OKLAHOMA AGRICULTURAL EDUCATION TEACHERS' PERCEPTIONS OF GRANTING SCIENCE CREDIT FOR AGRICULTURAL COURSES TO MEET HIGH SCHOOL GRADUATION AND COLLEGE ADMISSION REQUIREMENTS

By

KENNETH RAY BEAMS

Bachelor of Science
Oklahoma State University
Stillwater, Oklahoma
1978

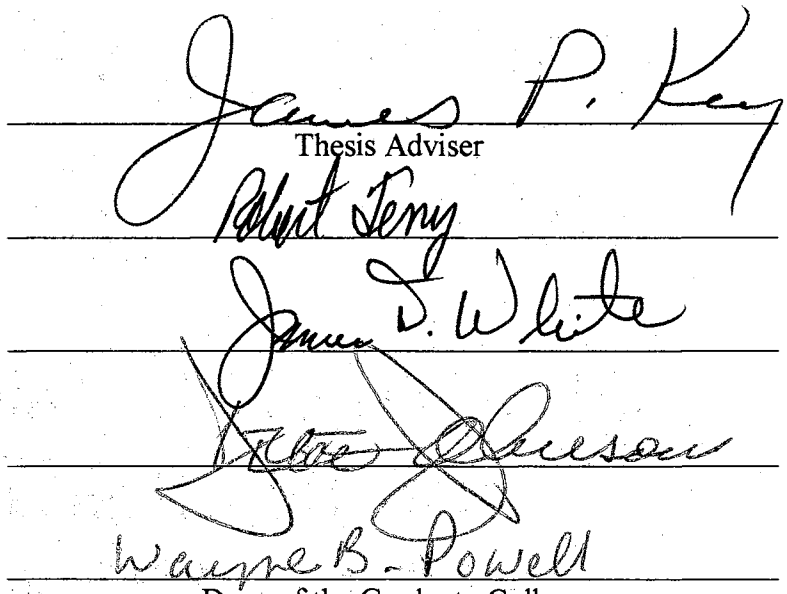
Master of Science
Oklahoma State University
Stillwater, Oklahoma
1993

Submitted to the Faculty of the
Graduate College of the
Oklahoma State University
in partial fulfillment of
the requirements for
the Degree of
DOCTOR OF PHILOSOPHY
December, 1998

OKLAHOMA STATE UNIVERSITY

OKLAHOMA AGRICULTURAL EDUCATION TEACHERS' PERCEPTIONS OF GRANTING SCIENCE CREDIT FOR AGRICULTURAL COURSES TO MEET HIGH SCHOOL GRADUATION AND COLLEGE ADMISSION REQUIREMENTS

Thesis Approved:



Thesis Adviser

Dean of the Graduate College

ACKNOWLEDGMENTS

I wish to express my sincere appreciation to my advisor, Dr. James Key, for his inspiration, constructive guidance, intelligent supervision and friendship. My sincere appreciation also extends to my other committee members Dr. James White, Dr. Robert Terry and Dr. Deke Johnson. Their encouragement, guidance, and friendship will always be remembered. Also, I thank Dr. James Leising and the Department of Agricultural Education, Communications and 4-H Youth Development at Oklahoma State University for providing me with this research opportunity and financial support.

I convey my sincere gratitude to those who provided suggestions and assistance to this study including Dr. Roy Peters, Dr. Ann Benson, Mr. Eddie Smith, Dr. Ben Shaw, the agricultural education staff members at the Oklahoma Department of Vocational and Technical Education, and especially agricultural education teachers in Oklahoma.

Most importantly, I thank my wife, Belinda, for her suggestions to my research, constant encouragement and unconditional devotion throughout this whole process. Also, I thank my sons, Travis and Dustin, my parents, Ozell and Betty Beams, and my other family members for understanding the time required of me on this project and encouraging me to go forward with my education.

Finally, I thank my former students, supporters, co-workers and administrators for their active participation, words of encouragement and belief in the value of my program during my years as an agricultural education teacher and FFA adviser.

TABLE OF CONTENTS

Chapter Page

Chapter Page

LIST OF TABLES

CHAPTER I

INTRODUCTION

During the past two decades, educational studies on the academic performance of high school and college students were critical of the educational system in the United States. One report, *A Nation at Risk* (National Commission on Excellence in Education, 1983), recommended all students increase their study in basic subjects. More recent studies reported that education in mathematics, science, and foreign language was particularly deficient (National Research Council, 1988).

The public reaction to these studies caused school officials to strengthen curricula with basic academic skills. Also, in response to the studies, educational policymakers in Oklahoma increased the academic requirements necessary for high school graduation and admission to Oklahoma colleges and universities.

The objective, of adding more requirements, was to improve student preparation for higher education and the workplace. However, with the additional requirements, students were forced into more rigid enrollment schedules with fewer opportunities to enroll in electives. Ironically, the electives that were eliminated were courses that historically emphasized and promoted career preparation, teamwork, personal initiative, leadership development and personal growth, all of which were common characteristics found in successful college students and people in the workplace.

These electives, many of which were vocational education courses, offered students an opportunity to apply the concepts learned in mathematics and science. As far back as the early 1900s, John Dewey advocated "learning by doing", a concept that vocational education was built upon. Later, Goodlad (1983), in *A Place Called School*, argued that most students learn best when engaged in "hands-on" activities.

A four-year plan of improvement, beginning in 1996, required 1998 high school graduates to complete four units of English and two units of science, math, social studies, and the arts (visual and music). Additional requirements included three elective classes selected from these subject areas and one class in citizenship. Also, it was strongly recommended that high school students take classes in computer science, foreign language, and speech or debate to complete a total of 20 required units. Plans were also made to increase the math requirement to three units by the year 2000 (The Oklahoma Department of Education and Oklahoma State Regents for Higher Education, 1996).

As a result of the additional requirements, credit hours available for vocational education courses and other beneficial electives were reduced. Since 1996, debate has arisen over the opportunity for students to enroll in traditional electives. One argument suggested "non-college-bound" students may eventually attend college, therefore, a schedule of rigorous courses, that emphasized basic academic skills, was necessary for all students in high school.

Another argument countered, that by raising academic requirements, it deprived "college-bound" and "non-college-bound" students a comprehensive educational experience, which in many cases, included athletics, vocational education and beneficial electives that provided occupational training and career development activities.

A compromising response to both arguments, made by the Oklahoma Department of Vocational and Technical Education, was for educators to provide rigorous studies in all classes by integrating the academic and technical skills needed in higher education and the workplace (Ten Key Educational Practices, ODVTE, 1997).

Whether high school students want to become neurosurgeons or electronic technicians, they will need a combination of academic and technical skills based on theoretical knowledge. They should also realize the importance of life-long learning. In this knowledge-based society, the traditional distinctions between "college-bound"and "non-college-bound" students are becoming obsolete. The skills and knowledge needed to succeed in post-secondary education and work is increasingly similar (McNeil, 1997).

As a result of increased graduation and college admission requirements, public school policy began to change. However, for the first time, Oklahoma policymakers opted to exclude agricultural education and other electives from their plan of educational reform. Oklahoma school policy stated that credits, derived from the completion of most agricultural education classes, did not satisfy any college admission requirements and satisfied only a few high school graduation requirements.

Survival in a changing school structure and competition with many new academic requirements, prompted some agriculture teachers to seek the answers to tough questions about the future of their profession. Teachers wondered about the long-term effect to their programs if agriculture courses met high school graduation and college admission requirements. Teachers also wondered if they were willing to be accountable for the future academic success of their students. More questions, concerning their confidence, arose when teachers assessed their educational preparation to teach core academic skills.

Contrary to an emerging belief among some teachers, the Agricultural Education staff, at the Oklahoma Department of Vocational and Technical Education, believed that several agriculture courses, which were basically equivalent to some classes satisfying high school graduation and college admission requirements, should receive full credit. In an effort to accomplish this task, the state staff identified priority academic skills (PASS) embedded in agricultural curricula, used by teachers in Oklahoma.

A cross-reference, of state and national priority academic skills to agricultural curricula, received positive reviews from administrators and seemed to be the first significant step toward reaching the goal of granting academic credit for agriculture courses. However, after several in-service meetings with agricultural educators, it was clear to the state staff that future plans were impossible to make until more was known about teachers' perceptions of this concept and their willingness to accept and implement the necessary changes needed to make the concept a reality.

Therefore, the research in this study specifically addressed a dilemma facing agricultural education programs and teachers in Oklahoma. The research attempted to identify the perceptions of agricultural education teachers, about the issue of granting academic science credit for agriculture courses, for the purpose of meeting high school graduation and college admission requirements.

This study addressed pertinent issues of educational change by directing questions to Oklahoma agriculture teachers about the integration of academic and technical skills in agricultural curricula. Also, this study challenged teachers to consider what changes should be made to accomplish the task of preparing their students for success in the classroom and workplace.

Statement of the Problem

According to Oklahoma school policy, academic science credit for high school graduation and college admission required approval by the State Board of Education and the State Regents for Higher Education, respectively. Agriculture education courses did not satisfy any college admission requirement, nor were they recommended for high school students.

In the absence of a state recommendation for students to enroll in agriculture courses, and approval of these courses to fulfill partial college admission requirements, the longevity and quality of Oklahoma agricultural education programs were subject to rapid deterioration.

Therefore, a need existed to determine (1) the local support for granting science credit for agriculture courses, (2) the effects of granting science credit for agriculture courses, as perceived by agricultural education teachers, (3) the teachers' perceptions about different methods of certification and methods of granting science credit for agriculture courses, (4) at what level were agricultural educators teaching priority academic skills, and (5) the agricultural education teachers' level of comfort with integrating basic academic skills into their daily lesson plans.

Purpose of the Study

The purpose of this study was to determine Oklahoma agricultural education teachers' selected perceptions of granting science credit for agriculture courses to meet high school graduation and college admission requirements.

Objectives of the Study

The following objectives were established by the researcher to achieve the purpose of the study:

1. To determine the level of support, from selected sources, for granting academic science credit for agriculture courses, as perceived by agricultural education teachers.

2. To determine the agricultural education teachers' perceptions of the effects of offering academic science credit for agriculture courses.

3. To determine the agricultural education teachers' preference and/or support for five different methods of granting academic science credit for agriculture courses.

4. To determine the agricultural education teachers' preference and/or support for five different types of certification procedures that would allow their students to obtain academic science credit.

5. To determine the extent to which agricultural education teachers teach and integrate the science objectives, listed in the *Oklahoma State Department of Education Priority Academic Student Skills* (Revised March, 1997) handbook, as reported by agricultural education teachers.

6. To determine the level of comfort agricultural education teachers have with integrating priority academic skills into their daily lesson plans.

Scope of the Study

The scope of this study included all Oklahoma agricultural education teachers and FFA advisors employed during the 1997-98 school year.

Assumptions of the Study

The following assumptions were made regarding the study:

1. The respondents fully understood the questions that were asked.
2. The respondents provided honest expressions of their attitudes and perceptions.
3. The instrument obtained accurate responses.
4. The need for agricultural education courses would continue.
5. Oklahoma agricultural education teachers were concerned about the future of their profession and interested in securing the quality and longevity of their programs.

Limitations of the Study

The following limitations of the study were identified:

1. The study did not attempt to predict the success of agricultural education teachers, or their programs, if academic science credit for specific agriculture courses was approved in Oklahoma.
2. The study was limited to only Oklahoma agricultural education teachers who were teaching under a valid 1997-98 contract. Therefore, the results of the study were generalizable only to the population of Oklahoma agricultural education teachers employed during the 1997-98 academic year.

Definition of Terms Used in the Study

ODVTE - The acronym used for the Oklahoma Department of Vocational and Technical Education located in Stillwater, Oklahoma.

State Staff or the ODVTE Agricultural Education Staff - A staff within the Oklahoma Department of Vocational and Technical Education consisting of the state program administrator of agricultural education programs, five district program specialists, and one executive secretary of the Oklahoma FFA Association.

PASS - The acronym used for Priority Academic Student Skills as identified by the Oklahoma Department of Education (March, 1997). It was intended that through the study of priority academic skills, Oklahoma students would become knowledgeable, responsible and productive citizens.

OAETA - The acronym used for the Oklahoma Agricultural Education Teachers Association, the professional affiliation for teachers of agricultural education in Oklahoma. OAETA members also have membership in the NAAE.

NAAE - The professional affiliation for teachers of agricultural education in the United States. NAAE is the acronym for the National Association of Agricultural Educators.

SAE - Supervised agricultural experience programs. Agriculture students are required to develop SAE's to become acquainted with methods of financial management.

FFA - Formerly known as the Future Farmers of America. The state and national youth organization available to students enrolled in agricultural education.

Summary

For approximately 60 years, the development of agricultural education programs in Oklahoma focused on production agriculture. However, the last 20 years have brought radical change to teachers and the structure of their programs. This study explored the perceived effects of change and the continuing change process in agriculture programs.

CHAPTER II

REVIEW OF LITERATURE

Introduction

The purpose of this chapter was to provide a theoretical background from the available literature on granting academic science credit for agriculture courses. A compilation of journal articles, books and ERIC documents was obtained to give a broad representation of the review of literature for this study. To provide a comprehensive review of literature, Chapter II was divided into the following sections: (1) Introduction, (2) Historical Overview, (3) Legislative Action, (4) Importance of Integrating Math and Science, (5) Granting Academic Credit, (6) Resource Sharing, (7) Training Agriculture Teachers, (8) Vocational Education's Response to Educational Reform, and (9) Summary.

Historical Overview

Hammonds (1950) provided a compelling argument for teaching agriculture as a science. According to Hammonds: "The organized body of knowledge we call the science of agriculture is deeply rooted in the sciences that contribute to agriculture. If we strip away from agriculture the portions of other sciences that bear upon it, we perhaps do not have left a science of agriculture. To teach agriculture as a science is to recognize that it is a science (p.5)."

In 1986, a report from the Secretary's Commission on Achieving Necessary Skills (SCANS), a project of the United States Department of Labor, stated priority should be given to the integration of academic and vocational skills to improve the labor force. According to the SCANS report, all students should learn basic academic skills and be able to use them in a practical way to solve problem situations in the workplace of the future. From this report, a trend developed giving emphasis to the integration of vocational and academic skills (Warnat, 1991). The SCANS report also suggested that schools provide a well-rounded, practical and functional education that produces a competent and productive worker, a successful post-secondary student and a beneficial member of society.

During the 1980s and early 1990s, there were numerous reports calling for reform in vocational education. As a result, a variety of recommendations to improve vocational education were made (Hunnicutt and Newman, 1994). These reports recommended that (a) the role of vocational education should change to make youth more employable, (b) vocational education should compliment academic education so that employability could be best accomplished, (c) academic and vocational education curricula should be integrated and their equal importance should be recognized by students, faculty, and administrators, and (d) students should be taught to see the connection between vocational subjects, academic subjects and the skills needed to succeed in the vocation of their choice (National Commission on Secondary Vocational Education, 1984).

Gray (1991) stated that if problems are not debated, and reform is not used to change and improve vocational education, it very well may cease to exist. The changing technology of business and industry creates a need for change in the educational process.

Vocational education must become aware of and adjust to this change in order to be an active part of the educational process in the future. Adapting to change by determining what must be done to reach the needs of future students and incorporating those needs into the goals of the discipline will strengthen and improve vocational education.

More recently, Smith (1997) identified a growing belief among vocational educators that vocational education should change from the present discipline form to one that coordinates with other disciplines. These changes are encouraged to produce a better trained workforce and provide basic academic skills for greater student success in completing the requirements of higher education and other post-secondary programs.

Legislative Action

The Perkins Act (The Carl D. Perkins Vocational and Applied Technology Education Act, 1990) is the legislation that mandated the approach recommended by the SCANS report. The Perkins Act provided standards designed to ensure that all vocational educators integrated mathematics and science into their teaching plans. This legislation provided direction and emphasis to state departments of education and local school districts to produce well-rounded, educated workers for the workplace through the integration of academic and vocational training (Warnat, 1991).

The Perkins Act included trend-setting legislation that called for educating students through a combination of vocational and academic training. This training was to be provided by all faculty members through the coordination of disciplines and was not to be fragmented, as had usually existed within schools and school systems (Hunnicutt and Newman, 1994).

Many other educational standards were developed from the Perkins Act. For example, it prompted state departments of education and local school systems to develop and incorporate a new standardized format for lesson plans. The new format, for lesson plans, provided teachers with an opportunity to effectively integrate academic skills into agricultural curricula (Huston, 1997). In Alabama, the Performance Based Accreditation System (PBAS) incorporated the new lesson plan format into the evaluation of vocational programs throughout the state (Alabama State Department of Education, Accreditation Division, 1993).

In recent years, Oklahoma legislators have shown their support for common education with the passage of House Bill 1017. This bill increased common education appropriations from $875 million in 1990 to over $1.5 billion in 1997. While not as dramatic, substantial increases in vocational and higher education also occurred. This legislative action clearly signified an intent to provide enhanced educational opportunities for Oklahoma's children and citizens (Oklahoma Department of Vocational and Technical Education Business Report, 1997).

Importance of Integrating Math and Science

In an effort to improve education, vocational educators recognized the importance of academic proficiency to vocational students (Miller and Gliem, 1993). Consequently, much of the work in academic content, within agricultural education, has included mathematics and science proficiency. Since math and science are closely related to agricultural education, an effort has been made to incorporate these two subjects into the content of agricultural curricula (Butler and Lee, 1993; Dormody, 1992).

The concepts of mathematics can be found throughout agricultural subject matter, but at this point, math has not received as much study and attention as science (Gliem and Persinger, 1987). Yet, Pritiz, (1988) stated that employers expect their employees to apply basic math and science skills to their everyday specific tasks.

Mitchell (1990) found that employment situations typically require practical problem solving in mathematics not taught in the current mathematics curriculum. D'Augustine (1989) stated that rapid changes in the workplace are creating new demands on the mathematics skills of students entering majors in business and vocational programs. The findings of Mitchell (1990) and D'Augustine (1989) indicate changes are needed in the educational process used to train the workforce of the future and to provide the basic academic skills needed for students to be successful at the post-secondary level.

Agricultural education can play an important role in the future of the education process by integrating academic and vocational skills. Agricultural education teachers can provide instruction in practical mathematics and science that will help students become more proficient in these two basic academic skills. The integration of academic content into agricultural education curricula is not only beneficial, but necessary according to federal standards (Mitchell, 1990).

Finally, the importance of integrating math and science in agricultural courses is emphasized in an Iowa study to determine how to reverse the downward trend of enrollment in high school agricultural education courses. It was found that (1) students thought of agriculture as "farming", (2) students thought that agricultural education courses should be offered for science credit, (3) college admission requirements were a barrier for students continuing in agricultural education at the 11th and 12th grade level,

(4) scheduling conflicts were a factor in reducing agricultural education enrollment, and (5) less than half of the students were interested in the FFA. The study concluded that enrollment in agricultural education courses would continue to drop and changes in the agricultural curricula were needed to reverse the trend (Doese and Miller, 1988).

Granting Academic Credit

This section, of the review of literature, looked at the historic development of high school graduation requirements, vocational education's relationship to graduation requirements, the role of vocational education in secondary schools and the perceptions of granting academic credit for vocational education courses.

During 1984, at least 44 states increased their graduation requirements for science, math and English (Delaware Department of Public Instruction, 1985). Since that time, granting academic credit, for training provided in vocational classrooms, has turned into a major dilemma for vocational educators. In fact, the dilemma now threatens vocational programs across the country.

Several state studies have investigated the ways in which vocational education is related to high school graduation requirements (Minnesota, Ohio, Virginia, California and Washington). These studies showed a variety of ways in which vocational education relates to high school graduation requirements. For example, agricultural education courses such as *The Principles of Biotechnology* were used to meet the state-mandated science requirements. However, some schools discovered problems with such an arrangement because of confusion over whether academic or vocational teachers should teach such courses.

After the conclusion of numerous studies, it was determined that subject matter in agricultural education strongly related to courses required for high school graduation and college admission. However, concerns continued to arise over the increase of graduation requirements. It was feared that additional requirements would draw students away from agricultural education, unless agricultural education courses satisfied some high school graduation and college admission requirements. Another option, which has been used in a few states, was rewriting requirements in terms of competencies rather than credit hours derived from specific courses.

Even with concerns about the future of vocational education looming over several states, Miller and Gliem (1993) found that Ohio teachers participating in a workshop were strongly positive regarding the integration of mathematics and science in vocational curriculum. Miller and Vogelzang (1983) found that Iowa teachers supported inclusion of science and mathematics into agricultural education curriculum and stated that integration could be used as a means of improvement in agricultural education.

Johnson and Newman (1993) provided additional information supporting the importance of teaching science skills in agricultural education. Administrators, counselors and teachers from 41 Mississippi schools supported a pilot agriscience curriculum. After examining the course content, science teachers expressed strong support for granting science credit for the course. However, the curriculum was strongly perceived, by those surveyed, as primarily for students planning agricultural careers.

As of 1985, 11 states had a policy allowing vocational credit to be counted in lieu of science or math, and 16 states gave local school districts jurisdiction over course approval. Only three states had a policy prohibiting credit allowance for occupational and

technical subjects as a substitute for math, science or any other required subject (Delaware Department of Public Instruction, 1985).

Naylor (1986) described four approaches to granting academic credit for instruction of basic skills provided in vocational education courses. Accreditation approaches with varying degrees of success were developed in New York State, Virginia, Ohio and California. However, an important and common characteristic in each approach later revealed that gaining community and staff support prior to implementing the approach was imperative.

To gain public support for granting academic credit for vocational courses, Holsey and Rosenfeld (1985) emphasized the importance of increasing the awareness of the extent to which basic skills were already being covered in vocational classrooms.

Dormody (1993) found that some teachers were reluctant to teach basic skills, even if their state allowed agricultural courses to be counted for academic credit. However, a survey of 241 secondary agriculture teachers showed that those with science credentials were more likely to teach science-based, agriculture courses to receive science credit. The research also indicated that agricultural education teachers with science credentials may be more marketable.

Because college-bound students had trouble fitting agriculture courses into their schedules and science teachers rejected the idea of giving a science credit for two years of agricultural education, a new integrated course was implemented in Tennessee. It was called Science IA (Agriscience) and taught by teachers with an endorsement in both agricultural education and science. The course received the same funding formula as agricultural education and counted toward a major in agricultural education.

The IA agriscience course included FFA units in communication skills and the application of knowledge. A long list of steps was needed to get the course accepted as a science credit for college admission in Tennessee. The pilot test of the program was a great success the first year and student test scores were higher than before implementation of the course. Recommendations were made to strengthen the program as a result of the pilot program. The course has become a model for integrating vocational and academic education (Ricketts, 1991).

Michigan agricultural educators also adopted an agriscience and natural resources (ANR) curriculum during the fall semester of 1991. In an evaluation study, Conners and Elliot (1994) found that Michigan agriculture teachers supported the new curriculum and strongly agreed that students should receive science credit for courses in agriscience and natural resources.

Peasley and Henderson (1992) studied Ohio agriculture teachers' attitudes toward adoption of an agriscience curriculum. The researchers found that, while teachers had a positive attitude toward agriscience, some were concerned about the possible effects of offering science credit for agricultural courses. One teacher wrote (p.42), "If we grant science credit, administrators will use this as a reason to treat ag (agriscience) classes as just another general science class." A second teacher wrote (p.42), "If we grant science credit, what happens to FFA? I think this is a big mistake."

According to Norris and Briers (1989, p.42), a teacher's perception toward the change process (i.e., the need for change, the amount of input and the manner in which the change was managed) was the single best predictor of the teachers' decision concerning the adoption of change.

Goodland (1975) and Owens (1987) also noted that teacher readiness is one of the most important variables associated with the success of school change in terms of student outcomes. Thus, this study was conducted to gather information from Oklahoma agricultural education teachers and at the same time, allow their input into the possible change process.

Resource Sharing

Dormody (1991) explored perceptions of secondary agriculture teachers regarding resource sharing between the agriculture program and science department. Data were collected from a random sample of 400 secondary school teachers of agriculture. With a Likert-type scale, the researcher measured three sharing dynamics: (1) present sharing of science department resources with teachers of agriculture, (2) present sharing of agriculture program resources with science departments, and (3) projected sharing of science department resources with teachers of agriculture.

Instructional services had the lowest mean among resource categories for each of the three sharing dynamics and equipment and supplies had the highest mean. Except for equipment and supplies, agriculture teachers perceived they had shared more resources than they had received. Teachers also predicted higher resource sharing in the future.

In Ohio, 27% of the agricultural education teachers surveyed indicated they cooperated with mathematics and science teachers to identify agriculture-related topics in which academic skills could be integrated at the appropriate levels (Miller and Gliem, 1993). The coordination of disciplines was perceived to be important in the effort to produce competent, successful graduates.

Further research found that responses from nine of ten agriculture/science teacher teams, participating in a group project, showed that participation increased cooperation and resource sharing. Also, science teachers had the greatest gains during the testing phase and agriculture teachers during the workshop phase. A lack of awareness inhibited science teachers from using agriculture department resources (Whent, 1994).

Training Agriculture Teachers

School district administrators play an important role in determining what a local agriculture program should emphasize. A key issue, to the well-being of agriculture programs, is the degree to which teacher educators, agriculture teachers and school administrators agree on which activities are important and which activities should or could be de-emphasized. Any evaluation of curricula, used to prepare agriculture teachers, will be enhanced by including local administrators (Rush and Foster, 1984).

With the current trends in education, agricultural education programs will face unique enrollment pressures in the future due to the competition of other courses which are required for high school graduation or college admission. Agriculture teachers, teacher educators and state supervisors of agricultural education should entertain strategies to prepare agriculture teachers to integrate basic academic skills within their curriculum.

Even though local administrators and school boards approve program existence, the quality of the agriculture programs may deteriorate unless (1) more priority academic skills are taught within the agricultural curricula, (2) courses in agriculture programs are recommended for high school students by the State Department of Education, counselors

and administrators, and (3) colleges and universities agree to accept agriculture courses to meet their academic admission requirements. It seems clear that the intelligent evaluation of the curricula, used in teacher preparation, will be imperative in the future.

The curriculum for teacher preparation is a major area of concern for teacher educators in agriculture (Hammonds, 1950). Even now, there continues to be much discussion centered around the three components of curricula used in teacher preparation: (1) the general education, (2) the technical aspect of the subject matter, and (3) the professional education.

The general education is that which prepares the individual to live and interact effectively within society (Clouse and Brown, 1982). The technical education and preparation, of an agriculture teacher, have been major concerns for most of the history of agricultural education (Peterson and Torrence, 1967). Technical education is designed to give teachers a certain degree of mastery of the subject matter they teach.

The professional education of a prospective teacher must be a quality experience, since it is designed to orient the prospective teacher with the purposes, principles, policies and procedures in education, as well as developing the abilities which are necessary in teaching agriculture (Crunkilton and Hemp, 1982). Many contend that the agricultural curricula should be a mixture of these three components tailored to individual and programmatic needs.

Continual evaluation will enable programs of instruction to adapt more readily to the changing needs of the clientele of the future (Cox and Edmundson, 1989). The preparedness of graduates and their ability to perform is often associated with the curriculum they studied in college (Larke, 1982).

In times when faculty must face curricular changes unique to their program, the graduates of the program are valuable resources (Trinklein and Wells, 1989). Follow-up studies by program completers as a form of evaluation can also be beneficial to the institution that desires to improve its instructional program in agricultural education (Drueckhammer and Key, 1986).

Today, agricultural education teachers must master certain competencies that will enable them to incorporate and teach the application of academics, such as mathematics and science, within the agricultural education curriculum. The ability of the teacher to integrate these core academic skills, will determine the success of agricultural education programs to a large degree. Therefore, agricultural education teachers, must be prepared to integrate academic skills into their daily lesson plans (Warnat, 1991).

Vocational Education's Response to Educational Reform

It is impossible for Oklahoma educators to provide an excellent education for all students if we do not acknowledge the current deficiencies in the educational system and address them with a degree of urgency. Increasing rigor in academic and vocational courses is the best strategy to address these deficiencies, rather than increasing the number of courses, which may not necessarily equal greater achievement. With the exception of ACT (American College Testing Program) test data, on prospective college students, a lack of information is available to determine the most beneficial courses that should be required for high school graduation and college admission (Peters, 1997).

Oklahoma business and industry supports greater rigor in the requirements for a high school diploma. However, it is imperative that all entities, including the public schools, vocational education, higher education, and the offices of the Governor and Secretary of Education, agree on how to prepare students for further education and work. By collaborating on processes, these entities should focus on the same goals to supply Oklahoma with a highly trained and qualified workforce (McCharen, 1997).

The results of a national survey further complicates the issue of addressing the deficiencies in the Oklahoma educational system. A national survey of administrators, teachers and business leaders provided a consensus that vocational education should do more than prepare a student for a specific occupation (Bottoms, 1997).

The survey, conducted in the state of New York, indicated that, in addition to training in basic technical skills, vocational education courses should include instruction in 14 additional areas. The following areas were identified and ranked: (1) employability skills, (2) abilities in problem solving, communications, decision making, interpersonal relationships, and resource management, (3) technological literacy, (4) ability to cope with life situations, (5) technical reading, writing and mathematic skills related to occupational areas, (6) awareness of careers, (7) basic reading, writing and mathematics skills (8) personal and occupational safety, (9) knowledge of basic economic concepts, (10) ability to take advantage of inevitable change, (11) technical skills specific to one job, (12) responsibility to work alone and social skills to work in groups, (13) abilities to manage a home and personal business affairs, and (14) ability to efficiently use leisure time for self-fulfillment purposes (Northwest Regional Educational Laboratory, 1986).

Attempting to address each of these areas while providing a rigorous, hands-on program of instruction may seem unrealistically ambitious, but evidence confirms that many vocational programs already include a significant amount of instruction in at least some of these areas. For example, vocational students, teachers, parents, and business leaders in North Carolina were asked to review three vocational programs. Results indicated that the courses included significantly more instruction in science and math skills than the respondents had previously imagined (Holsey and Rosenfeld, 1985).

Modern industries are demanding that future employees have proficiency in the areas of advanced technological skills coupled equally with academic and "soft" skills. To acquire a combination of diverse skills, students should conduct a six-year plan of study that includes a balance of academic education, vocational and technical education, physical education, and the arts. Requiring additional classes, that only emphasize core academic skills, is counterproductive for the state's economic base and is in direct conflict with the findings of the national survey conducted in New York (Benson, 1997).

Summary

Public high schools may be the most challenging institutions in our educational system. During this time, students go through some of the most important and difficult changes in their lives. They are coming face to face with adulthood and all of the opportunities and challenges that go along with it. High schools have traditionally been the gateways to the future for our young people. They still are, but as the future of work and the demands of adult life change, high schools have to change too (McNeil, 1996).

Consequently, agriculture programs, in Oklahoma, were confronted with the challenge of change. Considering the trend of Oklahoma educational policies, there was concern that students would be required to complete additional core academic classes, which could prevent them from enrolling in agricultural education programs.

To counter the negative trend toward agricultural education, it was determined, by the state agricultural education staff, that several courses, taught in agriculture programs, were worthy of receiving credit to satisfy high school graduation and college admission requirements. However, with skepticism surfacing among teachers, the state staff decided to gather more information before pursuing the matter. Agricultural education teachers had to decide if they were willing to modify their courses, accept changes in the structure of their programs and update their ability to integrate core academic skills into their daily lesson plans, even if it meant rigorous preparatory in-service.

CHAPTER III

METHODOLOGY

Purpose of the Study

The purpose of this study was to determine Oklahoma agricultural education teachers' selected perceptions of granting science credit for agriculture courses to meet high school graduation and college admission requirements.

Objectives of the Study

The following objectives were established by the researcher to achieve the purpose of the study:

1. To determine the level of support, from selected sources, for granting academic science credit for agriculture courses, as perceived by agricultural education teachers.
2. To determine the agricultural education teachers' perceptions of the effects of offering academic science credit for agriculture courses.
3. To determine the agricultural education teachers' preference and/or support for five different methods of granting academic science credit for agriculture courses.
4. To determine the agricultural education teachers' preference and/or support for five different types of certification procedures that would allow their students to obtain academic science credit.

5. To determine the extent to which agricultural education teachers teach and integrate the science objectives, listed in the *Oklahoma State Department of Education Priority Academic Student Skills* (Revised March, 1997) handbook, as reported by agricultural education teachers.

6. To determine the level of comfort agricultural education teachers have with integrating priority academic skills into their daily lesson plans.

Population of the Study

The population of this study was composed of 432 Oklahoma agricultural education teachers employed in state-reimbursed programs during the 1997-98 school year. The state agricultural education staff provided the researcher a current database with the mailing address and name of each agricultural education teacher employed in Oklahoma, during the study.

Institutional Review Board Approval

Federal regulations and Oklahoma State University policy require review and approval of all research studies that involve human subjects before investigators can begin their research. The Office of University Research and the Institutional Review Board at Oklahoma State University conduct the aforementioned review to protect the rights and welfare of human subjects involved in biomedical and behavioral research. In compliance with this policy, this study received the proper surveillance and was granted permission to continue. The Institutional Review Board approval code for this study was AG-98-031 and a copy of the approval form is presented at the end of this document.

Design of the Study

For the most part, the design of this study employed the paradigm of quantitative research. Descriptive research data were gathered using a mail survey instrument (Appendix A) which included opportunities, invitations and adequate space for respondents to provide answers to open ended questions (Appendixes C, D, and E).

Instrument Development

The first step in designing the instrument included a comprehensive review of related literature to find and evaluate instruments used in similar research studies. Upon completion of the review, the researcher consulted with agricultural education teachers, teacher educators at Oklahoma State University and agricultural education staff members at the Oklahoma Department of Vocational and Technical Education. The researcher then developed the questions that would satisfy the purpose and objectives of the study.

The first section of the questionnaire contained demographic and other general information about the respondents. Section II (7 items) was developed to determine if the agricultural education teachers' perceptions of support among parents, administrators, the school board, counselors, the faculty, and community would favor granting science credit for agriculture courses.

Section III (18 items) was developed to determine the agricultural education teachers' perception of the effects on his/her program by offering science credit for agriculture courses. The 18 items included questions about program enrollment, FFA membership, the program's image and student achievement.

Section IV (5 items) directed teachers to rank, by preference and/or support, five methods of granting science credit for agriculture courses. The five choices included changes in current course content and new courses. Section V (5 items) directed teachers to rank five methods of obtaining certification that would allow them to offer agricultural education courses for science credit. The choices included workshops, certification tests and additional college courses.

Section VI (25 items) was developed to determine the extent to which agricultural education teachers currently provide instruction related to the 25 science objectives listed in the *Oklahoma State Department of Education Priority Academic Student Skills* (Revised March, 1997).

Section VII (14 items) was developed to determine the perceived level of comfort among agricultural education teachers concerning the integration of priority academic skills (PASS) into their daily lesson plans. On a Likert-type scale, respondents were asked to identify their perceived level of comfort with integrating academic skills from courses such as biology, chemistry, trigonometry, geometry, geography and government.

The survey instrument was revised several times based on input from the researcher's graduate committee and fellow graduate students. Further refinement was accomplished through the use of a pilot test. A draft version of the instrument was administered to members of the state agricultural education staff to determine if the instructions, questions, and response modes were clear. After the consideration of individual input and group discussion, the necessary changes were made.

Next, the instrument was evaluated for face and content validity. The evaluators were the assistant state director of vocational and technical education, the state program

administrator of agricultural education programs, three district program specialists of agricultural education and three professors at Oklahoma State University. After the group considered the clarity and validity of the instrument, no changes were made.

The survey instrument was then administered to members of the Oklahoma Agricultural Education Teachers Association (OAETA), consisting of state officers, district vice-presidents and district board members. The group examined the survey instrument for face and content validity, as well as clarity. Only minor changes were made following the examination of the instrument.

A cover letter (Appendix B) was then developed to be included with the survey instrument. The letter explained the purpose of the study and the population under investigation. Furthermore, the letter served to insure potential participants that their responses would be kept confidential and the data would only be reported in aggregate.

Data Collection

The cover letter and survey instrument were administered to 292 agricultural education teachers attending their annual district meetings during May, 1998. Data were collected from 100 percent of the teachers attending the five district meetings. The researcher was provided a list, by each district program specialist, of 117 teachers not attending and the instrument was immediately mailed to them. Of the 117 teachers contacted by mail, 60 returned the survey (51.3 % return), for a total of 352 respondents. The researcher excluded from the study, 37 incomplete surveys from which accurate data could not be retrieved. Therefore, data were collected and reported on 315 respondents, of the possible 432, for a return rate of 72.92 percent.

Data Analysis

For the most part, data analysis was confined to the quantitative information collected from the survey instruments. However, answers to open-ended questions were considered in reaching a conclusion for the study. Descriptive statistical tools were primarily used in the study to summarize the data. The appropriate statistical calculations were conducted using Microsoft Excel 5.0 Data Analysis Package. Descriptive statistics such as means, frequency distributions, percentages and standard deviations were calculated using the Descriptive Statistics Test contained in the Analysis Tools of the spreadsheet program.

At the request of district program specialists and based on recommendations from the OAETA officers, the data were collected by districts and analyzed by age groups within the districts. The findings were reported in aggregate and no attempt was made to identify respondents.

CHAPTER IV

FINDINGS

Introduction

The purpose of this chapter was to provide a complete discussion of all data collected. Chapter IV was divided into the following sections: (1) Introduction, (2) Purpose of the Study, (3) Objectives of the Study, (4) Respondents, and (5) Findings.

Purpose of the Study

The purpose of this study was to determine the Oklahoma agricultural education teachers' selected perceptions of granting science credit for agriculture courses to meet high school graduation and college admission requirements.

Objectives of the Study

The following objectives were established by the researcher to achieve the purpose of the study:

1. To determine the level of support, from selected sources, for granting academic science credit for agriculture courses, as perceived by agricultural education teachers.

2. To determine the agricultural education teachers' perceptions of the effects of offering academic science credit for agriculture courses.

3. To determine the agricultural education teachers' preference and/or support for five different methods of granting academic science credit for agriculture courses.

4. To determine the agricultural education teachers' preference and/or support for five different types of certification procedures that would allow their students to obtain academic science credit.

5. To determine the extent to which agricultural education teachers teach and integrate the science objectives, listed in the *Oklahoma State Department of Education Priority Academic Student Skills* (Revised March, 1997) handbook, as reported by agricultural education teachers.

6. To determine the level of comfort agricultural education teachers have with integrating priority academic student skills into their daily lesson plans.

Respondents

The population of this study consisted of 432 Oklahoma agricultural education teachers who were employed in state-reimbursed programs during the 1997-98 school year. Oklahoma is divided into five agricultural education districts. In the 1997-98 school year, the agricultural education division, a unit of the Oklahoma Department of Vocational and Technical Education, reported the following number of teachers in each district: (1) the Northwest district - 69 teachers, (2) the Southwest district - 88 teachers, (3) the Central district - 86 teachers, (4) the Northeast district - 95 teachers, and (5) the Southeast district - 94 teachers. The total number of teachers was 432.

Assisted by the district program specialists, the researcher administered a cover letter and survey instrument to 292 Oklahoma agricultural education teachers attending

their annual district meetings during May, 1998. Data were collected from 100 percent of the teachers attending the five district meetings. The researcher was provided a list, by each district program specialist, of 117 teachers not attending and the instrument was immediately mailed to them. Of the 117 individuals contacted by mail, 60 teachers returned the survey (51.3 % return), for a total of 352 respondents. The researcher excluded from the study 37 incomplete surveys, from which accurate data could not be retrieved. Therefore, data were collected and reported on 315 respondents, of the possible 432, for a return rate of 72.9 percent.

Findings

At the request of the district program specialists, and based on recommendations from OAETA officers, data were collected by districts and analyzed by age groups within the districts.

One to Five Years of Experience

Table I shows the demographic information for teachers with one to five years teaching experience who responded to the survey. There were 80 teachers in this group who were an average of 27.7 years of age. This group had an average enrollment of 55 students per teacher and 76 percent of the teachers taught in single-teacher programs. Only two teachers had completed the requirements for a Master of Science degree. Also, two teachers indicated they held an alternative teaching certificate in agricultural education, but had earned a Bachelor of Science degree in another agriculture area. The mean for their years of experience was 2.90 with a standard deviation of 1.37.

TABLE I

SELECTED DEMOGRAPHIC CHARACTERISTICS OF OKLAHOMA AGRICULTURAL EDUCATION TEACHERS WITH ONE TO FIVE YEARS TEACHING EXPERIENCE

Characteristics	Distribution by District					Totals	
	NW	NE	C	SW	SE	N	%
Number of Teachers	14.00	14.00	18.00	21.00	13.00	80.00	25.00*
Average Age	28.00	26.80	28.10	27.80	27.60	27.70	N/A
Average Enrollment	49.60	57.40	61.30	55.20	51.50	55.00	N/A
M.S. Obtained	00.00	00.00	02.00	00.00	00.00	02.00	02.50
Single-Teacher Program	14.00	10.00	11.00	15.00	11.00	61.00	76.20
Multi-Teacher Program	00.00	04.00	07.00	06.00	02.00	19.00	23.80
Mean Years of Experience	03.14	02.50	02.89	02.95	03.00	02.90	N/A
SD Years of Experience	01.29	01.29	01.57	01.36	01.35	01.37	N/A

* 25 percent of the total respondents in the study came from this group

Six to Ten Years of Experience

There were 52 agriculture teachers (16.5 percent of the respondents) with six to ten years of teaching experience. As noted in Table II, these teachers were an average of 34.4 years of age, had an average enrollment of 64.4 students, and 67 percent taught in single-teacher programs. Also, 15 percent had completed a Master of Science degree. The mean for their years of experience was 8.04 with a standard deviation of 1.35.

TABLE II

SELECTED DEMOGRAPHIC CHARACTERISTICS OF OKLAHOMA AGRICULTURAL EDUCATION TEACHERS WITH SIX TO TEN YEARS TEACHING EXPERIENCE

Characteristics	Distribution by Districts					Totals	
	NW	NE	C	SW	SE	N	%
Number of Teachers	05.00	13.00	14.00	11.00	09.00	52.00	16.50*
Average Age	32.20	32.70	36.00	32.90	33.20	33.40	N/A
Average Enrollment	50.00	77.90	71.80	61.50	60.80	64.40	N/A
M.S. Obtained	01.00	03.00	03.00	00.00	01.00	08.00	15.00
Single-Teacher Program	03.00	12.00	08.00	06.00	06.00	35.00	67.00
Multi-Teacher Program	02.00	01.00	06.00	05.00	03.00	17.00	33.00
Mean Years of Experience	07.60	08.15	08.29	07.18	09.00	08.04	N/A
SD Years of Experience	01.82	01.41	01.33	00.87	01.32	01.35	N/A

* 16.5 percent of the total respondents in the study came from this group

Eleven to Fifteen Years of Experience

Table III represents 58 respondents with 11 to 15 years of experience. Teachers in this group had an average age of 37.8 years and had an average enrollment of 57.7 students. In this group, 28 percent (N = 16) taught in a multi-teacher program. Nine teachers in this group (15.5 %) had met the requirements for a Master of Science degree. The mean for their years of experience was 13.19 with a standard deviation of 1.31.

TABLE III

SELECTED DEMOGRAPHIC CHARACTERISTICS OF OKLAHOMA AGRICULTURAL EDUCATION TEACHERS WITH 11 TO 15 YEARS TEACHING EXPERIENCE

Characteristics	Distribution of Districts					Totals	
	NW	NE	C	SW	SE	N	%
Number of Teachers	05.00	10.00	11.00	13.00	19.00	58.00	18.00*
Average Age	36.60	35.90	37.70	39.20	39.60	37.80	N/A
Average Enrollment	51.00	64.20	59.70	57.50	56.20	57.70	N/A
M.S. Obtained	01.00	02.00	01.00	02.00	03.00	09.00	15.50
Single-Teacher Program	05.00	07.00	08.00	11.00	11.00	42.00	72.40
Multi-Teacher Program	00.00	03.00	03.00	02.00	08.00	16.00	27.60
Mean Years of Experience	13.40	12.90	12.91	13.10	13.63	13.19	N/A
SD Years of Experience	01.14	01.29	01.22	01.60	01.30	01.31	N/A

* 18 percent of the total respondents in the study came from this group

Sixteen to Twenty Years of Experience

In the group, 54 respondents had 16 to 20 years of teaching experience. Their average age was 41.3 years and they had an average enrollment of 61.9 students. Within the group, 30 percent of the teachers (N = 16) had completed a Master of Science degree and 18 teachers (33 %) taught in multi-teacher programs. The mean for their years of experience was 18.06 with a standard deviation of 1.58.

TABLE IV

SELECTED DEMOGRAPHIC CHARACTERISTICS OF OKLAHOMA AGRICULTURAL EDUCATION TEACHERS WITH 16 TO 20 YEARS TEACHING EXPERIENCE

Characteristics	Distribution by District					Totals	
	NW	NE	C	SW	SE	N	%
Number of Teachers	05.00	10.00	18.00	13.00	08.00	54.00	17.00*
Average Age	40.00	41.00	43.30	41.30	40.90	41.30	N/A
Average Enrollment	55.40	68.30	69.90	58.90	57.00	61.90	N/A
M.S. Obtained	01.00	03.00	07.00	03.00	02.00	16.00	30.00
Single-Teacher Program	03.00	09.00	12.00	06.00	06.00	36.00	66.70
Multi-Teacher Program	02.00	01.00	06.00	07.00	02.00	18.00	33.30
Mean Years of Experience	18.00	17.80	18.61	17.62	18.25	18.06	N/A
SD Years of Experience	01.87	01.48	01.42	01.45	01.67	01.58	N/A

* 17 percent of the total respondents in the study came from this group

Twenty-One to Twenty-Five Years of Experience

The 39 respondents in this group (teachers with 21 to 25 years of experience) had an average age of 47.0 years and an average enrollment of 63.1 students. In this group, 15 of the agriculture teachers (38.5 %) taught in multi-teacher programs and 15 had completed the requirements for a Master of Science degree, as well. The mean for their years of experience was 22.89 with a standard deviation of 1.40.

TABLE V

SELECTED DEMOGRAPHIC CHARACTERISTICS OF OKLAHOMA AGRICULTURAL EDUCATION TEACHERS WITH 21 TO 25 YEARS TEACHING EXPERIENCE

Characteristics	Distribution by District					Totals	
	NW	NE	C	SW	SE	N	%
Number of Teachers	09.00	05.00	07.00	07.00	11.00	39.00	12.40*
Average Age	46.20	45.80	49.90	45.90	47.20	47.00	N/A
Average Enrollment	55.30	62.40	75.00	59.00	63.90	63.10	N/A
M.S. Obtained	03.00	03.00	02.00	00.00	07.00	15.00	38.50
Single-Teacher Program	05.00	03.00	05.00	04.00	07.00	24.00	61.50
Multi-Teacher Program	04.00	02.00	02.00	03.00	04.00	15.00	38.50
Mean Years of Experience	23.33	23.00	22.71	22.60	22.80	22.89	N/A
SD Years of Experience	01.32	01.22	01.38	01.51	01.55	01.40	N/A

* 12.4 percent of the total respondents in the study came from this group

Twenty-Six or More Years of Experience

The final group, agriculture teachers with 26 or more years of experience, had 32 respondents (10.2 %) with an average age of 51.5 years and an average enrollment of 56.1 students. In this group, 37.5 % of the teachers (N = 12) had completed a Master of Science degree and nine teachers (28.1 %) taught in a multi-teacher program. The mean for their years of experience was 28.61 with a standard deviation of 2.07.

TABLE VI

SELECTED DEMOGRAPHIC CHARACTERISTICS OF OKLAHOMA AGRICULTURAL EDUCATION TEACHERS WITH 26 OR MORE YEARS TEACHING EXPERIENCE

Characteristics	Distribution by District					Totals	
	NW	NE	C	SW	SE	N	%
Number of Teachers	04.00	09.00	06.00	07.00	06.00	32.00	10.20*
Average Age	50.80	54.20	51.80	50.10	50.70	51.50	N/A
Average Enrollment	57.50	54.80	56.30	50.70	60.80	56.10	N/A
M.S. Obtained	01.00	05.00	03.00	00.00	03.00	12.00	37.50
Single-Teacher Program	01.00	07.00	05.00	06.00	04.00	23.00	72.00
Multi-Teacher Program	03.00	02.00	01.00	01.00	02.00	09.00	28.00
Mean Years of Experience	27.50	30.00	29.33	27.57	28.67	28.61	N/A
SD Years of Experience	00.58	03.77	02.66	01.72	01.63	02.07	N/A

* 10.2 percent of the total respondents in the study came from this group

Objective One - Perceived Support for Granting Science Credit for Agriculture Courses

Section II of the survey determined the teachers' perceptions of support from parents, administrators, the board of education, counselors, the faculty, and community for granting science credit for agriculture courses to meet high school graduation and college

admission requirements. Table VII illustrates the support given to this concept by the agricultural education teachers.

TABLE VII

SUPPORT SHOWN BY THE RESPONDENTS TO GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES

Years of Experience Group	Perceived Support NW	Distribution by District					Totals	
		NE	C	SW	SE		N	%
	No	01	00	01	02	01	05	06.25
1-5	Maybe	02	02	05	02	04	15	18.75
	Yes	11	12	12	17	08	60	75.00
	No	01	02	04	01	00	08	15.40
6-10	Maybe	00	02	00	02	01	05	09.60
	Yes	04	09	10	08	08	39	75.00
	No	01	00	02	01	00	04	06.90
11-15	Maybe	01	01	01	06	04	13	22.40
	Yes	03	09	08	06	15	41	70.70
	No	00	01	01	02	00	04	07.40
16-20	Maybe	00	00	04	00	00	04	07.40
	Yes	05	09	13	11	08	46	85.20
	No	01	00	00	00	00	01	02.60
21-25	Maybe	04	00	02	01	02	09	23.00
	Yes	04	05	05	06	09	29	74.40
	No	00	01	00	01	00	02	06.30
> 26	Maybe	00	02	02	00	01	05	15.60
	Yes	04	06	04	06	05	25	78.10
	No	04	04	08	07	01	024	07.60
Total	Maybe	07	07	14	11	12	051	16.20
	Yes	31	50	52	54	53	240	76.20*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 76.2 percent of the respondents indicated they would support granting science credit for agriculture courses.

In Section II, teachers assumed the adequate number of priority academic skills had been identified in the curriculum and the skills were being integrated into each lesson plan by the agricultural education teacher.

Agriculture teachers indicated, by a margin of 70 percent or greater, that they support granting science credit to students who enroll and complete an agricultural education course. Of the 315 agriculture teachers responding to the survey, 76.2 percent (N = 240) supported this option. Only 7.6 percent of the respondents (N = 24) opposed the idea and 16.2 percent (N = 51) reported they were unsure.

There were no notable differences between agricultural education districts, or age groups. Teachers with six-to-ten years of experience had the most opposition to the idea with 15.4 percent opposing the concept. However, fewer agricultural education teachers in this group were indecisive, as 75 percent of the group (N = 39) supported the concept of granting science credit for agriculture courses.

Table VIII showed the results of parental support for the concept of granting science credit for agriculture courses, as perceived by agricultural education teachers. Similar to the results in Table VII, some 71.7 percent of the teachers (N = 226) perceived that the parents of their students would support granting science credit for agriculture courses. Only 3.2 percent of the teachers perceived that parents would not support the idea and 25.1 percent (N = 79) were unsure.

Data in Tables IX, X, XI, XII, and XIII represented the support for granting academic science credit for agricultural education courses. Support from administrators, school boards, counselors, faculties, and communities, as perceived by the agricultural education teachers, was determined in these tables.

TABLE VIII

PARENTS' SUPPORT TO GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Support	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	No	01	00	00	00	00	01	01.25
1-5	Maybe	02	04	04	07	05	22	27.50
	Yes	11	10	14	14	08	57	71.25
	No	01	01	00	01	01	04	07.70
6-10	Maybe	00	01	04	03	03	11	21.20
	Yes	04	11	10	07	05	37	71.10
	No	01	00	00	01	00	02	03.50
11-15	Maybe	02	02	04	06	08	22	37.90
	Yes	02	08	07	06	11	34	58.60
	No	00	01	00	01	00	02	03.70
16-20	Maybe	01	01	05	02	00	09	16.70
	Yes	04	08	13	10	08	43	79.60
	No	00	00	00	00	00	00	00.00
21-25	Maybe	03	00	01	01	02	07	17.90
	Yes	06	05	06	06	09	32	82.10
	No	00	01	00	00	00	01	03.10
>26	Maybe	01	02	02	01	02	08	25.00
	Yes	03	06	04	06	04	23	71.90
	No	03	03	00	03	01	010	03.20
Total	Maybe	09	10	20	20	20	079	25.10
	Yes	30	48	54	49	45	226	71.70*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 71.7 percent of the respondents perceived that the parents of their students would support granting science credit for agriculture courses.

TABLE IX

ADMINISTRATORS' SUPPORT TO GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Support	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	No	02	00	01	03	01	07	08.75
1-5	Maybe	08	07	10	12	08	45	56.25
	Yes	04	07	07	06	04	28	35.00
	No	00	02	00	00	00	02	03.80
6-10	Maybe	02	04	06	05	05	22	42.30
	Yes	03	07	08	06	04	28	53.90
	No	00	00	00	03	00	03	05.20
11-15	Maybe	02	06	09	03	11	31	53.40
	Yes	03	04	02	07	08	24	41.40
	No	00	01	00	01	01	03	05.50
16-20	Maybe	02	02	06	06	05	21	38.90
	Yes	03	07	12	06	02	30	55.60
	No	01	00	00	00	02	03	07.70
21-25	Maybe	05	03	01	04	06	19	48.70
	Yes	03	02	06	03	03	17	43.60
	No	00	01	00	01	00	02	06.25
>26	Maybe	01	05	03	03	04	16	50.00
	Yes	03	03	03	03	02	14	43.75
	No	03	04	01	08	04	020	06.30
Total	Maybe	20	27	35	33	39	154	48.90
	Yes	19	30	38	31	23	141	44.80*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 44.8 percent of the respondents perceived that their administrators would support granting science credit for agriculture courses.

TABLE X

SCHOOL BOARDS' SUPPORT TO GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Support	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	No	02	00	01	03	00	06	07.50
1-5	Maybe	09	08	11	11	10	49	61.25
	Yes	03	06	06	07	03	25	31.25
	No	02	01	00	02	00	05	09.60
6-10	Maybe	01	05	07	04	05	22	42.30
	Yes	02	07	07	05	04	25	48.10
	No	00	00	00	02	01	03	05.20
11-15	Maybe	03	04	08	05	12	32	55.20
	Yes	02	06	03	06	06	23	39.60
	No	01	01	00	01	00	03	05.60
16-20	Maybe	02	00	08	06	06	22	40.70
	Yes	02	09	10	06	02	29	53.70
	No	00	00	00	00	02	02	05.20
21-25	Maybe	07	03	02	04	05	21	53.80
	Yes	02	02	05	03	04	16	41.00
	No	00	01	00	00	00	01	03.10
>26	Maybe	01	05	03	03	03	15	46.90
	Yes	03	03	03	04	03	16	50.00
	No	05	03	01	08	03	020	06.40
Total	Maybe	23	25	39	33	41	161	51.10
	Yes	14	33	34	31	22	134	42.50*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 42.5 percent of the respondents perceived that their school boards would support granting science credit for agriculture courses.

TABLE XI

COUNSELORS' SUPPORT TO GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Support	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	No	02	00	01	02	00	05	06.25
1-5	Maybe	07	03	08	11	09	38	47.50
	Yes	05	11	09	08	04	37	46.25
	No	01	01	01	00	03	06	11.50
6-10	Maybe	01	05	08	02	04	20	38.50
	Yes	03	07	05	09	02	26	50.00
	No	02	00	01	02	01	06	10.30
11-15	Maybe	01	04	06	05	07	23	39.70
	Yes	02	06	04	06	11	29	50.00
	No	02	01	03	02	02	10	18.50
16-20	Maybe	01	01	05	02	04	13	24.10
	Yes	02	08	10	09	02	31	57.40
	No	00	00	00	00	03	03	07.60
21-25	Maybe	06	02	02	04	04	18	46.20
	Yes	03	03	05	03	04	18	46.20
	No	00	02	01	02	01	06	18.75
>26	Maybe	01	04	02	03	00	10	31.25
	Yes	03	03	03	02	05	16	50.00
	No	07	04	07	08	10	036	11.40
Total	Maybe	17	19	31	27	28	122	38.70
	Yes	18	38	36	37	28	157	49.90*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 49.9 percent of the respondents perceived that their high school counselor(s) would support granting science credit for agriculture courses.

TABLE XII

FACULTY SUPPORT TO GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Support	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	No	03	01	02	05	03	14	17.50
1-5	Maybe	06	04	12	10	06	38	47.50
	Yes	05	09	04	06	04	28	35.00
	No	02	01	01	02	02	08	15.40
6-10	Maybe	01	06	06	05	04	22	42.30
	Yes	02	06	07	04	03	22	42.30
	No	01	01	02	02	01	07	12.10
11-15	Maybe	03	03	08	04	11	29	50.00
	Yes	01	06	01	07	07	22	37.90
	No	01	01	02	02	00	06	11.10
16-20	Maybe	02	04	10	04	05	25	46.30
	Yes	02	05	06	07	03	23	42.60
	No	00	00	00	02	02	04	10.20
21-25	Maybe	06	01	03	01	04	15	38.50
	Yes	03	04	04	04	05	20	51.30
	No	00	01	02	02	02	07	21.90
>26	Maybe	01	05	01	03	02	12	37.50
	Yes	03	03	03	02	02	13	40.60
	No	07	05	09	15	10	046	14.60
Total	Maybe	19	23	40	27	32	141	44.80
	Yes	16	33	25	30	24	128	40.60*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 40.6 percent of the respondents perceived that their faculty would support granting science credit for agriculture courses.

TABLE XIII

COMMUNITY SUPPORT TO GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Support	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	No	01	00	00	00	00	01	01.25
1-5	Maybe	06	04	10	10	06	36	45.00
	Yes	07	10	08	11	07	43	53.75
	No	01	00	00	01	01	03	05.80
6-10	Maybe	01	05	05	03	03	17	32.70
	Yes	03	08	09	07	05	32	61.50
	No	01	00	00	02	00	03	05.20
11-15	Maybe	01	01	10	06	08	26	44.80
	Yes	03	09	01	05	11	29	50.00
	No	00	01	00	01	00	02	03.70
16-20	Maybe	02	02	05	04	00	13	24.10
	Yes	03	07	13	08	08	39	72.20
	No	01	00	00	00	02	03	07.70
21-25	Maybe	02	01	02	01	02	08	20.50
	Yes	06	04	05	06	07	28	71.80
	No	00	01	01	00	00	02	06.25
>26	Maybe	01	04	02	03	02	12	37.50
	Yes	03	04	03	04	04	18	56.25
	No	04	02	01	04	03	014	04.50
Total	Maybe	13	17	34	27	21	112	35.50
	Yes	25	42	39	41	42	189	60.00*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 60 percent of the respondents perceived that their communities would support granting science credit for agriculture courses.

Agricultural education teachers were somewhat uncertain their administrators would support granting academic science credit for agriculture courses. Only 44.8 percent (N = 141) of the teachers perceived their administrator(s) supporting the idea. This number was considerably less than the number of teachers who supported the concept. Almost a majority of respondents (48.9 %) were unsure their administrators would lend their support. The largest of all groups (N = 80), teachers with one to five years of experience, were the most uncertain about the support of their administrators. Only 35 percent, in this group, indicated their administrators would support granting science credit for agriculture courses (Table IX).

Data in Table X reflected teachers' perceptions of their school boards in almost the same way as they perceived their administrators' support. Only 42.5 percent of the teachers (N = 134) thought their local school boards would support granting science credit for agriculture courses and 51.1 percent (N = 161) were uncertain of their school boards' support.

Data in Table XI showed the respondents' perceptions of their high school counselor. With almost a majority, at 49.9 percent, many teachers perceived their counselor would support the concept of granting academic science credit for agriculture courses. However, 36 agriculture teachers (11.4 %) were certain their counselor would not support the idea.

The support of faculty members, as perceived by the agricultural education teachers, was lowest among all support groups, with only 40.6 percent (N = 128) of the teachers perceiving their faculty would support the concept (Table XII). Agriculture teachers perceived their faculties as the largest group of non-supporters (14.6 %).

A majority of the respondents (60 %) perceived their community supporting the idea of granting science credit for agriculture courses. Only 4.5 percent (N = 14) of the teachers thought their community would oppose the concept, while 35.5 percent of all respondents (N = 112) were uncertain of the support in their community (Table XIII).

Objective Two - Perceived Effects of Granting Science Credit for Agriculture Courses

Section III measured the teachers' perceived effects on the agriculture program by offering science credit for agriculture courses. The teachers responded to statements that would best describe the effect on particular aspects of their program if science credit was offered for agriculture courses. For example, in Table XIV, most agricultural education teachers (64.1 %) agreed that offering science credit for agriculture courses would actually increase their enrollment, while only six teachers (1.9 %) thought their enrollment would decrease.

Teachers were also asked if they perceived the image of their program being harmed, improved or not affected by offering science credit for agriculture courses (Table XV). Less than one half of the respondents (48.6 %) perceived the image of their program would improve, while 12.7 percent (N = 40) thought the image of their program would be harmed by offering science credit.

Data in Table XVI determined if the number of basic academic skills used in the classroom would increase, decrease or not be affected by offering science credit for agriculture courses. More than 54 percent (N = 172) of the respondents thought the use

TABLE XIV

IMPACT UPON PROGRAM ENROLLMENT BY OFFERING SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Effect	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	Decrease	00	00	01	00	01	02	02.50
1-5	No Affect	05	03	03	09	04	24	30.00
	Increase	09	11	14	12	08	54	67.50
	Decrease	00	00	00	00	00	00	00.00
6-10	No Affect	02	04	03	05	03	17	32.70
	Increase	03	09	11	06	06	35	67.30
	Decrease	00	00	00	03	00	03	05.20
11-15	No Affect	01	04	05	05	07	22	37.90
	Increase	04	06	06	05	12	33	56.90
	Decrease	00	00	00	00	00	00	00.00
16-20	No Affect	01	02	04	04	03	14	25.90
	Increase	04	08	14	09	05	40	74.10
	Decrease	00	00	00	00	00	00	00.00
21-25	No Affect	08	03	03	02	04	20	51.30
	Increase	01	02	04	05	07	19	48.70
	Decrease	00	00	00	01	00	01	03.10
>26	No Affect	01	03	03	01	02	10	31.30
	Increase	03	06	03	05	04	21	65.60
	Decrease	00	00	01	04	01	006	01.90
Total	No Affect	18	19	21	26	23	107	34.00
	Increase	24	42	52	42	42	202	64.10*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 64.1 percent of the respondents perceived that their enrollment would increase if science credit were offered for agriculture courses.

TABLE XV

IMPACT UPON PROGRAM IMAGE BY OFFERING SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Effect	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	Harm	03	01	05	04	04	17	21.25
1-5	No Affect	05	03	11	06	06	31	38.75
	Improve	06	10	02	11	03	32	40.00
	Harm	00	01	02	00	00	03	05.80
6-10	No Affect	02	06	05	06	04	23	44.20
	Improve	03	06	07	05	05	26	50.00
	Harm	01	00	03	04	01	09	15.50
11-15	No Affect	00	05	03	03	05	16	27.60
	Improve	04	05	05	06	13	33	56.90
	Harm	00	01	01	03	00	05	09.20
16-20	No Affect	02	01	08	03	01	15	27.80
	Improve	03	08	09	07	07	34	63.00
	Harm	00	01	00	02	00	03	07.70
21-25	No Affect	05	03	05	03	05	21	53.80
	Improve	04	01	02	02	06	15	38.50
	Harm	00	01	01	01	00	03	09.40
>26	No Affect	01	06	04	02	03	16	50.00
	Improve	03	02	01	04	03	13	40.60
	Harm	04	05	12	14	05	040	12.70
Total	No Affect	15	24	36	23	24	122	38.70
	Improve	23	32	26	35	37	153	48.60*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 48.6 percent of the respondents perceived that the image of their program would improve if science credit was offered for agriculture courses.

TABLE XVI

IMPACT UPON THE NUMBER OF BASIC ACADEMIC SKILLS USED IN THE CLASSROOM BY OFFERING SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Effect	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	Decrease	00	00	00	00	00	00	00.00
1-5	No Affect	05	04	08	12	06	35	43.75
	Increase	09	10	10	09	07	45	56.25
	Decrease	00	00	00	00	00	00	00.00
6-10	No Affect	02	08	09	09	03	31	59.60
	Increase	03	05	05	02	06	21	40.40
	Decrease	00	00	00	00	00	00	00.00
11-15	No Affect	03	05	06	06	09	29	50.00
	Increase	02	05	05	07	10	29	50.00
	Decrease	00	00	01	00	00	01	01.90
16-20	No Affect	01	03	07	06	03	20	37.00
	Increase	04	07	10	07	05	33	61.10
	Decrease	00	00	00	00	00	00	00.00
21-25	No Affect	04	02	03	02	04	15	38.50
	Increase	05	03	04	05	07	24	61.50
	Decrease	00	00	00	00	00	00	00.00
>26	No Affect	02	02	03	03	02	12	37.50
	Increase	02	07	03	04	04	20	62.50
	Decrease	00	00	01	00	00	001	00.30
Total	No Affect	17	24	36	38	27	142	45.10
	Increase	25	37	37	34	39	172	54.60*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 54.6 percent of the respondents perceived that the number of academic skills they used in the classroom would increase if science credit were offered for agriculture courses.

of basic academic skills would increase, while 45.1 percent (N = 142) thought there would be no effect on the number of basic academic skills used in the classroom.

A group of 158 teachers (50.2 %) thought the enrollment of low-performing students in agriculture courses would increase by offering science credit. However, 42.5 percent (N = 134) of the teachers perceived it would have no effect on their enrollment. Only 7.3 percent (N = 23) thought the enrollment of low-performing students would actually decrease by offering science credit for agriculture courses (Table XVII).

The data in Table XVIII determined if the number of practical skills taught in the classroom would decrease, increase or not be affected by offering science credit for agriculture courses. Among the respondents, 69.8 percent (N = 220) perceived the number of practical skills would not be affected by offering science credit and 24.1 percent (N = 76) thought the practical skills taught in the classroom would increase.

When agriculture teachers were asked if they thought the public would perceive their agriculture courses as "watered down" science classes if science credit was offered for them, 51.4 percent (N = 162) of the teachers perceived that such might be the case. Some 37.8 percent (N = 119) thought the public would definitely think of agriculture courses as "watered down" science classes, while only 10.8 percent (N = 34) of the respondents believed that offering science credit for agriculture courses would not cause this public perception (Table XIX).

The data in Table XX relate to agricultural education teachers' perceptions that their FFA chapters would become stronger, weaker or experience no effect by offering science credit for agriculture courses. Only 32.7 percent (N = 103) of the respondents thought their FFA chapters would become stronger by offering science credit for

agriculture courses, while 25.4 percent (N = 80) thought their FFA chapters would become weaker.

TABLE XVII

IMPACT UPON PROGRAM ENROLLMENT OF LOW-PERFORMING STUDENTS BY OFFERING SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Effect	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	Decrease	05	01	01	00	01	08	10.00
1-5	No Affect	04	06	06	12	07	35	43.75
	Increase	05	07	11	09	05	37	46.25
	Decrease	00	00	01	02	00	03	05.80
6-10	No Affect	02	06	05	07	04	24	46.10
	Increase	03	07	08	02	05	25	48.10
	Decrease	00	01	01	01	02	05	08.60
11-15	No Affect	02	05	01	04	10	22	37.90
	Increase	03	04	09	08	07	31	53.50
	Decrease	00	00	02	00	00	02	03.70
16-20	No Affect	01	04	08	08	01	22	40.70
	Increase	04	06	08	05	07	30	55.60
	Decrease	01	00	01	01	01	04	10.20
21-25	No Affect	05	03	02	03	05	18	46.20
	Increase	03	02	04	03	05	17	43.60
	Decrease	00	01	00	00	00	01	03.10
>26	No Affect	00	03	03	02	05	13	40.60
	Increase	04	05	03	05	01	18	56.30
	Decrease	06	03	06	04	04	023	07.30
Total	No Affect	14	27	25	36	32	134	42.50
	Increase	22	31	43	32	30	158	50.20*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 50.2 percent of the respondents perceived that the enrollment of low-performing students would increase if science credit were offered for agriculture courses.

TABLE XVIII

IMPACT UPON THE NUMBER OF PRACTICAL SKILLS TAUGHT BY OFFERING SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Effect	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	Decrease	01	00	02	01	02	06	07.50
1-5	No Affect	09	09	11	16	10	55	68.75
	Increase	04	05	05	04	01	19	23.75
	Decrease	01	00	00	01	00	02	03.80
6-10	No Affect	01	10	11	10	06	38	73.10
	Increase	03	03	03	00	03	12	23.10
	Decrease	00	00	00	03	00	03	05.20
11-15	No Affect	03	06	08	07	17	41	70.70
	Increase	02	04	03	03	02	14	24.10
	Decrease	00	00	02	00	01	03	05.50
16-20	No Affect	02	08	12	11	07	40	74.10
	Increase	03	02	04	02	00	11	20.40
	Decrease	03	00	00	01	00	04	10.30
21-25	No Affect	06	05	05	03	06	25	64.10
	Increase	00	00	02	03	05	10	25.60
	Decrease	00	00	00	01	00	01	03.10
>26	No Affect	02	06	05	03	05	21	65.60
	Increase	02	03	01	03	01	10	31.30
	Decrease	05	00	04	07	03	019	06.10
Total	No Affect	23	44	52	50	51	220	69.80*
	Increase	14	17	18	15	12	076	24.10
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 69.8 percent of the respondents perceived there would be no effect on the number of practical skills taught if science credit were offered for agriculture courses.

TABLE XIX

THE POSSIBILITY OF AGRICULTURE COURSES BEING THOUGHT OF AS "WATERED DOWN" SCIENCE COURSES BY OFFERING SCIENCE CREDIT FOR THEM AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Effect	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	Would Not Cause	00	00	01	03	03	07	08.75
1-5	May Cause	11	05	07	09	05	37	46.25
	Would Cause	03	09	10	09	05	36	45.00
	Would Not Cause	01	00	02	00	01	04	07.70
6-10	May Cause	02	09	09	05	05	30	57.70
	Would Cause	02	04	03	06	03	18	34.60
	Would Not Cause	00	00	03	02	01	06	10.30
11-15	May Cause	03	04	06	06	08	27	46.60
	Would Cause	02	06	02	05	10	25	43.10
	Would Not Cause	00	01	02	02	02	07	13.00
16-20	May Cause	04	06	10	06	03	29	53.70
	Would Cause	01	03	06	05	03	18	33.30
	Would Not Cause	02	01	00	02	01	06	15.40
21-25	May Cause	04	03	05	04	05	21	53.80
	Would Cause	03	01	02	01	05	12	30.80
	Would Not Cause	01	00	01	02	00	04	12.50
>26	May Cause	02	07	02	05	02	18	56.25
	Would Cause	01	02	03	00	04	10	31.25
	Would Not Cause	04	02	09	11	08	034	10.80
Total	May Cause	26	34	39	35	28	162	51.40*
	Would Cause	12	25	26	26	30	119	37.80*
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 89.2 percent of the respondents perceived their classes may or would be thought of as "watered down" science courses if science credit were offered for agriculture courses.

TABLE XX

IMPACT UPON FFA CHAPTERS BY OFFERING SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Years of Experience Group	Perceived Effect	Distribution by District					Totals	
		NW	NE	C	SW	SE	N	%
	Weaker	05	00	05	05	05	20	25.00
1-5	No Effect	05	05	09	10	05	34	42.50
	Stronger	04	09	04	06	03	26	32.50
	Weaker	02	03	04	01	02	12	23.10
6-10	No Effect	02	05	03	09	04	23	44.20
	Stronger	01	05	07	01	03	17	32.70
	Weaker	01	02	04	04	02	13	22.40
11-15	No Effect	02	05	06	05	09	27	46.60
	Stronger	02	03	01	04	08	18	31.00
	Weaker	00	04	07	03	02	16	29.60
16-20	No Effect	01	02	07	07	01	18	33.40
	Stronger	04	04	04	03	05	20	37.00
	Weaker	04	02	01	03	02	12	30.80
21-25	No Effect	04	00	03	01	05	13	33.30
	Stronger	01	03	03	03	04	14	35.90
	Weaker	01	02	02	02	00	07	21.90
>26	No Effect	01	05	03	04	04	17	53.10
	Stronger	02	02	01	01	02	08	25.00
	Weaker	13	13	23	18	13	080	25.40*
Total	No Effect	15	22	31	36	28	132	41.90*
	Stronger	14	26	20	18	25	103	32.70
Total Distribution Numbers:		42	61	74	72	66	315	100.00

* 67.3 percent of the respondents perceived their FFA chapters would be weaker or there would no effect if science credit were offered for agriculture courses.

Objective Three - Support for Five Methods of Granting Science Credit

To satisfy this objective, teachers ranked their preference for five methods of granting science credit for agriculture courses. All of the respondents had the option of listing other methods, but none were identified. As shown in Table XXI, 138 teachers (43.8 %) preferred making "minor changes in course content." This method proposed to enhance priority academic student skills for the purpose of granting science credit for agriculture courses. Less than a majority of the respondents ranked this method first, but it was ranked over their next highest preference by a margin of 16.8 percent (N = 53). The mean rank for "minor changes in course content" was 2.06.

Fifty-nine percent (N = 186) of the agricultural education teachers indicated they had moderate support for creating "a new agriculture course" by ranking it as their second or third choice. The content of the new agriculture course proposed to integrate priority academic skills for the purpose of granting science credit for an agriculture course in Oklahoma. Another 20.6 percent (N = 65) of the respondents ranked this method fourth, which led the researcher to believe that most agriculture teachers would accept this method as an alternative, but it was not their preferred choice. The mean rank for a "new agriculture course" was 2.83 (Table XXII).

TABLE XXI

TEACHERS' SUPPORT FOR MAKING MINOR CHANGES IN COURSE CONTENT TO ENHANCE PRIORITY ACADEMIC SKILLS AND GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Ranks	Mean Rank
NW	16	09	06	06	05	42	101	2.40
NE	27	21	05	05	03	61	119	1.95
C	29	24	10	10	01	74	152	2.05
SW	34	15	10	11	02	72	148	2.06
SE	32	17	06	09	02	66	130	1.97
Total	138	86	37	41	13	315	650	2.06

TABLE XXII

TEACHERS' SUPPORT FOR A NEW AGRICULTURE COURSE DESIGNED TO INTEGRATE PRIORITY ACADEMIC SKILLS AND SATISFY SCIENCE CREDIT REQUIREMENTS

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Ranks	Mean Rank
NW	08	11	09	10	04	42	81	2.79
NE	05	14	26	12	04	61	179	2.79
C	09	17	24	16	08	74	219	2.96
SW	09	25	18	15	05	72	198	2.75
SE	07	27	15	12	05	66	179	2.71
Total	38	94	92	65	26	315	892	2.83

In Table XXIII, agricultural education teachers indicated they had slight to moderate support for "offering several new agriculture courses." The majority of respondents (73.6 %) ranked this method either third (N = 85), fourth (N = 86), or fifth (N = 61), while only 10.5 percent (N = 33) ranked this method first. These results led the researcher to believe that most teachers would rather maintain and improve the agriculture courses they have now, opposed to offering several new ones. The content of the new agriculture courses proposed to integrate priority academic skills for the purpose of

granting science credit for agriculture courses in Oklahoma. The mean rank for "offering several new agriculture courses" was 3.29.

TABLE XXIII

TEACHERS' SUPPORT FOR OFFERING SEVERAL NEW AGRICULTURE COURSES DESIGNED TO INTEGRATE PRIORITY ACADEMIC STUDENT SKILLS AND SATISFY SCIENCE CREDIT REQUIREMENTS

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Ranks	Mean Rank
NW	03	07	08	11	13	42	150	3.57
NE	05	07	12	24	13	61	216	3.54
C	12	13	14	21	14	74	234	3.16
SW	06	16	24	16	10	72	224	3.11
SE	07	07	27	14	11	66	213	3.21
Total	33	50	85	86	61	315	1,037	3.29

The data in Table XXIV, showed that most agricultural education teachers did not want to make "major changes" in course content. The major changes proposed to enhance priority academic student skills for the purpose of granting science credit for

agriculture courses. A strong majority of respondents (83.5 %) ranked this method third (N = 79), fourth (N = 93), and fifth (N = 91), while only 16.5 percent of the respondents (N = 52) ranked this method first and second. It was apparent to the researcher that most teachers were satisfied with the content of agriculture courses and preferred not to make any "major changes." The mean rank for making "major changes" to the content of agriculture courses was 3.64.

TABLE XXIV

TEACHERS' SUPPORT FOR MAKING MAJOR CHANGES IN COURSE CONTENT TO ENHANCE PRIORITY ACADEMIC SKILLS AND GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Ranks	Mean Rank
NW	01	08	15	11	07	42	141	3.36
NE	05	05	16	16	19	61	222	3.64
C	03	07	21	17	26	74	278	3.76
SW	06	07	16	23	20	72	260	3.61
SE	05	05	11	26	19	66	247	3.74
Total	20	32	79	93	91	315	1,148	3.64

In their support for making "no changes" in the content of agriculture courses, 39.1 percent of the agricultural education teachers (N = 123) ranked this method fifth. Apparently, many respondents thought that some changes, in the content of agriculture courses, should be made in order to grant science credit for them. However, 27 percent of the agricultural education teachers (N = 85) ranked this method first (Table XXV). This contrasting data indicated that most teachers would support making a few minor changes in the content of agriculture curricula, but many preferred making "no changes" at all. The mean rank for making "no changes" in course content was 3.17.

TABLE XXV

TEACHERS' SUPPORT FOR MAKING NO CHANGES IN THE CONTENT OF AGRICULTURE COURSES AS A METHOD TO GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Ranks	Mean Rank
NW	13	08	04	04	13	42	122	2.90
NE	19	14	02	04	22	61	179	2.93
C	21	13	05	11	24	74	226	3.05
SW	17	09	05	06	35	72	249	3.46
SE	15	10	07	05	29	66	221	3.35
Total	85	54	23	30	123	315	997	3.17

Objective Four - Support for Methods of Certifying Teachers in Science

For this objective, agricultural education teachers showed their support for five methods of certifying agriculture teachers in science. All of the respondents had the option to list other methods, but none were identified. It was assumed that additional certification would satisfy state requirements and help justify granting science credit for agriculture courses. Table XXVI indicated teachers' support for completing a special workshop emphasizing the integration of priority academic student skills. A strong majority (72.7 %) of respondents (N = 229) ranked this method as their first or second choice. The mean rank for "completing a special workshop" was 2.06.

TABLE XXVI

AGRICULTURE TEACHERS' SUPPORT FOR COMPLETING A SPECIAL WORKSHOP TO OBTAIN A SCIENCE ENDORSEMENT

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Ranks	Mean Rank
NW	25	08	01	03	05	42	81	1.93
NE	32	13	03	08	05	61	124	2.03
C	28	16	08	12	10	74	182	2.46
SW	36	15	07	07	07	72	150	2.08
SE	41	15	04	02	04	66	111	1.98
Total	162	67	23	32	31	315	648	2.06

Based on data in Table XXVII, there was moderate support from agricultural education teachers for a method of science certification which required them to achieve a designated score on a test. This method of certification would certify agriculture teachers in science and help justify granting science credit for agriculture courses. A large number (N = 205) of agricultural education teachers (65.1 %) selected this method of science certification as their second or third choice, while only 26 teachers (8.3 %) selected it as their first choice. The mean rank for "achieving a designated score on a general science test" was 2.83.

TABLE XXVII

AGRICULTURE TEACHERS' SUPPORT FOR ACHIEVING A DESIGNATED SCORE ON A GENERAL SCIENCE TEST TO OBTAIN A SCIENCE ENDORSEMENT

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Ranks	Mean Rank
NW	04	23	07	08	00	42	103	2.45
NE	04	25	15	12	05	61	172	2.89
C	05	18	24	12	15	74	236	3.19
SW	07	26	20	10	09	72	204	2.83
SE	06	27	20	08	05	66	177	2.68
Total	26	119	86	50	34	315	892	2.83

Agricultural education teachers showed moderate to slight support for this method of obtaining a science endorsement. A strong majority (73.6 %) of respondents ranked this method third (N = 85), fourth (N = 86), or fifth (N = 61). The data in Table XXVIII indicated the respondents' support for granting a science endorsement to teachers certified in more than area of science. It was assumed that this level of certification would satisfy state requirements and help justify granting science credit for agriculture courses. However, only 83 agriculture teachers (26.3 %) ranked this method as one of their top two choices. The mean rank for granting an endorsement to "teachers certified in more than one area of science" was 3.29.

TABLE XXVIII

AGRICULTURE TEACHERS' SUPPORT FOR GRANTING A SCIENCE ENDORSEMENT TO TEACHERS CERTIFIED IN MORE THAN ONE AREA OF SCIENCE

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Ranks	Mean Rank
NW	03	07	08	11	13	42	150	3.57
NE	05	07	12	24	13	61	216	3.54
C	12	13	14	21	14	74	234	3.16
SW	06	16	24	16	10	72	224	3.11
SE	07	07	27	14	11	66	213	3.23
Total	33	50	85	86	61	315	1,037	3.29

Passing the Oklahoma teacher certification tests in science, to satisfy the requirements for an endorsement in science, was not a popular choice of agricultural education teachers. A strong majority (76.5 %) of the respondents (N = 241) ranked this method third (N = 55), fourth (N = 130), or fifth (N = 56). The data in Table XXIX indicated that teachers in all districts had a similar opinion about passing Oklahoma's teacher certification tests in science. Only 74 agricultural education teachers (23.5 %) ranked this method of certification as their first or second choice. The data implied that respondents would rather not pursue this method of science certification. The mean rank for "passing the Oklahoma teacher certification tests in science" was 3.44.

TABLE XXIX

AGRICULTURE TEACHERS' SUPPORT FOR PASSING THE OKLAHOMA TEACHER CERTIFICATION TESTS TO OBTAIN A SCIENCE ENDORSEMENT

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Ranks	Mean Rank
NW	03	06	05	22	06	42	148	3.52
NE	08	06	11	23	13	61	210	3.44
C	06	16	17	23	12	74	241	3.26
SW	07	11	13	30	11	72	243	3.38
SE	05	06	09	32	14	66	242	3.67
Total	29	45	55	130	56	315	1,084	3.44

In the final method of certification, agricultural education teachers strongly opposed completing the necessary college courses and passing the Oklahoma teacher certification test in science. A majority (54.8 %) of teachers (N = 173) ranked this method fifth and another 55 teachers (17.5 %) selected it as their fourth choice. The data indicated that agricultural education teachers would probably be reluctant to pursue this method of science certification, even if it meant science credit would be granted for agriculture courses. The mean rank for "taking the necessary college courses and passing the Oklahoma teacher certification tests in science" was 4.00 (Table XXX).

TABLE XXX

AGRICULTURE TEACHERS' SUPPORT FOR COMPLETING NECESSARY COLLEGE COURSES AND PASSING THE OKLAHOMA TEACHER CERTIFICATION TESTS TO OBTAIN A SCIENCE ENDORSEMENT

District	Distribution by Rank and Category							
	1st	2nd	3rd	4th	5th	N	Sum of Means	Mean Rank
NW	04	00	07	06	25	42	174	4.12
NE	05	10	08	08	30	61	175	4.33
C	14	05	07	13	35	74	272	3.68
SW	06	03	05	16	42	72	301	4.18
SE	03	04	06	12	41	66	282	4.27
Total	32	22	33	55	173	315	1,260	4.00

Objective Five - Agricultural Instruction Related to

Priority Academic Science Skills

To satisfy this objective, the researcher asked the respondents if they provided instruction related to the science objectives identified by the Oklahoma Department of Education. Teachers responded, only if they taught the priority science objectives. The data in Table XXXI determined the number of teachers and the total percentage who taught the priority science objectives in their agriculture courses.

TABLE XXXI

NUMBER OF RESPONDENTS IN EACH DISTRICT WHO COMMONLY TEACH OKLAHOMA PRIORITY SCIENCE SKILLS AND OBJECTIVES IN AGRICULTURE COURSES

Statement	NW	NE	C	SW	SE	Percent
I commonly teach students to:	N =	N =	N =	N =	N =	of 315
Identify similar or different characteristics in a given set of objects.	34	53	55	56	53	79.7 %
Select qualitative (descriptive) and quantitative (numerical) observations in a given set of objects, organisms or events.	32	55	59	53	54	80.3 %
Identify qualitative and quantitative changes - before, during and after an event.	29	47	62	51	52	76.5 %
Use appropriate Systems International (SI) units (grams, meters, liters, etc.) to measure objects, organisms or events.	26	49	64	51	52	76.8 %

TABLE XXXI (Continued)

Statement I commonly teach students to:	NW N =	NE N =	C N =	SW N =	SE N =	Percent of 315
Identify the properties on which a classification system is based.	31	43	54	48	58	74.3 %
Use observable properties to classify a set of objects, organisms or events.	28	43	58	50	47	71.7 %
Place an object, organism or event into a classification system.	30	51	66	58	53	81.9 %
Arrange the steps of a scientific problem in logical order.	31	52	61	60	51	80.9 %
Identify the dependent and independent variables and control in an experimental set-up.	25	46	59	52	48	73.0 %
Use math to show basic relationships within a given set of observations.	34	54	65	61	55	85.4 %
Identify a hypothesis for a given problem.	24	38	54	47	41	64.8 %
Select appropriate predictions based on previously observed patterns of evidence.	35	49	60	64	56	83.8 %
Report data in an appropriate manner.	37	54	69	65	58	89.8 %
Predict data points not included on a given graph.	29	47	61	58	60	80.9 %
Interpret line, bar and circle graphs.	16	31	27	22	33	40.9 %
Identify data which support or reject stated hypotheses.	18	26	19	25	28	36.8 %
Accept or reject hypotheses when given results of an investigation.	18	22	19	25	23	34.0 %
Identify discrepancies between stated hypotheses and actual results.	15	20	18	23	19	30.2 %
Select the most logical conclusion for given experimental data.	29	33	41	36	34	54.9 %

TABLE XXXI (Continued)

Statement I commonly teach students to:	NW N =	NE N =	C N =	SW N =	SE N =	Percent of 315
Describe the properties of an object in sufficient detail so another person can identify it.	39	53	67	64	55	88.3 %
Create an appropriate graph or chart from collected data, table or written description.	38	55	68	65	59	90.5 %
Recognize potential hazards within a science activity.	38	59	68	66	62	93.0 %
Practice safety procedures in all science activities.	38	59	69	66	62	93.3 %

A significant number of agricultural education teachers reported they commonly teach most of the priority science skills and objectives identified as most important, by the Oklahoma State Department of Education. The science objectives concerning safety and safety procedures were taught by more than 90 percent of the respondents. The science objectives least taught by agriculture teachers were those dealing with scientific procedures in research such as stating hypotheses, data collection and data analysis. Only 30-54 percent of the teachers reported they commonly teach these areas of science.

Objective Six - Level of Comfort with Integrating Priority Academic Skills

For this objective, respondents reported their perceived level of comfort with integrating priority academic skills into their daily lesson plans. Agriculture teachers rated their level of comfort on a five-point Likert-type scale with one (1) representing very comfortable and five (5) representing very uncomfortable. Table XXXII was constructed to display data which determined the level of comfort agricultural education teachers had with integrating a variety of priority academic skills into their daily lesson plans. This objective included the common academic areas taught in Oklahoma schools.

Findings from Open-ended Questions and Comments

Even though the survey gave the respondents an opportunity to comment in a "qualitative nature", there were only three sections that drew responses from the agricultural education teachers. In response to objective five, 95 agricultural education teachers (30.2 %) identified specific courses and/or examples they used to emphasize priority academic skills in science.

The courses they identified were animal science, plant and soil science, forestry, communications, agriscience, aquaculture, horticulture, power and technology, natural resources, entomology, leadership development, and economics.

The researcher concluded that the 25 priority academic science skills, identified by the Oklahoma State Department of Education, were being taught, reinforced and emphasized in agricultural education programs (Appendix C).

TABLE XXXII

TEACHERS' PERCEIVED LEVEL OF COMFORT WITH INTEGRATING PRIORITY ACADEMIC SKILLS INTO DAILY LESSON PLANS AS REPORTED BY THE RESPONDENTS

Subject	Means and Standard Deviations by District									
	NW		NE		C		SW		SE	
	Mean	S.D.	Mean	S.D.	Mean	S.D.	Mean		S.D.	Mean S.D.
Physical Sci.	2.57	1.31	2.59	1.35	2.17	1.51	2.31	1.23	1.77	0.91
Biology	2.37	1.05	2.52	1.32	2.06	1.11	2.38	1.27	1.72	0.89
Chemistry	3.41	1.16	2.93	1.31	2.88	1.27	2.87	1.35	2.65	1.36
Physics	3.33	1.20	3.19	1.33	3.18	1.43	3.13	1.34	2.77	1.40
Gen. Math	2.19	1.25	2.06	1.36	2.14	1.24	2.39	1.29	2.01	1.23
Geometry	3.29	1.21	3.43	1.28	2.93	1.35	2.78	1.52	2.29	1.24
Statistics	3.50	1.21	3.51	1.10	3.34	1.20	3.42	1.23	2.97	1.35
Adv. Math	3.29	1.25	3.52	1.24	3.08	1.21	3.35	1.36	3.24	1.22
English	2.60	1.35	3.03	1.40	2.42	1.38	2.56	1.34	2.48	1.35
History	2.77	1.15	2.75	1.22	2.76	1.28	2.93	1.36	2.79	1.35
Government	2.78	1.21	2.95	1,28	2.64	1.23	3.08	1.42	2.83	1.35
Geography	2.50	1.09	3.03	1.45	2.70	1.21	2.94	1.44	2.97	1.40
Psychology	3.21	1.26	3.15	1.16	2.65	1.20	3.22	1.30	3.02	1.46
Economics	2.59	1.40	2.85	1.36	2.36	1.18	2.93	1.37	2.31	1.60

* A five-point Likert-type scale was used to determine the teachers' comfort level with integrating priority academic skills: 1 = very comfortable; 5 = very uncomfortable.

In response to objective six, agricultural education teachers cited some examples of how they integrated priority academic student skills in their daily lesson plans. Also, respondents identified subject matter from academic courses that was commonly used to teach agricultural topics. A total of 69 agriculture teachers (22.0 %) identified the same agriculture courses found in the responses to objective five.

The data indicated that at least 22 percent of the respondents emphasized the integration of core academic areas in their daily lesson plans. The core academic courses identified were physical science, biological science, chemistry, physics, general math, geometry, statistics, advanced mathematics, language arts, social studies, government, geography, psychology, and economics (Appendix D).

Only 17 (5.4 %), of the 315 respondents, wrote comments on the back of the survey. The invitation to respond did not specifically address any of the objectives in the study, but it gave teachers an opportunity to freely give their opinion about granting science credit for agriculture courses.

All but two of the respondents had negative comments about granting science credit for agriculture courses. Some teachers had already experienced the results of granting academic credit for agriculture courses and were very much afraid of what agricultural education programs would become if science credit was commonly granted for agriculture courses. There was a strong feeling from respondents that a clear line separated agricultural education courses from core academic courses. However, the same respondents agreed that agriculture is a science and should be identified as such.

The responding agriculture teachers believed that their program should be recognized for integrating core academic subjects, but should remain an open, elective

class, that should attract all types of students. Agricultural education teachers responding in this section, predicted a high enrollment of academically low-performing students with a low interest level in the program. Respondents believed that counselors and/or administrators would purposely enroll a high number of low-performing students in the program, solely to obtain a science credit (Appendix E).

CHAPTER V

SUMMARY, CONCLUSION AND RECOMMENDATIONS

Introduction

The purpose of this chapter was to present a summary of the study problem, purpose, objectives, methodology, and major findings of the study. Conclusions and recommendations or implications were also included based on the analysis and summarization of data collected from the survey.

Summary

Statement of the Problem

According to Oklahoma school policy, science credit for high school graduation and college admission required approval by the State Board of Education and the State Regents for Higher Education, respectively. Agriculture courses did not satisfy any college admission requirement, nor were they recommended for high school students.

In the absence of a state recommendation for students to enroll in agriculture courses, and approval of these courses to fulfill partial college admission requirements, the longevity and quality of Oklahoma agricultural education programs were subject to rapid deterioration.

Therefore, a need existed to determine (1) the local support for granting science credit for agriculture courses, (2) the effects of granting science credit for agriculture courses, as perceived by teachers, (3) the teachers' perceptions about different methods of certification and methods of granting science credit for agriculture courses, (4) at what level were agricultural educators teaching priority academic skills, and (5) the agricultural education teachers' level of comfort with integrating basic academic skills into their daily lesson plans.

Purpose of the Study

The purpose of this study was to determine Oklahoma agricultural education teachers' selected perceptions of granting academic science credit for agriculture courses to meet high school graduation and college admission requirements.

Objectives of the Study

The following objectives were established by the researcher to achieve the purpose of the study:

1. To determine the level of support, from selected sources, for granting academic science credit for agriculture courses, as perceived by agricultural education teachers.
2. To determine the agricultural education teachers' perceptions of the effects of offering academic science credit for agriculture courses.
3. To determine the agricultural education teachers' preference and/or support for five different methods of granting academic science credit for agriculture courses.

4. To determine the agricultural education teachers' preference and/or support for five different types of certification procedures that would allow their students to obtain academic science credit.

5. To determine the extent to which agricultural education teachers teach and integrate the science objectives, listed in the *Oklahoma State Department of Education Priority Academic Student Skills* (Revised March, 1997) handbook, as reported by agricultural education teachers.

6. To determine the level of comfort agricultural education teachers have with integrating priority academic student skills into daily lesson plans.

Design and Conduct of the Study

For the most part, the design of this study employed the paradigm of quantitative research. Descriptive research data were gathered using a mail survey instrument (Appendix A) which included opportunities, invitations and adequate space for respondents to provide answers to open ended questions (Appendixes C, D, and E).

The population of this study was composed of 432 Oklahoma agricultural education teachers employed in state-reimbursed programs during the 1997-98 school year. The state agricultural education staff provided the researcher a current database with the mailing address and name of each agricultural education teacher employed in Oklahoma, during the study.

Of the 432 agricultural education teachers employed in Oklahoma during the 1997-98 school year, a total of 352 participated in study by returning the survey instrument. However, the researcher excluded from the study, 37 incomplete surveys, from which

accurate data could not be retrieved. Therefore, data were collected and reported on 315 respondents, of the possible 432, for a return rate of 72.92 percent. The data were analyzed using descriptive statistics such as frequencies, percentages, means, and standard deviations.

Major Findings of the Study

The average teacher-respondent was 39.8 years of age, had taught agriculture for 15.62 years and worked in a single-teacher department. The mean student enrollment per teacher was 59.7. Over three-fourths of the respondents reported the Bachelor of Science degree as the highest degree earned, while 19.7 percent reported earning the Master of Science degree. Approximately one in every five respondents reported they currently held a valid certificate to teach science in Oklahoma. Of those certified to teach science, 31.7 percent indicated having taught science or another course in an Oklahoma public school. Demographic data for the respondents were summarized in Table XXXIII.

Objective One - Support for Granting Science Credit

As a group, the teachers were strong in their support for granting academic science credit for agriculture courses. In response to the statement, "I support granting science credit for agriculture courses to meet high school graduation and college admission requirements," over 76 percent "agreed", while slightly over 16 percent were "undecided", and less than eight percent were "opposed".

TABLE XXXIII

SUMMARY OF THE DEMOGRAPHIC DATA FOR OKLAHOMA AGRICULTURAL EDUCATION TEACHERS AS OF MAY, 1998

Characteristics	Distribution by Years of Experience						Totals	
	1-5	6-10	11-15	16-20	21-25	>26	N	%
Number of Teachers	80.00	52.00	58.00	54.00	39.00	32.00	315.00	73.00
Average Age	27.70	33.40	37.80	41.30	47.00	51.50	39.80	N/A
Average Enrollment	55.00	64.40	57.70	61.90	63.10	56.10	59.70	N/A
M.S. Obtained	02.00	08.00	09.00	16.00	15.00	12.00	62.00	19.70
Single Teacher Program	61.00	35.00	42.00	36.00	24.00	23.00	221.00	70.20
Multi-teacher Program	19.00	17.00	16.00	18.00	15.00	09.00	94.00	29.80
Mean Years of Experience	02.90	08.04	13.19	18.06	22.89	28.61	15.62	N/A
SD Years of Experience	01.37	01.35	01.31	01.58	01.40	02.07	09.08	N/A

* Data in this study were collected, analyzed and reported on 73 percent (N = 315) of the entire population (N = 432).

An overwhelming majority of teachers (71.7 %) believed that the parents of agriculture students would support granting science credit for agriculture courses, while 60 percent believe that community leaders would be supportive, as well. However, perceived support from administrators, school board members, counselors, and faculty members was somewhat low to moderate with most being in the 40 to 50 percent range, with the lowest level of support being from faculty members.

TABLE XXXIV

SUMMARY OF SUPPORT TO GRANT SCIENCE CREDIT FOR AGRICULTURE COURSES AS PERCEIVED BY THE RESPONDENTS

Support Groups	Perceived Support	Distribution by Years of Experience 1-5	6-10	11-15	16-20	21-25	>26	Totals N	%
Teacher	No	05	08	04	04	01	02	024	07.6
	Maybe	15	05	13	04	09	05	051	16.2
	Yes	60	39	41	46	29	25	240	76.2*
Parents	No	01	04	02	02	00	01	010	03.2
	Maybe	22	11	22	09	07	08	079	25.1
	Yes	57	37	34	43	32	23	226	71.7
Admin.	No	07	02	03	03	03	02	020	06.3
	Maybe	45	22	31	21	19	16	154	48.9
	Yes	28	28	24	30	17	14	141	44.8
Board	No	06	05	03	03	02	01	020	06.4
	Maybe	49	22	32	22	21	15	161	51.1
	Yes	25	25	23	29	16	16	134	42.5
Counselor(s)	No	05	06	06	10	03	06	036	11.4
	Maybe	38	20	23	13	18	10	122	38.7
	Yes	37	26	29	31	18	16	157	49.9
Faculty	No	14	08	07	06	04	07	046	14.6
	Maybe	38	22	29	25	15	12	141	44.8
	Yes	28	22	22	23	20	13	128	40.6
Community	No	01	03	03	02	03	02	014	04.5
	Maybe	36	17	26	13	08	12	112	35.5
	Yes	43	32	29	39	28	18	189	60.0
Distribution of Teachers by Years of Experience		80	52	58	54	39	32	315	100.0

* 76.2 percent of the respondents indicated they would support granting science credit for agriculture courses.

Objective Two - Effects of Offering Science Credit

As a group, over 64 percent of the teachers indicated that offering science credit for agriculture courses would have positive effects on the enrollment of their programs, while almost 73 percent believed it would benefit the students in their school. Slightly more than 50 percent of the teachers believed that granting science credit would (a) increase the importance of their program, (b) increase the number of basic academic skills they used in the classroom, (c) improve students' attitude toward agriculture, and (d) improve student achievement in academic skills.

However, slightly more than 50 percent of the teachers also believed that granting science credit for agriculture courses would (a) increase the enrollment of academically poor-performing students and (b) prevent them from teaching practical and vocational skills. Only 42 percent of the teachers thought that the enrollment of academically high-performing students would increase, however, more than one-third perceived the public would think of their courses as "watered down" science courses.

Table XXXV represents a summary of the agricultural education teachers' perceptions concerning the effects of offering science credit for agriculture courses. Even though more than 76 percent of the agricultural education teachers indicated that they would support granting science credit for agriculture courses, a sizable number of teachers were unsure or had strong concerns about the concept. As the research data indicated, teachers supported the concept of offering science credit for agriculture courses and perceived that many positive effects would result from the implementation of such, but their support was dependent on several conditions.

TABLE XXXV

SUMMARY OF THE RESPONDENTS' PERCEPTIONS CONCERNING THE EFFECTS OF OFFERING SCIENCE CREDIT FOR AGRICULTURE COURSES

PERCEIVED EFFECTS		STATEMENT: Granting science credit for agriculture courses will...
Decrease	01.9 %	
Not Affect	34.0 %	
Increase	64.0 %	...the enrollment of my program.
Not Benefit	03.8 %	
Not Affect	23.5 %	
Benefit	72.7 %	...the students in my school.
Harm	12.7 %	
Not Affect	38.7 %	
Improve	48.6 %	...the image of my program.
Harm	07.3 %	
Improve	26.0 %	
Not Affect	66.7 %	...my relationship with faculty members.
Harm	07.0 %	
Not Affect	41.6 %	
Improve	51.4 %	...students' attitude toward agriculture.
Decrease	07.3 %	
Not Affect	36.8 %	
Increase	55.9 %	...the importance of my program.
Decrease	02.3 %	
Increase	44.4 %	
Not Affect	53.3 %	...student interest toward academic skills.
Decrease	00.3 %	
Increase	54.6 %	...the number of basic academic skills I use in my
Not Affect	45.1 %	courses.

TABLE XXXV (Continued)

PERCEIVED EFFECTS		STATEMENT: Granting science credit for agriculture courses will...
Decrease	10.5 %	
Not Affect	47.3 %	...the enrollment of academically high-performing
Increase	42.2 %	students in my program.
Harm	02.6 %	
Not Affect	46.3 %	
Improve	51.1 %	...students' achievement in academic skills.
Decrease	07.3 %	
Increase	50.2 %	...the enrollment of academically low-performing
Not Affect	42.5 %	students in my program.
Decrease	06.1 %	
Not Affect	69.8 %	...the number of practical skills that I teach in my
Increase	24.1 %	program.
Not Cause	10.8 %	
Likely Cause	51.4 %	...the courses in my program to be thought of as
Cause	37.8 %	"watered down" science courses.
Prevent	04.4 %	
Likely Prevent	41.6 %	
Not Prevent	54.0 %	...me from teaching vocational skills.
Not Serve	25.4 %	
Probably Serve	45.7 %	...the needs of the agricultural industry in my
Serve	28.9 %	school district.
Make	09.8 %	
Probably Make	28.6 %	
Not Make	61.6 %	...me feel like a "second-rate" science teacher.
Weaken	25.4 %	
Strengthen	32.7 %	
Not Affect	41.9 %	...my FFA chapter.
Decrease	15.9 %	
Increase	40.3 %	
Not Affect	43.8 %	...FFA membership in my program.

Objective Three - Support for Methods of Granting Science Credit

To satisfy this objective, teachers rated their level of support for five methods of granting science credit for agriculture courses. The most preferred method was one that included only minor changes in course content. This method received support from almost 44 percent (N = 138) of the respondents and had a mean rank of 2.06.

The next highest rated method was to design a new course that emphasized the integration of priority academic skills. This method had a mean rank of 2.83, but only 38 teachers ranked it as their top choice. The method of making "no changes" in course content had a mean rank of 3.17. It was followed by methods with little support that called for designing "several new courses" with a mean rank of 3.29 and making "major changes" in course content" which had a mean rank of 3.64.

Objective Four - Support for Methods of Certifying Teachers in Science

For this objective, teachers rated their level of support for five methods of certifying agriculture teachers in science. Over 51 percent (N = 162) of the teachers supported the "completion of a special workshop" to certify them in science which had a mean rank of 2.06. The only other method gaining support from the respondents called for teachers to "achieve a designated score on a general science test" to obtain an endorsement in science. This method had a mean rank of 2.83 and had 119 teachers select it as their second choice. Teachers were not willing to complete necessary college courses

and pass the Oklahoma teacher certification test, as this method had a mean rank of 4.0 with 173 teachers (72 %) selecting it as their fifth choice.

Objective Five - Agriculture Instruction Related to Priority Academic Science Skills

The *Oklahoma State Department of Education Priority Academic Student Skills* handbook contained 25 priority skills (learner outcomes and/or objectives) for secondary science students. To determine the extent to which agriculture teachers integrated the state science objectives in their daily lesson plans, all 25 priority academic science skills were listed in the survey instrument. Respondents were instructed to check "yes" if the science objective was commonly emphasized in their agriculture courses.

More than 90 percent of the respondents taught the science objectives related to safety and safety procedures. Nineteen of the 25 priority academic science skills were identified by over 70 percent of the teachers as skills that were taught and emphasized in their classes. However, less than 41 percent taught the objectives related to (a) the interpretation of line, bar and circle graphs, (b) the identification of data supporting or rejecting a stated hypothesis, and (c) the identification of discrepancies between stated hypotheses and actual data.

Objective Six - Level of Comfort with Integrating Academic Skills

The final objective of the study determined the level of comfort teachers had with integrating priority academic skills into their daily lesson plans. On a five-point Likert-

type scale, teachers were asked to rate their level of comfort with integrating academic skills with one (1) representing "very comfortable" and five (5) representing "very uncomfortable". This objective provided the researcher with information that might lead to other academic areas in which credit could be sought.

With a mean of means score of 2.16, agricultural education teachers reported they were most comfortable with integrating general math into their daily lesson plans. Other academic areas, in which the respondents reported a high comfortable level were physical science, biology, economics, and English. Teachers were least comfortable with integrating statistics, advanced mathematics, physics, and psychology (Table XXXVI).

TABLE XXXVI

MEAN OF MEANS AND STANDARD DEVIATIONS FOR THE TEACHERS' PERCEIVED LEVEL OF COMFORT WITH INTEGRATING PRIORITY ACADEMIC SKILLS INTO DAILY LESSON PLANS

Academic Subject	Mean of Means	S.D.	Academic Subject	Mean of Means	S.D.
Physical Sci.	2.28	1.26	Adv. Math	3.30	1.26
Biology	2.21	1.13	English	2.62	1.36
Chemistry	2.95	1.29	History	2.80	1.27
Physics	3.12	1.34	Government	2.86	1.30
Gen. Math	2.16	1.27	Geography	2.83	1.32
Geometry	2.94	1.32	Psychology	3.05	1.28
Statistics	3.35	1.22	Economics	2.61	1.38

* A five-point Likert-type scale was used to determine the teachers' comfort level with integrating priority academic skills: 1 = very comfortable; 5 = very uncomfortable.

Reflections Based on Comments and Answers

to Open Ended Questions

The invitation to respond in a "qualitative nature" gave teachers the opportunity to openly discuss their opinions and feelings about granting academic science credit for agriculture courses. Most comments about offering science credit for agriculture courses were negative. Some of the respondents had already experienced negative results from granting science credit to students in their school, while others proclaimed that granting science credit for agriculture courses would be duplicating science classes, that already exists.

There was a strong feeling that agricultural education and science classes were two different entities, although the teachers did recognize the close relationship between science and agriculture. They also reported the integration of several core academic areas in their agriculture classes, but believed that agricultural education programs should consist of stand-alone courses, open to all students. Furthermore, teachers believed the enrollment of academically low-performing students would increase and in most cases, those students would enroll just to get a science credit.

Some teachers strongly believed that administrators and/or counselors would overload their classes with students who had no interest in agricultural education, FFA, or supervised agriculture experience programs (SAE's). They also felt that agriculture was far too big an industry to simply integrate into core academic areas and that the industry had enough diversity to remain independent and enough importance to have the respect of

students, educators, and the public. As reported, that is precisely why they became agricultural education teachers instead of science teachers (Appendix E).

One teacher suggested that the components of a successful agriculture program should include classroom instruction, SAE development, FFA activities and an instructor who expects and encourages his/her students to participate in these three fundamental components. Another teacher discussed how granting science credit would open a new window for the development of science-based SAE's, however, he/she also believed that granting science credit would cause programs to become shallow and narrowly focused. The end result would be a dramatic reduction in the participation of FFA activities.

The respondents were also asked to give examples of how the priority academic science skills were integrated into their classes. Almost one-third of the agricultural education teachers cited courses in which they emphasized science objectives or gave examples of how the science objectives were integrated (Appendix C). Additional data was gathered from teachers concerning the integration of all academic areas into their daily lesson plans. These responses were summarized in Appendix D.

Conclusions

The analysis of the data and subsequent findings were the basis for the following conclusions:

1. Support for granting academic science credit for agriculture courses would be moderate among agricultural education teachers as a group, although survey results suggest otherwise. A strong and vocal minority, with negative experiences concerning the issue, would most likely be overwhelming in the debate. The strongest

support would come from administrators in smaller school districts trying to capitalize on their decreasing financial resources.

2. The actual effects of offering science credit for agriculture courses would most likely reflect the perceived effects reported in the survey. Agriculture programs, teachers and students would reap many positive benefits from offering science credit, but throughout the change process some traditional values and "sacred cows" would probably be compromised. For example, the enrollment in agriculture courses would probably increase, but at the same time the students' interest level in agriculture would decrease resulting in fewer SAE's and a reduction of FFA participation.

3. The most successful method to grant science credit for agriculture courses would include supplemental workbooks, classroom and laboratory technology, or other educational materials that would support the current agriculture curricula.

4. Teachers did not support taking additional college courses or passing the Oklahoma teacher science certification tests, therefore, teachers as a group must look for alternatives in certification if it is required in the future. Teachers supported completing a special workshop to obtain a science endorsement, but this method of certification would probably meet resistence from state agencies.

5. Priority skills in science and other academic areas are currently being emphasized and taught to Oklahoma agricultural education students. The evidence of integration of these priority academic skills and objectives can be found in agriculture classrooms, SAE projects, career development events and other FFA youth activities.

Recommendations

Agriculture and the food, fiber, and natural resource system is Oklahoma's most creative, productive and basic industry. Much of this state's success in agriculture can be attributed to a sound program of education. To advance a dynamic and efficient agricultural system and to assure the continued well-being of our society, first-rate education must continue to be a high priority. A cooperative effort among teachers, educational institutions, government agencies, legislators, and agribusinesses should help Oklahoma provide leadership for the future through enhanced agricultural education programs (Reinventing Agricultural Education for the Year 2020, 1998).

More specifically, agriculture teachers should identify ways to increase agricultural awareness and integrate academic skills into agriculture curricula. The integration of these academic skills should be included in their lesson plans and pointed out to students, parents, counselors and administrators to gain maximum support for granting science credit for agriculture courses. Also, supplemental curricular materials should be developed with an emphasis on scientific principles, current technology, and real world applications. Implementing these minor changes will increase standards, and reduce the perceived negative effects of offering science credit for agriculture courses.

Agricultural education teachers should evaluate the classes that are strongly recommended and required for high school graduation and college admission. Many agriculture courses, already in place, may satisfy one or more of these requirements. Courses such as agricultural communications, economics, power and technology, and international marketing should be considered as courses that might satisfy Oklahoma

recommendations or requirements. A greater number of agriculture teachers may be certified in these areas which would reduce the need for mass science certification.

Other aspects of an agricultural education program that should be considered are (1) the leadership and citizenship training found in FFA activities, (2) the bridge from school-to-career emphasized in career development events, and (3) the hands-on training associated with the development of SAE projects. To feel most comfortable, agriculture teachers should use these strategies when teaching priority skills from academic areas.

The initial dreams and visions for agricultural education have changed many times since the Smith-Hughes Act of 1917. Congressmen Smith and Hughes had a vision that has allowed agricultural education programs to prosper for almost a century. With vision for the new millennium they will continue to prosper, but without vision, they will likely perish. Therefore, it is recommended that people directly involved with agricultural education set new goals and generate new objectives. These goals and objectives should clearly embrace the concept of creating enhanced agricultural education programs that will contribute to a strong and vibrant agriculture, food, fiber and natural resource system for Oklahoma.

Recommendations for Further Research

Recommendations for further research include measuring the performance of students enrolled in traditional science courses compared with students enrolled in a combination of agriscience and traditional science courses. Also, a follow-up study of former students of agricultural education would be useful. Further research in teacher preparation would be beneficial, as well. A study which measured the relationship

between the courses a student takes in college and the courses he/she offers in an agricultural education program would assist teacher-educators with the preparation of agriculture teachers. It would also help program specialists with the placement of new teachers.

REFERENCES

Alabama State Department of Education, Accreditation Division. (1993). The Alabama performance-based accreditation system. Montgomery, AL: Author.

Benson, A. M. (1997). Assistant State Director of Vocational Education. Implementing the key educational practices. Stillwater, OK: Oklahoma Department of Vocational and Technical Education.

Bottoms, G. (1993). Redesigning and refocusing high school vocational studies: Blending academic and vocational education, connecting the school site to the work site, and linking secondary and post-secondary education. Atlanta, GA: Southern Region Education Board.

Butler, J. N. & Lee, J. S. (1993). The importance of selected mathematics skills and applications as perceived by Mississippi agriscience and mathematics teachers for the introduction to agriscience curriculum. Department of Agricultural Education and Statistics, Mississippi State, MS: Mississippi State University.

Carl D. Perkins Vocational and Applied Technology Education Act (1990). American Vocational Association Legislative Update. Alexandria, VA: Author.

Clouse, J. P. & Brown R. A. (1982). The curriculum: General education. In A. L. Berkey (Ed.), Teacher Education in Agriculture, 107-118. Danville, IL: Interstate.

Conners, J. & Elliot, J. (1994). Teacher perceptions of agriscience and natural resources curriculum. Journal of Agricultural Education, 35(4), 15-19.

Copa, G. H., & Johnson, M. A. (1988). Vocational education and high school graduation requirements. Minnesota Research and Development Center for Vocational Education. Minnesota University, St. Paul, Minnesota.

Cox, D. E. & Edmundson, A. L. (1989). A multidisciplinary technical agriculture curricula. NACTA Journal, 33(1), 23-25.

Crunkilton, J. R. & Hemp, P. E. (1982). The curriculum: Professional education. In A. L. Berky (Ed.), Teacher Education in Agriculture, 135-160. Danville, IL: Interstate.

D'Augustine, C. H. (1989). What our college business students need from secondary school. Mathematics Teacher, 82(3), 163-165.

Delaware Department of Public Instruction (1985). Using professional development to facilitate vocational and academic integration: A practitioners guide.

Dewey, J. (1938). Experience and education. New York, NY: Collier Books.

Dillman, D. A. (1978). Mail and telephone surveys: The total design method. New York, NY: John Wiley & Sons.

Doese, E. K. & Miller, W.W. (1988). Factors affecting the future enrollment of students in vocational agriculture. The ERIC Clearinghouse on Assessment and Evaluation. No ED300559

Dormody, T. J. (1992). Exploring resource sharing between secondary school teachers of agriculture and science departments nationally. Journal of Agricultural Education, 33(3), 23-31.

Dormody, T. J. (1993). Science credentialing and science credit in secondary agricultural education. Journal of Agricultural Education, 34(2), 63-70.

Drueckhammer, D. C. & Key, J. P. (1986). Product evaluation of instructional programs. NACTA Journal, 30(1), 40-42.

Flatt, W. P. (1987). The future of agricultural education in secondary schools from the perspective of land grant universities. The Agricultural Education Magazine, 60(4), 21-22.

Gleim, J. A. & Persinger, K. M. (1987). Mathematical problem solving skills of vocational agriculture students and teachers [Summary]. Proceedings of the 14th Annual National Agricultural Education Research Meeting, 14, 200.

Goodlad, J. (1983). A place called school. San Francisco, CA: Jossey-Bass.

Goodland, J. I. (1975). The dynamics of educational change. New York, NY: McGraw-Hill.

Gray, K. (1991). Vocational education in the high school: A modern Phoenix? Phi Delta Kappan, 72(6), 437-445.

Haggerton, R. D. & Williams, R. H. (1998). Perceptions of Texas agricultural science teachers toward granting science credit for agricultural science courses. Proceeding of the Forty-eighth Annual Southern Region Agricultural Education Research Meeting, 14-34. Little Rock, AK.

Hammonds, C. (1950). Teaching agriculture. New York, NY: McGraw Hill.

Hunnicut, F. S. & Newman, M. E. (1994). Mathematical problem solving proficiency of agricultural education teachers in Alabama. Lamar School of Technology.

Huston, J. (1997). Annual report on the implications of federal programs. Stillwater, OK: Oklahoma Department of Vocational and Technical Education.

Jewel, L. R. (1982). Addressing teaching performance of vocational education teachers in the central region of North Carolina. Proceedings of the Thirty-eighth Annual Southern Research Conference in Agricultural Education. Jackson, MS.

Johnson, D. M. (1995, December). Arkansas agriculture teachers' opinions concerning science credit for agriculture. Proceedings of the 22nd Annual National Agricultural Education Research Meeting, 22, 129-140. Denver, CO.

Johnson, D. M. & Newman, M. E. (1993). Perceptions of administrators, guidance counselors, and science teachers concerning pilot agriscience courses. Journal of Agricultural Education, 34(2), 46-54.

McCharen, B. (1997). Proposed 4 x 4 curriculum structures in secondary schools. Oklahoma Department of Vocational and Technical Education response to graduation standards feasibility study commission.

McGhee, M. B. & Cheek, J. G. (1989). Assessment of the preparation and career patterns of agricultural education graduates, 1975-1985. Proceedings of the Sixteenth National Agricultural Education Research Meeting. Orlando, FL.

McNeil, P. (1997). Assistant Secretary for Vocational and Adult Education. Comments at the New American High School Conference. U.S. Department of Education and the National Center for Research in Vocational Education.

Miller, G. & Gleim, J. A. (1993). Integration of mathematics into the agriculture curriculum: Are teachers ready? [Summary]. Proceeding of the 47th Annual Research Conference in Agricultural Education, 20-41.

Miller, W. W. & Vogelzang, S. K. (1983). Importance of including mathematical concepts instruction as a part of the vocational agriculture program of study. Ames, IA: Iowa State University, Department of Agricultural Education.

Mitchell, C. E. (1990). Real world mathematics. Mathematics Teacher, 83(1), 12-16.

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.

Naylor, M. (1986). Granting credit for vocational education. ED275887. The ERIC Clearinghouse on Adult, Career, and Vocational Education, Columbus, Ohio.

Newcomb, L. H., McCraken, J. D., & Warmbrod, J. R. (1993). Methods of teaching agriculture, 25-40. Danville, IL: Interstate Publishers, Inc.

Newman, M. E. & Johnson, D. M. (1993). Perceptions of Mississippi secondary agriculture teachers concerning pilot agriscience courses. Journal of Agricultural Education, 34(3), 49-58.

Norris, R. J. & Briers, G. E. (1989). Perceptions of secondary agricultural science teachers toward proposed changes in agricultural curricula for Texas. Journal of Agricultural Education, 30(1), 32-43, 59.

Oklahoma Department of Vocational and Technical Education (1997). Workplace success for Oklahomans - Business report - FY 98.

Oklahoma Department of Vocational and Technical Education (1997). Key educational practices. Stillwater, OK: Oklahoma School-to-Work System: Author.

Oklahoma State Department of Education (1997). Priority academic student skills. Oklahoma Requirements for State Graduation.

Oklahoma State Regents for Higher Education (1997). Curricular requirements and recommendations for admission to Oklahoma colleges and universities. Preparing for College Guide.

Owens, R. G. (1987). Organizational behavior in education. Englewood Cliffs, NJ: Prentice Hall.

Peasley, D. D. & Henderson, J. L. (1992). Agriscience curriculum in Ohio agricultural education: Teacher utilization, attitudes, and knowledge. Journal of Agricultural Education, 33(1), 37-45.

Peters, R. Jr. (1997). Coments to the Oklahoma Vocational Association. Oklahoma Vocational Education Summer Conference. Tulsa, OK.

Peterson, M. J. & Torrence, A. P. (1967). The curriculum: Agriculture subject matter. In V. R. Cardozier (Ed.), Teacher Education in Agriculture (136-159). Danville, IL: Interstate.

Pritiz, S. G. (1988). Basic skills: The new imperative. Vocational Educational Journal, 63(2), 27-29.

Reinventing Agricultural Education for the year 2020 (1998). Missouri Department of Elementary and Secondary Education. Jefferson City, MO.: Author.

Ricketts, S. C. (1991). A science credit for agriculture: Integrating academic and vocational education. American Vocational Association Convention Paper, ERIC database, ED343999. Tennessee, Clearinghouse No. CE060690.

Riley, R.W. (1996). U.S. Secretary of Education. Comments at the New American High School Conference. U.S. Department of Education and the National Center for Research in Vocational Education.

Rosenfeld, S. A. (1984). Vocational agriculture: A model for education reform. Education Week, September 26.

Rush, M. G. & Foster, R. M. (1984). The importance of selected activities affecting the role of vocational agriculture instructors, principals, and superintendents in Idaho. American Association of Teachers in Agriculture, 25(4), 58-65.

Smith, S. (1997). Preparing for career success. Address at The State Chamber Success Connection III Conference. Tulsa, OK.

Trinklein, D. H. & Wells, J. A. (1989). Use of alumni surveys in curriculum development. NACTA Journal, 33(2), 14-17.

United States Department of Labor. (1991). What work requires of schools: A SCANS report for America 2000. Washington DC: United States Department of Labor.

Warnat, W. J. (1991). Preparing a world-class work force. Vocational Educational Journal, 66(5), 22-25.

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

Whent, L. (1994). Factors influencing resource sharing between agriculture and science teachers participation in the agriscience program. Journal of Agricultural Education, 35(3), 11-17.

APPENDIXES

APPENDIX A

SURVEY INSTRUMENT

CONFIDENTIAL SURVEY:

This survey is designed to gather information from Oklahoma agricultural education teachers. It addresses the issue of granting academic science credit for agricultural education courses for the purpose of meeting high school graduation and college admission requirements. Your opinion is important and will be used in making decisions about this issue, which could significantly affect agricultural education programs in the future. Please complete this form truthfully and accurately. Thank you. Your cooperation is appreciated.

SECTION I - General information.

Years of teaching agricultural education _____Age_____Agricultural education district_____

Current student enrollment (students per teacher)_____Highest degree earned (B.S., M.S.)_____

Current position is in a (single or multi) teacher department _____

Subjects, other than agricultural education, in which I am certified to teach _____

_____

Other subjects which I have taught_____How many years _____

SECTION II - Support for granting academic science credit for agricultural education courses, as perceived by agricultural education teachers.

NOTE: Assume the adequate number of Priority Academic Student Skills (PASS) has been identified in the curriculum and the skills are being integrated into each lesson by the agricultural education teacher. Please check the most accurate of the three choices on the right side of the table after completing the following sentence with the phrases below.

Granting academic science credit for agricultural education courses would be supported in my school district by.....

Statement	No	Maybe	Yes
the agricultural education teacher(s).			
the parents.			
the school administrators.			
the school board.			
the guidance counselor(s).			
the faculty.			
the community.			

SECTION III - Agricultural education teachers' perceptions of the effects of offering academic science credit for agricultural education courses.

NOTE: Please complete the following sentences by drawing a circle around the most accurate of the three choices on the left side of the table.

Granting academic science credit for agricultural education courses will.....

decrease	not affect	increase	**the enrollment of my program.**
not benefit	not affect	benefit	**the students in my school.**
harm	not affect	improve	**the image of my program.**
harm	not affect	improve	**my relationship with faculty members.**
harm	not affect	improve	**students' attitudes toward agriculture.**
decrease	not affect	increase	**the importance of my program.**
decrease	not affect	increase	**students' interest toward academic skills.**
decrease	not affect	increase	**the number of basic academic skills I use in my courses.**
decrease	not affect	increase	**the enrollment of academically high-performing students in my program.**
harm	not affect	improve	**students' achievement in academic skills.**
decrease	not affect	increase	**the enrollment of academically low-performiug students in my program.**
decrease	not affect	increase	**the number of practical skills that I teach in my program.**
cause	may cause	not cause	**the courses in my program to be thought of as "watered-down," science courses.**
prevent	may prevent	not prevent	**me from teachiug vocational skills.**
serve	probably serve	not serve	**the needs of the agricultural industry in my school district.**
make	probably make	not make	**me feel like a "second-rate" science teacher.**
weaken	not affect	strengthen	**my FFA chapter.**
decrease	not affect	increase	**FFA membership in my program.**

SECTION IV - Agricultural education teachers' support for five methods of granting academic science credit for agricultural education courses.

NOTE: If you support some form of granting academic science credit for agricultural education courses, please rank the following five methods. (Where: 1 = most preferred and 5 = least preferred)

Rank	Methods
	I would support granting science credit for agriculture courses if.....
	minor changes were made in current course content to enhance PASS.
	a new course was designed to integrate PASS in agriculture.
	several new courses were designed to integrate PASS in agriculture.
	major changes were made in current course content to enhance PASS.
	no changes were made in current course content.

If you did not rank the methods of granting academic science credit, is there another method you prefer_____

_____

_____

SECTION V - Agricultural education teachers' level of support for five methods of certifying teachers to offer agricultural education courses for academic science credit.

NOTE: If you support some form of certifying teachers to offer agricultural education courses for academic science credit, please rank the following five methods of certification. (Where: 1 = most preferred and 5 = least preferred)

Rank	Methods
	I would support obtaining a science endorsement by.....
	completing a special workshop emphasizing the integration of PASS.
	achieving a designated score on a general science test emphasizing the integration of PASS.
	certifying in more than one area of science.
	passing the Oklahoma teacher certification test in science.
	completing the necessary college classes and passing the Oklahoma teacher certification test in science.

If you did not rank the five alternative methods of certification, is there another method you prefer_____

_____

_____

SECTION VI - The extent to which agricultural education teachers provide instruction related to objectives listed in the science section of the Oklahoma State Department of Education Priority Academic Student Skills.

NOTE: Please complete the following sentence. Check Yes, only if the completed statement applies to you. Please give a very brief example of how, or in what area, each priority academic student skill might be integrated into your program.

STATEMENT	YES	EXAMPLE
I commonly teach students to.....		
Identify similar or different characteristics in a given set of objects, organisms or events.		
Select qualitative (descriptive) or quantitative (numerical) observations in a given set of objects, organisms or events.		
Identify qualitative and quantitative changes - before, during and after an event.		
Use appropriate Systems International (SI) units (grams, meters, liters and degrees Celsius) to measure objects, organisms or events.		
Select a serial order for each property within a set of objects, organisms or events.		
Identify the properties on which a classification system is based.		
Use observable properties to classify a set of objects, organisms or events.		
Place an object, organism or event into a classification system.		
Arrange the steps of a scientific problem in logical order.		
Identify the independent and dependent variables and control in an experimental set-up.		
Use mathematics to show basic relationships within a given set of observations.		
Identify a hypothesis for a given problem.		
Select appropriate predictions based on previously observed patterns of evidence.		
Report data in an appropriate manner.		
Predict data points not included on a given graph.		
Interpret line, bar and circle graphs.		
Identify data which support or reject stated hypotheses.		
Accept or reject hypotheses when given results of an investigation.		
Identify discrepancies between stated hypotheses and actual results.		
Select the most logical conclusion for given experimental data.		
Prepare a written report describing the sequence, results and interpretation of an event.		
Describe the properties of an object in sufficient detail so another person can identify it.		
Create an appropriate graph or chart from collected data, table or written description.		
Recognize potential hazards within a science activity.		
Practice safety procedures in all science activities.		

SECTION VII - The perceived level of comfort with integrating priority academic student skills (PASS) into daily lesson plans, as reported by agricultural education teachers.

NOTE: Please rate your level of comfort with integrating priority academic student skills (PASS) into your daily lesson plans. Then give a very brief example of how this might be achieved.

Academic Area	Perceived level of comfort with *integrating priority academic* skills into your lesson plans. 1 = very comfortable 5 = very uncomfortable	Give an example of how each *priority academic skill might* be integrated into your lesson plans.
Physical Science (Geology, Environmental, etc.)	1 2 3 4 5	
Biological Science (Zoology, Botany, etc.)	1 2 3 4 5	
Chemistry	1 2 3 4 5	
Physics	1 2 3 4 5	
General Math	1 2 3 4 5	
Trigonometry, Algebra, Math Analysis or Calculus	1 2 3 4 5	
Geometry	1 2 3 4 5	
Statistics	1 2 3 4 5	
Language Arts (Grammar, Composition, Speech, Journalism, etc.)	1 2 3 4 5	
Social Studies (History)	1 2 3 4 5	
Government	1 2 3 4 5	
Geography	1 2 3 4 5	
Psychology or Sociology	1 2 3 4 5	
Economics (Business, Accounting, etc.)	1 2 3 4 5	

OPEN ENDED RESPONSES AND COMMENTS

NOTE: On the back side of this page, please write any comment, idea or suggestion you have about granting academic science credit for agricultural education courses for the purpose of meeting high school graduation or college admission requirements. Feel free to expand on your thoughts and opinions to include any issue affecting Oklahoma agricultural education now or in the future. This is your opportunity to make recommendations or share a potential problem! Thanks again for your help.

APPENDIX B

COVER LETTER

May, 1998

Dear Agriculture Educators:

The last few years have brought numerous changes to agricultural education programs in the state of Oklahoma. One of the most significant is the increase of academic requirements that high school students have to satisfy, to graduate from high school, or to be admitted into Oklahoma colleges.

In an effort to improve the quality of agricultural education programs, we are conducting a study to determine how agricultural education teachers perceive the concept of granting academic science credit for agriculture courses to satisfy high school graduation and college admission requirements. As an agricultural education teacher, you can have a direct influence on the continued success and future of agricultural education programs in Oklahoma.

Enclosed please find the survey addressing "Oklahoma Agricultural Education Teachers' Perceptions of Granting Science Credit for Agricultural Courses to Meet High School Graduation and College Admission Requirements". Please answer all the questions as directed and respond to any part of the survey you wish. Your responses are strictly confidential and will only be reported in the aggregate. Please take a few minutes to complete the survey and return it to me as soon as possible.

Please understand that participation is voluntary and there is no penalty for refusing to participate. If you have any questions regarding this study, please do not hesitate to contact Kenny Beams at (405) 743-5499, Dr. James P. Key (405) 744-8136, or Gay Clarkson Institutional Review Board Executive Secretary (405) 744-5700.

Thank you, in advance, for sharing your perceptions and insight on this matter. Your opinion is important to me and it will help determine how the agricultural education staff looks at secondary agriculture programs in the future.

Sincerely,

Dr. James P. Key
Professor
Agricultural Education,
Communications, and 4-H Youth Development

Kenny R. Beams
OSU Graduate Student
S.W. District Program Specialist
ODVTE - Stillwater, Oklahoma

APPENDIX C

OBJECTIVE FIVE: RESPONSES TO OPEN ENDED QUESTIONS, AGRICULTURE COURSES AND EXAMPLES THAT EMPHASIZE PRIORITY ACADEMIC SCIENCE SKILLS

Agricultural education teachers responding to this section = 95

Identify similar or different characteristics in a given set of objects, organisms or events:

Course:

- Animal Science
- Plant and Soil Science
- Forestry
- Aquaculture

Example:

- Sperm and ova evaluation
- Characteristics of heat detection and ovulation
- Breeds of livestock
- Livestock evaluation and selection
- Meat judging
- Crop inputs/outputs
- Selection and identification of plant varieties
- Types of soils
- Tree identification
- Potential lumber amount and quality
- Fish specie identification
- All Career Development Event (CDE) activities

Select qualitative (descriptive) or quantitative (numerical) observations in a given set of objects, organisms or events:

Course:

- Power and Technology
- Agriscience I and II
- Horticulture
- Plant an Soil Science
- Natural Resources
- Aquaculture

Example:

- Appearance, strength and types of welds needed on a structure
- Surveying
- Soil and water testing
- Seed bed preparation
- Chemical use
- Plant growth and performance
- Plant variety selection
- Environmental conditions for humans, wildlife, soil and water resources
- Raising fish and wildlife

Identify qualitative and quantitative changes - before, during and after an event:

Course:

- Horticulture
- Agriscience I and II
- Animal Science
- Plant and Soil Science

Example:

- Growth rate of plants
- Response to chemicals, fertilizer, etc.
- Effect of stimulants, herbicides, pesticides, fungicides, etc.
- Internal and external parasite control
- Soil testing - before and after application of fertilizer
- Results of germination percentages

Use appropriate Systems International (SI) units (grams, meters, liters, and degrees Celsius) to measure objects, organisms or events:

Course:

- Power and Technology
- Animal Science
- Horticulture
- Agriscience I and II

Example:

- Designing structures and projects
- Administering vaccinations and medications
- Application of chemicals
- Soil and water testing

Select a serial order for each property within a set of objects, organisms or events:

Course:

- Animal Science
- Horticulture
- Plant and Soil Science

Example:

- Process of digestive, circulatory, respiratory systems
- Plant growth and development
- Composition and layers of soil

Identify the properties on which a classification system is based:

Course:

- Animal Science
- Plant and Soil Science
- Agriscience I and II
- Forestry

Example:
- Expected Progeny Differences (EPD's)
- USDA Grading system
- Taxonomy of seed wheat varieties and other crop seeds
- Classification of trees and tree by-products

Use observable properties to classify a set of objects, organisms or events:

Course:
- Animal Science
- Horticulture
- Plant and Soil Science

Example:
- Meat evaluation and identification
- Poultry judging
- Greenhouse plant identification
- Seed identification
- Soil judging
- Pasture and range identification

Place an object, organism or event into a classification system:

Course:
- Animal Science
- Horticulture
- Plant and Soil Science
- Forestry
- Entomology

Example:
- Breeds of livestock
- Meat grading
- Live animal evaluation
- Varieties of flowers and shrubs
- Grain evaluation
- Tree and lumber evaluation
- Insect collection and classification

Arrange the steps of a scientific problem in logical order:

Course:
- Agriscience
- Power and Technology
- Animal Science
- Agriculture Communications

Example:
- Agriscience experiments
- Process of photosynthesis
- Project construction

Construct a set of oral reasons (livestock, poultry, dairy, equine)
Writing an FFA speech
Reporting on an FFA activity

Identify the independent and dependent variables and control in an experimental set-up:
Course:
Animal Science
Example:
Internal and external parasite control
Genetic (DNA) make-up of a particular mating

Use mathematics to show basic relationships within a given set of observations:
Course:
Power and Technology
Animal Science
Plant and Soil Science
Economics
Example:
Fabricating metal for project construction
Machinery calibration
Animal performance based on nutrition (ration composition)
Expected progeny differences (EPD's)
Dressing and yield percentages, carcass measurements, etc.
Cost/sales price of cattle, pasture, feed and other inputs
Crop inputs/outputs
Taxes, insurance, interest and other expenses real estate property

Identify a hypothesis for a given problem:
Course:
Plant and Soil Science
Animal Science
Example:
Fertilizer requirements for a particular crop yield
Performance based on feed selection and maintenance conditions

Select appropriate predictions based on previously observed patterns of evidence:
Course:
Plant and Soil Science
Animal Science
Economics
Example:
Yields based on crop records, soil P.H., etc.
Rate of gain based on feed intake, environment and maintenance
Prices based on past market trends

Report data in an appropriate manner:
- Course:
  - Agriscience I and II
  - Economics
  - All classes
- Example:
  - Agriscience experiments
  - Population studies
  - Interpret supply and demand charts
  - Use of agricultural products and by-products
  - SAE records

Predict data points not included on a given graph:
- Course:
  - Agriscience I and II
  - Plant and Soil Science
  - Economics
- Example:
  - Future need for agriculture products based on population growth
  - Potential discoveries in agricultural products (fuels, paper, etc.)
  - Crop growth and performance
  - Market trends

Interpret line, bar and circle graphs:
- Course: Economics
- Example:
  - Monthly or annual market yields and prices

Identify data which support or reject stated hypotheses:
- Course:
  - Animal Science
- Example:
  - Results of internal parasite control
  - Results of genetical matings

Accept or reject hypotheses when given results of an investigation:
- Course:
  - Animal Science
  - Plant and Soil Science
- Example:
  - Performance of animals on feed
  - Record results of yield after crop inputs
  - Cull or keep offspring of genetical matings

Identify discrepancies between stated hypotheses and actual results:
- Course:
  - Animal Science
  - Plant and Soil Science
- Example:
  - Evaluate performance of animals on feed
  - Results of yields after crop inputs

Select the most logical conclusion for given experimental data:
- Course:
  - Animal Science
  - Plant and Soil Science
- Example:
  - Compare performance with animals on different feeds, etc.
  - Find common characteristics in crop yields with similar applications

Prepare a written report describing the sequence, results and interpretation of an event:
- Course:
  - Agriculture Communications
- Example:
  - News reporting on agricultural education and FFA activities

Describe the properties of an object in sufficient detail so another person can identify it:
- Course:
  - Agriculture Communications
  - Agriculture Leadership
  - Animal Science
- Example:
  - Written (news articles) or visual descriptions (photography)
  - FFA award applications (proficiency, state & American degrees, etc.)
  - Oral reasons of livestock, horses, dairy and poultry

Create an appropriate graph or chart from collected data, table or written description:
- Course:
  - Agriculture Leadership
  - Animal Science
- Example:
  - Fund raising activities
  - FFA member participation
  - Trends in livestock markets and populations

Recognize potential hazards within a science activity:
- Course:
  - Power and Technology
  - Agriscience I and II

Animal Science
Horticulture
Plant and Soil Science

Example:

Fuels, gases, oxygen, etc.
Water testing
Working with blood and diseases that can be transmitted to humans
Chemicals that are harmful to humans and the environment

Practice safety procedures in all science activities:

Course:

Power and Technology
Agriscience I and II
Animal Science
Horticulture
Plant and Soil Science

Example:

Welding arcs
Machine safety
Electrical safety
Fuel and gas safety
Fire safety and prevention
Dangerous metals and ventilation
Proper eye, hand, head, feet, and body protection
Restraining and controlling animals for human and animal safety
Constant use of chemical protection for humans and the environment

APPENDIX D

OBJECTIVE SIX: RESPONSES TO OPEN ENDED QUESTIONS, AGRICULTURE COURSES AND EXAMPLES OF INTEGRATING PRIORITY ACADEMIC SKILLS

Agricultural education teachers responding to this section = 69

Physical Science (Geology, Environmental Science, etc.):

- Course:
  - Natural Resources
  - Plant and Soil Science
  - Animal Science
  - Power and Technology
- Example:
  - Water quality
  - Soil conservation
  - Point and non-point source pollution
  - Wildlife management
  - Retention and run-off of agricultural chemicals
  - Rangeland control and conservation
  - Livestock waste management
  - Soil type and structure
  - Replenishing soil nutrients
  - Building locations (sub-surface composition, flood areas, land class, etc.)

Biological Science (Zoology, Botany, etc.):

- Course:
  - Animal Science
  - Plant and Soil Science
  - Horticulture
- Example:
  - Food science and safety
  - Reproductive, digestive, circulatory systems, etc.
  - Artificial insemination and embryo transfer
  - Semen extrapolations and extensions
  - Plant and animal composition, life cycles, benefits, efficiencies

Chemistry:

- Course:
  - Animal Science
  - Plant and Soil Science
  - Natural Resources
- Example:
  - Waste management
  - Chemical make-up of pesticides, herbicides, fungicides, fertilizers, etc.
  - Effect of livestock drugs/vaccinations on animals and human consumption

Physics:
- Course:
  - Power and Technology
- Example:
  - Hydraulics, leverage, gears, torque, RPM's, etc.
  - How and why farm equipment works

General Math:
- Course:
  - Animal Science
  - Plant and Soil Science
  - Horticulture
  - Natural Resources
  - Forestry
  - Power and Technology
- Example:
  - Break-even price
  - Balancing rations
  - Fertilizer requirements
  - Plants (floriculture, landscaping design, etc.) - financial input/outputs
  - Timber calculations
  - Project construction

Trigonometry, Algebra, Math Analysis, Calculus:
- Course:
  - Agriscience I and II
  - Animal Science
  - Plant and Soil Science
- Example:
  - Agriscience experiments
  - Solving for unknown (rations, yields, amount of applications, etc.)

Geometry:
- Course:
  - Power and Technology
- Example:
  - Project construction
  - Cutting and welding angles, circles, squares, etc.
  - Structures (roofs, stairs, etc.)
  - Grain bin and area measurements

Statistics:
- Course:
  - Economics
  - Agriculture Communications and Leadership

Animal Science
Plant and Soil Science

Example:

Supply and demand of agriculture products
Prediction of prices, crop yields, and trends
Written reports from DTN, Farm-Dayta, and Internet
Speech bibliography resources
SAE record book efficiency factors
Genetical probabilities of plants and animals
Test plots

Language Arts (Grammar, Composition, Speech, Journalism, etc.):

Course:

Agricultural Communications & Leadership
Animal Science
All Classes

Example:

Writing speeches and public speaking
Written reports
Interview skills
Resume writing, cover letters, and letters of application
FFA award applications
Written and oral reasons

Social Studies (History):

Course:

Agriscience I and II
Animal Science
Plant and Soil Science
Economics

Example:

History of agriculture
Population demand for agricultural products
Societal impact of U.S. and world agriculture production
History of FFA
History and origination of breeds of livestock and varieties of plants
State and U.S. agricultural policy
International trade policy

Government:

Course:

Agriscience I and II
Animal Science
Plant and Soil Science
Economics

Example:
- Local, district, state, and national exposure to political process
- Chapter officer elections
- Committee work
- Parliamentary procedure
- Chapter community projects
- Study of county, state and national government
- Current issues (legislation) affecting agricultural products
- Agriculture policy (check-off programs, subsidies, regulations, etc.)
- International imports and exports
- Ethics in agricultural education and FFA activities

Geography:

Course:
- Natural Resources
- Animal Science
- Plant and Soil Science
- Forestry

Example:
- Study of state soil maps
- Best use of land for ultimate production and conservation
- Optimum climatic conditions for crops and livestock
- Prime locations for business and industry
- Agriculture census Department of Agriculture statistics
- Satellite farming (for optimum fertilizer and chemical needs)

Psychology, Sociology:

Course:
- Animal Science
- FFA activities

Example:
- Study of animal behaviors and effect of population numbers
- Small animal, estrus behavior
- Personal and leadership development (camps, conventions, conferences)
- Chapter, individual and community development programs
- Dealing with people in sales (fund raisers) and extensions of SAE's
- Learning about appropriate appearances and dressing for success

Economics (Business, Accounting, etc.):

Course:
- Animal Science
- Plant and Soil Science
- Economics (Agriculture Business Management, Sales and Service)
- Agricultural Communications and Leadership
- Horticulture

Example:

Principles of borrowing and paying back money for SAE projects
Price trends for crops and livestock
Law of supply and demand impact on agricultural commodities
Impact to agriculture from food-borne diseases
Puts, calls, contracts, futures market, etc.
Agricultural policy
Personal financing (investments, retirement funds, etc.)
Financing a small business (gardens, greenhouses, etc.)

APPENDIX E

COMMENTS FROM AGRICULTURAL EDUCATION TEACHERS

Agricultural education teachers responding to this section = 17

The majority of agriculture that we teach is interlaced with different degrees and different areas of science. Most teachers give a broad base of science, but we prepare the student for a specific area of science.

I feel like I obtained my degree to teach agricultural education - not science!

It seems, to me, that we use science every day in our classrooms - I know I do. I teach quite a lot of science and possibly more than the regular science teacher does. So why shouldn't students benefit from our experience. The 4 x 4 system we keep talking about, also adds to the need for agricultural education instructors to be able to satisfy some science credit. The slight fear of losing students to extra math, science, history, and English requirements should bother more teachers than it does! That point does interest me, from the standpoint of losing my better students.

I am in agreement with giving academic science credit for agriculture courses.

Yes, I agree that students in agricultural education classes should have science credit because agriculture is very much based on science. What concerns me is this - will the program change to just another science course or will it remain, an agriculture course? We don't need to be dissecting frogs and the like (I guess pigs would be OK). Agricultural education has changed tremendously in recent years - and for the better, I would say. But there's a point to where we would lose our agricultural identity and be just like other science courses. This cannot be allowed to happen. I don't have the answers, but I want to help make this a reality (students receiving academic science credit for agriculture courses).

I would like to see us be certified to teach science creditable classes, due to the fact, that basically all PASS skills, are already taught, but just aren't identified as such.

In regards to granting science credit for agriculture courses - I don't see how this would help agriculture education in that I have seen what has happened to an agriculture class where physical science credit was given. Low producing students, with no interest what so ever in agriculture, were placed in the class to get science credit for graduation. This isn't what I want, as an agricultural education instructor, and I can't believe you would want this type of student either. These kids insist on not paying dues, and could care less about agriculture of any form. I want to find more ways to attract those 3.5 to 4.5 G.P.A. students who want to excel. Allowing science credit for agriculture courses isn't the answer in my mind - these kids are in applied chemistry, Biology II, etc. already. Also, where will the funding come from to buy the needed laboratory equipment and supplies so we can attempt to meet PASS objectives?

We are about to offer potential veterinary students, an animal science course and an agricultural communications and leadership course, to top students interested in becoming leaders. I would like more information on how to attract the high-performing, motivated students by offering an elective they are interested in. If teachers need more students, they should recruit and find local solutions. If science credit is what is needed to keep our courses and vocation alive - then we've hit an all-time low - because we are so much more than science teachers and offer an opportunity for all students, not just low or non-qualifiers. Maybe we should spend more time and effort in showing the academic world how our courses support their curriculum instead of replacing their courses.

We offered a practical math credit for agricultural economics in the 1997-98 school year. Students were required to be a member of FFA, pass the class with a 2.0 or above, and do additional math assignments for practical math credit. We are going to do something for science in 1998-99.

All eighth grade students do a science project for the science fair and biotechnology students do labs over plant propagation, antibiotics, bacterial growth, etc. If all teachers would take the time to note PASS skills in lesson plans, we each would realize just how much science we already teach.

Method of certifying teachers must be available to all teachers - something we are all capable of doing!

If I had wanted to become a science teacher, I would have made it my major in college!

If added as a science credit, our programs could turn into a "dumping ground" for lower level students. If I had thought about being a science teacher, that's the way I would have gone!

Applied science and math courses are already being taught in Oklahoma agricultural education programs. We are 23,000 students strong, now! Why change what is currently working? If it's not broke, don't fix it!!!

Be advised, that I graduated with an ag-ed degree - I am not a science teacher.

Granting academic science credit for agriculture courses will increase students, but decrease the number of paid FFA members.

Why should we have to obtain additional certification in science if we are already certified in "general science" and it is listed on our certificate?

Instructors should look at PASS skills and design his/her program to meet the needs. I don't feel like this should be a blanket decision for all programs. It could backfire on the whole program.

APPENDIX F

INSTITUTIONAL REVIEW BOARD

APPROVAL FORM

OKLAHOMA STATE UNIVERSITY
INSTITUTIONAL REVIEW BOARD
HUMAN SUBJECTS REVIEW

Date: March 6, 1998 **IRB #: AG-98-031**

Proposal Title: OKLAHOMA AGRICULTURAL EDUCATION TEACHERS PERCEPTIONS CONCERNING SCIENCE CREDIT FOR AGRICULTURAL COURSES FOR HIGH SCHOOL GRADUATION AND COLLEGE ADMISSION

Principal Investigator(s): James P. Key, Kenneth R. Beams

Reviewed and Processed as: Exempt

Approval Status Recommended by Reviewer(s): Approved

ALL APPROVALS MAY BE SUBJECT TO REVIEW BY FULL INSTITUTIONAL REVIEW BOARD AT NEXT MEETING, AS WELL AS ARE SUBJECT TO MONITORING AT ANY TIME DURING THE APPROVAL PERIOD.
APPROVAL STATUS PERIOD VALID FOR DATA COLLECTION FOR A ONE CALENDAR YEAR PERIOD AFTER WHICH A CONTINUATION OR RENEWAL REQUEST IS REQUIRED TO BE SUBMITTED FOR BOARD APPROVAL.
ANY MODIFICATIONS TO APPROVED PROJECT MUST ALSO BE SUBMITTED FOR APPROVAL.

Comments, Modifications/Conditions for Approval or Disapproval are as follows:

Signature: _____ Date: March 10, 1998

Chair of Institutional Review Board

cc: Kenneth R. Beams

VITA

Kenneth Ray Beams

Candidate for the Degree of

Doctor of Philosophy

Thesis: OKLAHOMA AGRICULTURAL EDUCATION TEACHERS' PERCEPTIONS OF GRANTING SCIENCE CREDIT FOR AGRICULTURAL COURSES TO MEET HIGH SCHOOL AND COLLEGE ADMISSION REQUIREMENTS

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Pauls Valley, Oklahoma, June 3, 1955, the son of Ozell F. and Betty J. Beams

Education: Graduated from Wayne High School, Wayne, Oklahoma, in May, 1973; completed a summer term and two semesters at Murray State Junior College, Tishomingo, Oklahoma, in 1975 and 1976; received Bachelor of Science degree in Agricultural Education from Oklahoma State University, Stillwater, Oklahoma, in May, 1978; received Master of Science degree in Educational Administration from Oklahoma State University in December, 1993. Completed the requirements for the Doctor of Philosophy degree at Oklahoma State University in December, 1998

Experience: Raised on a farm and ranch setting near Maysville, Oklahoma; employed as a farm and ranch laborer during the summers; employed by Swan's Inc., Irwin Sand Company, Johnny Payne Insulation, and Perkins Veterinary Clinic as an undergraduate student; employed as an agricultural education teacher at Hennessey, Oklahoma for six years, Fairview, Oklahoma for two years, and Kingfisher, Oklahoma for ten years; employed by Nicholas Real Estate and Auction Company for one year; employed by the Oklahoma Department of Vocational and Technical Education as a program specialist in agricultural education from July, 1997 to present

Professional Memberships: American Vocational Association, Oklahoma Vocational Association, National Association of Agricultural Educators, Oklahoma Agricultural Education Teachers Association, National Association of Supervisors of Agricultural Education, Phi Delta Kappa, Chamber of Commerce in Stillwater, Oklahoma