

Factors Associated with Knowledge Level Attained by Vocational Agriculture II Students

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Louisiana, as well as the rest of the nation, is experiencing a crisis in education. College entrance test scores, standardized basic achievement test scores and other indicators of educational quality indicate that students have not performed as well as educators and the general public would like.

Since the money being spent on general education may not be producing the desired results, legislators, educators and the general public are asking if expenditures for programs such as vocational agriculture are producing desirable results. In addition, funding agencies need information upon which policy decisions can be based.

A review of the literature revealed that a paucity of research exists in the area of student achievement and competency testing in vocational agriculture programs. Cheek and McGhee (1985) found that students who had SOE projects and who were FFA members scored significantly higher on the Applied Principles of Agribusiness and National Resource Education test they administered. Morton and McCracken (1979) studied the relationship between the quality of a supervised occupational experience (SOE) program (in terms of income and scope of program) and level of academic achievement on a test measuring technical agriculture knowledge in production agriculture. They found that higher quality SOE programs are likely to result in greater learning achievement if the effects of scholastic aptitude, opportunity, year in school and instructor project visits are statistically controlled.

Studies such as these can provide information to determine the merits of existing programs, the need for new programs or the need for revision of existing programs. This study was conducted in an effort to add to existing knowledge in the area of student achievement in vocational agriculture and also because no valid and reliable evaluation of the instructional effectiveness of Louisiana vocational agriculture programs had ever been conducted.

Purpose and Objectives

The purpose of this study was to assess the technical agriculture knowledge level attained by students who had completed Vocational Agriculture II and the factors related to the knowledge attainment level. The objectives were:

1. Determine the technical agriculture knowledge level attained by Vocational Agriculture II students on a criterion-referenced test developed from the state Vocational Agriculture II basic curriculum.
2. Determine if students' scores on the test differed according to selected variables: FFA membership, supervised occupational experience

(SOE) program, economically disadvantaged status, special needs status, and student's race.

3. Determine if the grand means of the students' scores by teacher differed according to selected teacher variables: age, educational level, whether the teacher received additional income from farming, agribusiness or other part-time work and years of teaching experience.

4. Determine to what extent the topics listed in the Louisiana basic curriculum guide were being taught by the teachers in the schools.

Procedure

Two instruments were used in the study. The teacher form consisted of questions designed to secure demographic information and also to determine which of the basic curriculum topics were being taught.

The Vocational Agriculture II test was developed from a test item bank used for the Louisiana literacy rally tests. The instrument used in the study consisted of 52 test items stratified according to the 20 subject matter areas in the Vocational Agriculture II basic curriculum. The test also had a coded area where the teacher could record the demographic information needed for each student prior to removing the student's name from the test.

Both instruments were examined for content validity by six vocational agriculture teachers who were students in a graduate course in vocational agriculture program evaluation and by four vocational agriculture teachers who were not members of the class. The teachers reported that both instruments possessed content validity.

The test was field tested in four schools that had not been selected to participate in the study. The teacher survey form was field tested with the four teachers from the schools that field tested the test plus 11 other teachers who were not in the sample. The field test revealed that revisions in the instruments were not necessary. Test item reliability was measured using the Kuder-Richardson 20 correlation coefficient. A KR-20 value of .84 was calculated on the field test results, and .97 was calculated on the research sample data. These data indicate that the test possessed internal consistency.

The two populations used in the study included all vocational agriculture teachers in Louisiana who taught Vocational Agriculture II during the 1984-1985 school year and the students in their Vocational Agriculture II classes at the time of the study. A sample size of 140 teachers out of the 275 teachers in the state and their Vocational Agriculture II classes were randomly selected based on Cronbach's formula (Snedecor & Cochran, 1980).

A teacher survey form, enough tests for the teachers' Vocational Agriculture II class(es) (based on information from the Louisiana Department of Education), instructions on administering the test and providing the student information, and a return envelope were mailed to the sample. Of the 140 teachers, 118 (84.3%) administered the test and provided the teacher information as requested. The 118 teachers had 1,997 Vocational Agriculture II students in their classes.

The test scores and demographic characteristics of the teachers and students from the first mailing were compared to the test scores and demographic characteristics of the teachers and students whose responses were received after the follow-up mailing. No significant differences

were found. In addition, the 22 teachers who did not return the completed tests and teacher survey were surveyed by phone. Since no significant differences existed between the teacher characteristics of those who had responded and those who had not, it was determined that the non-respondents did not differ from the respondents. As a result of these procedures, it was determined that the respondent groups were representative of the population of teachers and Vocational Agriculture II classes.

Descriptive statistics were used to analyze the data related to objectives 1 and 4. Inferential t-tests and oneway analyses of variance with post hoc Scheffe' tests were used to analyze the data related to objectives 2 and 3. The alpha level for these tests was set at .01 to alleviate the problems associated with multiple t- and F-tests.

Results

Knowledge Attainment

The main score on the 52-item criterion-referenced test was 54.9% with a standard deviation of 16.8. This may be compared to the results of the Cheek and McGhee (1985) study in which they found that Florida students achieved a score of 52.3% on a criterion-referenced test covering information in the Florida curriculum guide.

FFA Membership

Over 82% of the students were FFA members. The analysis of variance and the post hoc Scheffe' test revealed that FFA members who were in the top half of members in FFA participation, as reported by the teacher, scored significantly higher (59.3%) than those students who were in the bottom half in FFA participation (53.4%) and non-members (47.7%). In addition, FFA members in the bottom half in FFA participation scored significantly higher than non-members. The results of the ANOVA are presented in Table 1. Cheek and McGhee (1985) also found that FFA members scored significantly higher than non-members.

Table 1

Analysis of Variance of Student Test Scores by FFA Membership Status

| <u>Mean by FFA Membership Status</u> | | | F-ratio | Prob. of F |
|--------------------------------------|---------------|---------------|---------|------------|
| Top Half | Bottom Half | Non-Member | | |
| 59.3 n=830 | 53.4 n=824 | 47.7 n=328 | 67.3* | .0000 |

Note. Scheffe' post hoc analysis indicated that all pairs of groups differed significantly.

*p<.0001.

Race

Over 71% of the students were white, while 27.4% of the students were black. The t-test revealed that white students scored significantly higher (59.8%) than black students (54.0%) on the test (Table 2). It should be noted that many studies have supported the thesis that social and other life factors account for academic performance differences when the race issue is investigated further (Coleman et al., 1979; Marcus & Stickney, 1981; Smith & Cox, 1976).

Table 2

T-Test (Using Pooled Variance) of Student Test Scores by Race

| Variable | Race | | T-value | Prob. | |
|----------|-------|-------|---------|-------|------|
| | White | Black | | | |
| Race | m | 58.5 | 45.6 | 16.1* | .000 |
| | sd | 15.7 | 16.0 | | |
| | n | 1422 | 547 | | |

*P<.001.

Disadvantaged Status

Over half (53.0%) of the students were reported to be economically disadvantaged by their teachers. The t-test revealed that non-economically disadvantaged students scored significantly higher (58.4%) than economically disadvantaged students (51.9%). The results of the t-test are presented in Table 3.

Special Needs Status

Approximately one-tenth (11.2%) of the students were identified as special needs students. The t-test revealed that non-special students scored significantly higher (55.7%) than the special needs students (48.2%). The t-test results are presented in Table 3.

SOE (Supervised Occupational Experience) Programs

Over two-thirds (69.2%) of the students had SOE programs. The t-test revealed that those students who had SOE programs scored significantly higher (57.0%) than those students who did not have SOE programs (50.3%). The results of the t-test are presented in Table 3. Cheek and McGhee (1985) also found that students who had SOE programs scored significantly higher than students who did not.

Teacher Variables

The grand means of student scores by teacher were analyzed to determine if the grand means varied according to the levels of the teacher variables. The analyses of variance revealed that no

Table 3

T-test (Using Pooled Variance) of Student Test Scores by Selected Variables

| Variable | | Response | | T-value | Prob. |
|-----------------------------------|-----------|----------|------|---------|-------|
| | | Yes | No | | |
| Economically disadvantaged status | <u>m</u> | 51.9 | 58.4 | 8.86* | .000 |
| | <u>sd</u> | 17.4 | 15.3 | | |
| | <u>n</u> | 1059 | 923 | | |
| Special needs status | <u>m</u> | 55.7 | 48.2 | 6.39* | .000 |
| | <u>sd</u> | 16.5 | 17.0 | | |
| | <u>n</u> | 1773 | 223 | | |
| SOE project | <u>m</u> | 57.0 | 50.3 | 8.39* | .000 |
| | <u>sd</u> | 16.8 | 15.6 | | |
| | <u>n</u> | 1362 | 620 | | |

*p<.001.

significant differences existed among the grand means of the students' scores by teacher for five of the teacher variables, namely, age, years of teaching experience, degree, number of teachers in the department and geographic location. In addition, the results of three t-tests revealed that no significant differences existed between the grand means of those teachers who had part-time income from agriculture, agribusiness or non-agricultural sources and those who did not.

Topics Taught

The data indicate that the percent of teachers teaching the 17 topics in the basic curriculum ranged from 42.4% for soil judging to 98.3% for the FFA. Overall, the teachers were teaching 71.8% of the topics in the basic curriculum. These data are presented in Table 4.

Conclusions and Recommendations

1. The data indicated that 71.8% of the topics in the basic curriculum were taught. Since the basic curriculum was designed to be taught in its entirety in all Vocational Agriculture II classes, it is recommended that the state staff analyze the results of this study and either modify the basic curriculum or initiate activities that will result in teachers adhering to the basic curriculum.

2. Since the data indicated that FFA members scored significantly higher than non-members and that students with SOE projects scored significantly higher than students without SOE projects, it is recommended that the state staff emphasize the results of this study in their communications with teachers in an effort to motivate teachers to increase FFA and SOE program participation.

Table 4

Percent of Teachers Teaching Topics in the Basic Curriculum Guide

| | | | |
|---|------|--|------|
| FFA | 98.3 | Livestock breeding | |
| Leadership | 97.5 | principles | 64.4 |
| Orientation to Vo-Ag II | 94.1 | Seed & plant selection | 63.6 |
| Arc welding | 93.2 | Safe use of Chemicals | 61.9 |
| Awards & contests | 87.3 | Soil water | 59.3 |
| Soil fertility/soil fertilization | 81.4 | Insects affecting plants | 55.9 |
| Developing SOE programs | 83.1 | Diseases affecting plants | 53.4 |
| Woodworking | 78.8 | Conserving energy | 53.4 |
| Small engines | 77.1 | Occupational training, placement & advancement | 52.5 |
| Livestock nutrition | 71.2 | Soil judging | 42.4 |
| Soil classification & land use evaluation | 66.9 | | |

3. Researchers in other states should conduct similar studies to provide additional evidence as to the outcomes of vocational agriculture programs.

4. Researchers should consider studying other educational products of the vocational agriculture program, including the affective and psychomotor aspects, in an effort to document program effectiveness.

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