Perceptions of Mississippi Secondary Agriculture Teachers Concerning Pilot Agriscience Courses

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According to agricultural education department heads and research experts, the second highest priority research topic in agricultural education is to "determine the appropriate curriculum for agricultural education in the secondary schools" (Silva-Guerrero and Sutphin, 1990, p.6). A common practice used to determine curriculum is to develop pilot courses and evaluate the courses to determine whether they should be included in the curriculum. Teacher perceptions are often a major part of the evaluation of these courses (Norris and Briers, 1989; Peasley & Henderson, 1992). The study reported in this article used teacher perceptions as one way of determining whether an agriscience course or courses should be part of the secondary agricultural education curriculum in Mississippi.

In 1988, the National Research Council (NRC) reported that "much of the focus and content of many vocational agriculture programs is outdated" (p. 3). The NRC recommended that agricultural educators move quickly to upgrade the scientific and technical content of the curriculum.

Mississippi agricultural educators responded to this recommendation by developing two pilot courses in agriscience for the 1991-92 school year. One course, Introduction to Agriscience, was designed as a one-hour, 9th and 10th grade level course. The other, Agriscience I, was designed as a two-hour, 11th and 12th grade level course. A third course, Agriscience II. will be implemented during the 1992-93 school year.

The content of the courses corresponded with the definition of agriscience offered by Buriak (1989), where he defined agriscience as "instruction in agriculture emphasizing the principles, concepts, and laws of science and their mathematical relationships, supporting, describing, and explaining agriculture" (p. 18). In a report on the development of the courses, Johnson (1991) stated, "The courses were designed to teach the scientific principles which form the basis of the modem food and fiber industry and to provide students with active, hands-on learning experiences which emphasize the scientific method in the study of agriculture" (p. 1).

The objectives for the courses were developed by faculty in the Division of Agriculture, Forestry, and Veterinary Medicine at Mississippi State University, with input from selected teachers and others. An Agriscience Learning Activities Manual was developed, with members of various departments in the Division contributing activities in their areas of expertise.

Forty-one schools (with 42 agriculture teachers) were selected to serve as test sites for the pilot courses. The sites were selected so that the schools and teachers would be representative of all current agricultural education programs in Mississippi in terms of geographic location, school type, school size, and teacher and program quality (J.W. Jones, assistant state supervisor, personal communication, June 10. 1991). All of the selected teachers attended a two-week, inservice workshop in June, 1991.

Related Literature

The researchers used several areas of related literature to develop the conceptual **base** for the study. These areas included: teachers as educational change agents; relationships between demographic variables and perceptions of new programs; and the content of agriscience courses.

Teachers as Educational Change Agents

Teachers are important stakeholders in the educational change process. If changes in educational programs are to be successful, acceptance of these changes by teachers is essential (Norris and Briers. 1989). Other researchers have noted that teacher behavior and readiness for change are among the most important variables associated with the success of school change in terms of student outcomes (Goodlad. 1975; Owens, 1987).

Relationships Between Demoerauhic Variables and Perceptions

Relationships between demographic variables and perceptions of educational programs have been reported by several researchers. Christiansen and Taylor (1966) found that the level of post-graduate education possessed by teachers can indicate their level of innovativeness--those with more education are more innovative. In the same study, they found that younger teachers are more likely to accept innovations. Norris and Briers (1989) found statistically significant negative relationships between perceptions of curriculum change and age and years of teaching experience, but reported that relationships involving level of education were inconclusive. In a study of Ohio teachers, Peasley and Henderson (1992) reported negligible relationships between level of agriscience curriculum being taught and age, years of experience, years at current position, and educational level.

Content of Agriscience Programs

Knowledge of what is actually being taught in agriscience courses is very important to those who make decisions on funding and accreditation of programs. Agriscience programs should focus on the scientific concepts that are important to an understanding of agriculture (Buriak. 1989; Johnson, 1991; Trexier and Barrett, 1992). Some agricultural education programs have changed the name of their program to agriscience. but continued to teach the same traditional subject matter (Gleim, 1991).

Purpose and Objectives

The pilot programs in agriscience represented a dramatic change in program emphasis in Mississippi. State agricultural education leaders were concerned about the level of acceptance of the program by the agriculture teachers and requested the study be conducted. Understanding the perceptions of influential stakeholders is important when attempting to implement new educational programs (Carpenter-Huffman. Hall, & Summer, 1974; Connelly & Clandinin, 1988). This study was conducted to assess the perceptions of the agriculture teachers who were participating in the pilot test regarding the two pilot courses. The results of this study will be one of the means used to determine whether the pilot courses are continued after the second year and if the courses qualify for science credit.

To accomplish the purpose of assessing the perceptions of agriculture teachers regarding the agriscience pilot courses, the specific objectives of the study were to:

Determine agriculture teachers' level of agreement with selected statements regarding the pilot agriscience program.

Determine the relationship between teachers' level of agreement with statements regarding the pilot agriscience courses and the teacher demographic variables of: age, years of teaching experience and level of education.

Determine the level of cooperation between the agriculture and science teachers as reported by the agriculture teachers.

Determine the percentage of teachers teaching the agriscience units as reported by the agriculture teachers.

Procedures

The population for this study included all Mississippi agriculture instructors teaching pilot agriscience courses during the 1991-1992 school year (N = 42). The entire population was surveyed.

The instrument used in this study was developed by the researchers after reviewing the instrument used by Peasley and Henderson (1992). Input about content, format, and individual items were provided by a planning/advisory committee comprised of three agriscience teachers, one science teacher, one graduate assistant, and the assistant state supervisor of agricultural education.

The instrument contained four sections. Section one contained a six-point scale to determine the teachers' level of agreement with selected statements about the agriscience courses. Some items were stated negatively to help the researchers identify possible response set. Section two contained a listing of individual units in each agriscience course. In this section the respondents indicated the agriscience units taught and the number of hours devoted to each unit. In section three, respondents were asked to provide information about the level of cooperation between the science teacher and the agriculture teacher during the school year. Respondents provided demographic information in section four.

The planning/advisory committee reviewed the developed instruments to establish face and content validity and clarity. Because responses were reported on an individual item basis, an estimate of the overall reliability for the instrument was not obtained.

Usable responses were received from 41 of the 42 teachers, for a response rate of 98 percent. The only nonrespondent is no longer teaching in Mississippi.

Findings

The 41 teachers who responded to the study averaged 40 years (SD · 8.97) and had been teaching for 15 years (SD = 9.07). All of the teachers were male. The highest

degrees held by the teachers were as follows: one had an associate degree; 15 had bachelors degrees; 17 had masters degrees; and 7 had educational specialist degrees. One teacher did not indicate a highest degree held.

Fifteen (36.6%) of the responding teachers taught both the Introduction to Agriscience and Agriscience I courses. Twenty-four (58.5%) of the responding teachers taught only the Introduction to Agriscience course. Two (4.9%) of the teachers indicated that they taught the Agriscience course. Other findings of the study are reported by objective.

Objective One

To assess the first objective of the study, the teachers were asked to indicate their level of agreement with 17 statements and substatements concerning several aspects related to the agriscience pilot courses. The scale used was a six-point scale (1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = somewhat agree; 5 = agree; 6 = strongly agree).

For the most part, the teachers responded uniformly in agreement with the statements written positively and uniformly in disagreement with the statements written negatively. The responses to each question are summarized in Table 1.

The teachers strongly agreed that science credit should be awarded to students completing agriscience courses. They agreed that the science teacher(s) in their school would support granting science credit for agriscience. This feeling is supported by the administrators, guidance counselors and science teachers in the same schools, as found in a parallel study by Johnson and Newman (1991).

The teachers agreed the courses were appropriate for all students, whether they were going to college or not and whether they planned to work in an agricultural occupation or not.

The teacher indicated administrator(s), guidance counselor(s), and science teacher(s) in their school supported the program. A parallel study substantiated this finding (Johnson & Newman, 1992).

The teachers agreed that the activities in the Agriscience Learning Activities Manual worked well with their students and that adequate instructional materials are currently available for teaching agriscience. They also agreed that they enjoy teaching agriscience more than other agriculture courses.

Respondents generally disagreed that the agriscience curriculum limits opportunities for supervised experience programs or FFA involvement. They also disagreed with the statement, "the agriscience curriculum does not meet the needs of the agricultural industry in my school district." The teachers somewhat disagreed that they had adequate equipment and supplies to teach agriscience.

Objective Two

Spearman-rank correlations were calculated on the 17 statements in Part One of the instrument and the demographic variables of age. years of teaching experience, and

Table 1. Level of Agreement of Agriscience Teachers with Statements Regarding Pilot Agriscience Courses

Statement	Percent Selecting Response						
	1	2	3	4	5	6	Median
Science credit should be awarded for agriscience	0	0	0	4.9	7.3	87.8	6
My support(s) the new agriscience curriculum							
Building administrator(s)	0	2.4	0	4.9	34.1	58.5	5
Guidance counselor(s)	4.9	0	2.4	4.9	39.0	48.4	5
Science teacher(s)	0	0	2.4	22.0	34.1	41.5	5
The following students in my school should take agriscience courses:							
Those planning to go to college and pursue a nonagricultural major	2.4	2.4	4.9	31.7	22.0	36.6	5
Those planning to go to college and pursue an agricultural major	0	0	0	2.5	17.5	80.0	6
Noncollege bound students planning to work in a non-agricultural occupation immediately after high school	0	0	0	10.0	25.0	65.0	6
Noncollege bound students planning to work in a non-agricultural occupation immediately after high school	0	5.0	10.0	25.0	35.0	25.0	5
High-ability students in my school are more likely to enroll in agriscience than in other agriculture courses	2.4	2.4	2.4	12.2	39.0	41.5	5
Activities in the Aeriscience Learning Activities Manual have worked well with my students	0	0	2.4	31.7	48.8	17.1	5
The science teacher(s) in my school would support granting science credit for agriscience	0	5.1	0	23.1	33.3	38.5	5
I enjoy teaching agriscience more than other agriculture courses	2.4	0	12.2	17.1	36.6	31.7	5
Student enrollment has increased because of the agriscience program	2.4	1.3	9.8	17.1	34.1	29.3	5
Adequate agriscience instructional materials are available	2.4	9.8	9.8	22.0	41.5	14.6	5
I have adequate equipment and supplies in my department for teaching agriscience	14.5	17.1	24.4	26.8	14.6	2.4	3
Students in agriscience have less opportunity for supervised experience programs than students in other agricultural courses	43.9	29.3	9.8	4.9	7.3	4.9	2
Students in agriscience are less interested in the FFA	51.2	19.5	7.3	12.2	7.3	2.4	1
An agriscience curriculum does not meet the needs of agricultural industry in my school district	58.5	36.6	4.9	0	0	0	1

Note: 1 = strongly disagree; 2 = disagree; 3 = somewhat disagree; 4 = somewhat agree; 5 = agree; 6 = strongly agree.

highest degree held. The correlations are presented in Table 2. Overall, little evidence was found of linear relationships between the demographic variables and teacher responses to the selected variables.

Table 2. Spearman-Rank Correlations Between Demographic Variables and Responses to Statements Regrading Pilot Agriscience Courses

Statement	Demographic Variables		
	Age	Years Taught	Highest Degree
Science credit should be awarded for aeriscience	-.05	-.06	.02
My support(s) the new agriscience curriculum.			
Building administrator(s)	.24*	.23*	.04
Guidance counselor(s)	.33**	.36**	.15
Science teacher(s)	.oo	.13*	-.03
The following students in my school should take agriscience courses:			
Students planning to go to college and pursue a nonagricultural major	-.03	-.06	-.24*
Students planning to go to college and pursue an agricultural major	-.04	-.06	.06
Noncollege bound students planning to work in an agricultural occupation immediately after high school	-.23*	-.33**	-.31**
Noncollege bound students planning to work in a nonagricultural occupation immediately after high school	-.11*	-.08	-.33**
High-ability students in my school are more likely to enroll in agriscience than other agriculture courses	-.03	-.11*	-.01
The science teacher(s) in my school would support granting science credit for agriscience	-.20*	-.23*	-.14*
The student activities in the Aeriscience Learning Activities Manual have worked well with my students	.20	.21*	.06
I enjoy teaching agriscience **more** than other agriculture courses	-.26*	-.28*	-.19*
Student enrollment has increased because of the pilot agriscience program	.06	-.08	.04
Adequate instructional materials are currently available for teaching agriscience	.08	.oo	-.12*
I have adequate equipment and supplies in my department for teaching agriscience	-.03	.05	-.10*
Students in agriscience have **less** opportunity for supervised experience programs than students in other agriculture courses	-.23*	-.08	-.05
Students in agriscience are **less** interested in the FFA than are other agriculture students	-.14*	-.12*	-.04
An agriscience curriculum **does not** meet the needs of the agricultural industry in my school district	-.06	.13*	.14*

Note: Using conventions established by Davis (1971), * indicates low associations and ** indicates moderate associations. All other associations were negligible.

Objective Three

Teachers were asked to indicate their level of agreement with the statement, "Teaching agriscience has caused me to work more closely with the science teacher(s) in my school" using the same six-point scale used with statements in Part One. Teachers agreed with this statement (median = 5). Teachers were also asked to indicate whether they had shared various types of resources with science teacher(s) in their school. They were most likely to have shared advice on teaching science methods and least likely to have shared facilities. This information is summarized in Table 3.

Table 3. Sharing of Selected Resources by the Science and Agriscience Teachers as Reported by Agriscience Teachers

Resource Category	Have Shared			Percent
	Yes	No	Missing	Yes*
Advice on Teaching methods	36	4	1	90.0
Reference Materials	33	6	2	84.6
Equipment	32	7	2	82.1
Supplies	25	14	2	64.1
Facilities	9	29	3	23.7

d*Based on only those teachers responding to item.

Objective 4

The teachers were given a list of the units in the curriculum guides developed for the pilot agriscience programs and asked to indicate whether they had taught the units in their program. This information is summarized in Table 4 for the Introduction to Agriscience course and in Table 5 for the Agtiscience I course.

Table 4. Units Taught in Introduction to Agriscience as Reported by Teachers

Unit	Did Teach			Percent
	Yes	No	Missing	Yes*
Introduction to Agtiscience	38	0	3	100.0
Opportunities in Agriscience	38	0	3	100.0
Human Relations/Leadership in Agriscience	37	1	3	97.4
Principles of Animal Science	37	1	3	97.4
Principles of Plant Science	37	1	3	97.4
Supervised Agricultural Experience in Agriscience	36	2	3	94.7
Application of the Scientific Method to Agriscience	34	3	4	91.9
Principles of Soil Science	34	3	4	91.9
Natural Resource Protection	33	4	4	89.2
Mechanical Technology in Agriscience	32	6	3	84.2
Principles of Food and Fiber Science	25	12	4	67.6
Computers in Agriscience	25	13	3	65.8
Principles of Entomology	22	16	3	57.9
Introduction to Biotechnology	22	16	3	57.9

*Based on only those teachers responding to item.

The most frequently taught units in the course Introduction to Agriscience were "Introduction to Agriscience" and "Opportunities in Agriscience." both of which were taught by all of the teachers responding to the question. The least frequently taught units were "Principles of Entomology" and "Introduction to Biotechnology," each of which were taught by 57.9 percent of the teachers. The overall mean percentage of units taught was 85.2 percent.

Table 5. Units Taught in Agriscience I as Reported by Teachers

Unit	Did Teach			Percent
	Yes	No	Missing	Yes*
Introduction to Agriscience	17	0	0	100.0
Leadership and Communications Agriscience	17	0	0	100.0
Plant Propagation	16	1	0	94.1
Soil Science	16	1	0	94.1
Supervised Agricultural Experience in Agriscience	16	1	0	94.1
Animal Science Technology	15	2	0	88.2
Plant Science Technology	15	2	0	88.2
Crop Production	14	3	0	82.4
Machinery and Power	14	3	0	82.4
Genetics	12	5	0	70.6
Pest Management	11	5	1	68.7
Computers in Agriscience	11	6	0	64.7

*Based on only those teachers responding to item.

The most frequently taught units in the course Agriscience I were "Introduction to Agriscience" and "Leadership and Communications in Agriscience." both of which were taught by all responding teachers. The least frequently taught units were "Computers in Agriscience," taught by 64.7 percent of the responding teachers, and "Pest Management," taught by 68.7 percent of the responding teachers. The overall mean percentage of units taught was 85.6 percent.

Conclusions and Recommendations

The following conclusions and recommendations are based on the findings of this study and the review of related literature.

The agriscience teachers strongly support the pilot courses. They believe the courses are beneficial to all students, especially those interested in working in agriculture, either immediately after high school or after college. The teachers enjoyed teaching the courses and felt that the instructional materials and learning activities were appropriate. In addition, teachers perceive strong support from other stakeholders in their schools. Building administrators, guidance counselors, and science teachers all support the program, as perceived by the teachers. This support should be further developed as the courses are revised during the pilot test period.

Teachers believe science credit should be awarded for the agriscience courses. This belief is supported by administrators, guidance counselors, and science teachers (Johnson & Newman, 1992). Further research should be conducted to determine whether students are obtaining the necessary knowledge and skills in science before the pilot courses are submitted to the state accreditation board for consideration for science credit.

The relationships between teacher demographic variables and perceptions of the various aspects of the pilot courses have little practical significance. With the exception of which students would benefit from the courses and perceived guidance counselor support, all relationships between teacher variables and statements were either low or negligible. In this study, the demographic variables suggested by the related literature (Christiansen & Taylor, 1966; Norris & Briers, 1989) do not appear to be good predictors of teacher perceptions of the pilot courses. This conclusion is consistent with the findings of Peasley and Henderson (1992). This finding may be explained by the high perceptions teachers hold about the different aspects of the courses. Responses to almost every statement were very positive and had little, variance, so relationships were not evident.

Agriscience teachers appear to have worked most closely with science teachers since the implementation of the pilot agriscience courses. Mississippi pilot agriscience teachers and science teachers are sharing resources to a greater extent than teachers nationally (Dormody. in press). Apparently, the pilot agriscience courses are facilitating the linkages between agriculture and science teachers advocated by Budke (1991). Teachers should investigate strategies for sharing facilities to a greater extent to make better use of limited resources.

Teachers taught most of the units suggested in the curriculum guies for the pilot courses. Few teachers taught alls of the units. This finding is not of immediate concern, because the teachers are participating in a pilot study and determining appropriate content and scope of instruction in the process. However, as the pilot courses are refined and become a permanent curriculum offering, the teachers should commit to teaching all recommended units. This commitment may require additional inservice education and the purchase of new equipment and supplies.

Overall, it appears the teachers involved in the pilot test strongly support the new agriscience courses. Such teacher support is essential for the success of the pilot courses. The challenge to agricultural education leaders in Mississippi is to sustain and enhance the support throughout the pilot test period and beyond.

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