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ABSTRACT

Agriscience teachers' perceptions of the impact of integrating science on their agricultural education program were examined through a survey of all 253 state, regional, and national winners of the National Future Farmers of America AgriScience Teacher of the Year Award Program in 1988-1995. The survey contained 38 Likert-type statements. Usable responses were received from 131 (71.98%) of the teachers. The study population generally believed the following: (1) integrating science improves students' understanding of science concepts and their application to agriculture; (2) agriscience teachers need more preparation time before they can emphasize integrated science concepts, and they are better prepared to integrate biological science concepts than physical science concepts; (3) undergraduates will be better prepared to teach if they receive instruction in how to integrate science and if their student teaching experience is with a cooperating teacher who integrates science; and (4) enrollment of high-quality students in agricultural education will likely increase as agriscience teachers integrate more science into agriculture programs. Recommendations called for more inservice and preservice training in integrating science into the agricultural education curriculum and scheduling more planning time for teachers attempting to integrate science into their agriculture curricula. (Contains 30 references.) (MN)

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IMPLICATIONS OF INTEGRATING SCIENCE IN SECONDARY AGRICULTURAL EDUCATION PROGRAMS

Introduction/Theoretical Framework

Educational initiatives (A Nation at Risk, 1983; The Unfinished Agenda, 1984; An Imperiled Generation: Saving Urban Schools, 1988) have called for educators to find ways for students to learn more effectively and more efficiently. The A Nation at Risk report alarmed many Americans with students' low levels of basic skill performance in science (National Commission on Excellence in Education, 1983). Ten years later, results of the International Assessment of Educational Progress (Science), as reported in USA Today ("Riskline" 1993) found U.S. students ranked 13 out of 15 participating countries. These low science scores resulted in a demand for improved science education for American students.

In response, educational policy makers increased graduation requirements in the basic skills in an attempt to improve students' academic knowledge and stimulate higher order thinking (Case, 1986; Wirt, 1991). Jennings (1991) contended that raising academic standards has not been effective for most students who perform poorly in academic settings. In an interview by the New York Times (1990), George Tressel of the National Science Foundation pointed out that the general idea in present science education has been: "Don't educate them better: raise the standards, filter harder. We've gotten so good at weeding out that no one's left" (p. B-18).

Wirth (1992) painted the delivery of science as a depressing picture when he cited evidence that large numbers of American students avoided science in both secondary and higher education. Cole (1990) agreed, "Science education in the United States right now is largely a misnomer. It has little to do with science as scientists practice it, nor does it seem to educate anyone particularly well" (New York Times, p. B-18).

The National Science Board Commission on Precollege Education in Mathematics, Science, and Technology (1983) joined in stating an urgent need for curricula that utilized science and math applications in practical situations to improve student learning. The American Association for the Advancement of Science began a major effort to improve the delivery method of science education through Project 2061, science for all Americans (1989). Teachers and administrators devised the science curriculum to encourage students to make their own discoveries instead of reading about them in a book.

Policymakers, educators, employers, scholars, and social critics have advocated vocational education reform that dealt with "integration" (Stasz, Kaganoff, & Eden, 1994). According to researchers (Stasz and Grubb, 1991; O'Neil, 1992), vocational educators as well as critics of vocational education viewed integration of academics as a curricular reform that improved the academic content of vocational education and helped prepare students for employment in an ever-changing world of work.

In recent years, Agricultural Education Programs have faced a lack of stability in enrollments, a shifting of the job structure in the agriculture industry, and changing clientele in agricultural education (National Research Council, 1988). The agricultural industry anticipated a decrease of 163,000 agricultural production related jobs from 1987 to the year 2000 according to the Monthly Labor Review (1987). During the same period, it was anticipated that 47,000 farm manager positions would be created and life science jobs were expected to increase by 21%. This increase represented approximately 30,000 new science oriented jobs such as plant and animal genetics, biotechnology, and medicine (Silvestri and Lukasiewicz, 1987).

The National Research Council (1988) reported that much of the curriculum in agricultural education programs was outdated and additional science-based curriculum should be incorporated. According to Budke (1991), agricultural education provided an excellent means to teach biological sciences such as genetics, photosynthesis, nutrition, pollution control, water quality, reproduction, and food processing. The use of live examples as a part of the classroom for experimentation and observation provided an effective method to teach science concepts (Budke, 1991).

Whent (1992) indicated that many agriculture teachers were reluctant to change traditional agriculture programs because they believed integrating too much science into the curriculum may threaten the program. To assist in developing programs that integrate science into agricultural education, knowledge must be gathered about the perceptions and beliefs of teachers with exemplary agriscience programs.

Johnson (1995) reported that Arkansas teachers perceived that offering science credit for agriculture courses would increase enrollment, benefit students, and enhance the program image. Researchers (Roegge and Russell, 1990; Whent and Leising, 1988; Enderlin and Osborne, 1992; Connors and Elliot, 1995) found that students who have been taught science using agriculture and natural resources perform equally well or better than students who have been taught science using traditional instructional methods.

Duval (1988) stated that the AgriScience Teacher of the Year Award Program recognized outstanding agricultural educators who emphasized agriscience technology in their curriculum. "The program has surfaced some of the finest agriscience programs in the country. They have recognized the need for retaining the assets of today's vocational agriculture program, leadership training and SOE programs, while placing renewed emphasis upon the scientific and technological aspects of agriculture" (p. 20).

The educational reform movement has led to rapid changes in education and agricultural education. One result of the changes in agricultural education has been the establishment of the new FFA Award Programs to recognize teachers in agriscience and technology. Few studies have been conducted to evaluate the agriscience programs and ascertain the perceptions of these award winning agriscience teachers. This study provided information about perceptions of teachers who have been recognized as state, regional, and national winners of the FFA AgriScience Teacher of the Year Award Program. The results of this study will provide the agricultural education profession with information that will be useful in providing direction of science and technology in agricultural education.

"Purposive sampling" as described by Kerlinger (1986) was used to specifically study agricultural education teachers that were considered to be the most effective in integrating science into the agricultural education curriculum. Purposive sampling was used in this study as it identified exemplary agriscience teachers in the nation as identified by their state leadership and the National FFA Organization. Moore (1994) stated, "There are times when selecting purposive samples would do more to advance the profession than selecting random samples. At times we need to identify the best programs, best teachers, and best FFA Chapters and study them in detail" (p. 11).

Purpose/Objectives

The purpose of this study was to determine how agriscience teachers perceived the impact that integrating science has had on their agricultural education program. To fulfill the purposes of the study, the following research questions were addressed to state, regional, and national winners of the National FFA AgriScience Teacher of the Year Award Program:

1. What were the perceptions of agriscience teachers concerning integrating science and agriculture?

2. What were the perceptions of agriscience teachers concerning teaching integrated science?

3. What were the perceived barriers to integrating science into the agricultural education program?

4. What were the agriscience teachers' perceptions concerning the role of teacher preparation programs in integrating science into agricultural education programs.

5. What were the agriscience teachers' perceptions concerning student enrollment since integrating science into their agricultural education program?

6. What were the agriscience teachers' perceptions concerning support of the agricultural education program since integrating science?

Methods/Procedures

The target population of this study consisted of all state, regional, and national winners of the National FFA AgriScience Teacher of the Year Award Program from the years 1988 - 1995 ($\underline{N} = 253$). The accessible population was limited to agriculture teachers whose names were provided by the National FFA Organization and consisted of all available records of AgriScience winners that were still teaching. The list of names and addresses was cross-referenced with the Agricultural Educators Directory (1995) to determine if they maintained the same address and/or school since winning their respective AgriScience Teacher of the Year Award. If the agriscience teacher was not listed as currently teaching at the same school, the Agricultural Educators Directory (1995) was used to verify if the teacher was teaching in the same state. Finally, the National Vocational Agriculture Teachers Association (NVATA) office verified if individuals whose names were not listed in the Agricultural Educators Directory (1995) were members of the NVATA. If the teacher's name was not found in the Agricultural Educators Directory (1995) or in the membership records of NVATA, they were eliminated from the sample. AgriScience winners who no longer taught at the secondary level, were also eliminated from the sample. A purposive sample of 187 teachers that were still teaching were identified from the population for inclusion in the study.

The survey instrument was constructed based on a review of the literature and examined by a panel of experts for content validity and readability. The panel of experts consisted of members of the agricultural education profession representing teachers, state supervisors, teacher educators, and National FFA Organization staff ($n = 7$). The instrument was pilot tested with a sample of teachers ($n = 16$) to gain insight on clarity, appropriateness, reliability, and validity. The results of the pilot test indicated that only formatting and clarification changes were needed. Cronbach's alpha coefficient was .88 for the pilot test.

The survey instrument and cover letter were mailed to the subjects with a self-addressed, stamped return envelope. Two weeks after the initial mailing, a reminder post card was sent to non-respondents. After another two-week waiting period, a telephone call was placed to all non-respondents by using a phone number that was obtained through the internet (WWW.Swithboard.com, 1996). A new cover letter with a survey instrument and return envelope was mailed to those individuals who indicated that they had misplaced or discarded the original survey instrument. Usable responses were received from 131 teachers for an overall response of 71.98 percent.

Results/Findings

The respondents were asked to respond to 38 statements regarding integrating science into their Agricultural Education Programs. Their responses were measured using a five point Likert-type scale where 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree. Cronbach's alpha coefficient revealed an item reliability ranging from .80-.81. Cronbach's alpha reliability of the 38 scaled items was .81.

The raw mean scores on the 38 Likert-type items ranged from a low mean of 2.55 for the item, "the lack of a science teacher who is willing to help me integrate science concepts has been a barrier to integrating science in the agricultural education program" to a high score of 4.65 for the item "people pursuing a career in agriculture must have a greater understanding of biological science than ten years ago." The respondents rated 15 (37.5%) of the items 4.00 or higher while 34 (90%) of the items received mean ratings of 3.00 or higher. Only four (10%) of the items received a mean score less than 3.00.

Table 1 presents the means and standard deviations for agriscience teachers' perceptions of integrating science. Research question number 1, "Agriculture and Science" contained seven items with mean scores that ranged from 3.82 - 4.65. The items within this category had the highest mean scores for the six categories with only one item that had a mean below 4.00.

Table 1

Means (M) and Standard Deviations (SD) for Agriscience Teachers' Perceptions of Integrating Science and Agriculture (N = 130)

Agriculture and Science Item	M	SD
People pursuing a career in agriculture must have a greater understanding of biological science than ten years ago.	4.65	.52
Students are more aware of the connection between scientific principles and agriculture when science concepts are an integral part of their instruction in agricultural education.	4.56	.60
Students are better prepared in science after they completed a course in agricultural education that integrated science.	4.45	.67
Students learn more about agriculture when science concepts are an integral part of their instruction.	4.40	.73
Science concepts are easier to understand for students since I integrated science into the agricultural education program.	4.39	.66
People pursuing a career in agriculture must have a greater understanding of physical science than ten years ago.	4.33	.73
Students are more motivated to learn since I integrated science into the agricultural education program.	3.82	.83

Research question number 2, "Teaching Integrated Science" contained six items with mean scores that ranged from 3.28 - 4.18 (Table 2). The respondents agreed (a mean greater than 4) with statements regarding feeling prepared to teach integrated biological science concepts, more preparation time required to integrate science, and that they teach more biological than physical science concepts.

Table 2

Means (M) and Standard Deviations (SD) for Agriscience Teachers' Perceptions Toward Teaching Integrated Science in Their Agricultural Education Program (N = 130)

Teaching Integrated Science Item	M	SD
I feel prepared to teach integrated biological science concepts.	4.18	.74
Integrating science into the agricultural education program requires more preparation time for me than before I emphasized integrating science concepts in my agricultural education program.	4.18	.84
I teach integrated science concepts in agricultural education that focus more on the biological science concepts than the physical science concepts.	4.13	.78
Integrating science into agriculture classes has increased my ability to teach students to solve problems.	3.90	.72
I feel prepared to teach integrated physical science concepts.	3.89	.83
I have integrated more science in the advanced courses than the introductory courses that I teach in agricultural education.	3.28	1.13

Research question number 3, "Barriers to Integrating Science" contained nine items with mean scores that ranged from 2.55 - 3.99 (Table 3). No items in this category received mean scores above 4.00. This category also had the lowest mean scores. As indicated by the data, the respondents were undecided (a mean greater than 3 and less than 4) with statements regarding barriers to integrating science.

Table 3

Means (M) and Standard Deviations (SD) for Perceived Barriers in Integrating Science Into the Agricultural Education Program (N = 130)

Barriers to Integrating Science Item	M	SD
The lack of appropriate equipment is a barrier to integrating science into the agricultural education program.	3.99	1.00
The lack of adequate federal, state, or local funds is a barrier to integrating science in the agricultural education program.	3.56	1.23
The lack of agriscience inservice workshops/courses for agricultural education teachers is a barrier to integrating science into the ag. ed. program.	3.50	1.11
The lack of close proximity to high-technology firms is a barrier to integrating science in agricultural education programs.	3.25	1.07

Table 3 continued

Barriers to Integrating Science Item	M	SD
The lack of science competence among teachers in agricultural education is a barrier to integrating science in agricultural education.	3.13	1.11
The lack of an integrated science curriculum is a barrier to integrating science into the agricultural education program.	3.04	1.08
The lack of agriscience jobs in the local community is a barrier to integrating science into agricultural education programs.	2.90	1.09
The lack of student preparation (prior to enrolling in agricultural education) in science is a barrier to integrating science into agricultural education programs.	2.86	.99
The lack of a science teacher who is willing to help me integrate science concepts has been a barrier to integrating science in the ag. ed. program.	2.55	1.21

Research question number four, "Teacher Preparation Programs" contained five items with mean scores that ranged from 3.46 - 4.44 (Table 4). Agriscience teachers agreed (mean scores greater than 4) that teacher preparation programs should provide inservice for teachers and instruction for undergraduates on how to integrate science. Agriscience teachers also agreed (mean scores greater than 4) that student teachers and students in early field experience programs should be placed with teachers that integrate science into their agricultural education program.

Table 4

Means (M) and Standard Deviations (SD) for Agriscience Teachers' Perceptions Concerning the Role of Teacher Preparation Programs in Integrating Science in Agricultural Education Programs (N = 130)

Teacher Preparation Programs Item	M	SD
Teacher preparation programs should provide inservice for teachers in the field on how to integrate science into their agricultural education program.	4.44	.56
Teacher preparation programs in agriculture should provide instruction for undergraduates on how to integrate science.	4.38	.67
Teacher preparation programs in agriculture should place student teachers with a cooperating teacher that integrates science into the ag. ed. program.	4.19	.73
Teacher preparation programs should require that students conduct their early field experience program with a teacher that integrates science into the agricultural education program.	4.05	.70
Teacher preparation programs in agriculture should require students to take more basic science courses.	3.46	1.03

Research question number five, "Student Enrollment" contained five items with mean scores that ranged from 2.89 - 4.07 (Table 5). Only two statements had mean scores that were over 4.0. Agriscience teachers had high mean scores (greater than 4.0) in increased program enrollment and that high ability students are more likely to enroll in agricultural education courses that integrated science into the curriculum.

Table 5

Means (M) and Standard Deviations (SD) for Agriscience Teachers' Perceptions Concerning Student Enrollment Since Integrating Science into Their Agricultural Education Program (N = 130)

Student Enrollment Item	M	SD
High ability students are more likely to enroll in agricultural education courses that integrate science.	4.07	.89
Total program enrollment in agricultural education has increased since I integrated science.	4.03	.87
Average ability students are more likely to enroll in agricultural education courses that integrate science.	3.71	.85
Integrating science into the agricultural education program more effectively meets the needs of special population students.	3.19	1.02
Low ability students are more likely to enroll in agricultural education courses that integrate science.	2.89	1.15

" Program Support" contained six items with mean scores that ranged from 3.51 - 3.79 (Table 6). No items in this category had a mean score above 4.00. The respondents were undecided (mean scores greater than 3 and less than 4) as to groups of people that have increased support since integrating science into the agricultural education program.

Table 6

Means (M) and Standard Deviations (SD) for Agriscience Teachers' Perceptions Concerning Program Support Since Integrating Science into Their Agricultural Education Program (N = 130)

Program Support Item	M	SD
Local administrator support has increased since I have integrated more science into the agricultural education program.	3.79	1.01
Parental support has increased since I have integrated more science into the agricultural education program.	3.68	.79
Community support has increased since I have integrated more science into the agricultural education program.	3.65	.84
School counselor support has increased since I have integrated more science into the agricultural education program.	3.64	.94
Science teacher support has increased since I have integrated more science into the agricultural education program.	3.60	1.10
Other teacher support has increased since I have integrated more science into the agricultural education program.	3.51	.86

Conclusions/Recommendations/Implications

The conclusions of this study were based on the responses of the winners of the National FFA AgriScience Teacher of the Year Awards Program from 1988-1995. Although other agricultural education programs that integrate more science may have similar characteristics, caution must be exercised when generalizing the results of this study beyond the population. Based on the findings of this study, the following conclusions were formulated:

1. Agriscience teachers believed that integrating science assists students in better understanding science concepts and their application to agriculture. This concurs with the findings of Enderlin and Osborne (1992) that integrating more science will produce more science literate students that are better prepared to compete in today's society.

2. Agriscience teachers indicated that they need more preparation time than before they emphasized integrated science concepts. Agriscience teachers also feel better prepared and indicated that they teach more biological science concepts than physical science concepts in their curriculum.

3. Undergraduates will be better prepared to teach if they receive instruction on how to integrate science and if they student teach with a cooperating teacher that integrates science. Agriscience teachers also believe that teacher preparation programs should provide inservice for teachers on how to integrate science.

4. Agriscience teachers perceived that total program enrollment, and more specifically the number of high ability students, will likely increase as agriscience teachers integrate more science into their agricultural education program. This finding supports the conclusion of Johnson (1995) that Arkansas teachers perceived that offering science credit for agriculture courses would increase enrollment, benefit students, and enhance the program image.

Recommendations

1. Inservice programs should be offered to assist teachers in integrating science into the agricultural education curriculum. Inservice programs should target specifically in integrating the physical sciences into the agricultural education program.

2. Administrators should schedule planning time for teachers to better prepare them to integrate science. The profession should initiate an effort to educate administrators that time demands to integrate science are significant.

3. Teacher Preparation Programs must identify and use teachers in the state that are integrating science into their curriculum as cooperating teachers and placement centers for student teachers and early experience students.

References

Agricultural Educators Directory. (1995). Chas. M. Henry Printing Co. Greensburg, PA.

American Association for the Advancement of Science. (1989). Project 2061 - Science for all Americans. Washington, DC: Author.

Banyan Systems Incorporated. (1996). http://www.switchboard.com.

Budke, W. E. (1991, January). Agriculture science-Striving for excellence. The Agricultural Education Magazine, 63 (7), 4, 11.

Carnegie Foundation for the Advancement of Teaching. (1989). An imperiled generation: Saving urban schools. Princeton, New Jersey

Case, L. D. (1986). Agricultural education: Striving for excellence. The Agricultural Education Magazine, 58 (7) 10-12.

Cole, K. C. (1990, January 7). Science under scrutiny. New York Times.

Connors, J., & Elliot, J. (1995). The influence of agriscience and natural resources curriculum on student's science achievement scores. Journal of Agricultural Education, 36 (3), 57-63.

Enderlin, K. J., & Osborne, E. W. (1992). Student achievement, attitudes, and thinking skill attainment in an integrated science/agriculture course. Proceedings of the Nineteenth Annual National Agricultural Education Research Meeting. St. Louis, MO.

Duval, C. L. (1988). The AgriScience movement. The Agricultural Education Magazine, 61 (5), 18-21.

Jennings, J. F. (1991), February). Congressional intent. Vocational Education Journal, 66 (2), 18-19.

Johnson, D. M. (1995). Arkansas agriculture teachers' opinions concerning science credit for agriculture. Proceedings of the 22nd Annual Agricultural Education Research Meeting. Denver, CO.

Kerlinger, F. N. (1986). Foundations of behavioral research. (3rd ed.). New York: Holt, Rinehardt and Winston Publishing Company.

Moore, G. E. (1994). Back to the future: Research in Agricultural Education. A paper presented to the National Agricultural Education Research Meeting, December 9, 1994, Dallas, Texas.

National Commission on Excellence in Education. (1983). A nation at risk: the imperative for educational reform. David P. Gardner (Chair). Washington, DC: U.S. Department of Education.

National Commission on Secondary Vocational Education. (1984). The unfinished agenda: The role of Vocational Education in high school. Columbus, OH: The National Center for Research in Vocational Education. The Ohio State University.

National Research Council. (1988). Understanding agriculture: New directions for education. Washington, DC: National Academy Press.

National Science Board Commission on Precollege Education in Mathematics, Science and Technology. (1983). A revised and intensified science and technology curriculum for grades K-12 urgently needed for our future. Washington, DC: National Science foundation. (ERIC Document Reproduction Service No. ED 239 847).

New York Times. (1990, May 25). Science under scrutiny.

O'Neil, J. (1992). Preparing for the changing workplace. Educational Leadership, 49 (6),6-9.

Osborne, E. W., & Dyer, J. E. (1995). Attitudes of Illinois high school science teachers toward the agricultural industry and educational programs in agriculture. Proceedings of the 22nd Annual National Agricultural Education Research Meeting. Denver, CO.

"Riskline." USA Today, March 17, 1993, p. 5D.

Roegge, C. A. & Russell, E. B. (1990). Teaching applied biology in secondary agriculture: Effects on student achievement and attitudes. Journal of Agricultural Education, 31 (1), 27-31.

Silvestri, G. T., & Lukasiewicz (1987, September). Projections 2000: A look at occupational employment trends to the year 2000. Monthly Labor Review, 110 (9), 46-63.

Stasz, C., & Grubb, W. N. (1991). Integrating academic and vocational education: Guidelines for assessing a fuzzy reform. (Report No. MDS-375). Berkeley, CA: National Center for Research in Vocational Education.

Stasz, C., Kaganoff, T., & Eden, R. A. (1994). Integrating academic and vocational education: A review of the literature, 1987-1992 Journal of Vocational Research, Vol. 19, No.2. 1994.

Whent, L. (1992). Bridging the gap between agricultural and science education. The Agricultural Education Magazine, 65 (4), 6-8.

Whent , L. S., & Leising, J. (1988). A descriptive study of the basic core curriculum for agriculture students in California. Proceedings of the 66th Annual Western Region Agricultural Education Research Seminar. Fort Collins, CO.

Wirt, A. G. (1991, February). New federal law on vocational education: Will reform follow? Phi Delta Kappan, 72 (6), 425-433.

Wirth, A. G. (1992). Education and work for the year 2000: Choices we face. San Francisco, CA: Jossey-Bass Inc.

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