

Vocational Agriculture Program Quality and Factors Influencing Program Quality

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Excellence in vocational education has become a major concern of vocational educators and the general public. The call for excellence has come at a time of rapid social and technological change coupled with fierce competition for public funds. These concerns have placed additional demands on vocational educators to improve program quality (Mckinney, Farley, Smith, Kohan, & Pratzner, 1985). Since vocational agriculture is considered one of the areas within vocational education, the concerns for excellence in vocational agriculture are just as important. Program quality becomes tangible only through measurement of the attributes associated with the vocational agriculture program. A quantitative measure can be placed upon the concept of quality through the evaluation of those characteristics that can be measured in both a valid and reliable manner.

Past research has defined the concept of program quality narrowly as instructional effectiveness and has measured this construct using standardized achievement tests. This approach ignores the variety of school goals and yields measures of school effectiveness that are invalid and unreliable (Rowan, Bossert, & Dwyer, 1983). MacKenzie (1983) presented another view in stating that there is seldom clear agreement on the precise definition of constructs and variables measuring school effectiveness. Vocational agriculture education has attempted to resolve the issue of measuring school effectiveness through the development of program standards suitable for assessing program quality. The Standards for Quality Vocational Programs in Agriculture/Agribusiness? were developed through a series of national meetings of state supervisors, teacher educators and vocational agriculture teachers. The standards were developed by the profession as a whole and have traversed a lengthy process of refinement and validation. These standards were developed by the profession to serve as a model against which all existing agriculture/agribusiness programs and activities can be evaluated.

Many factors have been identified as affecting program quality in vocational agriculture in secondary school systems. Those factors include teacher characteristics (Dunathan, 1980; Murray, 1980), the funding of the program (Johns, Morphet, & Alexander, 1983; Walter, 1986), and characteristics of the school (Eberts, Kehoe, & Stone, 1984). However, few have speculated about the influence of educational supervision in developing program quality in vocational agriculture. Of most recent writing, Foster and Horner (1986) offer that the quality of vocational agriculture in a state reflects the state-level leadership. Barrick (1980) has isolated the role of supervision as program improvement with the ultimate objective of quality programs in vocational agriculture. Barrick, in a national study of state supervision role expectation, found that state supervisors and teachers of vocational agriculture believe that program improvement is a high priority in the realm of the state supervisor job responsibilities.

Purposes and Objectives

There is a need to assess the quality of vocational agriculture programs in the United States. External public pressure on vocational education continually calls for the best programs possible. Within the profession, periodic self-examination can serve to improve present program quality.

This study was designed to answer the following questions:

1. What is the level of program quality in secondary vocational agriculture programs in the United States as measured by the Standards for Quality Vocational Programs in Agriculture and Agribusiness through the perceptions of the teachers of vocational agriculture?

2. What is the relationship between program quality and the following selected program variables?

a. State-level supervision of vocational agriculture education:

1. Duties of the state supervisor
- ii. State level hierarchy for the administration of state level supervision
- i. iii. The state structure of supervision based upon the duties of the state supervisor and the hierarchy for administration as defined by Barrick (1980)

b. Teacher variables:

- i. Degree major at the beginning of the teaching career
- ii. Level of education achieved
- iii. Type of institution granting highest degree
- iv. Recentness of earning highest degree
- v. Years of teaching experience
- vi. Type of responsibility for adult education in agriculture

c. Characteristics of the school:

- i. Type of high school
- ii. Number of teachers in the department
- iii. Number of students in the vocational agriculture program
- iv. Number of students in the high school
- v. Percent of time spent teaching high school vocational agriculture
- vi. Percent of rural, suburban and urban students in vocational agriculture program

d. Fiscal support for the vocational agriculture program:

- i. Vocational agriculture teacher's annual salary based upon the percent of time spent teaching vocational agriculture
- ii. Total level of financial support for instructional materials, new equipment, consumable supplies, travel and inservice

3. What variables account for the variance in program quality?

Procedure

The target population for this study was all high school vocational agriculture programs in the public schools of the United States during the 1986-87 school year. The list of programs came from the 1986 Agriculture Teachers Directory published annually by Smith Publications. To achieve a representative sampling, the formula for estimating sample size developed by Cochran (1977) was used. From a population of 11,750 high school teachers, a sample of 567 was randomly drawn.

The design for this study was correlational. To maximize the strengths and control for the weaknesses in the survey approach to research, Dillman's (1978) Total Design Method was utilized.

An instrument to assess the dependent variable program quality was developed by the researcher based upon the Standards for Quality Programs in Agriculture/Agribusiness Education. The instrument was reviewed by faculty members of the Department of Agricultural Education at The Ohio State University and by the Ohio Agriculture Education Service state supervisory staff to assure content validity. The field test was based on a random sample of vocational agriculture programs not selected to participate in the study and conducted in a manner as close to the final format as possible. Utilizing Cronbach's Alpha reliability ranged from .88 in the area of public relations to .48 in the area of student enrollment, recruitment and counseling.

The instrument was divided into two sections. Part I consisted of 55 items that required the teacher to rate their program in comparison to other vocational agriculture programs in the state. A Likert-type scale was used with 5 equal to excellent in comparison to other programs in the state, 4 equal to much better than other programs in the state, 3 equal to about the same as other programs in the state, 2 equal to not as good as other programs in the state, and 1 representing much worse when compared to other programs in the state. The other 48 statements regarding program quality asked the teacher to indicate if the statement was true for his/her program. A yes response was coded as 5 and the no response was coded as 1.

The instrument also quantified the four categories of independent variables: teacher variables, school characteristics, program funding level and supervisory structure.

Findings

Of the 567 high school vocational agriculture teachers sampled, 394 questionnaires (69%) were returned. Since a comparison of the early and late respondents found no significant difference and since late respondents are similar to non-respondents, generalization can be made to the entire sample (Miller & Smith, 1983).

The average vocational agriculture teacher held a bachelor's degree with a major in agricultural education from a land-grant institution. The teacher had been teaching for 11 years in a single teacher department with 86 students in a comprehensive high school with 177 students per grade. The average high school vocational agriculture program is composed of 51% rural, 28% suburban and 21% urban students. While the average teacher teaches vocational agriculture 90% of the school day, she/he does not work with adults. Only 16% of the teachers work with adults throughout the year. The average salary was \$27,000, and the teacher has approximately \$400 per year for instructional materials, consumables, new equipment, SOEP travel, FFA travel and inservice education.

Total program quality scores ranged from a low of 2.10 to a high of 4.90 on the 5-point scale (see Table 1). The largest proportion of programs (42.13%) scored in the 3.50 to 3.99 range. Only 22 programs (6.18%) scored less than 3.00. A total of 99 programs (24.81%) reported mean quality scores of 4.00 or greater.

Table 1

Vocational Agriculture Program Quality as Perceived by the Vocational Agriculture Teacher

Quality Range ^a	Frequency	Percent
2.00 to 2.49	6	1.69
2.50 to 2.99	85	4.49
3.00 to 3.49	150	23.88
3.50 to 3.99		42.13
4.00 to 4.49	88	24.72
4.50 to 4.99	11	3.09
Total	356	100.00
Mean: 3.71	Median: 3.75	
Mode: 4.10	Standard Deviation: 0.45	

^aScale: 5 = excellent when compared to other programs in the state; 4 = much better than other programs in the state; 3 = about the same as other programs in the state; 2 = not as good as other programs in the state; 1 = much worse than other programs in the state.

Program Quality and State-Level Supervision of Vocational Agriculture

The variable duties of the state supervisor was categorized into those states where the state supervisors have duties beyond the supervision of vocational agriculture and states where the state supervisors are responsible only for vocational agriculture. Barrick (1980) proposed that the more desirable state supervisory duties would be limited to the supervision of vocational agriculture education. Therefore, the variable duties of the state supervisor was treated as an ordinal variable and a Spearman rank-order correlation coefficient was calculated between duties of the supervisor and program quality. A total of 356 cases was used in the equation with a negligible association, $r = .08$ found between the duties of the supervisor and program quality as perceived by the vocational agriculture teachers, not significant at $\alpha = .05$ (see Table 2).

The state-level administration of vocational agriculture education occurs either through the head state supervisor reporting directly to the state director of vocational education or not reporting directly to the state director. As Barrick (1980) proposed, the more desirable hierarchy would provide for direct reporting to the state director of vocational education. Treating this variable as an ordinal measure, a

Spearman rank-order correlation coefficient was calculated between the supervisory hierarchy and the level of program quality. No association ($r_s = .00$) was found between supervisory hierarchy and program quality as perceived by the vocational agriculture teachers.

Table 2

Relationship Between Program Quality and Duties, Hierarchy and Structure of State-Level Supervision n = 356

Variables	r_s	p
Program quality with duties of state supervisor	.08	.057
Program quality with hierarchy of state supervision	.00	.488
Program quality with structure of state supervision	.08	.069

Based upon the duties of the state supervisor and the relation of state supervision to the state director of vocational education, four structures were identified. Placing these four categories into a ranking of least desired to most desired structure in the administration of vocational agriculture, again a Spearman rank-order correlation coefficient was calculated between program quality and state structure. A negligible association ($r_s = .08$) was found between the variable supervisory structure and program quality, not significant at alpha = .05 (see Table 2).

Relationship Between Program Quality and Teacher Variables

Since it was believed that, for vocational agriculture teachers, a degree with a major in agricultural education is more desirable than another degree major, the variable degree major at the beginning of the vocational agriculture teaching career was treated as an ordinal measure. Utilizing the Spearman rank-order correlation coefficient, a negligible negative association ($r_s = -.04$) was found between the variables degree major and program quality, not significant at alpha = .05. (see Table 3). The variable level of education achieved was treated as an ordinal measure. A negligible association ($r_s = .07$) was found, not significant at alpha = .05.

A Spearman rank-order correlation coefficient was calculated between program quality and type of institution awarding the highest degree. Type of Institution was coded with high school receiving a ranking of 1, non-land-grant university or college a rank of 2 and land-grant university receiving a ranking of 3. A negligible negative association ($r_s = -.09$) was found, significant at alpha = .05 (see Table 3).

A Pearson product-moment correlation coefficient was calculated between program quality and the measure of recentness of achieving the highest degree with a negligible association ($r = .05$), not significant at alpha = .05 (see Table 3).

The Pearson product-moment correlation coefficient was also used in calculating the relationship between program quality and years of teaching experience. A low degree of association ($r = .19$) was obtained, significant at alpha = .05.

Table 3

Relationship Between Program Quality and Selected Teacher Variables

	<u>r</u>	<u>s</u>	Number of Cases	<u>p</u>
Program quality with college major		-.04	356	.252
Program quality with degree level achieved		.07	356	.086
Program quality with type of institution awarding highest degree		-.09	356	.046
Program quality with recentness of achieving highest degree	.05		356	.187
Program quality with years of high school vo. ag. teaching experience	.19		355	<.001
Program quality with teacher's Instruction of adults		-.29	348	<.001

The type of responsibility for adult education in agriculture was the final teacher variable. Since this variable required the teacher to identify the degree of interaction with adults, the variable was treated as an ordinal measure. The responses to this variable were coded with the greater the interaction with adults, the lower the coding number. A Spearman rank-order correlation coefficient was calculated between program quality and the type of responsibility for adult education in agriculture. A low association ($r_s = -.29$) was obtained, significant at $\alpha = .05$ indicating that the greater the level of formal instructional interaction with adults, the greater the program quality as perceived by the vocational agriculture teacher.

Relationship Between Program Quality and Selected School Characteristics

Six school characteristics were selected for the study. For each of these variables, a correlation coefficient was calculated. Using a Spearman rank-order correlation coefficient, a negligible association ($r_s = .02$), not significant at $\alpha = .05$, was achieved between program quality and the type of school where the vocational agriculture program is located (see Table 4). Type of school was coded with the comprehensive high school receiving a rank of 1, the specialized vocational school receiving a rank of 2 and the one school in the other category a) special education facility providing vocational agriculture courses) receiving a rank of 3.

A Pearson product-moment correlation coefficient was calculated between the variables program quality and the number of teachers in the department. A low association ($r = .18$) was realized, significant at $\alpha = .05$ ($p = .001$).

Pearson product-moment correlation coefficients were calculated between program quality and the number of students in the department and

Table 4

Relationship Between Program Quality and Selected School Characteristics

	r	r_s	Number of Cases	p
Program quality with type of school where vo. ag. program is located		.02	356	.389
Program quality with number of teachers in the department	.18		356	<.001
Program quality with number of students in the vo. ag. program	.12		352	.013
Program quality with number of students in each grade of the high school	.17		344	.001
Program quality with the percent of school day spent as a vo. ag. teacher	.18		353	<.001
Program quality with percent of rural students in the vo. ag. program	-.07		353	.082
Program quality with percent of suburban students in the vo. ag. program	.03		352	.287
Program quality with percent of urban students in the vo. ag. program	.10		353	.028

the number of students per grade. A low association ($r = .13$) was found between program quality and the number of students in the program, significant at alpha = .05 ($p = .013$). A low association ($r = .17$) was also found between program quality and the number of students per grade in the high school, significant at alpha = .05 ($p = .001$).

A low association ($r = .18$) was found between the percent of school day spent teaching-vocational agriculture and program quality, significant at alpha = .05 ($p = .001$).

Where the students lived who were enrolled in the program was found to have some relationship to program quality. Pearson product-moment correlation coefficients indicated a low association ($r = -.07, .03$ and $.10$) between program quality and the percent of students who lived in a rural, suburban or urban area, respectively. Of the three correlation coefficients, only the relationship between program quality and the percent of students who lived in an urban area was found to be statistically significant ($p = .028$). This low association indicates that the greater the percent of students who lived in an urban area, the greater the level of program quality.

Relationship Between Program Quality and Fiscal Support for the Vocational Agriculture Program

A Pearson product-moment correlation coefficient was calculated between program quality and the teacher's annual salary adjusted for the percent of the school day spent teaching vocational agriculture. A low degree of association ($r = .26$) was obtained, significant at alpha = .05 ($p < .001$) (see Table 5). A similar process was followed in calculating a correlation coefficient between program quality and the amount of dollars available for program support per teacher. Again a low association ($r = .14$) was obtained, significant at alpha = .05 ($p = .005$).

Table 5

Relationship Between Program Quality and Fiscal Support for the Vocational Agriculture Program

	<u>r</u>	Number of Cases	<u>p</u>
Program quality with teacher's salary based on percent of time teaching vo. ag.	.26	351	<.001
Program quality with amount of resources available per teacher	.14	339	.005

Accounting for the Variance in Program Quality

Ten independent variables were identified as statistically significant and entered in single steps into the multiple regression equation. Table 6 indicates the intercorrelations between the four variables entering into the regression equation. A low degree of association was found between teacher salary and number of teachers and between teacher salary and dollars available for program support. A moderate negative degree of association was found between number of teachers in the department and the dollars available for program support. This negative relationship indicates that the greater the number of teachers, the less the amount of dollars available for program support per teacher.

Table 6

Intercorrelations Between Independent Variables Which Account for Program Quality in the Regression Equation (n = 329)

	Intercorrelations				
	Teac h Adults	Adj usted Salary	Number of Teachers	Dol lars Available	Program Quality
Teach Adu lts	1 .000	-.056	.022	-.080	-.287*
Adjusted Sa l ary		1 .000	.173*	.135*	.261*
Number of Teachers			1 .000	-.395*	.180*
Dollars Available				1 .000	.143*
Program Quality					1 .000

* $p < .005$.

The first variable to enter into the regression equation was the type of responsibility for adult education in agriculture (see Table 7). This variable accounts for the greatest degree of variance in program quality, 8.1%. The adjusted salary of the vocational agriculture teacher accounts for another 6.7% of the variance. The final two variables, number of teachers and dollars available for program support, account for 2.6% and 1.9% of the variance, respectively.

Table 7

Regression of Program Quality on Select Variables (n = 308)

Independent Variables Entered Into Equation ^a	<u>R</u>	<u>R</u> ²	Change in <u>R</u> ⁴	Regression Coefficient	<u>F</u> [*]
Teachers	.2848	.0811	.0811	-.160	27.54
Adjusted salary	.3844	.1478	.0666	.121E-4	26.96
Number of teachers	.4171	.1740	.0262	.083	21.77
Program support resources	.4393	.1930	.0190	.279E-3	18.48
Constant				3.544	

^aEach variable was added to the regression equation in a single step.

^{*}All F values were significant at p<.001.

Conclusions

Vocational agriculture teachers perceive their programs to be better than other programs in their state. The teachers in the sample indicated that their programs were, on the average, better than other programs in the state using the scale of 5 equal to excellent, 4 equal to much better, 3 equal to about the same, 2 equal to *not* as good and 1 equal to much worse.

The duties of the state supervisor, the hierarchy of state supervision in vocational agriculture and the structure of state supervision are not related to program quality.

Program quality was found not to be related to the vocational agriculture teacher's college major, level of educational achievement and recency of graduation. However, a low negative association was found between program quality and the type of responsibility for adult education in agriculture. Teachers who were responsible for adult education in agriculture perceived their level of program quality higher than other teachers. A low positive association was found between program quality and years of teaching experience. The longer the teaching experience, the greater the perceived level of program quality. The type of institution awarding highest degree was found to be related to program quality. Programs with teachers from non-land-grant institutions perceived a higher level of program quality.

Several selected school characteristics were found to be associated with program quality. The higher the number of teachers in the department, the greater the program quality. The size of the vocational agriculture program and number of students in the high school appear to be

related to program quality. Increased enrollment in the vocational agriculture programs and programs located in larger schools were found to be associated with higher program quality. The type of student enrolled also was related to program quality. A greater percent of students who lived in an urban area was found to be associated with greater program quality. The increased percent of the school day spent teaching vocational agriculture was associated with greater program quality. However, several variables were not found to be associated with program quality. Those variables included the type of school where the program was located and the percent of rural and suburban students.

The level of financial support for the program was related to program quality. A low positive association was found between program quality and the adjusted annual salary of the vocational agriculture teacher. The amount of dollars available per teacher for program support was also related to program quality in a similar manner. As the amount of funds available increased, the level of program quality increased.

Implications

This study indicates that a low relationship exists between perceived level of program quality and the teacher's responsibility for adult education in agriculture. As declining enrollment continues, especially in the secondary programs, the addition of adult programs may appear to be an easy solution. However, cognizant of the type of research conducted, the use of cause and effect statements is not in order. Therefore, to imply program quality can be enhanced through work with adults cannot be made. Further study into this relationship is recommended.

Program funding level accounted for slightly more than 9% of the variance in program quality. To expect a substantial increase in program quality through expensive vocational agriculture programs does not appear logical.

Program quality was found to be related to a set of variables which are indicative of larger, more urban programs. The role of the larger, more urban programs must be further examined as vocational agriculture continues to develop into the 21st century. As this research indicates, has the expectations for program quality in the rural backroads of America gone the way of the one-bottom plow?

This research identified a higher perceived level of program quality associated with teachers receiving their highest degree from non-land-grant institutions. Additional inquiry into the characteristics of those teachers from non-land-grant institutions and the teacher training curriculum offered at these institutions is suggested.

Finally, the number of teachers in the vocational agriculture program was found to be positively related to program quality. This demonstrates that the continued comparison of single and multiple teacher programs gives the advantage to the larger departments. Multiple teacher programs appear to have the advantage in providing higher levels of program quality.

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