

# Academic Engagement and Satisfaction of Undergraduate Agricultural, Food and Life Sciences Students

**Donald M. Johnson<sup>1</sup>, George W. Wardlow<sup>2</sup>,  
and Donna L. Graham<sup>3</sup>**  
**University of Arkansas**  
**Fayetteville, AR 72701**



## Abstract

Freshmen ( $n = 205$ ) and seniors ( $n = 194$ ) in a College of Agricultural, Food and Life Sciences (CAFLS) were compared to each other and to freshmen ( $n = 1749$ ) and seniors ( $n = 1341$ ) university-wide on measures of academic engagement and satisfaction. The academic engagement variables were: (i) level of academic challenge, (ii) active and collaborative learning, (iii) student-faculty interaction, (iv) enriching educational experiences, and (v) supportive campus environment. Both freshmen and senior CAFLS students reported a significantly ( $P < .05$ ) higher level of student-faculty interaction than did freshmen and senior students university-wide. CAFLS seniors perceived the campus environment to be significantly ( $P < .05$ ) more supportive than did seniors university-wide. CAFLS seniors rated active and collaborative learning, student-faculty interaction, and enriching educational experiences significantly ( $P < .05$ ) higher than CAFLS freshmen. These findings are important given the empirical evidence linking increased student engagement to increased academic achievement and student retention. CAFLS administrators and faculty should evaluate the freshmen year experiences of CAFLS students to determine if changes are needed to enhance student academic engagement. CAFLS faculty and administrators should highlight these findings when recruiting prospective students, especially those concerned about attending a “large” university.

## Introduction

Higher levels of student engagement lead to higher levels of academic achievement (Pascarella and Terenzini, 2005). According to Kuh (2003, p. 25), “The engagement premise is deceptively simple, even self-evident. The more students study a subject the more they learn about it.” Kuh (2003) further argued that current measures of student engagement can serve as proxy measures for learning and postgraduate outcomes that otherwise can only be assessed in the future. Shulman (2002) extended this argument by indicating that student engagement is not merely a proxy for learning, it is a fundamental purpose of education. According to Shulman (2002, p. 40), “Our

institutions of higher education are settings where students can encounter a range of people and ideas and human experiences that they have never been exposed to before.”

The research on student engagement both draws on and is consistent with Chickering and Gamson's (1987) seven “Principles for Good Practice in Undergraduate Education.” These principles indicate that good practice in undergraduate education (i) encourages student-faculty contact, (ii) encourages cooperation among students, (iii) encourages active learning, (iv) provides prompt feedback, (v) emphasizes time on task, (vi) communicates high expectations, and (vii) respects diverse talents and ways of learning. Research indicates that these seven principles of good practice are positively associated with higher levels of student cognitive growth and a more positive attitude toward learning (Cruce, et al., 2006; Pascarella and Terenzini, 2005).

Gonyea (2006) developed a model of factors affecting three academic outcomes for first-year university students (Figure 1). According to Gonyea (p. 9), “The conceptual model proposes directions of influence among the student background, engagement, environment, and outcome variables.” Gonyea described “Engagement with agents of socialization” as a construct that includes student-faculty interaction, interaction with diverse cultures and ideas, and substantive conversations between student peers. The construct “Forms of academic engagement” included writing experiences, amount of reading and writing, use of information technology, use of tutoring services, and amount of time spent per week on academic tasks. The construct “Integration” measures the extent to which ideas and skills learned in one context are applied to problems or situations in a different context. According to Gonyea (2006, p. 8), “Integrative learning activities may include students being asked to apply what they have learned to a different setting, bringing ideas from various sources together in a paper or project, or explaining material to another person.” Finally, “Perceptions of the campus environment” refers to students' beliefs about coursework; the quality of relationships between students, faculty, staff and administrators;

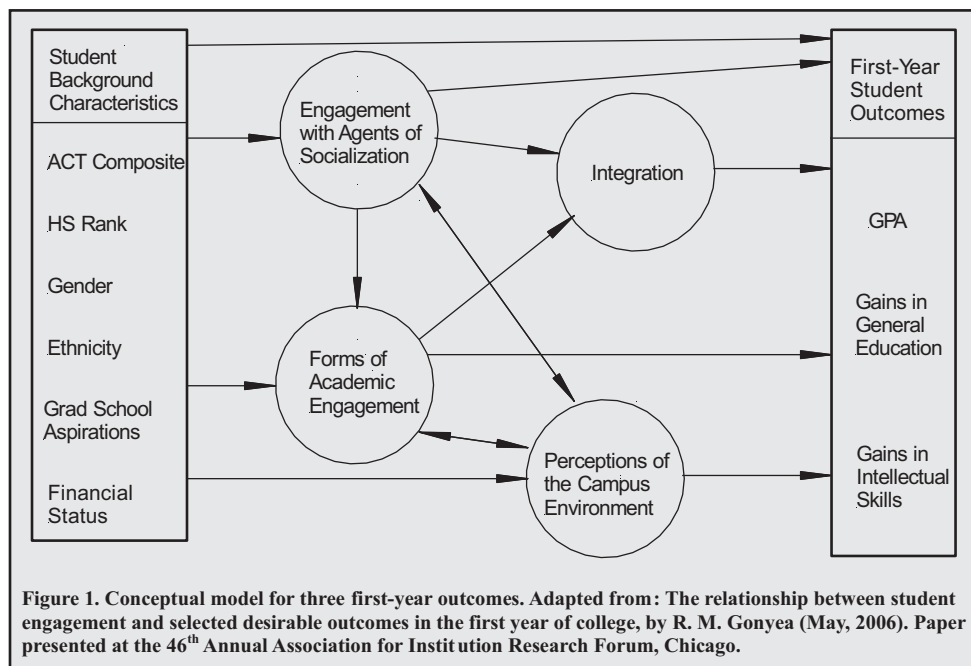
<sup>1</sup>Professor, Department of Agricultural and Extension Education, 205 Agriculture Building; Tel: 479-575-2035; Email: dmjohnso@uark.edu

<sup>2</sup>Professor and Head, Department of Agricultural and Extension Education

<sup>3</sup>Professor and Associate Dean, Dale Bumpers College of Agricultural, Food and Life Sciences

and the degree to which the institution emphasizes academic and scholarly activities.

enriching educational experiences, and supportive campus environment) and satisfaction with their university experiences,



between CAFLS students and all students in the university, by classification (freshmen or senior);

2. Determine if there were significant differences ( $P < .05$ ) between freshmen and senior CAFLS students' on selected student engagement variables (level of academic challenge, active and collaborative learning, student-faculty interaction, enriching educational experiences, and supportive campus environment) and satisfaction with their university experiences.

## Methods

The population for this study included all CAFLS

The College of Agricultural, Food and Life Sciences (CAFLS) at the University of Arkansas recently conducted a “branding” survey to determine undergraduate students' perceptions of the defining characteristics of the college. According to Medders et al. (2004), respondents described the college “with words such as (in order of frequency) family, friendly, caring, helpful, and home or home-like. Respondents used similar words . . . to describe faculty in the College.” The researchers concluded that, “The strong theme of family-like, caring, friendly atmosphere represents a strong emotional response that might be a major defining characteristic of the College brand” (p. 3).

Student engagement appears to be foundational to academic achievement. It underlies accepted principles of good practice in college teaching and is an important component of a positive campus culture. Therefore, understanding the academic engagement and satisfaction of students in CAFLS may aid faculty and administrators in improving student achievement and retention.

## Purpose and Objectives

The purpose of this study was to examine student engagement and satisfaction of freshmen and senior students enrolled in the College of Agricultural, Food and Life Sciences (CAFLS) and compare them to other university freshmen and seniors. Specific objectives were to:

1. Determine if there were significant differences ( $P < .05$ ) on selected student engagement variables (level of academic challenge, active and collaborative learning, student-faculty interaction,

freshmen and seniors enrolled for both the fall and spring semesters of the 2004-2005 (freshmen = 197; seniors = 391), 2005-2006 (freshmen = 217; seniors = 391), and 2006-2007 (freshmen = 257; seniors = 431) academic years (Office of Institutional Research, 2005, 2006, and 2007). The comparison group for Objective One was all freshmen and senior students at this university enrolled for both the fall and spring semesters of 2004-2005 (freshmen = 2771; seniors = 4086), 2005-2006 (freshmen = 2865; seniors = 4119), and 2006-2007 (freshmen = 2832; seniors = 4275) (Office of Institutional Research, 2005a, 2006a, and 2007a). Freshmen were defined as students who had completed fewer than 30 semester credit hours; seniors were defined as students within two to 24 semester credit hours of graduation.

The university's Office of Institutional Research provided the data used in this study. The data set included raw data for all freshmen and senior CAFLS students' responding to the 2004-2005 (freshmen = 56; seniors = 30), 2005-2006 (freshmen = 82; seniors = 63), and 2006-2007 (freshmen = 65; seniors = 51) administrations of the National Survey of Student Engagement (NSSE) (Indiana University Center for Postsecondary Research, 2009). For comparison purposes, the Office of Institutional Research also provided summarized data for all freshmen and senior students at the university who completed the NSSE in the 2004-2005 (freshmen = 424; seniors = 286), 2005-2006 (freshmen = 628; seniors = 692), and 2006-2007 (freshmen = 607; seniors = 468) academic years.

Each academic year randomly selected freshmen and senior students enrolled at this institution are asked to complete the NSSE. The survey is adminis-

## Academic Engagement

tered during the spring semester to ensure that respondents have completed at least one full semester at the institution. The overall NSSE response rate was approximately 30% across years and was comparable to the response rates of other doctoral-intensive universities (Office of Institutional Research, 2005b, 2006b, and 2007b). To control for non-response bias in the overall NSSE survey, Kuh (2003), compared a national sample of NSSE respondents to non-respondents (via telephone interviews) and concluded that “few meaningful differences exist between respondents and non-respondents in terms of their engagement in educationally effective practices” (p. 13). In each year, the percentage of CAFLS NSSE respondents represented approximately 9% of the total respondents, which was consistent with the percentage of CAFLS students in the overall university student population (Office of Institutional Research (2005a, 2006a, and 2007a).

For this study, data for five NSSE subscales and an item measuring student satisfaction with their university experiences were analyzed. The five student engagement subscales consist of multiple items; each subscale has a maximum possible score of 100 (NSSE Codebook, 2005). The six subscales and the satisfaction variable are described below (NSSE Codebook, 2005):

1. Level of academic challenge (LAC). This nine item sub-scale measures the amount of time spent preparing for class, reading, and writing; degree of higher-level cognitive learning; and institutional expectations for academic performance.

2. Active and collaborative learning (ACL). This seven item sub-scale measures the amount of class participation, collaborative work with other students, and participation in community-based learning.

3. Student-faculty interaction (SFI). This six item subscale measures the amount of time spent talking with faculty in and out of class, the extent of feedback received from faculty, and time spent working with faculty on research projects.

4. Enriching educational experiences (EEE). This 12-item subscale measures the extent to which students interact with students with different ethnic backgrounds or different political opinions or values; use electronic technologies; and participate in internships, study abroad, co-curricular activities, and senior capstone experiences.

5. Supportive campus environment (SCE). This six item subscale measures student perceptions of the extent to which the university helps them succeed academically and socially; assists them in coping with non-academic responsibilities; and promotes supportive relationships between students, staff, faculty, and administrative personnel.

6. Satisfaction. This single-item variable consisted of responses to the question: “How would you evaluate your entire educational experience at this institution?” (1 = “poor”; 4 = “excellent”) (NSSE Codebook, 2005).

The NSSE has been the subject of extensive validation studies and has been shown to possess face, content, and construct validity. According to Kuh (2003), “the pattern of responses from first-year students and seniors suggest the items are measuring what they are supposed to measure . . . and discriminate among students in expected ways” (p. 11). According to Kuh et al. (2001), self-reported student data is likely to be valid when the information requested is known to the respondents; the questions are clear and unambiguous; the questions refer to recent activities; the respondents think the questions merit a serious response; and answering the questions does not threaten or embarrass the respondents.

Kuh (2003) assessed instrument stability by administering the NSSE twice to 1,226 college students and correlating their responses on the two administrations for the five subscales used in the present study. These correlations ranged from .74 to .78. The coefficient alpha internal consistency for the five subscales ranged from .66 on the EEE to alpha = .77 on the SCE (Indiana University Center for Postsecondary Research, 2005). For the present study, the coefficient alpha reliability estimates for each subscale were: level of academic challenge, .76; active/collaborative learning, .76; student-faculty interaction, .73; enriching educational experiences, .56; and supportive campus environment, .66.

## Results

A majority of both freshmen ( $n = 203$ ) and senior ( $n = 144$ ) respondents were female (78.8% and 70.8%, respectively) and non-minority (83.2% and 85.4%, respectively). Using CAFLS enrollment data (Institutional Research, 2005a, 2006a, and 2007a), chi square analyses revealed that the percentage of females in the CAFLS freshmen respondent group was significantly higher than the percentage of females in the freshmen class (78.8% vs. 69.7%, respectively),  $\chi^2(1) = 6.49$ ;  $p < .05$ . There was no significant difference ( $P > .05$ ) in ethnicity between the responding sample and the population.

The data for CAFLS students were sorted by classification (freshmen or senior) and one-way factorial MANOVAs were used to determine if there were significant differences on the five student engagement variables or the student satisfaction variable by survey year. There were no significant differences between years for freshmen [Wilks' lambda = .91,  $F(12, 346) = 1.31$ ;  $p = .21$ ] or seniors [Wilks' lambda = .86,  $F(12, 226) = 1.45$ ;  $p = .15$ ]. Thus, responses were grouped across years within each classification (freshmen or senior) for all subsequent analyses.

### Objective One

The first objective was to determine if there were significant differences between CAFLS students and students university-wide on the five student engage-

ment variables or satisfaction, by classification (freshmen or seniors). To accomplish this objective, the upper- and lower-limits of the 95% confidence interval (CI95) was calculated around the difference between the CAFLS and university student means for each variable, by class level. Confidence intervals not containing zero (0) indicated a statistically significant ( $P < .05$ ) difference between the two student groups (Darlington and Carlson, 1987).

As shown in Table 1, CAFLS freshmen rated student-faculty interaction (SFI) significantly higher ( $M = 36.20$ ) than did freshmen university-wide ( $M = 33.21$ ). There were no other significant differences between CAFLS freshmen and university freshmen for any of the four remaining student engagement variables or student satisfaction. Thus, CAFLS freshmen appear to be typical of freshmen university-wide, except for a higher perceived level of interaction with faculty members. Both CAFLS and other university freshmen were satisfied with their experiences at this university, with mean satisfaction scores of 3.17 and 3.14, respectively, on a 1 to 4 scale.

Senior CAFLS students also rated student-faculty interaction higher ( $M = 47.01$ ) than did seniors university-wide ( $M = 41.76$ ). Additionally, CAFLS seniors rated the supportive campus environment (SCE) variable significantly higher ( $M = 60.09$ ) than did university-wide seniors ( $M = 54.46$ ). There were no other significant differences between CAFLS seniors and university-wide seniors on the three remaining student engagement variables or student satisfaction. Again, both CAFLS and university seniors were satisfied with their experiences at this university, with means of 3.18 and 3.06, respectively (Table 1).

**Table 1. Comparison of CAFLS and University Freshmen and Seniors on Academic Engagement and Satisfaction**

Class level	CAFLS			University			CI <sub>95</sub> <sup>z</sup>		p <sup>1</sup>	
	n	M	SD	n	M	SD	d	y		LL
<i>Freshmen</i>										
LAC <sup>x</sup>	190	47.88	12.77	1612	48.85	13.55	-0.97	-2.91	0.96	NS
ACL <sup>x</sup>	201	41.74	16.37	1749	41.82	16.97	-0.08	-2.48	2.32	NS
SFI <sup>x</sup>	194	36.20	18.23	1632	33.21	18.08	2.99	0.28	5.70	*
EEE <sup>x</sup>	186	27.93	13.30	1563	27.87	13.25	0.06	-1.96	2.09	NS
SCE <sup>x</sup>	184	60.05	19.15	1535	57.49	18.29	2.56	-0.36	5.47	NS
Satisfaction <sup>w</sup>	181	3.17	0.69	1497	3.14	0.69	0.03	-0.08	0.13	NS
<i>Senior</i>										
LAC	130	49.45	14.22	1265	51.95	14.09	-2.50	-5.06	0.07	NS
ACL <sup>x</sup>	144	50.16	16.69	1341	48.34	16.09	1.82	-1.04	4.68	NS
SFI <sup>x</sup>	131	47.01	18.93	1270	41.76	20.39	5.25	1.82	8.68	*
EEE <sup>x</sup>	124	39.77	16.25	1241	40.48	17.44	-0.71	-3.72	2.31	NS
SCE <sup>x</sup>	122	60.09	17.89	1219	54.46	18.64	5.63	2.28	8.99	*
Satisfaction <sup>w</sup>	121	3.18	0.72	1198	3.06	0.75	0.12	-0.02	0.25	NS

<sup>z</sup>95% confidence interval around the difference in means for CAFLS and university students; <sup>y</sup>Difference in means for CAFLS and university students; <sup>x</sup>Maximum possible score was 100; <sup>w</sup>Measured on a 1 – 4 scale (1 = “poor” and 4 = “excellent”); <sup>1</sup>NS, \* Nonsignificant or significant at  $P < .05$ , respectively

**Table 2. CAFLS Students’ Levels of Academic Engagement and Satisfaction by Classification**

Factor	Freshmen		Seniors		ANOVA	Cohen’s $d^z$
	M	SD	M	SD	F(1, 300)	
LAC <sup>y</sup>	47.94	12.77	49.37	14.05	0.84	0.11
ACL	41.67	16.20	49.47	16.49	16.56****	0.51
SFI <sup>y</sup>	35.70	17.56	46.79	18.69	27.47****	0.58
EEE <sup>y</sup>	27.86	13.27	39.53	16.09	47.18****	0.81
SCE <sup>y</sup>	59.78	18.99	59.76	17.58	0.00	0.00
Satisfaction <sup>x</sup>	3.17	0.69	3.18	0.72	0.02	0.02

<sup>z</sup>Measure of effect size  $(M_1 - M_2) / SD_{pooled}$ ; <sup>y</sup>Maximum possible score was 100; <sup>x</sup>Measured on a 1 – 4 scale (1 = “poor” and 4 = “excellent”); <sup>1</sup>\*\*\*\* Significant at  $p < .0001$

**Objective Two**

The second objective was to determine if there were significant differences between freshmen and senior CAFLS students on the five student engagement variables or student satisfaction. The results of a one-way multivariate analysis of variance (MANOVA) indicated that freshmen and senior CAFLS students were significantly different on one or more variables, [Wilks' lambda = .81,  $F(6, 295) = 0.73$ ;  $F(6, 295) = 11.45$ ;  $p < .0001$ ]. Subsequent univariate analyses indicated that senior CAFLS students rated the active/collaborative learning (ACL), student-faculty interaction (SFI), and enriching educational experiences (EEE) variables

## Academic Engagement

significantly higher than did freshmen CAFLS students. Using the descriptors suggested by Cohen (1988), classification had a medium effect size for active/collaborative learning and student-faculty interaction and a large effect size for enriching educational experiences. There were no significant differences between CAFLS freshmen and seniors for level of academic challenge (LAC), supportive campus environment (SCE), or student satisfaction (Table 2).

## Conclusions and Implications

This study sought first to compare CAFLS freshmen and seniors with freshmen and seniors university-wide and then to compare CAFLS freshmen and CAFLS seniors on five measures of academic engagement and one measure of student satisfaction. The results indicated that significant ( $P < .05$ ) differences existed between CAFLS freshmen and university freshmen, between CAFLS seniors and university seniors, and between CAFLS freshmen and CAFLS seniors.

CAFLS freshmen rated their level of interaction with faculty significantly higher than did freshmen university-wide. There were no significant differences between CAFLS freshmen and freshmen university-wide on the remaining four engagement variables or student satisfaction.

When CAFLS seniors were compared with all university seniors, there were significant differences on two of the six variables. Seniors in CAFLS rated their level of interaction with the faculty higher than did university seniors and they also rated the variable supportive campus environment higher than did university seniors.

The variable student-faculty interaction, which is based on the amount of time spent talking with faculty in and out of class, extent of feedback received from faculty, and time spent working with faculty on research projects, was significantly higher for both CAFLS freshmen and seniors. To determine if this difference was potentially due to smaller class sizes in CAFLS, average class enrollment data was obtained for the 2008-2009 academic year (Office of Institutional Research, 2009). The data indicate that freshmen-level CAFLS classes were actually larger than freshmen-level classes university-wide ( $M = 52$  and  $M = 33$ , respectively). Senior-level courses in CAFLS and university-wide had the same average enrollment ( $M = 18$ ). Thus, the higher levels of student-faculty interaction perceived by CAFLS students likely occurs not because of smaller classes, but, especially at the freshmen level, in spite of larger classes. Perhaps, CAFLS students and faculty interact more frequently due to similar background characteristics, course laboratory requirements, the college's faculty advising model, a unique college ethos, or to other undetermined factors. Further research should be conducted to better understand this phenomenon.

Regardless of the underlying cause, higher levels of student-faculty interaction should positively impact, either directly or indirectly, each of the three mediating constructs (engagement with agents of socialization, forms of academic engagement, integration, and perceptions of the campus environment) Gonyea (2006) hypothesized to enhance student academic outcomes (GPA, gains in general education, and gains in intellectual skills). Although Gonyea's model is specifically a model of first-year student outcomes, there is little reason to doubt its applicability to other college students, including seniors. Additional research should be conducted to test this hypothesis.

Taken together, the student-faculty interaction data in Tables 1 and 2 shows that CAFLS seniors not only rate student-faculty interaction significantly higher than other university seniors, they also rate student-faculty interaction significantly higher than do CAFLS freshmen. While it is perhaps logical that senior CAFLS students would more often engage in interaction with faculty, concerted efforts should be made to increase opportunities for interaction between faculty and freshmen CAFLS students. Perhaps smaller freshmen-level class sizes would lead to increased interaction. Given the relationships posited in Gonyea's (2006) model, such interactions should enhance educational outcomes for CAFLS freshmen and lead to greater student retention.

CAFLS seniors also rated the variable supportive campus environment significantly higher than did other university seniors. This variable measured student perceptions of the extent to which the university helped them succeed academically and socially; assisted them in coping with non-academic responsibilities; and promoted supportive relationships between students, staff, faculty, and administrative personnel. This finding provides strong support for the conclusions of Medders et al. (2004) that students in CAFLS perceive the college to have a supportive, family-like environment. According to Gonyea's (2006) model, a more supportive campus environment should positively impact each of the four mediating factors posited to enhance student academic outcomes.

When CAFLS seniors were compared with CAFLS freshmen on each of the six variables, CAFLS seniors reported higher scores on three variables: active and collaborative learning, student-faculty interaction, and enriching educational experiences. Freshmen, those in CAFLS and campus-wide, are traditionally enrolled in larger sections of general education courses; seniors are typically more likely to be enrolled in smaller sections of courses within their majors. It is within the smaller, more specialized courses at the senior level that these experiences are offered. Efforts should be made to implement these proven educational practices in freshmen CAFLS courses, perhaps through smaller class sizes and enhanced use of faculty-mentored student learning communities.

Analysis of NSSE (Indiana University Center for Postsecondary Research) data provides colleges and departments of agriculture with valuable information concerning the academic engagement and satisfaction of undergraduate students. Faculty and administrators in participating institutions are encouraged to conduct their own analyses to provide insight into issues of importance at their college or university.

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