

Learning Communities and Agricultural Youth Organizations: Their Influence on College Agriculture Students' Academic Performance and Retention

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Abstract

One of the most important challenges facing colleges of agriculture today involves recruiting, retaining, and educating high caliber individuals who are academically prepared to function in a rapidly changing food, fiber, and natural resource industry. This study compared the influence of participation in a learning community called a Freshman Interest Group (FIG) and participation in agricultural youth organizations (4-H/FFA) on academic performance and retention of freshmen in the College of Agriculture, Food and Natural Resources at the University of Missouri. Freshmen enrolled in a college-wide learning and development course in the Fall of 1997 and 1998 ($n = 442$) participated. Involvement in a FIG and participation in an agricultural youth organization (4-H and/or FFA) were investigated as variables that could possibly influence academic performance and retention. Analysis of Covariance (ANCOVA) procedures were utilized to determine the influence of participation in FIGs and agricultural youth organizations on academic performance. The Chi square test for association was utilized to determine the influence of participation in FIGs and agricultural youth organizations on retention.

Participation in a FIG was not found to be a significant variable in its influence on either academic performance or retention for the sophomore year. However, prior involvement in agricultural youth organizations was found to have a significant association with students' academic performance as well as retention in the college of agriculture. The study raises important implications for the recruitment of individuals with prior experience in agricultural youth organizations as potentially successful students in colleges of agriculture.

Introduction/Theoretical Framework

"Nothing is permanent but change." This quote by the Greek philosopher, Heraclitus, presents a holistic summary of agriculture over the past century. It also provides an accurate projection of what agriculture is likely to experience in the new millennium.

Change has been a defining characteristic of agriculture. In 1950, 17% of the population in the United States lived on a farm, whereas today, less than two percent of the population resides on a farm. Yet, agricultural production has increased by 150% over the past 45 years (National Research Council [NRC], 1995). Furthermore, farming is not the only segment of agriculture that has experienced change. The food, fiber, and natural resource sectors currently employ 18% of the U.S. population and contribute 16% of total "value added" endeavors in the processing, marketing, and distribution of agricultural products (NRC, 1995). Through research, development, and education, colleges of agriculture across the nation have contributed greatly to this growth in productivity (NRC, 1996). However, with change comes challenge; and colleges

of agriculture must face the challenges of providing education for the human resource base in a rapidly growing, increasingly global, and highly technological food, fiber, and natural resource system (NRC, 1996).

Possibly, the most important challenges facing colleges of agriculture today involve recruiting, retaining, and educating high caliber individuals who are academically prepared to function in a rapidly changing food, fiber, and natural resource industry. Goeker, Coulter, and Stanton (1995) predicted that at the turn of the millennium a shortfall of almost four percent would exist between employment opportunities and available graduates in food and agricultural sciences and cooperating fields. The previous prediction supported Russell's assertions of an impending "brain drain" in agriculture, or more specifically, a lack of qualified individuals with an agricultural background or experience (Russell, 1993). In addition to changing industry demands, colleges face great monetary investments dependent upon the academic success and degree completion of their students. With rising costs of education and depleting sources of funding, loss of students in colleges of agriculture translates to significant losses of instructional dollars (Dyer, Lacey, & Osborne, 1996). To remain viable, colleges of agriculture must meet these challenges by discovering ways of predicting the academic success and ensure the academic retention of its students.

In studying the complex phenomenon of education, Cruikshank (1990) suggested using theoretical models such as those developed and tested by Dunkin and Biddle. The theoretical framework for this study was derived from an adaptation of Mitzel's Model of teaching, as presented by Dunkin and Biddle (1974). In their model, Dunkin and Biddle suggested that the study of teaching and learning involve four categories of variables: presage, context, process, and product (Figure 1).

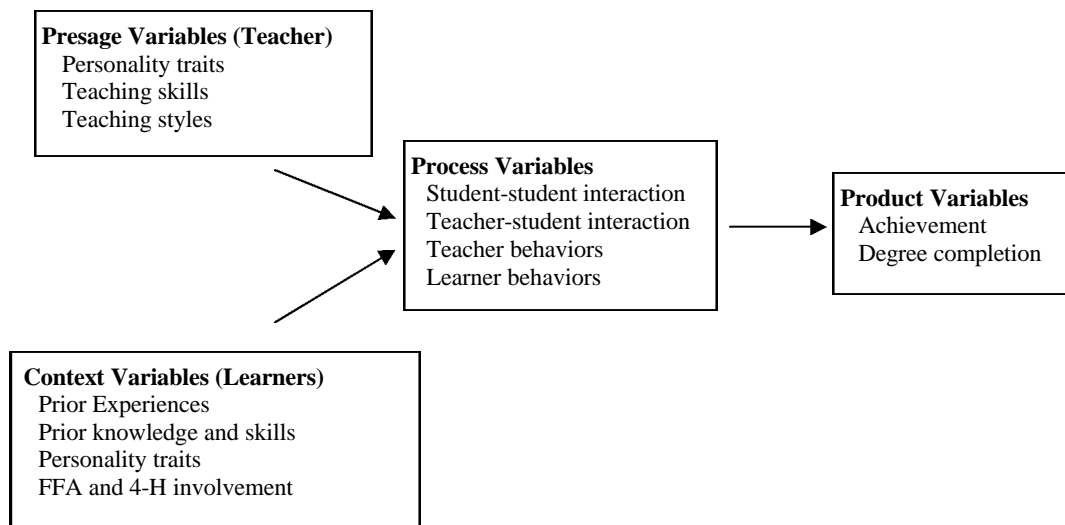


Figure 1. Theoretical Model for the Study of Classroom Teaching

Presage variables include those that influence teachers and their teaching behaviors (i.e., those things that teachers contribute to the learning process). Context variables are those that

students contribute. Context variables include the background of learners, their prior knowledge and skills, their attitudes toward learning, and their involvement in organizations and activities that may potentially shape the nature of their personality and skill development, such as 4-H and/or FFA. Process variables describe the interaction of teacher and learner behaviors in the teaching-learning process. Examples include institutional activities and programs that support teacher-student or student-student interactions, such as learning communities. Finally, product variables include the knowledge and skills gained or attitudes modified as a result of teaching and learning.

Involvement in agricultural youth organizations such as FFA and 4-H are important context variables that have been shown to influence educational outcomes such as student achievement, skill attainment, and even student retention in colleges (Dyer & Breja, 1999; Dyer, et al, 1996). At an ever-increasing rate, students who enter colleges of agriculture are deficient in agricultural experience (Dyer, et al, 1996; Scofield, 1995). Dyer, Lacey, and Osborne noted that colleges of agriculture could select students with the next best thing: experience in high school agriculture classes, 4-H, and FFA. Participation in 4-H and FFA was shown to influence the outcomes of achievement and life skill development (Fleming-McCormick & Tushnet, 1997; Junge, 1994; Pruckno & Miller, 1987; Seevers & Dormody, 1994; Thomas & Ladewig, 1985). Another important influence on the products of teaching and learning is the educational setting or the academic institution in the teaching and learning process. Not all learning takes place in the classroom. Institutions of higher education nationwide have developed the concept of learning communities in response to the current needs for enhanced academic performance, as well as improved rates of student retention (Hill, 1990; University of Missouri, 1996). Lenning and Ebbers (1999) defined learning communities as small subgroups of learners organized by common purpose and mode of interaction.

Learning communities are organized in a variety of approaches, such as freshmen interest groups, learning clusters, federated learning communities, and coordinated studies communities (Lenning & Ebbers, 1999; Tinto & Goodsell, 1994). Organized as clusters of students with common characteristics, similar academic interests, enrolled in similar courses, and living together in a residence hall, Freshman Interest Groups (FIGs) in particular have been noted to increase students' levels of academic performance and retention in postsecondary institutions (Hill, 1985; Lenning & Ebbers, 1999; Pike, 1999; Tinto & Goodsell, 1994; University of Missouri, 1996). Pike, Schreoder, and Barry (1997) concluded that student involvement in residential learning communities improved educational outcomes by fostering increased levels of student-student and faculty-student interactions, as well as enhanced student involvement in coursework. While a strong literature base supports FIGs as enhancing the outcomes of teaching and learning, research involving FIG participation among college of agriculture students is lacking. Specifically, can involvement in FIGs be utilized as a process variable to predict the product variables of student achievement and student retention in colleges of agriculture?

The current literature base is helpful in identifying context variables that can serve as predictors of student retention or life skill attainment. However, little research exists regarding the effectiveness of those context and process variables, specific to agriculture students, in predicting students' academic performance, specifically at the college level. Can selected context

variables (4-H or FFA involvement) be a distinguishing characteristic on the academic performance and retention of students in colleges of agriculture?

By targeting specific variables that have the potential to enhance academic performance and student retention, colleges of agriculture have an opportunity to shape the changing face of agriculture, just as they have shaped scientific advancements and management practices in the past. While the population in the U.S. is on the rise, the population of individuals possessing experience with or a background in agricultural endeavors is in rapid decline (NRC, 1995). Colleges of agriculture across the nation must find ways to respond to the challenges of a population and a workforce in the midst of an agricultural "brain drain." Consequently, a research base is needed to identify characteristics that can be used in predicting the academic performance and retention of students in colleges of agriculture.

Purpose and Objectives

The purpose of this study was to compare the influence of participation in Freshmen Interest Groups (FIGs) and involvement in agricultural youth organizations (4-H/FFA) on academic performance and retention of freshmen in the College of Agriculture, Food and Natural Resources (CAFNR) at the University of Missouri. The following research questions were used to guide the study:

1. Did college of agriculture students who participated in a Freshmen Interest Group (FIG) have greater academic success than those students who did not participate in a FIG?
2. Did college of agriculture students who participated in agriculture youth organizations (FFA and/or 4-H) have greater academic success than students who did not participate in agricultural youth organizations?
3. Did college of agriculture students who participated in a Freshmen Interest Group (FIG) have a greater chance of returning for their sophomore year than students who did not participate in a FIG?
4. Did college of agriculture students who participated in agriculture youth organizations (FFA and/or 4-H) have a greater chance of returning for their sophomore year than students who did not participate in agriculture youth organizations?

For the purpose of statistical analysis, the research questions were posed as null hypotheses.

HO₁: There was no difference in the academic performance of students who participated in a FIG and those who did not participate in a FIG, when controlling for the variance associated with ACT score.

HO₂: There was no difference in the academic performance of students who had prior involvement in agricultural youth organizations and those who did not have prior involvement in agricultural youth organizations, when controlling for the variance associated with ACT score.

HO₃: There was no difference in the retention of students who participated in a FIG and those who did not participate in a FIG.

HO₄: There was no difference in the retention of students who had prior involvement in agricultural youth organizations and those who did not have prior involvement in agricultural youth organizations.

Procedures

The target population for this ex post facto study was freshman entering the College of Agriculture, Food and Natural Resources at the University of Missouri in the Fall Semesters of 1997 and 1998 ($N = 664$). The accessible sample consisted of intact groups of freshmen enrolled in a college learning and development course during those semesters ($n = 442$).

Involvement in a Freshman Interest Group (FIG) consisted of approximately 20 students living in the same residence hall. Participation requirements included concurrent enrollment in at least three courses and a weekly Proseminar led by a junior or senior student serving as a Peer Advisor. Participation in agricultural youth organizations was determined by students' prior enrollment in either FFA and/or 4-H at the high school level.

Analysis of Data

Students' academic performance was measured by their cumulative grade point at the completion of the freshmen academic year. Retention was based on enrollment status at the beginning of the first semester of the sophomore year. Descriptive statistics were generated for composite ACT score as well as cumulative GPA at the completion of the freshmen year. Values for cumulative GPA, composite ACT, and enrollment status were collected from a university database. Research hypotheses one and two were analyzed using analysis of covariance (ANCOVA). An ANCOVA procedure was used because there were between group differences of ACT scores. Research hypotheses three and four were tested using the Chi Square test for association. An alpha level of .05 was established a priori for all statistical tests.

Results

The mean cumulative GPA for students who participated in a FIG was 2.9, whereas the mean cumulative GPA for students who did not participate in a FIG was 2.7 (Table 1). Furthermore, the mean composite ACT score for students who participated in a FIG was 25.7, whereas the mean ACT score for students who did not participate in a FIG was 23.8.

The first null hypothesis was developed to ascertain if there was a difference in the academic success of students who participated or did not participate in a Freshmen Interest Group (FIG). The results of the analysis of covariance (ANCOVA) procedure are reported in Table 2. The main effect, participation in a FIG, did not produce a significant difference in students' academic performance when controlling for the influence on academic performance associated with ACT score. Therefore, the first null hypothesis asserting that there were no

differences in academic performance between students who participated in a FIG and students who did not participate in a FIG was not rejected.

Table 1. Descriptive Data for Academic Performance and ACT Score for Freshmen Interest Group (FIG) Participation

	<u>Participated (n=123)</u>			<u>Did Not Participate (n=306)</u>		
	<u>M</u>	<u>SD</u>	<u>Range</u>	<u>M</u>	<u>SD</u>	<u>Range</u>
Cumulative GPA	2.9	.8	.6-4.1	2.7	.7	.3-4.0
ACT score (covariate)	25.7	3.6	18-33	23.8	4.0	15-34

Table 2. Analysis of Covariance of FIG Participation by ACT Score

<u>Source</u>	<u>df</u>	<u>MS</u>	<u>F</u>	<u>p</u>
Intercept	1	7.50	17.92	.00
Covariate (ACT score)	1	40.52	96.84	.00
Main effect (FIG participation)	1	5.87	.01	.97
Error	422	.42		

The mean cumulative GPA of students who had been involved in an agricultural youth organization was 3.1, whereas the mean cumulative GPA of students who had not been involved in an agriculture youth organization was 2.6 (Table 3). The mean composite ACT score for students who participated in agricultural youth organizations was 25.4, whereas the mean composite ACT score for students who did not participate in an agriculture youth organization was 23.7.

The second null hypothesis was developed to ascertain if there was a difference in the academic success of students who had or did not have prior involvement in agricultural youth organizations. The results of the ANCOVA procedure are reported in Table 4. The main effect, involvement in agricultural youth organizations (FFA and/or 4-H), produced a significant difference in students' academic performance when controlling for the variance associated with ACT score. Therefore, the second null hypothesis asserting that there was no difference between the performance of students who were involved in agricultural youth organizations and students who were not involved in agricultural youth organizations was rejected.

Table 3. Descriptive Data for Academic Performance and ACT Score by Involvement in Agricultural Youth Organizations

	<u>Involved (n=158)</u>			<u>Not involved (n=271)</u>		
	<u>M</u>	<u>SD</u>	<u>Range</u>	<u>M</u>	<u>SD</u>	<u>Range</u>
Cumulative GPA	3.1	.6	.9-4.1	2.6	.7	.3-4.1
ACT score (covariate)	25.4	3.8	17.0-34.0	23.7	4.0	15.0-33.0

Table 4. Analysis of Covariance of Involvement in Agricultural Youth Organizations by ACT Score

Source	df	MS	F	p
Intercept	1	12.28	30.92	.00
Covariate (ACT score)	1	33.06	83.25	.00
Main effect (Ag Youth participation)	1	9.02	22.71	.00
Error	422	.40		

The third null hypothesis sought to determine if a difference existed in the retention of students who participated in a FIG versus those who did not participate. Results of the Chi Square test of association are presented in Table 5. Of the 317 freshmen who did not participate in a FIG, 43 did not enroll for their sophomore year. Regarding the 125 freshmen who participated in a FIG, 12 did not enroll for their sophomore year. Pearson's Chi Square yielded a value of 1.29, which was not significant ($p=.255$). Thus, the third null hypothesis asserting that there were no differences in retention between students who participated in a FIG and students who did not participate in a FIG was not rejected.

The fourth null hypothesis sought to determine if a difference existed in the retention of students who did or did not have prior involvement in agricultural youth organizations. Results of the Chi Square test of association are presented in Table 6. Of the 284 students who did not have prior involvement in an agricultural youth organization, 46 did not return fall of their sophomore year. Of the 158 freshmen that had been involved in an agricultural youth organization, nine did not enroll for their sophomore year. Pearson's Chi Square yielded a value of 10.73, which was significant ($p = .001$). Thus, the fourth null hypothesis asserting that there were no differences in retention between students who were involved in agricultural youth organizations and students who were not involved in agricultural youth organizations was rejected.

Table 5. Contingency Table by Retention and FIG Participation

	<u>Retained for Sophomore Academic Year</u>		Total
	No	Yes	
Did Not Participate in a FIG	43 (13.6%)	274 (86.4%)	317
Participated in a FIG	12 (12.4%)	113 (90.4%)	125
Total	55 (12.4%)	387 (87.6%)	442

$$\chi^2 (1, N=442) = 1.29, p > .05$$

Conclusions and/or Recommendations

Students who participated in Freshmen Interest Groups (FIGs), while not markedly different in performance measures associated with cumulative GPA, did possess slightly higher ACT scores than those who did not participate in a FIG. When utilizing ACT scores as a

covariate to equate the two groups on performance measures, participation in a FIG was not found to be a significant process variable in its influence on academic performance. Additionally, participation in a FIG was not found to possess a significant association with retention for the sophomore year. This finding contradicts prior studies (Hill, 1985; Lenning & Ebbers, 1999; Pike, 1999; Tinto & Goodsell, 1994; University of Missouri, 1996) indicating the positive influences of FIG participation on a student's academic performance and retention at the postsecondary level. While research has pointed toward FIGs as an effective solution for increasing students' retention and academic performance across universities as a whole, college of agriculture students may not experience the effects of FIG participation as immediately as do students in other colleges. Further quantitative as well as qualitative research is needed to determine the direct effects of FIG participation specific to college of agriculture students.

Table 6. Contingency Table by Retention and Agriculture Youth Organization Participation

	Students Retained for Sophomore Enrollment		
	No	Yes	Total
Not Involved in Ag Youth Organizations	46 (16.2%)	238 (83.8%)	284
Involved in Ag Youth Organizations	9 (5.7%)	149 (94.3%)	158
Total	55 (12.4%)	387 (87.6%)	442

$$\chi^2 (1, N=442) = 10.28, p < .05$$

Students who were involved in agricultural youth organizations possessed important differences in performance measures associated with cumulative GPA. This finding is consistent with Dyer et al. (1996). The practical implications of this difference form striking distinctions between those who are selected and those who are excluded from college admission and/or scholarships based upon cumulative GPA. In addition, students who were involved in agricultural youth organizations scored approximately two points higher on the ACT. Yet, when utilizing ACT score as a covariate to equate the groups on performance measures, involvement in agricultural youth organizations was still found to have a significant influence on cumulative GPA.

Additionally, involvement in agricultural youth organizations was found to have a significant association with retention for the sophomore year. This finding was consistent with previous research indicating the influence of involvement in FFA and 4-H as an important indicator for retention in a college of agriculture (Dyer et al., 1996; Dyer & Breja, 1999). Thus, prior experiences such as involvement in agricultural youth organizations, can serve as significant context variables in their influence on the product variable of academic performance and retention in a college of agriculture. The implications of this finding are twofold. First colleges of agriculture, in order to ensure the success of their students, should continue efforts to recruit individuals with prior experiences in agricultural youth organizations. Finally, colleges of agriculture should continue to train quality individuals in the fields of agricultural and extension

education in order to maintain a quality pool of FFA chapters and 4-H clubs from where future college of agriculture students may be selected. Continued quantitative and qualitative studies are warranted in order to further indicate presage, context, and process variables that can enhance the products of student achievement and retention in colleges of agriculture.

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