The Relationship of Supervised Occupational Experience Program Scope to Student Achievement in Livestock Production

Roberta J. Tylke, Biological Scientist
Clinical Pathology

Larry R. Arrington, Associate Professor
Agricultural and Extension Education
University of Florida

Accepted for Publication February 1988

Supervised occupational experience (SOE) programs have long been thought to be an effective method of developing skills in vocational agriculture students. Beginning with the original federal legislation for vocational agriculture, the supervised occupational experience program was recognized as a component of the total vocational agriculture program. Teachers typically coordinate SOE programs with local agribusinesses and producers, or students acquire ownership of an agricultural commodity to gain practical experience. SOE programs are excellent examples of the principle of learning by doing, which is an effective method of teaching. However, does the profession have evidence to indicate that students participating in SOE learn more?

Several studies have found a positive relationship between student participation in SOE and various achievement factors (Cheek & McGhee, 1983; Christensen, 1964; Cushman, Hill, & Miller, 1968; McGhee & Cheek, 1983; Neaville, 1973). However, only two studies have investigated the relationship between the quality or scope of students' SOE and their level of achievement.

Morton (1978) found a positive relationship between achievement test scores and (a) quality scores of supervised occupational experience programs, (b) opportunity to engage in experience programs, (c) cumulative grade point average, (d) the number of years in vocational agriculture, and (e) the number of project visits received by students from their instructor in 12 months' time.

In a study of handicapped students in Ohio, Potter (1984) found a positive relationship between student achievement, as measured by the first-semester grade in vocational agriculture, and the total Productive Man Work Unit score for the student's SOE which included in-school and out-of-school projects. When Potter limited the SOE score to out-of-school experiences, he found no significant relationship to student achievement. Other variables which he found to be positively related to student achievement included Future Farmers of America (FFA) involvement and parental encouragement.

More research is needed to determine if SOE is really having an influence on student achievement. Is the SOE program really doing what it is supposed to do for students?

Purpose and Objectives

The primary purpose of this study was to determine the relationship between the scope of SOE, as measured by total Productive Man Work Units (PMWU), and the level of achievement for students enrolled in livestock production in Florida.

Journal of the American Association of Teacher Educators in Agriculture
Volume 29, Number 3, pp.28-34
DOI: 10.5032/jaatea.1988.03028

The primary research hypothesis was as follows:

There is a positive relationship between the scope of an SOE program as measured by PMWUs and the level of achievement on a multiple choice test designed to measure technical knowledge in livestock production.

In addition to the primary hypothesis, six alternate rival hypotheses were considered:

1. There is a positive relationship between cumulative grade point average and the level of achievement on a multiple-choice test designed to measure technical knowledge in livestock production.

2. There is a positive relationship between the amount of parental encouragement a student receives and the level of achievement on a multiple-choice test designed to measure technical knowledge in livestock production.

3. There is a positive relationship between the number of years enrolled in vocational agriculture and the level of achievement on a multiple-choice test designed to measure technical knowledge in livestock production.

4. There is a positive relationship between student involvement in FFA and the level of achievement on a multiple-choice test designed to measure technical knowledge in livestock production.

5. There is a positive relationship between student involvement in agriculture and the level of achievement on a multiple-choice test designed to measure technical knowledge in livestock production.

6. There is a positive relationship between teacher effectiveness as indicated by clarity, variability, enthusiasm, business-like behavior, student opportunity to learn material, and indirectness, and the level of achievement on a multiple-choice test designed to measure technical knowledge in livestock production.

Methodology

The design of this study was ex post facto. The independent variable (SOE scope) had already occurred and the research began with the measurement of the dependent variable. To control for the weaknesses of this design, six rival hypotheses were investigated as recommended by Kerlinger (1964). Each of the rival independent variables was identified through the literature as having an influence on student achievement.

The target population consisted of 13 public high schools offering livestock production in Northeast and Central Florida. A purposive sample of 10 schools was selected to participate in the study. These schools met the criteria which were established by the researchers to facilitate on-site data collection and minimize costs. Northeast Florida schools were rural while Central Florida schools tended to be in larger urban counties. Within each of the schools selected for the primary sample, students who were enrolled in livestock production classes in the 1984-85 school year and still enrolled in vocational agriculture in the 1985-86 school year were tested.

Data were collected from 67 students in the sample of 10 schools. All data were collected through on-site interviews and a written test administered by the researchers. Students absent on the test day were

tested at a later date by their vocational agriculture teacher, and the information was mailed to the researchers. These procedures resulted in a 100% response from students in the 10 schools.

Four instruments were used to collect the data. The first instrument was a 42-item, multiple choice, written test designed to measure technical knowledge in livestock production. Items were selected from a test item bank developed by Maday (1983). These items were developed around the Occupational Performance Standards developed by the State Division of Vocational Education, which represent the minimal competencies students must acquire. Items were field tested in two separate test forms having Kuder-Richardson reliability coefficients of .87 and .90.

The second questionnaire collected information from students relating to the type and scope of their SOE program. To insure valid and reliable data on SOE programs, each questionnaire was completed by the researcher during a personal interview with the student and utilizing SOE record books. A third demographic questionnaire collected information from students related to parental encouragement and expectations, length of enrollment in vocational agriculture, student perceptions of teacher effectiveness, FFA involvement and student interest. The final instrument was a grade point average (GPA) form completed by the guidance counselor at each school. Guidance counselors were instructed to compute GPAs on a four-point scale to help insure reliability.

Results

Characteristics of Livestock Production Students

The mean score on the achievement test was 22.18; the mode was 20; the standard deviation was 5.08; and the lowest score was 10, or 24%. The highest score was 36, or 86%. Roughly one-half (49%) scored higher than 23, or 55%.

The scope scores for supervised occupational experience programs were computed using income and inventory data from the 1984-85 school year. Income was defined as the net income of a student's ownership projects and net receipts from a student placement work experience. A PMWU was defined as the work accomplished by one person in a 10-hour work day with typical levels of production practices and equipment.

The score was calculated according to the formula:

$$S + \frac{I}{100} + \frac{PMWU}{5}$$

S = scope score for the SOE program

I = total income for the 1984-85 school year

PMWU = Estimated Productive Man Work Units for the 1984-85 school year.

Table 1 summarizes findings relative to SOE scope. The mean SOE program scope score was 20.61, the mode was 0.00, the standard deviation was 26.42, and the range was from 0.00 to 131.48. More than 50% of the students scored greater than 11.24. Seventeen students had an SOE score of less than 0.13.

Table 1

Supervised Occupational Experience Program Scope

Scope	N	%	Cumulative %
0.00-0.12	17	25.4	25.4
0.13-11.24	16	23.8	49.2
11.25-26.04	17	25.4	74.6
26.05-131.5	17	25.4	100.0
Total	67	100.0	

The average cumulative GPA for the students was 2.5 or C+. More than 90% of the students had completed three years of vocational agriculture.

Parental encouragement and expectations was determined by asking students to indicate whether they strongly disagreed, disagreed, neither agreed nor disagreed, agreed, or strongly agreed with several value statements about their parents' encouragement and expectations of them. Using a five-point scale, a higher score indicated a higher level of parental encouragement. The mean of 3.84 suggested that most students were receiving encouragement to some extent from their parents.

For FFA involvement, students were asked to respond to questions regarding offices held, attendance at conventions and conferences, and judging team participation. Roughly 30% of the livestock production students had little or no involvement with the FFA, while the remaining 70% had varying degrees of involvement. The wide range of scores (0-30) indicated a high degree of disparity among individual students' participation in FFA. The mean FFA involvement score was 9.19 with a standard deviation of 8.46.

Students were asked to react to a series of statements related to their interest in agriculture. Using a five-point scale, a higher score indicated greater interest. An average of 3.95 and 77% of the students scoring higher than 3.33 indicated that most students were interested to some degree in agriculture.

Student ratings were used to determine teacher effectiveness. Teacher effectiveness scores were calculated by averaging each student's ratings for the six teacher behavior scores identified, yielding one composite rating per student. The possible range of scores was 1 to 5, with a higher score indicating a more effective teacher. Greater than 75% of the students rated their teachers higher than 3.83, while nearly 30% rated their teachers higher than 4.66. The mean rating was 4.24.

Relationships Between the Major Variables

Pearson product moment correlation coefficients and step-wise multiple regression analysis were used to test each of the hypotheses.

Pearson product moment correlation coefficients were computed for all possible pairs of the variables and are presented in Table 2. Using a predetermined decision level of .05, two of the independent variables were positively related to student achievement in livestock production: (a) involvement in the FFA (R = .29), and (b) interest in agriculture (R = .28).

Although these correlation coefficients were significant, their magnitude would be considered low. That is, their ability to predict student achievement is low.

Table 2

Pearson Product Moment Correlation Coefficients for the Major Variables

	TEF	INT	IFFA	YIA	PEE	GPA	SOES
INT	-0.0621						
IFFA	-0.0213	0.2266					
YIA	-0.0516	0.1495	0.1775				
PEE	0.1642	-0.0912	0.0792	0.2165			
GPA	0.1046	-0.0708	0.3234*	0.2822*	0.3092		
SOES	-0.1224	-0.0513	0.3165*	0.2092	0.1826	0.3343*	
ACH	-0.0413	0.2812*	0.2879*	0.1186	0.0580	0.2032	0.1171

Note. TEF = Teacher effectiveness, INT = Student interest in agriculture, IFFA = Involvement in FFA, YIA = Years of enrollment in vocational agriculture, PEE = Parental encouragement and expectations, GPA = Cumulative grade point average, SOES = Supervised occupational experience program scope score, ACH = Student achievement.

*Significant at the $p<.05$ level.

Stepwise 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.

Only one variable, interest in agriculture, was significant ($p<.05$) in explaining variance in student achievement. Interest in agriculture accounted for 6% of the variance in student achievement.

Conclusions

Supervised occupational experience program scope, when measured by PMWUs, was not related to student achievement in livestock production, when achievement was measured by a multiple-choice test of technical knowledge in livestock production.

Cumulative grade point average was not related to student achievement in livestock production, when achievement was measured by a multiple-choice test of technical knowledge in livestock production.

The amount of parental encouragement a student receives was not related to student achievement in livestock production, when achievement was measured by a multiple-choice test of technical knowledge in livestock production.

The number of years a student is enrolled in vocational agriculture was not related to the student's level of achievement in livestock production, when achievement was measured by a multiple-choice test of technical knowledge in livestock production.

Students who were more involved in the FFA tended to have a higher level of achievement in livestock production, when achievement was measured by a multiple-choice test of technical knowledge in livestock production.

Student participation in the FFA was not significantly related to achievement, when the effects of the other independent variables in the study were statistically controlled.

Students who expressed greater interest in agriculture tended to have a higher level of achievement in livestock production, when achievement was measured by a multiple-choice test of technical knowledge in agriculture.

Student interest in agriculture was significantly related to achievement, when the effects of the other independent variables in the study were statistically controlled.

Student ratings of teacher effectiveness were not related to student achievement in livestock production, when achievement was measured by a multiple-choice test of technical knowledge in agriculture.

Recommendations

Further research needs to be conducted to reconcile the conflicting results of this study with previous and concurrent research, concerning not only the dependent and main independent variables but also the other independent variables not found to be related to student achievement in this study. Future studies should investigate additional variables that might explain variance in student achievement, such as opportunity to farm, student ability as measured by methods other than GPA, and the amount of supervision students are receiving with their SOE program.

Student interest in agriculture should be generated and cultivated by any means available to the agricultural education profession. The emphasis should be not only on creating interest in the high-school agriculture classroom but on fostering an interest in agriculture in the future high school student in the elementary and middle school.

Participation in the activities of the FFA, both as a key to stimulating interest and as teaching method, should be encouraged. Low SOE scope scores indicate that efforts must continue to identify and assist with problems teachers are having in implementing SOE. Better measures of supervised occupational experience program quality for all areas of agricultural education need to be developed.

References

Cheek, J. G., & McGhee, M. B. (1983). Competency test items for applied principles of agribusiness and natural resource occupations. Gainesville: University of Florida, Department of Agricultural and Extension Education. (ERIC Document Reproduction Service No. ED 230 769)

Christensen, V. E. (1964). Factors influencing the acquisition and retention of learning in vocational agriculture (Doctoral dissertation, University of Wisconsin). Dissertation Abstracts International, 25, 2344-A.

Cushman, H. R., Hill, C. W., & Miller, J. K. (1968). The development and improvement of directed work experience programs in expanded vocational education offerings in agriculture at the secondary school level (Final report). Ithaca: State University of New York, College of Agriculture at Cornell. (ERIC Document Reproduction Service No. ED 022 911)

Kerlinger, F. N. (1964). Foundations in behavioral research. New York: Holt, Rinehart and Winston.

Maday, J. (1983). Develop and field test written and performance student achievement measures for cattle rancher (Staff study). Gainesville: University of Florida, Department of Agricultural Education.

McGhee, M. B., & Cheek, J. G. (1983). Competency test items for fundamentals of agribusiness and natural resources occupations. Gainesville: University of Florida, Department of Agricultural and Extension Education. (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). Dissertation Abstracts International, 39, 4658-A.

Neaville, A. T. (1973). Criterion-referenced assessment of ninth and tenth grade instruction in agriculture (Doctoral dissertation, The Ohio State University). Dissertation Abstracts International, 33, 5264-B.

Potter, O. B. (1984). Supervised occupational experience programs and achievement of students mainstreamed in Ohio vocational agricultural programs (Doctoral dissertation, The Ohio State University). Dissertation Abstracts International, 45, 23261-A.