaviors and mitigate effects of competition, weed-out, and isolated learning that have been cited as reasons for leaving engineering[10] and provide evidence of student attitude development and growth, student activity involvement, and student opportunities for learning.

The learning community concept has roots dating back to 1264 in Oxford, England[11] and has been defined many ways.[12, 13] For the context of this study, learning community is defined as the purposeful rearrangement of curricular time and space of both students and teachers to foster community, coherence and connections among courses and create more sustained intellectual interaction among students and their teachers. In particular, the learning community in this study is further defined as a group of students sharing the same majors and going through common courses as a cohort and participating in weekly peer-facilitated groups.

The engineering LLC in this study combined two existing programs, a residential learning community and a chemistry peer-facilitated team learning model and then added an engineering element by recruiting engineering upperclassmen for peer-facilitators and structuring learning activities around engineering disciplines and concepts. Fifty-seven participants were able to live with their engineering peers, attend four common classes together, and meet weekly with the same small group of students and an upper-classman peer-facilitator.

Method

Affective learning and college engagement evaluations were made from individual responses to a survey. Affective learning and engagement was assessed by measuring students' attitudes, participation in activities that contribute to success in college,[1] and time students spent doing various activities and comparing them at the beginning of the semester and at the end of the semester as well as comparing the treatment group (the LLC students) with the control group (the students that did not participate in a learning community). The survey was administered as a pre- and post-survey; the pre-survey was administered during the second week of the semester and the post-survey was administered during the 15th week to engineering freshmen in an introductory engineering class during the fall 2003 semester.

Participants

Survey respondents were freshmen engineering students attending one of three Engineering 120, Innovation in Design, course sections. LLC members made up the majority of students in one of those sections. Student demographics for the study population are shown in Tables 1 and 2.

Table 1. Gender

	Male	Female	Total
LLC	39	12	51
Control	142	23	165
Total	181	35	216

Table 2. Ethnicity

	Not Indicated	Asian	African American	Native American	Hispanic	Caucasian	Total
LLC	5	6	2	1	2	35	51
Control	24	9	2	2	4	124	165
Total	29	15	4	3	6	159	216

Instrument

The Iowa State University Undergraduate Education Survey 2000[14] was the survey instrument used for this study. Pre-survey questions asked students to rate their knowledge and abilities and how important certain activities that promote learning and persistence were to them using a 9-point Likert scale that ranged from "very weak" to "strong" for knowledge and abilities questions and "not at all important" to "very important" for the activities that promote learning and persistence. In a separate section students were asked to estimate the time they expected to spend on activities related to school or work. Post-survey questions were similar and included additional sections asking students to rate their level of satisfaction with their learning environment. LLC students were asked additional questions about their satisfaction with the LLC and to rate their LLC experience overall.

Analysis

All analyses were performed using SPSS version 11. Frequencies were determined for all Likert scale questions. T-tests were run comparing control and LLC students on items that addressed activities promoting learning and persistence, satisfaction with learning environments, and student estimates and actual time spent on activities. Responses to the open ended questions were coded and those with the highest frequencies are reported.

Confirmatory factor analysis of the seven previously identified scales underlying the set of knowledge and ability items for the pre- and post-surveys were analyzed separately using a promax solution with pairwise deletion of missing data (as similarly performed by Iowa State University in the development of this instrument). Mirroring the steps of development by Iowa State University researchers, the same seven scales – knowledge, diversity, written communication, critical thinking, teamwork, oral communication, and time management – were extracted for computation. Reliability analysis for each scale was also performed.

For each scale a repeated measures analysis of variance was performed with data from the students who completed both pre- and post-surveys. Interactions using paired sample *t*-tests to determine significance at the 95% level were used to assess whether LLC students reported learning more during the semester than their non-participating peers.

Results

Entering engineering LLC participants were similar in many ways to their peers at the beginning of the semester. At the end of the semester, differences in their college experiences began to emerge as they spent less time at paid work and more time in study groups, interacted more with their advisors and instructors (although not significantly) and indicated their persistence in engineering at a much higher frequency (94%) than their non-participating peers (77%).

Pre-survey results

Engineering students starting the semester were looking forward to learning about their major and taking classes in their major, learning and increasing their knowledge, meeting new people, and experiencing college life. There was little difference in what the LLC participants were looking forward to in comparison to their non-participating peers. Both groups were worried about the same things: difficult classes, time management, grades, and workloads. Table 3 lists the most frequent responses to the open ended questions on the pre-survey.

Table 3. Most frequent responses to open-ended pre-survey questions

Question	Living-Learning Community	Control
What are you most looking forward to this semester?	▪ learning about major/classes in major ▪ meeting/making friends college life ▪ increasing knowledge/learning	▪ learning about major/classes in major ▪ meeting/making friends ▪ college life ▪ increasing knowledge/learning
What worries you the most about your first semester?	▪ time management ▪ grades/doing well in classes ▪ difficult class/passing/math/chemistry ▪ workload ▪ failing/falling behind	▪ time management, grades/doing well in classes ▪ difficult class/passing/math/chemistry ▪ workload ▪ wrong major/discipline

Students rated the importance of factors that promote learning and persistence on a Likert scale ranging from 1=strongly agree to 9 = strongly disagree. Table 4 lists the attributes associated with college success[1] that were significantly different between the LLC students and the Control students when asked to rate their importance.

Table 4. Attributes of college success rated significantly different between LLC and Control students.

LLC students thought it was more important to work collaboratively on class projects		LLC	Control
$t(117) = 3.081$	$p = .003$	M = 7.71, SD = 1.08	M = 7.10, SD = 1.62
LLC students thought it was important to develop study groups with other students			
$t(128) = 4.665$	$p < .01$	M = 7.69, SD = 1.12	M = 6.70, SD = 1.81
LLC students thought it was more important to interact with people from different cultural or ethnic backgrounds			
$t(108) = 2.834$	$p = .005$	M = 7.37, SD = 1.38	6.67, SD = 1.91
Control students thought it was more important to receive prompt feedback			
$t(213) = -2.392$	$p = .018$	M = 7.80, SD = 1.17	M = 8.19, SD = 0.95

Students were asked to predict how much time they expected to spend in various activities listing the number of hours for each of those activities. Significant differences in the amounts of time spent on activities are shown in Table 5.

Table 5. Activities with significant differences between LLC and Control students.

Control students expected to spend more hours studying alone		LLC	Control
$t(212) = -2.53$	$p = .012$	M = 7.71. SD = 4.50	M = 9.52, SD = 4.34
LLC students expected to spend more time studying in groups			
$t(212) = 4.792$	$p < .01$	M = 6.37, SD = 3.42	M = 4.01, SD = 2.90
Control students expected to spend more time doing social activities			
$t(118) = -3.815$	$p<.01$	M = 5.45, SD = 3.17	M = 7.68, SD = 4.72

When students were asked to rate their knowledge and abilities there was one difference between LLC and control students. Control students had significantly higher estimates of their written communication abilities (M = 6.69, SD = 1.32) than LLC students (M = 5.25, SD = 1.41), $t(214) = -2.037$, $p = .043$ on a Likert scale of 1 = very weak to 9 = very strong.

Post-survey results

By the end of the semester, differences emerged between the LLC students and their non-participating peers. Four open-ended response questions regarding academic successes and difficulties as well as what they liked about engineering and what they disliked were asked at the end of the survey. A considerably higher percentage of LLC students intended to continue in engineering studies (94% LLC students versus 77% non-LLC students). Survey questions and their most frequent responses are listed in Table 6.

Table 6. Responses to post-survey open-ended questions

Question	Living-Learning Community	Control
Do you plan to continue in Engineering?	Yes = 45 (93.8%) No = 1 (0.2%) Undecided = 2 (0.4%)	Yes = 115 (77.7%) No = 17 (11.5%) Undecided = 16 (10.8%)
What was your greatest difficulty or negative academic experience this semester?	▪ class/lab ▪ test/grades ▪ time management ▪ chemistry ▪ teaching/professor ▪ math	▪ class/lab ▪ test/grade ▪ time management ▪ time spent on homework/studying
What is it about the study of engineering that you like?	▪ applied real-world/science/math ▪ problem solving ▪ intellectually stimulating/interesting/ technology/how things work ▪ building/constructing/ designing things ▪ creative	▪ applied real-world/science/math ▪ problem solving ▪ intellectually stimulating/interesting/ technology/how things work ▪ building/constructing/ designing things
What is it about the study of engineering that you dislike?	▪ difficult classes/hard to understand ▪ amount of time it takes/amount of work ▪ nothing	▪ difficult classes/hard to understand ▪ amount of time it takes/amount of work ▪ math

LLC students were asked some additional open-ended questions on the survey about what they liked and disliked about their learning community. The most frequently cited response to what they liked best about their LLC was studying together and being able to get help from their group members or facilitators. The students would have liked to have more of their LLC peers to participating in the peer-facilitated study groups (these groups were not mandatory) and at times wanted to study subjects that were not scheduled during the group meeting times. Their most frequent responses are listed in Table 7.

Table 7. Frequent responses from living-learning community members

Liked best about learning community	Least liked about learning community
▪ study together/help from group members/facilitators ▪ residential living with same majors	▪ nothing ▪ not everyone participated in study groups ▪ not getting help wanted in study groups/wanted to work on another subject in study group other than what was scheduled

Fully participating LLC students (those that attended five or more times during the semester) rated their overall LLC experience as 7.42 on a 1 = strongly dissatisfied and 9 =

strongly satisfied Likert scale. Partially participating LLC students (attended four or fewer times) rated their overall experience at 6.86.

Control and LLC students were mixed when they reflected on the number of opportunities they had to participate in activities that promote learning and persistence such as being able to see connections among classes, able to connect personal experience with class learning, and better understanding the nature of their anticipated major. Although only one significant difference was found, LLC students took advantage of these opportunities more often than their counterparts. LLC students reported having more opportunities to interact with people from different backgrounds (M = 7.20, SD = 1.29) than their control counterparts (M = 6.53, SD = 1.69), $t(106) = 2.922$, $p = .004$ on a 1 = strongly dissatisfied to 9 = strongly satisfied Likert scale.

Responding to questions about what students did during their non-class time, LLC students spent significantly more hours in study groups (M= 4.62, SD = 3.05) than non-LLC students (M = 2.53, SD = 2.77), consistent with the nature of learning communities, $t(191) = 4.389$, $p < .01$. Control students spent more time at paid work (M = 1.91, SD = 4.62) than LLC students (M = 0.56, SD = 2.63), $t(143) = -2.506$, $p = .013$.

When asked to rate their knowledge and abilities, students responded similarly to their pre-survey responses. No significant differences between LLC and control students in their estimates of knowledge and abilities were found, although control students still rated their written communication abilities higher, though not significantly, than the LLC students, as they did on the pre-survey. Knowledge, diversity, teamwork, oral communication, and time management were all rated higher by LLC students than control students, although the results were not significant.

A repeated measures analysis was run on each scale to determine changes in the LLC and control groups and changes between the pre- and post-surveys. Significant differences were found in the groups taken as a whole between their pre and post responses for knowledge, written communication, and oral communication. However, there were no significant differences between the pre and post-survey responses of the LLC group compared to the control group from beginning of the semester to the end. Table 8 details the significance, mean, and standard deviation for the different scales.

Table 8. Repeated measures results

Scale	Time (pre vs. post)	Pre-survey		Post-survey	
		Mean	SD	Mean	SD
Knowledge	$p < .01$	5.41	1.51	6.15	1.32
Diversity	not significant				
Written Communication	$p < .01$	6.55	1.33	6.98	1.36
Critical Thinking	not significant				
Teamwork	not significant				
Oral Communication	$p < .01$	6.63	1.14	6.92	1.11
Time Management	not significant				

Survey instrument

Cronbach's alpha was used for reliability analysis of the knowledge and abilities questions assessing internal consistency of the scales. A scale's reliability measures the consistency of questions relating to their particular scale. Reliability ranges between 0 and 1, where 1 most closely correlates to the scale and zero least correlates. Table 9 lists the scale, reliability, and associated questions.

Table 9. Scale reliability analysis

Scale	Reliability	Associated Survey Questions
Knowledge of university, discipline, and careers	.84	1, 2, 3, 4
Diversity	.79	5, 19, 20, 21
Written communication	.81	6, 7, 8
Critical thinking	.36	9, 10, 11
Teamwork	.83	12, 13, 14, 15
Oral communication/leadership	.90	16, 17, 18, 26, 27, 28
Time management	.91	22, 23, 24, 25

Reliability for six of the seven scales was high. Further refinement of the critical thinking scale is necessary for future use of this instrument. Reliability analysis for critical thinking increased from .36 to .82 if question 9 were left out. During confirmatory factor analysis, six factors, rather than seven as Iowa State University researchers found, emerged when analyzing scree plots. Scales for knowledge, diversity, written communication, oral communication, and time management were clear; however, questions about critical thinking and teamwork tended to load on other factors and question 9 loaded on a separate factor entirely. Additional refinement on teamwork question 14 is also warranted as it generally loaded on the oral communication factor. Redesigning some of these questions and subsequent testing will produce a more refined instrument useful for evaluating and benchmarking effects of engineering living-learning communities at this institution.

Discussion of Results and Implications

This study found LLC students more engaged in activities that promote learning and persistence and spending more time in those activities than their peers. Most compelling was the expected persistence in engineering, where 94% of the LLC students intended to continue their studies in engineering versus 77% of their non-participating peers. Non-significant results regarding critical thinking and teamwork indicate further work is needed with both the structure of the LLC and the survey instrument. However, initial indications of the success of the engineering LLC concept are encouraging.

During the engineering LLC pilot study, several aspects of the program were seen to be beneficial to the students. The vast majority of students were anxious to meet new friends but were worried about time management and grades. Many students in the LLC indicated they did meet new friends, did improve their grades and improved time management and study skills. Students perceived the peer-facilitated groups to be a learning opportunity to work through concepts and problems they had with class work, which, in turn, improved their grades. Students

also used the peer-facilitated groups as a method of time management by regularly using the time around the study groups for completing homework, again mitigating some of their concerns over their abilities to manage time. Students developed relationships with their upper-classmen facilitators often asking for advice and finding university resources through them, thus learning how to seek help and become more independent. Survey results confirm that all students believed they had a better understanding of university resources, university policies and procedures and knowledge about engineering by the end of the semester.

LLC students were particularly satisfied living in the same residential hall with other engineering majors, allowing them to help each other and study together – the very essence of living-learning communities where the purposeful rearrangement of curricular time and space of both students and teachers fosters community, coherence and connections among courses and creates sustained intellectual interaction among students.

It is not surprising that learning communities work well for beginning engineering students because the practice of engineering usually occurs in a team setting with a great deal of interaction among team members. Additionally, engineers must be lifelong, self-directed, experimental learners to keep current in their field. Learning communities promote this type of behavior in the peer-facilitated study groups as students learn and construct concepts and ideas under gentle guidance of their peer-facilitators. The very premise of learning community theory posits that students learn from each other and learn to interact in ways that support each other both socially and academically. Living and learning in the same environment develops teamwork and critical thinking skills early in an engineering student's academic career preparing them for a successful academic career and eventual entry into the engineering profession or graduate school.

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Biographical Information

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WSU Engineering Freshmen Survey 1

WSU ID _____ Discipline (if known): _____

Items 1-28. Listed below are a number of knowledge and ability domains related to your education at Washington State University. Please rate your current level of skill functioning in each domain using the scale below.

Very Weak 1 2 3 4 5 6 7 8 9 **Very Strong**

1. Knowledge of university policies and procedures relevant to undergraduate students	1 2 3 4 5 6 7 8 9
2. Knowledge of university resources for undergraduate students (e.g. writing lab, student counseling center, etc.)	1 2 3 4 5 6 7 8 9
3. Knowledge in your anticipated discipline or field of study	1 2 3 4 5 6 7 8 9
4. Knowledge of career choices and options in your anticipated discipline or field of study.	1 2 3 4 5 6 7 8 9
5. Knowledge of other cultures and/or ethnic groups.	1 2 3 4 5 6 7 8 9
6. Ability to produce well-written term papers that would receive a grade of "B+" or better.	1 2 3 4 5 6 7 8 9
7. Ability to write the types of technical, critical, review, or creative papers typical for your discipline with a grade of "B+" or better.	1 2 3 4 5 6 7 8 9
8. Ability to edit a document or paper for correct grammar, punctuation, and spelling.	1 2 3 4 5 6 7 8 9
9. Ability to analyze and evaluate ideas systematically and critically from different perspectives.	1 2 3 4 5 6 7 8 9
10. Ability to apply academic knowledge and reason to current problems.	1 2 3 4 5 6 7 8 9
11. Ability to think of different ways to solve problems.	1 2 3 4 5 6 7 8 9
12. Ability to work cooperatively and productively with others.	1 2 3 4 5 6 7 8 9
13. Ability to effectively listen to others enabling you to clearly understand what is being said and reflect that understanding back to the speaker.	1 2 3 4 5 6 7 8 9
14. Ability to interact with others and contribute to group discussions.	1 2 3 4 5 6 7 8 9
15. Ability to put team goals above your own personal goals.	1 2 3 4 5 6 7 8 9
16. Ability to make formal class presentations.	1 2 3 4 5 6 7 8 9
17. Ability to argue a point of view assertively.	1 2 3 4 5 6 7 8 9
18. Ability to persuade others to follow your lead.	1 2 3 4 5 6 7 8 9
19. Ability to effectively and comfortably interact with people from other cultures or ethnic groups.	1 2 3 4 5 6 7 8 9
20. Ability to speak up when you see bigotry.	1 2 3 4 5 6 7 8 9
21. Ability to accept religious differences.	1 2 3 4 5 6 7 8 9
22. Ability to manage your time effectively.	1 2 3 4 5 6 7 8 9
23. Ability to prioritize tasks to be performed for a project.	1 2 3 4 5 6 7 8 9
24. Ability to coordinate multiple concurrent tasks or projects.	1 2 3 4 5 6 7 8 9
25. Ability to study effectively.	1 2 3 4 5 6 7 8 9
26. Ability to inspire others through your leadership.	1 2 3 4 5 6 7 8 9

27. Ability to bring people with different viewpoints together to cooperate on a project.	1 2 3 4 5 6 7 8 9
28. Ability to facilitate group interactions.	1 2 3 4 5 6 7 8 9

Items 29-43. How important is it to you that each of the following be part of your college experience?

Not at all Important 1 2 3 4 5 6 7 8 9 **Very Important**

29. Interact closely with faculty members.	1 2 3 4 5 6 7 8 9
30. Receive individual support, encouragement of advice from faculty members.	1 2 3 4 5 6 7 8 9
31. Participate in a department club, residence government, or other organization.	1 2 3 4 5 6 7 8 9
32. Work collaboratively with other students on class projects.	1 2 3 4 5 6 7 8 9
33. Develop study groups with other students.	1 2 3 4 5 6 7 8 9
34. Apply learning to real world problems.	1 2 3 4 5 6 7 8 9
35. See connections among classes (e.g., learning in one class supports or augments learning in another class).	1 2 3 4 5 6 7 8 9
36. See connections between personal experiences and class learning.	1 2 3 4 5 6 7 8 9
37. Interact with people from different cultural or ethnic backgrounds.	1 2 3 4 5 6 7 8 9
38. Earn high grades in classes.	1 2 3 4 5 6 7 8 9
39. Take courses from professors who have high expectations for you.	1 2 3 4 5 6 7 8 9
40. Have experiences that help you understand the nature of your anticipated major.	1 2 3 4 5 6 7 8 9
41. Have experiences that "fit together" in helping you reach your goals as a student.	1 2 3 4 5 6 7 8 9
42. Have opportunities to practice the skills you are learning or have learned.	1 2 3 4 5 6 7 8 9
43. Receive prompt feedback about your progress.	1 2 3 4 5 6 7 8 9

Items 44-53. How many hours per week do you expect to spend on the following activities? Respond using the following scale.

0= 0 hours	7=7 to 8 hours	15= 15 to 16 hours
1=1 to 2 hours	9= 9 to 10 hours	17= 17 or more hours
3= 3 to 4 hours	11= 11 to 12 hours	
5= 5 to 6 hours	13= 13 to 14 hours	

44. Classes and labs.	
45. Studying alone.	
46. Studying in groups.	
47. Talking with your advisor.	
48. Talking with instructors outside of class.	
49. Community service/volunteer work.	

50. Social activities.	
51. Recreational activities.	
52. Leadership activities.	
53. Paid work.	

Please record your comments for the following questions.

A. What are you most looking forward to this semester?

B. What worries you about your first semester?

WSU Engineering Freshmen Survey II

Record the information requested below in the spaces provided.

WSU ID # _____ Discipline (if known): _____

Items 1-28. Listed below are a number of knowledge and ability domains related to your education at Washington State University. Please rate your current level of skill functioning in each domain using the scale below.

Very Weak 1 2 3 4 5 6 7 8 9 **Very Strong**

1. Knowledge of university policies and procedures relevant to undergraduate students	1 2 3 4 5 6 7 8 9
2. Knowledge of university resources for undergraduate students (e.g. writing lab, student counseling center, etc.)	1 2 3 4 5 6 7 8 9
3. Knowledge in your anticipated discipline or field of study	1 2 3 4 5 6 7 8 9
4. Knowledge of career choices and options in your anticipated discipline or field of study.	1 2 3 4 5 6 7 8 9
5. Knowledge of other cultures and/or ethnic groups.	1 2 3 4 5 6 7 8 9
6. Ability to produce well-written term papers that would receive a grade of "B+" or better.	1 2 3 4 5 6 7 8 9
7. Ability to write the types of technical, critical, review, or creative papers typical for your discipline with a grade of "B+" or better.	1 2 3 4 5 6 7 8 9
8. Ability to edit a document or paper for correct grammar, punctuation, and spelling.	1 2 3 4 5 6 7 8 9
9. Ability to analyze and evaluate ideas systematically and critically from different perspectives.	1 2 3 4 5 6 7 8 9
10. Ability to apply academic knowledge and reason to current problems.	1 2 3 4 5 6 7 8 9
11. Ability to think of different ways to solve problems.	1 2 3 4 5 6 7 8 9
12. Ability to work cooperatively and productively with others.	1 2 3 4 5 6 7 8 9
13. Ability to effectively listen to others enabling you to clearly understand what is being said and reflect that understanding back to the speaker.	1 2 3 4 5 6 7 8 9
14. Ability to interact with others and contribute to group discussions.	1 2 3 4 5 6 7 8 9
15. Ability to put team goals above your own personal goals.	1 2 3 4 5 6 7 8 9
16. Ability to make formal class presentations.	1 2 3 4 5 6 7 8 9
17. Ability to argue a point of view assertively.	1 2 3 4 5 6 7 8 9
18. Ability to persuade others to follow your lead.	1 2 3 4 5 6 7 8 9
19. Ability to effectively and comfortably interact with people from other cultures or ethnic groups.	1 2 3 4 5 6 7 8 9
20. Ability to speak up when you see bigotry.	1 2 3 4 5 6 7 8 9
21. Ability to accept religious differences.	1 2 3 4 5 6 7 8 9
22. Ability to manage your time effectively.	1 2 3 4 5 6 7 8 9
23. Ability to prioritize tasks to be performed for a project.	1 2 3 4 5 6 7 8 9
24. Ability to coordinate multiple concurrent tasks or projects.	1 2 3 4 5 6 7 8 9
25. Ability to study effectively.	1 2 3 4 5 6 7 8 9

26. Ability to inspire others through your leadership.	1 2 3 4 5 6 7 8 9
27. Ability to bring people with different viewpoints together to cooperate on a project.	1 2 3 4 5 6 7 8 9
28. Ability to facilitate group interactions.	1 2 3 4 5 6 7 8 9

Items 29-35. Please indicate your level of agreement with each of the following statements by using the following rating scale.

Strongly Disagree 1 2 3 4 5 6 7 8 9 **Strongly Agree**

29. I was able to see connections among my classes (e.g., learning in one class supported or augmented learning in another class).	1 2 3 4 5 6 7 8 9
30. I was able to see connections between personal experiences and class learning.	1 2 3 4 5 6 7 8 9
31. I was able to earn high grades in classes.	1 2 3 4 5 6 7 8 9
32. My professors had high expectations for me.	1 2 3 4 5 6 7 8 9
33. I better understand the nature of my anticipated major.	1 2 3 4 5 6 7 8 9
34. I have had experiences this semester that "fit together" in helping me meet my goals as a student.	1 2 3 4 5 6 7 8 9
35. I have received prompt feedback about my progress in classes.	1 2 3 4 5 6 7 8 9

Items 36 – 49. Please indicate your degree of satisfaction this semester on each of the following dimensions.

Strongly Dissatisfied 1 2 3 4 5 6 7 8 9 **Strongly Satisfied**

36. Opportunities to interact closely with faculty.	1 2 3 4 5 6 7 8 9
37. Level of individual support, encouragement, or advice from faculty members.	1 2 3 4 5 6 7 8 9
38. Opportunities to interact with people from different cultural backgrounds.	1 2 3 4 5 6 7 8 9
39. Opportunities to participate in a department club, residence government, or other organization.	1 2 3 4 5 6 7 8 9
40. Opportunities to work collaboratively with other students on class projects.	1 2 3 4 5 6 7 8 9
41. Opportunities to develop or participate in study groups.	1 2 3 4 5 6 7 8 9
42. Opportunities to apply learning to real world problems.	1 2 3 4 5 6 7 8 9
43. Opportunities to practice the skills you are learning or have learned.	1 2 3 4 5 6 7 8 9
44. Overall quality of instruction that you received this semester.	1 2 3 4 5 6 7 8 9
45. Overall quality of your classmates.	1 2 3 4 5 6 7 8 9
46. Availability of your academic advisor.	1 2 3 4 5 6 7 8 9
47. Helpfulness of your academic advisor.	1 2 3 4 5 6 7 8 9
48. Overall experiences at WSU.	1 2 3 4 5 6 7 8 9

Items 50-59. During the fall semester, how many hours per week did you spend on the following activities?

0= 0 hours	7 = 7 to 8 hours	15 = 15 to 16 hours
1 = 1 to 2 hours	9 = 9 to 10 hours	17 = 17 or more hours
3 = 3 to 4 hours	11 = 11 to 12 hours	
5 = 5 to 6 hours	13 = 13 to 14 hours	

50. Classes and labs.	
51. Studying alone.	
52. Studying in groups.	
53. Talking with your advisor.	
54. Talking with instructors outside of class.	
55. Community service/volunteer work.	
56. Social activities.	
57. Recreational activities.	
58. Leadership activities.	
59. Paid work.	

Please record your comments for the following questions.

A. What was your greatest success or positive academic experience this semester?

B. What was your greatest difficulty or negative academic experience this semester?

C. Do you plan to continue in Engineering? Please circle one: Yes No Undecided

D. What is it about the study of Engineering that you:

Like:

Dislike:

If you are an Engineering Teniwe Student please complete the following questions:

Strongly Dissatisfied	1	2	3	4	5	6	7	8	9	**Strongly Satisfied**

Please rate your overall Engineering Teniwe experience	1	2	3	4	5	6	7	8	9

C. What was the most satisfying aspect of Engineering Teniwe?

D. What was the most disappointing aspect of Engineering Teniwe?