

**The Relationship of Supervised Agricultural Experience
Program Participation and Student Achievement
in Practical Skills in Agricultural Science***

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Experiential learning is interwoven into the very fabric of agricultural education. The value of experiential learning in agricultural education has long been recognized as an important part of the educational process. The reason for this is that through practice and experience students apply what they have learned in real situations, thus the material becomes understandable and usable. Dewey (1916) stated: "an ounce of experience is better than a ton 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 inter-relationships of various learning experiences to abstractness of directness. He classified the "doing" experiences as direct experiences, contrived experiences, and dramatic participation and indicated that these experiences were the "bed-rock" of all education.

The supervised agricultural experience program is an essential part of the secondary agricultural education program which consists of three integral components: classroom instruction, supervised agricultural experience, and participation in the FFA. The supervised agricultural experience program has been the component of the program that emphasizes the "learning by doing" theory. SAE gives the student the chance to utilize the principles learned in class and apply them to real life situations.

Five studies were identified that have investigated the relationship between supervised agricultural experience scope and student achievement. Morton (1978) and Noxel and Cheek (1988) concluded that there was a positive significant relationship between the scope of a student's SAE program and achievement in agriculture class. Potter (1984), who studied handicapped students mainstreamed into agriculture programs and Tylke and Arrington (1988), did not find a positive relationship between SAE scope and student achievement. In 1990, Arrington and Cheek examined this relationship once more and discovered that there was 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 attempt to reconcile conflicts in previous studies. A comprehensive review of the literature revealed that the following variables were related to student achievement, along with SAE involvement, and were examined in this study: FFA involvement (Arrington & Cheek, 1990; Cheek & McGhee, 1985; Long & Israelson, 1983; McGhee & Cheek, 1983; Noxel & Cheek, 1988; Potter, 1984; Smith, 1983; Tylke & Arrington, 1988); grade point average (Arrington & Cheek, 1990; Christensen, 1964; Morton, 1978); and student interest in agriculture (Arrington & Cheek, 1990; Christensen, 1964; Neavill, 1973; Noxel & Cheek, 1988; Sjoberg, 1984; Tylke & Arrington, 1988). Socioeconomic status had not been used as a variable in previous studies of this type, but a review of literature found it to be related to student

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achievement (Coleman, 1940; Lindholm & Rich, 1987; Morgan, 1979) Three variables, years previously enrolled in vocational agriculture, parental involvement and expectations, and teacher effectiveness were studied in previous studies (Noxel & Cheek, 1988; Tylke & Arrington, 1988; and Arrington & Cheek, 1990), but were excluded from this study. None of the three had been significant in explaining variance in student achievement.

Purpose and Objectives

The primary purpose of this study was to investigate the relationship between participation in a supervised agricultural experience program and student achievement in Practical Skills in Agricultural Science, the ninth grade agricultural education class in Florida.

The primary research hypothesis stated that there was a positive relationship between achievement gain scores and participation in a SAE program. Alternative hypotheses stated that there was a positive relationship between achievement gain scores and the following independent variables: FFA involvement, student grade point average, student interest in agriculture and socioeconomic status.

Procedures

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. Pearson product moment correlation coefficients and stepwise multiple regression were used to test the hypotheses.

The population for the study consisted of public high school and junior high school classes of Practical Skills in Agricultural Science in Polk County, Florida. A purposive sample of ten of the thirteen schools in Polk County which teach the ninth grade agricultural education class were selected. All ninth grade agriculture students in these schools were studied. Polk county is located in central Florida and is a county consisting of both rural agricultural and urban areas. The major agricultural industries in the county are citrus production, cattle production, and ornamental horticulture.

The student achievement instrument items were selected from a test bank developed in 1983 (McGhee & Cheek, 1983). This test bank offered criterion-referenced test items in the major cognitive areas covered by the Practical Skills in Agricultural Science class. The test items were field tested and then analyzed for item difficulty, item discrimination, and point biserial correlation. A Kuder-Richardson 20 was calculated for reliability in each subject area and the results were as follows: animal science, .94; agricultural mechanics, .95; leadership, .58; plant science, .86; agribusiness management, .65; and soil science, .79 (McGhee & Cheek, 1983).

Fifty test questions for the achievement test were selected from this test bank based on the Florida Department of Vocational Education Student Performance Standards for Practical Skills in Agricultural Science. Kuder-Richardson Reliability for the pretest was .66 and .80 for the posttest.

Two sources of information were used to determine the extent of participation in SAE: students provided information on their SAE and teacher ratings of SAE participation. Each student supplied the following data: description or name of SAE, size of SAE, and income generated. Productive Man Work Units which had been used in previous studies to calculate program scope (McMillion & Auville, 1976; Morton, 1978; Arrington 1981; Noxel & Cheek, 1988; Tylke & Arrington, 1988; and Arrington & Cheek, 1990) were used to translate the information into the following formula to calculate SAE scope:

$$\frac{I + \text{PMWUs} + \text{Teacher Rating}}{20 + 2}$$

I = Income

PMWU = Productive Man Work Unit, which is defined as the amount of work accomplished by one person in a ten hour day with typical levels of production practices and equipment.

The teachers were given a guide to follow when rating the students. Their ratings could range from zero [no SAE or inappropriate (nonag) SAE] to 50 (appropriate SAE, broad scope, much involvement, good records). This rating was included to help the researcher get a more accurate portrayal of the scope of the student's project. All SAE information was collected at the end of the school year. Teacher ratings and calculated SAE scores were combined to arrive at a final SAE rating.

A second questionnaire was developed by the researchers to collect data from the students pertaining to the following variables: FFA involvement, student interest in agriculture, and socioeconomic status. Both questionnaires were field tested and revised for clarity.

Data was calculated for a final sample of 149 students, and descriptive statistics were conducted to illustrate the characteristics of the sample in respect to the variables. Pearson product moment correlation coefficients were calculated to determine which of the independent variables were significantly related to the dependent variable at the $p < .05$ level.

Results

The students were given a pretest at the beginning of the school year and an identical posttest eight months later. Student achievement was measured by subtracting the pretest score from the posttest score, and labelling the difference as the gain score, or achievement. The gain scores on the achievement test ranged from -26 to 56. The mean gain score was 9.3, the median gain score was 8.0, the mode was 2.0, and the standard deviation was 13.93.

Table 1 summarizes the SAE scope scores. The scores ranged from 0.2 to 227.2. The mean value was 25.81, the median was 14.8, the mode was 14.3, and the standard deviation was 32.99.

Students provided information regarding their FFA participation by responding to questions on a questionnaire that determined their participation in a variety of FFA activities. Each activity was assigned a point value, and the teacher was asked to give

each student a rating from 0-50 which best described their FFA involvement. Both the total points from the questionnaire and the teacher rating were incorporated into the following formula to arrive at the FFA score for each student:

$$\text{FFA Participation} = (\text{Total points} \times 4) + \text{Teacher Rating}$$

The FFA involvement scores ranged from 0 to 110. The mean score was 37.95, the median was 32.0, the mode 0, and the standard deviation was 29.10.

Three questions on the questionnaire assessed the student's interest 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 11.07, a median of 11, and a mode of 11. The standard deviation was 2.83. Sixty-three 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.

To determine grade point average, the students were given a listing of possible letter grade averages, and were asked to circle the grade they believed was most indicative of their average for all their classes that year. The researcher assigned a number value to the letter grades based on a 4.0 scale. The minimum grade point average was 0.0 and the maximum was 4.0. The mean was calculated to be 2.4, the median 2.3, the mode 2.0, and the standard deviation 0.78.

Socioeconomic status was determined by the researcher, using the parents' occupation and educational level. Students were grouped into one of three socioeconomic groups, low, medium, and high. Of the 143 students who responded to this question, 25.2 percent were classified in the low category, 54.5 percent were classified in the medium category, and 20.3 percent were classified as coming from a high socioeconomic background.

Table 1. Frequency and Summary Statistics for Supervised Agricultural Experience Scope

| SAE scope | Frequencies | Percent | Cumulative percent |
|---|-------------|---------|--------------------|
| .2-10.3 | 38 | 25.5 | 25.5 |
| 10.4-14.8 | 37 | 24.8 | 50.3 |
| 14.9-29.0 | 37 | 24.8 | 75.2 |
| 29.3-227.2 | 37 | 24.8 | 100.0 |
| Total | 149 | 99.9 | |
| Mean = 25.8; Standard Deviation=32.9; Median=14.8; Mode=14.3. | | | |

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 low, positive relationship between the dependent variable --student achievement, and one independent variable--grade point average. All other variables in the study, SAE scope, FFA involvement, interest in agriculture, and socioeconomic status were not related to student achievement in Practical Skills in Agricultural Science, the dependent variable voiding the need for the step-wise multiple regression analysis.

Table 2. Pearson Product Moment Correlation Coefficients for the Variables

| Variable ^a | ACH | SAE | FFA | INT | GPS | SES |
|-------------------------|-------|-------|-------|-------|------|-----|
| Achievement | ---- | | | | | |
| SAE Scope | .082 | --- | | | | |
| FFA Involvement | .014 | .433* | --- | | | |
| Interest in Agriculture | -.003 | .203* | .462* | --- | | |
| Grade Point Average | .170* | .163* | .216* | -.004 | --- | |
| Socioeconomic Status | .050 | .273* | .350* | .144 | .263 | --- |

^aACH=Achievement; SAE=Supervised Agricultural Experience; FFA=National FFA Organization; INT-Student interest in Agriculture; GPA= Grade Point Average; SES= Socioeconomic Status.

* p<.05.

Conclusions

The following conclusions were drawn:

Supervised agricultural experience scope as measured by a formula using PMWUs and a teacher rating, was not related to student achievement in Practical Skills in Agricultural Science, when achievement was measured by a multiple choice pretest and posttest.

FFA involvement was not related to student achievement in Practical Skills in Agricultural Science.

Student interest in agriculture was not related to student achievement in Practical Skills in Agricultural Science.

Grade point average was positively related to student achievement in Practical Skills in Agricultural Science.

Socioeconomic status was not related to student achievement in Practical Skills in Agricultural Science.

Recommendations

The following recommendations are suggested:

Develop a method to more accurately measure SAE scope that is more adaptable to Florida.

Involve the teachers in the test development process.

Further research needs to be done in this area to investigate the conflicting results between this study and previous studies.

FFA appears to be related to several of the other independent variables. Further research needs to be conducted examining the benefits of FFA, and its relationship to various other variables.

References

- Arrington, L. R. (1981). Relationship of length of vocational agriculture teacher contract to supervised occupational experience program scope and FFA chapter activity level (Doctoral dissertation, The Ohio State University, 1981). Dissertation Abstracts International, 42, 2975A.
- Arrington, L. R., & Cheek, J. G. (1990). SAE scope and student achievement in agribusiness and natural resources education. The Journal of Agricultural Education, 31 (2), 55-61.
- Cheek, J. G., & McGhee, M. B. (1985). Assessment of competencies possessed by students enrolled in applied principles of agribusiness and natural resources education. The Journal of the American Association of Teacher Educators in Agriculture, 24 (4), 55-56.
- Christensen, V. E. (1964). Factors influencing the acquisition and retention of learning in vocational agriculture (Doctoral dissertation, University of Wisconsin, 1964) Dissertation Abstracts International, 25, 2344-A.
- Dale, E. (1946). Audio-visual methods in teaching. New York; The Dryden Press, Inc.
- Dewey, J. (1916). Democracy and education. New York: The MacMillan Company.
- Kerlinger, F. N. (1964). Foundations in behavioral research. New York: Holt, Rhinehart, and Winston, Inc., 359-374.
- McGhee, M. D., & Cheek, J. G. (1983). Competency items for fundamentals of agribusiness and natural resources occupations. Gainesville; University of Florida, Department of Agricultural and Extension Education.
- McMillion, M. B., & Auville, M. K. (1976). Factors associated with the success of supervised occupational experience programs of Virginia high school students. Blacksburg; Virginia Polytechnical Institute and State University. (ERIC Document Reproduction Service No. ED 230 768).
- Morton, R. (1978). The relationship between the quality of supervised occupational experience programs and achievement of students in vocational agriculture (Doctoral dissertation, The Ohio State University, 1978). Dissertation Abstracts International, 39, 4658-A.
- Neavill, A. T. (1973). Criterion-referenced assessment of ninth and tenth grade instruction in agriculture (Doctoral dissertation, The Ohio State University, 1973). Dissertation Abstracts International, 33, 5264-B.
- Noxel, S., & Cheek, J. G. (1988). Relationship of supervised occupational experience scope to student achievement in ornamental horticulture. The Journal of The American Association of Teacher Educators in Agriculture, 29 (4), 24-30.

- Potter, O. B. (1984). Supervised occupational experience programs and achievement of students mainstreamed in Ohio vocational agriculture programs (Doctoral dissertation, The Ohio State University, 1984). Dissertation Abstracts International, 45, 2361-A.
- Tylke, R. J., & Arrington, L. R. (1988). The relationship of supervised occupational experience program scope to student achievement in livestock production. The Journal of the American Association of Teacher Educators in Agriculture, 29 (3), 28-33.