

Relationship of Supervised Agricultural Experience Program Participation and Student Achievement in Agricultural Education¹

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The value of experiential learning in agricultural education has long been recognized as an important part of the educational process. Through practice and experience students apply what they have learned in real situations, thus the material becomes understandable and usable. Moreover, in the process of gaining experience, new problems and situations arise causing learners to seek additional information and new ways of applying what they have learned.

Experience provides relevance to the educational process. Dewey (1916) stated, "An ounce of experience is better than a tone of theory simply because it is only in experience that any theory has a vital and verifiable significance" (p. 109). Dale (1946) used the "Cone of Experience" to explain the inter-relationships of various learning experiences to their abstractness or directness. He classified the "doing" experiences as direct experiences, contrived experiences, and dramatic participation and indicated these experiences were the "bed-rock" of all education.

When using experiential learning, students must practice in real situations, model appropriate behaviors and procedures, and receive appropriate feedback and reinforcement. Also, there should be a lapse of time between practices so students are put in a situation where they must think as they apply their knowledge to various situations.

Supervised agricultural experiences (SAE) in agricultural education programs incorporate experiential learning and direct application of

knowledge into the students' curriculum to enhance learning. The SAE program is an essential part of the agricultural education program which consists of three integral components: classroom instruction, supervised agricultural experiences, and participation in the FFA. Agricultural education has always emphasized the "learning by doing" theory. This theory is exemplified in the SAE program. SAE gives the student the chance to utilize the principles learned in class and apply them to real life situations.

Relatively few studies have been conducted to investigate the relationship between supervised agricultural experience participation and student achievement. Morton (1978) and Noxel and Cheek (1988) concluded there was a positive significant relationship between the scope of a student's SAE program and achievement in agricultural classes. Potter (1984), who studied handicapped students mainstreamed into agricultural education programs, and Tylke and Arrington (1988) did not find a positive relationship between SAE scope and student achievement. In 1990, Arrington and Cheek examined the relationship once more and discovered a significant positive relationship between SAE scope and student achievement for students in the tenth grade but not for students in the ninth grade.

This study was undertaken to provide additional research evidence about the relationship between SAE and student achievement in agricultural education. A comprehensive study of

¹*This research was conducted as part of Project FLA-AEE-02496 of the Florida Agricultural Experiment Station, Institute of Food and Agricultural Sciences, University of Florida, Gainesville, Florida. Journal Series Number R02180.*

the literature revealed the following variables were FFA involvement (Arrington & Cheek, 1990; Cheek & McGhee, 1985; Long & Israelsen, 1983; McGhee & Cheek, 1983; Noxel & Cheek, 1988; Potter, 1984; Smith, 1983; Tylke & Arrington, 1988); student interest in agriculture (Arrington & Cheek, 1990; Christensen, 1964; Neavill, 1973; Noxel & Cheek, 1988; Sjoberg, 1984; Tylke & Arrington, 1988); and years previously enrolled in agricultural education (Arrington & Cheek, 1990). Socioeconomic status had not been used as a variable in previous studies of this type, but a review of literature indicated it is related to student achievement (Coleman, 1940, Morgan, 1979), and was added as an independent variable in this study.

Purpose and Objectives

The primary purpose of this study was to investigate the relationship between supervised agricultural experience program scope and student achievement in agriscience, which included agricultural education courses in the tenth through twelfth grades. The primary research hypothesis stated that there was a positive relationship between student achievement scores and SAE participation. In addition, the alternative hypothesis stated that there was a positive relationship between achievement scores and the following independent variables: FFA involvement, student interest in agriculture, years previously enrolled in agriscience, and socioeconomic status.

Procedures

Design

The design of this study was ex-post facto since the independent variables had already occurred, and the research began by studying the dependent variable. As suggested by Kerlinger (1964), rival hypotheses were stated before collecting data and then tested along with the major hypothesis.

Population and Sample

The population consisted of public high school classes of agriscience throughout Florida. A purposive sample of twenty-one high schools in Florida, which taught agricultural education classes, were selected. Of these schools, teachers from fourteen schools returned complete data which could be utilized in this study. The schools

were situated in counties containing both rural and urban areas. Areas of study included animal and plant science, ornamental horticulture, and agricultural mechanics. The primary criteria for selecting schools for the study was that each school was recognized as having a comprehensive SAE program for students and that the teacher utilized a written final examination.

Instrumentation

Three data sources were utilized in the study (teacher questionnaire, student questionnaire, and final examination). The variable, SAE participation, was quantified utilizing information collected from teacher and student questionnaires. Each student supplied the following SAE data: description of SAE activities, size and scope of SAE, and SAE income generated. Using a formula utilized in previous studies (Noxel & Cheek, and Tylke & Arrington) an SAE score was computed for each student.

To improve the validity and reliability of the SAE measurement, a teacher rating of each student's SAE was combined with the computed score. Teachers were instructed to rate SAE participation on a fifty-point scale. To insure reliability, teachers were provided with descriptors to assist in arriving at a rating for each student. Ratings could range from zero (No SAE or inappropriate SAE) to fifty (appropriate SAE, broad scope, much involvement, or good records).

For the variable, FFA involvement, a similar procedure was utilized combining student and teacher assessments. Each student provided information on specific FFA activities in which (s)he had participated during the previous year. Also, teachers rated student FFA involvement. As with SAE, teachers were instructed to rate SAE participation on a fifty-point scale and descriptors were provided to improve reliability. Ratings could range from zero (not a member or only paid dues) to fifty (attended meetings and participated in local, county, and state activities).

The student questionnaire collected information on two additional variables, socioeconomic status and interest in agriculture. For the variable, socioeconomic status, each student indicated parental occupations and the researchers rated them from high (professional occupations) to low (laborer, unskilled, or

employed). Student interest in agriculture was quantified by summing three Likert scale questions.

Previous SAE studies (Arrington & Cheek, 1990; Noxel & Cheek, 1988; and Tylke & Arrington, 1988) used standardized tests to measure student achievement. To provide a different approach to measuring student achievement, student achievement was measured by the final examination developed and administered by the teacher. One limitation of this study was the researchers' inability to determine the reliability of the tests since they were "teacher-made." The examination was designed to measure what students had learned in agriculture during the year. From the teachers' perspectives, each examination had content validity.

Data Analysis

Data were obtained from 537 students. Descriptive statistics were calculated to illustrate the characteristics of the sample in respect to the variables. Pearson product moment correlation coefficients were calculated to determine which independent variables were significantly related to the dependent variable at the $p < .05$ level. Step-wise multiple regression analysis was also used to enter each independent variable into the multiple regression equation. This analysis partials out the effects of a single variable at each step, while other variables were statistically controlled.

Results

A student's achievement score was based on the score received on the teacher-made final examination which contained material taught throughout the school year in the specific agriscience class in which the student was enrolled. The scores on the final exams ranged from 14 to 96. The mean score was 83, and the standard deviation was 13.19.

Table 1 summarizes the SAE scope scores. The scores ranged from 0 to 50. The mean value was 24.18, and the standard deviation was 15.65.

Students provided information regarding their FFA participation by responding to questions on a questionnaire that determined their FFA involvement. Each answer was assigned a point value, and the teacher was asked to give each

Table 1. Summary Statistics for Supervised Agricultural Experience Participation Scores

SAE Participation Scores	N	%	Cum. %
0-10	123	22.9	22.9
11-20	95	17.7	40.6
21-30	128	23.8	64.4
31-40	116	21.6	86.0
41-50	75	14.0	100.0
Total	537	100.0	100.0

SD=15.65

M=24.18

student a rating from 0 to 50 which best described the student's FFA involvement. The total points from the questionnaire and the teacher rating were incorporated into a final FFA participation score by a professional evaluator in order to standardize scores and eliminate teacher bias. The FFA involvement scores ranged from 0 to 50. The mean score was 22.13, and the standard deviation was 15.87.

Three questions on the questionnaire assessed student interest in agriculture and interest in pursuing a career in agriculture. These questions were scored using a Likert Scale, each offering five possible answers, with point values ranging from 1 to 5. The point values were then summed to arrive at an interest score for each student. The scores ranged from 3 to 15, with a mean of 11.81 and a standard deviation of 2.37. Sixty percent of the students had an interest score of 11 or higher indicating that the majority of students enjoyed their agriculture class, were very interested in agriculture, and were likely to pursue a career in agriculture.

Socioeconomic status was determined by the researchers, using the parents' occupations and educational levels. Students were grouped into one of three socioeconomic groups: low, intermediate, and high. Of the 535 students who responded to this question, 25.6 percent were classified in the low category, 61.7 percent were classified in the intermediate category, and 12.7 percent were classified as coming from a high socioeconomic background.

Pearson product moment correlation coefficients were calculated for all possible pairs of

the variables. The results of this analysis can be found in Table 2. The Pearson correlation analysis revealed a significant, positive relationship between the dependent variable of student achievement and all of the independent variables: SAE involvement (.33), FFA participation (.42), interest in agriculture (.28), years enrolled in agriscience (.14), and socioeconomic status (.12).

Table 2. Pearson Product Moment Correlation Coefficients for the Variables

	X ¹	X ²	X ³	X ⁴	X ⁵
X ²	.33*				
X ³	.42*	.64*			
X ⁴	.28*	.44*	.51*		
X ⁵	.12*	.15*	.19*	.16*	
X ⁶	.14*	.28*	.29*	.20*	.02*

X¹=Achievement

X²=Supervised Agricultural Experience Participation

X³=Future Farmers of America Involvement

X⁴=Student Interest in Agriculture

X⁵=Socioeconomic Status

X⁶=Years Enrolled in Agriculture

*=p<.05

Step-wise multiple regression analysis was used to enter each independent variable into the multiple regression equation. This analysis partials out the effects of a single variable at each step, while other variables are statistically controlled. Table 3 summarizes the multiple regression analysis.

Table 3. Step-Wise Multiple Regression of the Independent Variables on Achievement in Agriscience Classes

Variable	R ²	F	Prob.
FFA	.1731	96.7204	0.0001
SAE	.0047	2.6311	0.1055

Conclusions

Based on the findings of this investigation, the following conclusions were drawn:

The primary research hypothesis that supervised agricultural experience program participation is positively related to student achievement in agriscience was accepted. A moderate correlation was found between SAE

participation and student achievement. FFA involvement and SAE scope were highly correlated (R=.638). SAE participation was not significant in explaining a significant portion of the variance in student achievement when step-wise multiple regression was calculated.

FFA involvement was shown to be significantly related to student achievement in agriscience and explained 17.31 percent of the variance in student achievement in this study as determined by a step-wise multiple regression.

Student interest in agriculture, socioeconomic status, and number of years in agriscience were shown to be significantly related to student achievement in agriscience, but when entered into the step-wise regression equation did not explain a significant part of the variance in student achievement.

Recommendations

Teachers should encourage students and devise strategies to encourage students to actively participate in FFA and SAE.

Work needs to continue on developing more accurate measures of SAE participation that is more standardized to compensate for differences in teacher evaluation measurements.

FFA appears to be related to several of the other independent variables. Further research needs to be conducted examining FFA and its inter-relatedness with various other variables.

Further research needs to be conducted to further explain and clarify the role SAE and FFA play in student achievement. This research and similar studies indicate that SAE and FFA are related and both are related to student achievement. The question remains, do high achievers participate more in SAE and FFA, or does participation in SAE and FFA improve achievement?

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