

## Perceptions of Administrators, Guidance Counselors, and Science Teachers Concerning Pilot Agriscience Courses

Donald M. Johnson, Assistant Professor  
Michael E. Newman, Assistant Professor  
Mississippi State University

In 1988, the National Research Council (NRC) recommended that "efforts should be expanded and accelerated to upgrade the scientific and technical content of vocational agriculture courses" (p. 35). According to the NRC, this change was necessary to better prepare students for both advanced study and for employment in growth sectors of the food and fiber industry.

Agricultural educators in Mississippi reacted to the NRC's recommendations by developing two full-year agriscience courses to be pilot-tested in selected schools. Introduction to Agriscience is a one-hour, one-credit course targeted at 9th and 10th grade students. Agriscience I is a two-hour, two-credit course targeted at 11th and 12th grade students (a third course, Agriscience II, is under development.)

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 agriculture teachers and state staff members. An Agriscience Learning Activities Manual was also developed, with members of various departments in the Division contributing learning activities in their areas of expertise. Figure 1 shows an example module (with objectives) from the Introduction to Agriscience course.

Module: Application of the Scientific Method to Agriscience  
Course  
Units/Objectives

### 1. Understanding the Scientific Method

- a. Describe how non-scientists solve problems
- b. Describe how scientists solve problems
- c. Compare and contrast the problem-solving methods used by non-scientists and scientists
- d. Define scientific method
- e. List and explain the steps of the scientific method

### 2. Using the Scientific Method

- a. Identify a problem to be solved
  - b. Describe how the scientific method can be used to solve the identified problem
  - c. Apply the steps of the scientific method to solving the identified problem
  - d. Critique the use of the scientific method (both the process itself and results obtained)
- Figure 1. Example Module From Introduction to Agriscience Course.

According to Johnson (1991), the new courses were "designed to teach the scientific principles which form the basis of the modern 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 courses were designed so that academic science credit could be requested for agriscience if the courses are approved for statewide implementation (Johnson, 1990).

Agricultural education supervisory staff members of the Mississippi State Department of Education selected 42 teachers (employed in 41 secondary schools) to pilot-test the new agriscience courses. The schools and teachers were selected so as to be representative of schools and teachers offering secondary agricultural education programs in Mississippi (J. W. Jones, assistant state supervisor, personal communication, June 10, 1991).

During June 1991, a two-week intensive inservice workshop was held for all teachers selected to teach the new agriscience courses. In the fall of 1991, the agriscience courses were implemented for a three-year pilot-test period.

Agriscience represents an innovative curriculum shift for Mississippi secondary school agricultural education programs. According to Carpenter-Huffman, Hall, and Sumner (1974), curriculum innovations "will be welcomed by many teachers and administrators who enjoy learning new techniques, but there will be some resistance because of inertia" (p. 9).

Carpenter-Huffman et al. (1974) and Connelly and Clandinin (1988) indicated that understanding the perceptions of influential stakeholders is essential for successful implementation of innovative educational programs. Connelly and Clandinin (1988) defined a stakeholder as "a person or group of persons with a right to comment on, and have input into, the curriculum program offered in schools" (p. 124).

Previous researchers have identified school administrators and guidance counselors as influential school-based stakeholders in agricultural education programs. Magill and Leising (1990) stated that, "The curriculum, although not totally dictated by local school administrators, is greatly affected by their influence. Throughout the public school system, high school principals are key decision makers in the overall curriculum . . . offered in their high schools" (p. 147).

School guidance counselors are in a position to exert an influence on student enrollment in all agricultural education programs, including agriscience courses. According to Matulis and Osborne (1990), "Guidance counselors have had, and will continue to have, a vital role in providing the effective and operational support needed by vocational education programs" (p. 139). Based on the results of their study of Illinois secondary school guidance counselors, Matulis and Osborne (1990) concluded that guidance practices were substantially influenced by the guidance counselors' perceptions of program quality.

Due to the nature of the curriculum being implemented, science teachers were also identified as important stakeholders in the pilot agriscience courses. Science teachers' perceptions of the agriscience courses were deemed to be especially important since the possibility existed that academic science credit would be requested for agriscience.

The National FFA Organization (1990) has indicated that agriculture and science are natural partners. However, Budke (1991) has stated that, in order for this partnership to become a reality, "Teaching relationships must be developed between the agriculture teacher and the physics, chemistry, biology, earth science, and general science teachers in order to complement each others" expertise and share teaching environments, facilities, and equipment" (p. 4). According to Dormody (in press), such a relationship "could extend the utilization of scarce resources, promote science and agricultural literacy, and strengthen program partnerships" (p. 3) between science and agriculture teachers.

#### Problem Statement

The pilot agriscience courses are an innovative curriculum shift for Mississippi secondary school agricultural education programs. Local school administrators, guidance counselors, and science teachers are in positions to influence the success or failure of these courses. Agricultural educators need to understand how these three important schoolbased stakeholder groups perceive the pilot agriscience courses. Such an understanding would enable program planners to make timely and informed decisions concerning the pilot agriscience courses.

#### Purpose and Objectives

This study was conducted to determine the perceptions of important school-based stakeholder groups concerning the pilot agriscience courses. Specific objectives were to:

- Determine the perceptions of school administrators, guidance counselors, and science teachers (by group and overall) concerning selected aspects of the pilot agriscience courses.
- Determine the inter-relationships between perceptions of selected aspects of the agriscience courses.
- Determine the level of cooperation between science and agriculture teachers as perceived by administrators and science teachers.

#### Procedures

The population (N=123) for this study was composed of one building-level administrator [principal (n=39) or vocational director (n=2)], guidance counselor, and science teacher from each of the 41 Mississippi public schools offering pilot agriscience courses during the 1991-1992 school year. The population members were identified by the agriscience teacher in each school. The entire population was surveyed.

Three instrument forms were developed for use in this study. In all

three forms a six-point, Likert-type scale was used to assess perceptions of selected aspects of the pilot agriscience courses. Each form also included space for open-ended comments about the pilot agriscience courses. On the administrator and science teacher forms, an additional item was included to determine the perceived level of cooperation between the science and agriscience teacher. Finally, the science teacher form also

contained five yes/no questions concerning specific areas of cooperation between the science and agriscience teacher.

The instrument forms were developed by the researchers after input from a planning/advisory committee composed of three agriscience teachers, a graduate student, a science teacher, and an assistant state supervisor of agricultural education. The committee members also reviewed the instrument forms to ensure content and face validity and clarity. Since responses are reported on an individual item basis, overall instrument reliabilities were not estimated (Borg and Gall, 1983).

A packet containing instruments, cover letters, and return envelopes (stamped and self-addressed) was mailed to the agriscience teacher in each school for distribution. The respondents were instructed to return the completed forms directly to the researchers.

Useable responses were received from 40 administrators (98%), 39 guidance counselors (95%), and 38 science teachers (93%) for an overall response rate of 95%. Because the group and overall response rates exceeded 90%, no follow-up of nonrespondents was conducted (Borg and Gall, 1983).

The data were analyzed using descriptive statistics. The recommendations made by Davis (1971) were used to interpret the magnitude of the correlation coefficients for objective two.

### Findings

As indicated in Table 1, the administrators, guidance counselors, and science teachers surveyed had positive perceptions of the pilot agriscience courses being offered in their schools. All groups agreed that the agriculture teacher in their school had explained the pilot agriscience curriculum to them.

The three groups strongly agreed that they supported the new agriscience curriculum. All groups agreed that science credit should be awarded for agriscience; however, science teachers agreed more strongly than either administrators or guidance counselors. While all groups agreed that the agriculture teacher in their school was qualified to teach agriscience for science credit, science teachers expressed the highest level of agreement while administrators expressed the lowest level of agreement.

All groups agreed that high-ability students were more likely to enroll in agriscience than in other agriculture courses. At the same time, the respondents felt the agriscience curriculum was challenging to students of all ability levels.

All groups highly agreed that students planning to go to college and major in agriculture and noncollege bound students planning to work in an agricultural occupation immediately after high school should take agriscience courses. However, to a lesser degree, the respondents also agreed that students planning to go to college and pursue a nonagricultural major and students planning to work in a nonagricultural occupation immediately after high school should enroll in agriscience courses. Science teachers agreed less than administrators or guidance counselors that students planning to attend college in nonagricultural majors should take agriscience courses.

Table 1. Perceptions of Administrators, Guidance Counselors, and Science Teachers Concerning Selected Aspect of the Pilot Agriscience Courses

| Statement   | Group        |      |              |       |              |      |                 |      |
|---|--------------|------|--------------|-------|--------------|------|-----------------|------|
|   | Admin (n=40) |      | G. C. (n=39) |       | S. T. (n=38) |      | Overall (n=117) |      |
|   | Mean         | SD   | Mean         | SD    | Mean         | SD   | Mean            | SD   |
| The agriculture teacher in my school thoroughly explained the new agriscience curriculum to me                  | 5.25         | .95  | 5.26         | .92   | 5.18         | 1.09 | 5.23            | .98  |
| Science credit should be awarded to students for completion of agriscience course(s)                            | 5.20         | 1.22 | 4.95         | 1.49  | 5.34         | .81  | 5.16            | 1.21 |
| The agriculture teacher in my school is qualified to teach agriscience for science credit                       | 5.15         | 1.25 | 5.46         | 1.04  | 5.66         | .53  | 5.42            | 1.01 |
| I support the new agriscience curriculum being offered in my school   | 5.63         | .87  | 5.74         | .55   | 5.63         | .59  | 5.67            | .68  |
| High ability students in my school are more likely to enroll in agriscience than in other agriculture courses   | 4.83         | .96  | 4.82         | 1.02. | 5.05         | .87  | 4.90            | .95  |
| The content of the agriscience curriculum is challenging to:  |              |      |              |       |              |      |                 |      |
| high-ability students   | 4.79         | .99  | 4.92         | .81   | 4.75         | .87  | 4.82            | .89  |
| average-ability students  | 5.08         | .98  | 5.09         | .66   | 4.89         | .78  | 5.02            | .83  |
| low-ability students  | 4.89         | 1.09 | 4.60         | 1.19  | 4.40         | 1.42 | 4.63            | 1.24 |
| The following students in my school should take agriscience courses:  |              |      |              |       |              |      |                 |      |
| students planning to go to college and pursue a nonagricultural major   | 4.37         | 1.32 | 4.36         | .96   | 3.94         | 1.43 | 4.23            | 1.26 |
| students planning to go to college and pursue an agricultural major   | 5.68         | .62  | 5.67         | .58   | 5.73         | .65  | 5.69            | .61  |
| noncollege bound students planning to work in an agricultural occupation immediately after high school          | 5.56         | .75  | 5.55         | .61   | 5.55         | .65  | 5.56            | .67  |
| noncollege bound students planning to work in a nonagricultural occupation immediately after <i>high</i> school | 4.24         | 1.44 | 4.58         | .91   | 4.27         | 1.52 | 4.36            | 1.32 |

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

\* Admin=School Administrators; G. C.=Guidance Counselors; S. T.=Science Teachers.

Positive relationships existed between each of the paired statements. A very strong positive correlation (.12) existed between the level of agreement with awarding science credit for agriscience and the level of agreement that the agriscience teacher was qualified to teach agriscience for science credit. The intercorrelations between the remaining pairs of statements ranged from .low (10 to .29) to moderate (.30 to .49) using conventions suggested by Davis (1971). Table 2 presents the intercorrelation matrix for the paired statements.

Both administrators and science teachers tended to agree that the science and agriscience teachers had worked together more closely since implementation of the agriscience courses. Science teachers were in stronger agreement (Mean = 4.03; SD = .99) than were administrators (Mean = 4.75; SD = 1.01).

Over 80% of the science teachers reported sharing equipment, reference materials, and advice on science teaching techniques with their agriscience teacher. Only about one in five science teachers reported sharing facilities with their agriscience teacher. A summary of selected resources shared by the science and agriscience teachers (as reported by science teachers is reported in Table 3)

The final item on each instrument form requested open-ended comments concerning the pilot agriscience courses. Overall, 29 (24.8%) of the 117 respondents provided written responses to this item. Within each group, 3 (7.5%) of 40 administrators, 11 (28.2%) of 39 guidance counselors, and 15 (39.5%) of 38 science teachers provided written comments. Of the 29 written comments, four (13.8%) were classified by the researchers as being negative. The remaining 25 (86.2%) comments were classified as being positive.

Table 2. Intercorrelations Between Level of Agreement with Selected Statements (n=117)

| <u>Statement</u>   | <u>ATEXPLN</u> | <u>SCREDIT</u> | <u>ATQUAL</u> | <u>ISUPP</u> | <u>HAENROL</u> |
|--|----------------|----------------|---------------|--------------|----------------|
| The agriculture teacher thoroughly explained the new agriscience curriculum to me (ATEXPLN)                              | 1.00           |                |               |              |                |
| Science credit should be awarded to students for completion of agriscience courses (SCREDIT)                             | .47            | 1.00           |               |              |                |
| The agriculture teacher in my school is qualified to teach agriscience for science credit (ATQUAL)                       | .49            | .72            | 1.00          |              |                |
| I support the new agriscience curriculum being offered in my school (ISUPP)  | .48            | .44            | .48           | 1.00         |                |
| High-ability students in my school are more likely to enroll in agriscience than in other agricultural courses (HAENROL) | .19            | .37            | .21           | .24          | 1.00           |

Table 3. Resource Sharing Between Science and Agriculture Teachers as Reported by Science Teachers

| Resource Category                     | <u>Response</u>    |          |                        |          |
|---------------------------------------|--------------------|----------|------------------------|----------|
|                                       | <u>Have Shared</u> |          | <u>Have Not Shared</u> |          |
|                                       | <u>f</u>           | <u>%</u> | <u>f</u>               | <u>%</u> |
| Equipment                             | 29                 | 80.6     | 7                      | 19.4     |
| Supplies                              | 22                 | 61.1     | 14                     | 38.9     |
| Facilities                            | 8                  | 22.9     | 27                     | 77.1     |
| Reference Materials                   | 29                 | 80.6     | 7                      | 19.4     |
| Advice on Science Teaching Techniques | 31                 | 83.8     | 6                      | 16.2     |

Two of the negative comments concerned a lack of equipment for teaching agriscience. As stated by one administrator, "Could be and would be a very outstanding program if funds were available for teaching supplies and equipment." One guidance counselor felt the agriscience curriculum was "too broad." The final negative comment (guidance counselor) was that "The requirement for sciences in our district is only two. Since only two sciences are required, I feel we should at least require Biology and Consumer Science."

Ten of the 25 positive comments were general statements of support for the pilot agriscience sources. Example statements included "The agriscience program has been an asset to our curriculum" (science teacher), and "The agriscience curriculum has been an excellent addition to our schedule" (guidance counselor).

Nine statements concerned the integration of agriculture and science in agriscience. As expressed by one science teacher, "I believe this course will bring science and ag together and make them real to students." Another science teacher stated that, "My students show this new knowledge in the classroom."

Four statements expressed support for granting science credit for agriscience. According to a guidance counselor, "I believe this course merits receiving science credit if taken prior to biology." A science teacher wrote, "I believe that this course will be of more benefit than either consumer science or applied life science to all students."

The remaining two statements indicated that agriscience courses attracted a diverse group of students. As stated by an administrator, "I think this is a very good program that will attract more diverse groups of students."

#### Conclusions and Recommendations

The findings of this study indicated that administrators, guidance counselors, and science teachers in the schools having pilot agriscience programs support the new curriculum; therefore, the agriscience courses should be continued into the second year of the pilot test period.

Administrators, guidance counselors, and science teachers support granting science credit for agriscience. Science teachers agree more strongly with granting science credit for agriscience than do either administrators or guidance counselors. For this reason, science teachers should be viewed as an especially important advocacy group if science credit is to be requested for agriscience.

The level of agreement with granting science credit for agriscience was strongly related to the respondents' perceptions of the agriculture teachers' qualifications to teach agriscience for science credit. Each of the three respondent groups agreed that the agriculture teacher in their school was qualified to teach agriscience for science credit. Although these positive perceptions are encouraging, an assessment of agriculture teachers' knowledge of core science concepts and principles should be conducted. Such a study would provide a more objective measure of teacher science competency and would provide insight into possible inservice needs.

Although support exists for granting science credit for agriscience, further research should be conducted before science credit is requested. This research should focus on determining the level of mastery of selected science objectives by students enrolled in agriscience courses. To request science credit for agriscience without such information would be neither ethical nor prudent.

The administrators, guidance counselors, and science teachers in this study perceived the agriscience courses as being primarily for students planning to work in an agricultural career, regardless of college attendance plans. However, limited agreement exists that students not planning a career in agriculture should also enroll in agriscience courses. Agriscience courses may be used to provide agricultural literacy training for a wide range of secondary school students not currently being served by more traditional agricultural education programs.

Both administrators and science teachers agreed that resource sharing between the science and agriculture teachers had increased since implementation of the pilot agriscience courses. Apparently the agriscience courses are facilitating the linkages between science and agriculture teachers advocated by Budke (1991) and Dormody (in press).

In summary, the agriscience courses have the support of influential school-based stakeholders in the pilot-test schools. The challenge to those involved with agriscience is to build upon this support during the second and third years of the pilot-test period.

#### References

- Borg, W. R. & Gallo, M. D. (1983). Educational research: An introduction. New York: Longman.
- Budke, W. E. (1991). Agricultural science - Striving for excellence. The Agricultural Education Magazine, 63(7), 4, 11.
- Carpenter-Huffman, P. C., Hall, G. R. & Sumner, G. C. (1974). Change in education. Cambridge, MA: Ballinger Publishing Company.
- Connelly, F. M. & Clandinin, D. J. (1988). Teachers as curriculum planners. New York: Teachers College Press.
- Davis, J. A. (1971). Elementary survey analysis. Englewood Cliffs, NJ: Prentice-Hall.
- Dormody, T. J. (in press). Exploring resource sharing between secondary school teachers of agriculture and science departments nationally. The Journal of Agricultural Education.
- Johnson, D. M. (1990). Agriscience pilot course proposal meeting (Minutes of a meeting held April 9, 1990). Mississippi State: Mississippi State University, Department of Agricultural and Extension Education.

- Johnson, D. M. (1991). Inservice workshop for instructors teaching pilot agriscience courses. (Final Project Report). Mississippi State: Mississippi State University, Department of Agricultural and Extension Education.
- Magil, B. R. & Leising, J. G. (1990). Attitudes and perceptions of school administrators and agricultural advisory committee chairpersons toward agricultural education programs in California. Proceedings of the 17th National Agricultural Education Research Meeting. (pp. 147-154). Cincinnati, OH.
- Matulis, J. K. & Osborne, E. W. (1990). Attitudes, perceptions, and guidance practices of Illinois guidance directors concerning vocational education in secondary schools. Proceedings of the 17th National Agricultural Education Research Meeting. (pp. 139-145). Cincinnati, OH.
- National FFA Organization. (1990). Agriscience student recognition program: A bold new experiment. (Available from the National FFA Center, P.O. Box 15160, Alexandria, VA 22309).
- National Research Council. (1988). Understanding agriculture: New directions for education. Washington, DC: National Academy Press.