TEACHER CHARACTERISTICS RELATED TO THE ADOPTION OF AGRISCIENCE CURRICULUM IN VIRGINIA MIDDLE SCHOOL AGRICULTURAL EDUCATION PROGRAMS

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(ABSTRACT)

Middle school programs in agricultural education are unique educational experiences that provide middle school aged children in Virginia with a basic understanding of agriculture and its applied sciences. Curriculum innovations such as the one for Virginia middle schools provide guidance for teachers in the field and offer a base from which programs can operate. However, the benefits of educational innovations are never fully realized until the teacher in the classroom adopts and implements the changes. The purpose of this study was to determine the relationship between teacher characteristics and the adoption of agriscience curriculum in Virginia middle school agricultural education programs.

The population for this study consisted of the 57 middle school teachers of agricultural education in Virginia. All of the teachers were surveyed with an 81% response rate obtained. Selected conclusions drawn from the findings were:

1. There are two distinct groups of middle school agricultural education teachers in Virginia, those who are teaching a large part of the approved curriculum and those who are teaching only a small portion of the curriculum.
2. Teacher attitude toward agriscience is a significant predictor of the amount of agriscience curriculum taught.
3. Teacher knowledge of agriscience is a significant predictor of the amount of agriscience curriculum taught.
4. Teacher expectations of agriscience curriculum is a meaningful predictor of the amount of agriscience curriculum taught.

Selected recommendations drawn from the findings and conclusions are:

1. Given the existence of the significant contribution of the teachers' positive attitude toward the amount of agriscience curriculum taught by middle school teachers of agricultural education in Virginia, more effort by teacher education, the Virginia Department of Education, and agricultural interests in Virginia should be devoted to building positive attitudes toward agriscience.
2. Given the significant contribution of the teachers' knowledge toward the amount of agriscience curriculum taught by middle school teachers of agricultural education in Virginia, more effort is needed by teacher education to prepare prospective teachers in agriscience content and

methodology as part of their teacher preparation. The Virginia Department of Education and agricultural interests in Virginia should also commit to teacher training through inservice and other activities involving agriscience education.

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Chapter 1

Introduction

When the Smith-Hughes Act was passed in 1917, agricultural education was a vocational preparation course for boys. Agricultural education programs were located mainly in the high school grades and were intended to provide training for program completers that would furnish skills required for entry and advancement in farming occupations.

Although the agricultural education programs were intended to be vocational, in 1929 agricultural education in local schools was considered, in part, to be an applied science (Sutphin, 1992). Resources were allocated by local schools to agricultural education programs for the implementation of science based instruction. School garden plots and laboratories served as teaching environments for the plant and related sciences (True, 1929). Over the years, the ideals of vocational education in agriculture developed a narrower focus as science concepts were de-emphasized in favor of job preparation. By the mid 1980s, the curricular emphasis was on training people for occupations in the food and fiber industry (Neason, 1992).

Although they were not included in the early vocational education legislation, agricultural education programs for middle grade students were initiated by the Commonwealth of Virginia in 1925 (Hillison, 1993). Currently there are 57 middle school agricultural education programs in Virginia (Virginia Agricultural Education

Teachers Directory, 1993). As local school systems begin to recognize the potential benefits of middle school agricultural education programs that emphasize the science of agriculture, the number of programs will increase. Students in middle and junior high school programs already comprise over 35% of FFA membership in Virginia (Gender, Ethnicity, and Age, 1993).

Nationally, the number of middle school programs in agricultural education has grown steadily over the last 10 years with 31 states currently offering agricultural education in the middle grades (Barrick & Hughes, 1992). Problems exist when attempting to make middle school programs fit a pre-existing mold for secondary programs. These problems have kept some states like Ohio from initiating middle school programs in agricultural education. States that recognize the different needs of the middle school student and are willing to build middle school programs around those student needs have been and will continue to be successful with middle school agricultural education.

The on-going process of middle school curriculum and program development in agriculture in Virginia has historically received support from the Virginia Department of Education. In 1992, the Virginia Agricultural Council added its support to middle school programs by funding a $24,000, two-year curriculum development project for agricultural education in the middle grades. This program will provide instructional units that can be adopted for use by middle school agricultural education teachers.

Middle grade agricultural education programs are not intended to be small-scale high school programs, but unique educational experiences that meet the needs of middle school aged youth (Frick, 1992). The purpose for middle school agricultural education in Virginia is to provide students with a basic understanding of science through agriculture (Agriscience Education, 1990).

Understanding Agriculture: New Directions for Education (1988) reported findings that suggested additional science-based curriculum be used in agricultural education programs to teach the biological, physical, and chemical sciences through agriculture. The Carl D. Perkins Vocational Education Act of 1990 further emphasized the importance of teaching the science of agriculture through integration of academic and vocational education.

In 1990, the Virginia Department of Education designed an agriscience curriculum for middle school programs that was reflective of recommendations from the National Research Council and the Perkins Vocational Education Act of 1990. This agriscience curriculum is currently available for middle school agricultural education programs in Virginia.

Teachers in agricultural education programs have traditionally had a great deal of freedom over the curriculum taught in their individual programs. The logic behind this policy is to allow localities to customize curriculum to meet the needs of the community. Implementation of the core curriculum,

outlined in Agriscience Education for the Middle School (1990), in middle school programs rests, to a large extent, with the teacher.

Concurrent with the national emphasis on agriscience, the Commonwealth of Virginia has suffered massive cuts in the education budget. Vocational education has experienced state department of education personnel reductions, decrease in program funding at the state and local levels, loss of local vocational directors, and loss of extended contracts for many local teachers. Facing decreases in funding, while attempting to implement changes, may impede the implementation of an agriscience curriculum. Are the initiatives in the National Research Council report and Carl D. Perkins legislation being implemented in the middle school agriscience curriculum in Virginia? The answer to this question is unknown in part because the state department of education and universities have limited contact with local programs as well as constricted access to feedback from the field.

To the knowledge of the author, there have been no efforts to ascertain the data to answer this question. The profession needs to know the extent to which agriscience is being implemented and the factors that affect the adoption of agriscience curriculum in local middle school programs.

The Problem

Given the growth of middle school programs in agricultural education in the United States and the unique needs of middle school youth, it is important for the agricultural education profession to analyze middle school curriculum efforts, such as the one in Virginia. Measuring the affect of the teacher on curriculum adoption can offer insight in future curriculum development efforts.

Purpose and Objectives

The Commonwealth of Virginia has presented a new curriculum for the middle school agricultural education programs. The extent to which the state approved curriculum competencies have been adopted by middle school teachers is unknown. Furthermore, the characteristics of the teachers within the middle school agricultural education programs that influence the adoption process is unknown. Therefore, the purpose of this study was to determine the relationship between teacher characteristics and the adoption of the middle school agriscience curriculum in Virginia middle school agricultural education programs.

The specific objectives were to determine:

1. the amount of agriscience being taught in middle school agricultural education programs in Virginia,

2. the extent to which teachers' attitude toward agriscience is related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia,
3. the extent to which teachers' knowledge of agriscience curriculum content is related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia,
4. the extent to which teachers' expectations of agriscience curriculum are related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia,
5. the extent to which selected demographic traits of teachers are related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia, and
6. the relationships among the variables identified in objectives one through five.

Limitation

This study was limited to teachers of middle school agricultural education programs in Virginia for the 1993-94 school year.

Definition of Terms

1. Degree of agriscience curriculum being taught

Constitutive definition: Understanding Agriculture: New Directions for Education (1988) defined agriscience as instruction using agricultural examples to teach biology, chemistry, and physical science. Agriscience curriculum in Virginia middle school agricultural education programs is defined by the competencies in the Agriscience Education for the Middle School curriculum developed by the Virginia Department of Education (1990). Therefore, the degree of agriscience content taught in Virginia middle school agricultural education programs is reflected in the competencies included from the Agriscience Education for the Middle School curriculum in the content of courses taught.

Operational definition: This variable was operationally defined as the percentage of competencies within the Virginia middle school agricultural education curriculum that is taught by the teachers of agriscience in Virginia middle school agricultural education programs.

2. Attitude of the teacher toward agriscience

Constitutive definition: Trandis (1971) defined attitude as "an idea charged with emotion which predisposes a class of actions to a particular class of social situations" (p. 2). Agriscience is defined as the use of agricultural examples to teach biological, chemical, and physical science (Understanding

Agriculture, 1988). Therefore, the teachers' attitudes toward agriscience can be measured by defining the state of mind teachers possess toward using agricultural examples to teach the physical, chemical, and biological sciences.

Operational definition: This variable was operationally defined as the mean score on a semantic differential with 10 items and a six point scale. The bipolar sets of adjectives appeared below the term "agriscience" and the subjects were asked to check a response that represents their position on the continuum. The scores were summed, and a mean calculated for the attitude score of teachers toward agriscience.

3. The teachers' knowledge of agriscience curriculum content

Constitutive definition: Agriscience is defined as teaching biological, chemical, and physical sciences through agricultural examples (Understanding Agriculture, 1988). Finch and Crunkilton (1994) define curriculum as "the sum of the learning activities and experiences that a student has under the auspices or direction of the school" (p. 9). Knowledge is defined as "familiarity, awareness, or comprehension acquired by experience or study" (Websters, 1988, p.699).

Operational definition: The variable was operationally defined by teachers' responses to their level of knowledge of competencies that are agriscience related and are included in the Virginia middle school agricultural education curriculum. Teachers were asked to respond to the statement "I

know enough about this competency to teach it to my students." A four point Likert-type scale was used with the mean score of 68 items calculated for the perceived knowledge score of the middle school agricultural education teachers.

4. The teachers' expectations of the middle school agriscience curriculum

Constitutive definition: The middle school agriscience education program in Virginia is described in Agriscience Education for the Middle School (1990) as:

> A program designed to introduce agriscience to all middle school students. Through the program, students become aware of, explore, and apply science to agriculture, thus developing an understanding of the nature of science and its application to the food and fiber system (p. 3).

Expectancies are defined by Mischel and Mischel (1977, p. 387) as "anticipated outcomes in particular situations."

Operational definition: This variable was operationally defined with a set of 10 statements that reflected the expected outcomes of the Agriscience Education for the Middle School curriculum. The teachers were asked to evaluate the statements on a four point Likert-type scale. A mean score of the statement evaluations was calculated for an expectations variable value.

Summary

Agricultural education must change (Understanding Agriculture, 1988). The findings of the Understanding Agriculture report (1988) helped change the focus of "vocational agriculture" from a training program for agricultural labor to a broad scope agricultural education program that encompasses the science of agriculture.

The Commonwealth of Virginia has been a pioneer in the development of middle school agricultural education programs. The agriscience curriculum currently in place in Virginia offers students an opportunity to explore and apply the science of agriculture and develop an understanding of the nature of science and its application to the food and fiber industry (Agriscience Education for the Middle School, 1990).

Teachers make the final decision on the curriculum that is used in the classroom. To assess the effectiveness of a curriculum innovation, one must consider the affect of the teacher on curriculum adoption.

The purpose of this study is to determine the relationship between teacher characteristics and the adoption of the middle school agriscience curriculum in Virginia middle school agricultural education programs. Such a study should give insight to the affect that teacher characteristics have on the curriculum adoption process.

Chapter 2

Review of Literature

The review of literature concentrated on the areas of educational change and adoption as the theoretical framework for the study. Also included in the literature review were the areas of agriscience education, middle school education, agricultural and vocational education in the middle grades, behavior prediction, and teacher characteristics.

Educational Change

The focus of agricultural education must change (Understanding Agriculture, 1988). This statement is the first in a list of findings published by the National Research Council to offer new directions for agricultural education.

The results published by the National Research Council have been praised by progressive thinkers in agricultural education as a new mission for vocational agriculture (McCormick, Zurbrick, & Miller, 1989). Change for the accommodation of the clientele (students of agricultural education programs) would strengthen agriculture throughout the country.

A definition of change in education may be a significant alteration which is intended to benefit the people involved (Haveloc, 1973). The key to this definition is that change is an attempt to improve the present situation. A term closely associated

with change is innovation, which may be defined as an idea, practice, or program with potential benefit to the organization (Russell, 1972).

Types of Change

There are three types of change described by Hanson (1991). Spontaneous change occurs as a result of natural occurrences that are unplanned. The organization may be faced with a sudden emergency that requires adaptation, such as a loss of an employee that requires a reallocation of responsibilities among the remaining staff.

Losing most of the agricultural education supervisory staff in Virginia Department of Education was a spontaneous change for Virginia agricultural education. This change forced the organization to adopt new strategies to continue offering a quality agricultural education program in Virginia.

Changes that occur as a result of the organization's cumulative long-range planning and implementation are evolutionary changes. Policies and practices that guide decision making and functions of the organization evolve over time. Agricultural education has evolved from a program intended to train farmers to a comprehensive curriculum that includes education in and about all aspects of the agricultural industry (Neason, 1992).

The final type of change discussed by Hanson (1991) is planned change. A conscious, deliberate effort to bring about a desired outcome in the organization or in

the individuals within the organization is planned change. Although parts of the agriscience initiative can be attributed to evolution, recent efforts by teacher education, state departments of education, and others in agricultural leadership roles reflect planned change.

Resistance to Change

Resistance to change occurs at both the organizational and individual levels (Hanson, 1991). Change is confronted with a multitude of barriers that can impede or even block innovation. People and organizations are generally comfortable with the status quo. They know their responsibilities, mission, and place in the scheme of the organization. Teachers who have traditionally been production agriculture oriented are comfortable in their roles.

Watson (1969) suggested an organizational resistance cycle with four stages. In the first stage, progressive thinkers are ridiculed and not taken seriously. In the second, support is developed, while pros and cons for the innovation become evident. The battle ensues in the third stage as resistant people in the organization try to quell the new program. The fourth stage is characterized by a strong flow of support to the new program. The agriscience initiative could be placed in the third stage of resistance as traditional teachers and supporters of traditional programs are clinging to the "vocational agriculture" model.

Teachers tend to teach what they know (House, 1981). When an innovation requires a change in the way a teacher presents a lesson or a change in the content of the course threatens the existing security of a deeply entrenched pattern, the teacher will likely resist. It is easier for a person to perform at a level at which he/she is familiar, comfortable, and secure. Psychological systems exist in individuals that can promote resistance. Habits, dependence, insecurity, and coping strategies are strong motivators and often difficult to alter.

Mechanics of Change

A three step model for change introduced by Schein (1969) outlined the process as unfreezing, changing, and refreezing. The unfreezing stage involves creating a motivation in the organization for change. Schein creates unfreezing by disconfirming behaviors or situations, inducing guilt anxiety, and creating psychological safety by reducing the threats to individuals and the organization. A disconfirmation of the norms of reality must occur to convince the constituents of the need for change (unfreezing). In many ways, Understanding Agriculture (1988) served to disconfirm the belief that vocational agriculture would survive without programmatic changes.

The second phase of the Schein model is the changing of the target. Once the target decides that change is necessary, persons re-examine their assumptions and

beliefs. Cognitive redefinition is a problem that is best solved by seeking valid and reliable information from trusted sources and developing alternate assumptions and beliefs.

Identification is accomplished through a single source of new information. The source of this new information can be the actual change agents, colleagues, or the supervisor of the change target. The target often connects with a person that relates with him/her emotionally. Scanning occurs when information is gathered through multiple sources present and not present. The content, not the person, is emphasized as these sources are not emotionally connected. Alternate assumptions and beliefs are developed as a result of cognitive redefinition.

Refreezing is the final step that stabilizes the changes. The innovations will appear in the responses and personalities of the change targets. Refreezing is a confirmation process that solidifies the change and serves to eliminate the pre-change behaviors. Reinforcement is crucial to the refreezing process. If the new beliefs and assumptions are reinforced through the organization, the target will make them a permanent part of his/her personal construct.

Section Summary

Change in education may be a significant alteration which is intended to benefit students, teachers, and other constituents in education (Haveloc, 1973).

Change is an attempt to improve the present situation. Innovation, a term closely associated with change, is an idea, practice or program with potential to benefit an organization (Russell, 1972).

Change takes three forms, spontaneous, evolutionary, and planned (Hanson, 1991). Changing from vocational agriculture to agriscience have been both evolutionary and planned changes. The initial shift to agriscience was a natural evolution for agricultural education programs that used the science of agriculture in their curriculum, while changes to agriscience that have been initiated by leadership in agricultural education are an example of planned change.

Resistance to change occurs in four stages (Watson, 1969). In the initial stage, progressive thinkers are ridiculed for their beliefs. In the second stage, support starts to build for the innovation. In the third stage, supporters of each side of the issue face off. A strong flow of support for the new program is characteristic of the fourth stage.

Changes that require behavior modifications meet with more resistance than changes that require little effort to adopt. When teachers are faced with learning new material to teach agriscience, they are more likely to resist the change.

Schein (1969) defines the change process with a three step model. The model of unfreezing, changing, and refreezing offers a simple explanation of the change process. To change a behavior, a better way must first be identified (unfreezing).

The change step attempts to retrain individuals in an effort to implement the innovation. The refreezing step stabilizes the change while making the new behavior a permanent part of the target audience.

Predicting Behavior

Behavioral sciences are gaining recognition in industry as management attempts to influence employee behavior (Longenecker, 1977). Although predicting and explaining behavior is the basis of social research (Pedhauser, 1982), there are few models in existence that serve to predict teacher behavior. Multiple regression analysis in behavioral science can serve to predict behavior (Pedhauser, 1982).

If "Educational change depends on what teachers do and think" (Fullam, 1982, p. 107), then predicting behavior should be closely tied to teacher knowledge. Expectations that the teachers hold toward an innovation will affect their adoption of the innovation. Teachers tend to be concerned about the effects of educational innovations on the student (Darr, 1985). Darr also noted that when teachers perceive changes in the curriculum to benefit the students, they are more likely to adopt those changes.

Curriculum taught in the classroom depends on the teacher's personal theories and beliefs (Ross, Cornett, & McCutcheon, 1992). Teachers tend to teach what they know best (House, 1981). If teachers have a low degree of agriscience knowledge, they will be less likely to include agriscience topics in the curriculum.

What a person can do is based on what the person knows about that activity (knowledge), while performance of a task is based on expected outcomes and incentives (Mischel & Mischel, 1977). If teachers are to include competencies from the Agriscience Education for the Middle School (1990) curriculum, they must have knowledge in the competency area and expect that competency to benefit them and or the student.

Trandis (1971) identified four indicators for predicting human behavior. They included attitude, social norms, habits, and perceived benefits of the behavior. For the purpose of this study, attitude represents "a state of mind or feeling" (Webster's, 1988, p. 136) toward agriscience. Social norms are reflected in the current condition of agricultural education. The teachers' habits will be assessed through their knowledge and application of agriscience competencies as well as teacher demographics. Expected benefits of agriscience education can be assessed through identifying the teachers' anticipated outcomes of agriscience curriculum (Mischel & Mischel, 1977).

Section Summary

Behavioral science methods such as multiple regression analysis are being used more frequently for predicting and explaining human behavior. Since educational change is dependent on teacher actions and beliefs, the adoption of educational innovations can be evaluated through teacher characteristics.

A person's ability to perform a task is based on knowledge of the task while actual performance is based on expected outcomes and incentives. Topics included in the curriculum depend heavily on the teacher's personal theories and beliefs. A behavior prediction model identified by Trandis (1971) showed behavior to be a function of attitudes, social norms, habits, and expectations.

Agriscience Education

Although science has been taught in agricultural education programs even before the Smith Hughes Act was passed in 1917, formal efforts to emphasize the science of agriculture have only recently evolved. In fact, the early 1980s saw agricultural education programs serving mainly to prepare individuals for employment in the food and fiber industry (Neason, 1992). In 1988, the National Research Council's (NRC) Committee on Agricultural Education in Secondary Schools published a landmark document for agricultural education. Understanding Agriculture: New Directions for Education gave agricultural education in the United States a new vision.

Understanding Agriculture (1988) told a story of agricultural education that was not promising. Enrollments in agricultural education programs have been dropping at a one to three percent rate since the peak enrollment in the late 1970s. Peasley (1990) reported that enrollment in Ohio agricultural education programs dropped 30% between 1980 and 1989. Farm populations are declining with only

2.2% of the United States population living on farms in the mid 1980s. The need to train farmers has been greatly diminished while the need to train agricultural professionals in new and emerging agricultural fields has dramatically increased. Curricula in agricultural education programs have not kept up with technology in the agriculture industry.

While employment opportunities are waning in traditional production agriculture, the future is bright for individuals prepared for agriscience-based careers. Agriscience in agricultural education was defined as identifying and using concepts of biological, chemical, and physical sciences in the teaching of agriculture (Understanding Agriculture, 1988). Cooper (1990, p. 8) defines agriscience as "the application of scientific principles and new technologies to agriculture." Cooper went on to define agriculture as "activities concerned with the production of plants and animals, and the related supplies services, mechanics, products, processing, and marketing" (p. 8).

Middle schools offer a unique arena for teaching the science of agriculture. Middle school agricultural education programs enroll a high percentage of middle school students at some point in their middle school tenure. The most significant opportunities to teach science through agriculture in the middle school are in the life and earth sciences. Topics include "physiology, nutrition, plants and animals, taxonomic classifications, soil formation, the hydrogeological cycle, and other topics that contribute to agricultural literacy" (Understanding Agriculture, 1988, p. 14).

Peasley (1990) identified teacher knowledge and attitude about agriscience as having an affect on the adoption of the Ohio agriscience core curriculum. Ohio agricultural education teachers were teaching a moderate level of agriscience with 68% of the teachers including 51% to 84% of the competencies identified in the agriscience core curriculum in Ohio (Peasley, 1990).

Although there is a national thrust for an agriscience emphasis in agricultural education, there is a shortage of instructional materials, lack of leadership at the state and national levels, and little development of curriculum in agriscience (Peasley & Henderson, 1992). Rosetti and McCaslin (1992) recommended that the National FFA, the United States Department of Agriculture, and the United States Department of Education encourage the development of middle school agricultural education programs.

Identification of Science Related Competencies Taught in Vocational Agriculture Programs in Louisiana (1986) reported that the basic program of agricultural education in Louisiana included objectives that overlap with state approved science courses. Louisiana agricultural education teachers were teaching similar subject matter as science teachers in Louisiana. Although there seem to be many similarities between agriculture and science teachers, teacher education programs for agriculture educators must include more science for agriscience programs to prosper (Understanding Agriculture, 1988).

Section Summary

Agriscience in agricultural education has been defined as identifying and using concepts of biological, chemical, and physical sciences in the teaching of agriculture (Understanding Agriculture, 1988). Cooper (1990) defined agriscience as "The application of scientific principles and new technologies to agriculture" (p. 8).

Agricultural education in the United States has taken a new path. The agriscience initiative identified in the 1980s has taken root and is growing. Agricultural educators are embracing the idea of teaching science through agriculture even though there are shortfalls in resources needed to support such programs.

Similarities between science and agriculture have been identified and are being emphasized in many states. Middle school agricultural education programs offer a particularly suitable arena for agriscience education.

Agriscience in the Middle Grades

Thirty-one states currently offer agricultural education for middle school students (Barrick & Hughes, 1992). Although states have been slow to adopt middle school agricultural education, the number of programs in the United States has steadily increased over the last 10 years with promise of the trend continuing. The primary focus of middle school programs and the vocational student organizations

associated with the programs, is to "provide insight into personal and career interests, and develop social, leadership, and practical skills" (Barrick & Hughes, 1992, p. 220).

Miller (1973) reported teachers of exploratory agricultural education classes in Virginia middle schools described their classes as being a combination of career exploration and orientation with a minimal emphasis in technical agriculture. Teachers emphasized the importance of teaching students aspects of agriculture that were beyond the boundaries of their community, interdisciplinary in nature, and provided a sound basis for students to make high school and post high school career decisions.

Lesson topics related to gaining employment were not appropriate for the middle grades (Griner, 1978). Lessons for the middle grades in 1978 were too technical in nature and not appropriate for the intended audience. Agricultural educators reported the lessons taught were not reflective of the lessons that should be taught (Griner, 1978). Efforts in Virginia and other states have attempted to lessen the emphasis on employment and emphasize the needs of middle school aged children.

The current Virginia middle school curriculum for agricultural education was implemented in 1990. Waidelich (1990, p. 40) offered the following description of the Virginia middle school agriscience curriculum:

Introduction to Agriscience, Grade 6
Relationships between agriculture and science, agricultural awareness, careers, human relations, scientific principles in agriculture

Agriscience Exploration, Grade 7
Explore science as it relates to agriculture, human relations, communications, importance of agriculture to the economy, scientific terms in agriculture

Agriscience and Technology, Grade 8
Apply scientific principles of agriculture in a laboratory setting, explore new technologies in agriculture, international agriculture and marketing

Eichhorn (1987) recommended an educational program for middle schools that included analytical instruction in science, language, social studies, and mathematics. Eichhorn also recommended cultural education that included fine arts, cultural studies, and practical studies. Agriscience education at the middle school meets needs in the analytical area of science as well as the cultural area of practical studies.

The appropriate curriculum for middle school agricultural education programs is yet to be developed (Hansen & Miller, 1988). Rosetti and McCaslin (1992) recommended that the United States Department of Agriculture and the United States Department of Education encourage development of middle school and junior high school agricultural education programs. Agricultural curriculum and student activities should reflect the needs of early adolescents (Barrick & Hughes, 1992). At this point, there have been few major curriculum efforts that focus on middle school agricultural education.

Although Virginia was the first state to offer agricultural education in the middle school, Griner (1978) reported that Virginia middle school agricultural education teachers were not properly prepared to teach exploratory agriculture at the middle grade level. Many middle school teachers of agricultural education were trained as high school teachers (Hillison, 1993). Griner (1978) reported that the leadership from the state department of education was not adequate and there were no guidelines for middle school agricultural education programs.

Topics taught by teachers in pre-vocational middle school programs in Iowa included horticulture, agricultural careers, parliamentary procedure, FFA, meats, computers, wood shop, livestock, crops, and metals. Agriscience was identified as a topic that should be taught in Iowa middle school programs (Hansen & Miller, 1988).

"Designers of middle school agricultural education programs should ensure that program content is distinct from senior high school programs" (Frick, 1992 p. 243). Frick identified agriscience as one of six components of a middle school agricultural education program. Other components identified for middle school agricultural education programs included food safety/consumer relations, leadership/human relations, agricultural careers, agricultural vocabulary, and agricultural benefits to the world.

Section Summary

The number of agricultural education programs in middle and junior high schools is increasing across the country. The primary focus of middle school agricultural education is to provide insight into career interests and develop personal, leadership, social, and practical skills (Barrick & Hughes, 1992).

Agricultural education programs in middle schools should focus on career exploration with a minimal emphasis on technical agriculture. Middle school educational efforts must consider the special needs of the pre-adolescent audience. Current curriculum emphasis in middle school agricultural education programs seems to be off target.

The history of middle school agricultural education shows a lack of funding, curriculum development efforts, and leadership. Although the ideal middle school curriculum is yet to be developed, the early trials have led to viable curriculum models in many states.

Early efforts by the Commonwealth of Virginia in middle school agricultural education have paved the way for more recent developments in middle school curriculum. Agriscience Education for the Middle School (1990) was developed by the Virginia Department of Education with the intent of meeting the needs of middle school students.

Teacher Characteristics

The use of demographic variables in social science research is supported by Guilford (1965) who attested that placing subjects into categories that assist in the description of the population is a basic psychological process. Guilford also noted the occurrence of classification variables in both scientific and social research to place individuals into categories for analysis.

The teacher's age can affect professional decisions about curriculum adoption. Cheek and Beeman (1978) found that the age of the teacher affected the teacher's perception of the importance of professional affiliations and professional development. Borko and Niles (1982) reported that older teachers could define their roles and philosophies better than younger teachers.

As the teachers' education level rises, they are likely to be more effective in the classroom and perceive their role as being important to the student's education. Additional education was identified by Rush (1984) as a strong predictor of teacher effectiveness. Blezek (1982) and Cheek and Beeman (1978) found a positive relationship between the years of teaching experience and the perceived importance of the role of the teacher.

Subject matter taught in the classroom is selected by the teacher. Darr (1985) found teacher knowledge of curriculum content was a strong predictor of subjects taught from the curriculum. Knowledge of curriculum content is imperative if the

teacher is to implement the curriculum. Hashew (1986) stated that prior teacher knowledge of subject matter contributed greatly to the transformation of the written curriculum into an active curriculum component in the classroom. Kirby (1990) reported teachers in North Carolina felt that a lack of knowledge was a major barrier in teaching agriscience.

For many agricultural education teachers, agriscience is a new field of study. Teachers who offer courses in agriscience must learn new material that is possibly very different from that which they have traditionally taught (Horne & Key, 1992). Newman and Johnson (1992) reported that teachers in pilot agriscience programs demonstrated a need for inservice in biotechnology, computer applications, mechanical and physical technology, entomology, environmental science, and application of the scientific method.

How teachers' feel about the curriculum will have an affect on the amount of the curriculum they employ in their classroom. Trandis (1971) identified attitude as a strong indication of behavior. Trandis defined attitude as "an idea charged with emotion which predisposes a class of actions to a particular class of social situations" (p. 30). Pratkins, Breckler and Greenwald (1989) identified attitude as a strong predictor of evaluative responses. If individuals place objects or statements in a favorable light, they will evaluate them favorably. If individuals hold objects or statements in a negative light, they will evaluate them negatively.

Section Summary

Placing subjects into categories and using classification variables assists in the description of the population. Teacher demographic variables identified as potentially relevant to predicting teacher behavior included education level, teaching experience, and age.

Since agriscience is a relatively new field for many teachers of agricultural education, they need to learn it in order to teach it to their students. Since many teachers in middle school agricultural education were trained as high school teachers, they may also need to learn methods that are better suited to pre-adolescent students.

Teachers' knowledge of and attitude toward curriculum content influence the inclusion of the content areas in their program. Darr (1985) noted that teacher knowledge of content area was a strong predictor of subjects taught. Pratkins, Breckler, and Greenwald (1989) found that individuals who hold a positive attitude toward a topic will evaluate the topic favorably.

Chapter Summary

Agriscience education has been defined as the use of biological, chemical, and physical sciences to teach agriculture. Further defined, agriscience is the application of scientific principles to agriculture. Although teaching science through agriculture is not a new concept, it has gained an increased emphasis in agricultural education in recent years.

Agricultural education in middle schools started in Virginia in the middle 1920s. Middle school programs are growing in number across the country. Middle school programs in agricultural education should be designed to focus on the needs of students in their pre-adolescent years. Middle school programs should focus on personal development, leadership, social, and practical skills.

Educational change such as the agriscience curriculum effort for middle school agricultural education programs in Virginia will be challenged. A change represents a significant alteration that is intended to benefit students, teachers, and other constituents of education. Curriculum changes are often evolutionary changes followed by planned change.

Since curriculum change in education is dependent on what teachers believe and on what part of the curriculum they choose to implement, predicting behavior is an important tool for curriculum innovators to use. Behavior is a function of a person's attitudes, habits, expectations, and social norms.

Individual demographic characteristics can offer insight into a persons' actions. Placing subjects into groups can facilitate description of a population. Teacher knowledge of and attitude toward curriculum are identified as strong indicators of inclusion of curriculum content areas.

Chapter 3

Research Methodology

The purpose of this chapter is to describe the population, the design of the study, the development of the instrument, data collection procedures, and the statistical analysis of the data.

Description of the Population

The population for this study included the teachers of Introduction to Agriscience (taught at the sixth grade level), Agriscience Education (taught at the seventh grade level), and Agriscience and Technology (taught at the eighth grade level) in Virginia middle school agricultural education programs. The teachers were identified through Dr. Glenn Anderson, Adolescent Education Specialist, Virginia Department of Education (1993) and the Virginia Agricultural Education Teachers Directory (1993). Fifty-seven middle school teachers of agricultural education constituted the population of the study.

Instrumentation

The instruments used in this study were developed to identify the agriscience topics taught by teachers of agricultural education in Virginia middle schools, teachers' attitudes toward agriscience, teachers' knowledge of agriscience, teachers'

expectations of the agriscience curriculum, and selected demographic information of agricultural education teachers in Virginia middle school programs. A review of literature revealed no satisfactory instrument had been previously developed to examine the questions of this study. Therefore, instruments were developed to obtain the data needed to answer the research questions.

Construction of the Instruments

A teacher survey with five component instruments was developed to gather data to answer the research questions. To measure the amount of agriscience taught, a random sample of competencies from the Virginia middle school curriculum Agriscience Education for the Middle School (1990), were selected. The attitudes of teachers toward agriscience were measured with a semantic differential. Teachers' perceived knowledge of agriscience topics in the Virginia middle school curriculum was measured with a Likert-type scale. Teacher expectations of agriscience curriculum were measured with a set of statements evaluated on a four point Likert-type scale.

Amount of agriscience

The instrument to measure the amount of agriscience taught in Virginia middle school agricultural education programs was developed from the Virginia Department of Education's existing recommended curriculum for agricultural education in the

middle grades entitled Agriscience Education for the Middle School (1990). Teachers were asked to identify competencies taught in their programs by answering "yes", if they included the topic in their instruction, and "no" if they did not include the topic.

The recommended curriculum for grades six, seven, and eight included 136 competencies. On the recommendation of the panel of experts (Appendix D), the competencies were divided into two equal parts (68 competencies each) taking every other competency starting with the first to make list A, and using the opposite competencies to compile list B. The competencies were divided to decrease the size of the survey instrument and increase the response rate. The lists were randomly distributed to the teachers. One set of competencies was included in form A the other set was included in form B. The mean responses from list A and B were compared and showed no statistical difference.

Teachers attitudes toward agriscience

The instrument developed to measure the teachers' attitudes toward agriscience was a semantic differential with 10 items and a six point scale. Semantic differentials have proven to be valid and reliable measures of attitude, providing meaningful results in a wide variety of applications (Heise, 1970). A score of one indicated a strong negative attitude and a score of six indicated a strong positive attitude.

Knowledge of agriscience

The instrument developed to measure teachers' knowledge of agriscience was a four point Likert-type scale. The scale was labeled Strongly Agree, Agree, Disagree, and Strongly Disagree. The subjects were asked to respond to the question: "I know enough about this competency to teach it to my students," for each of the 68 competencies. The competencies identified to measure the amount of agriscience taught were also used for this instrument.

Teachers' expectations of agriscience curriculum

The instrument designed to measure the teachers' expectations of the agriscience curriculum was a set of 10 statements that reflected benefits and expectations of agriscience programs. The statements were developed from Agriscience Education for the Middle School (1990). The teachers were asked to rate the statements on a four point Likert scale (Strongly Agree, Agree, Disagree, Strongly Disagree).

Teachers' demographic information

The instrument developed to collect teachers' demographic information related to agriscience curriculum adoption was a series of questions fashioned to amass the following information: teachers' age, teachers' gender, teachers' education level, teachers' experience, and teachers' professional affiliation.

Pilot Test

Because the instruments for this study were designed by the investigator, it was necessary to pilot test the instruments to gain insight on clarity, appropriateness, reliability, and validity. Fifteen teachers of eighth grade introductory agriculture classes were chosen to pilot test the instrument, see Appendix A. The pilot instrument (Appendix B) was sent to the group along with a letter and an evaluation sheet (Appendix C) on October 13, 1993. Given the relatively small population of middle school teachers and the use of a census to ascertain data, these teachers served as an acceptable pilot group and were not included in the study.

Reliability of the Instruments

Cronbach's alpha was used to determine the reliability coefficient of internal consistency for the attitude instrument, the expectations instrument, and the knowledge instrument.

Validity of the Instruments

Content validity was established through a pilot test and evaluation by the panel of eighth grade teachers (Appendix A) that participated in the pilot test. The panel provided input concerning clarity of the questionnaire, appropriateness of the questionnaire content, and input concerning the design and layout of the questionnaire.

Construct validity for the dependant variable, the amount of agriscience taught in Virginia middle school agricultural education programs as measured by the independent variables, was determined theoretically and confirmed by a panel of experts, see Appendix D.

Data Collection Procedure

The Dillman (1978) total design method for survey research was used to collect the data. One half of the subjects were randomly assigned form A (Appendix E) and one half of the subjects were randomly assigned form B (Appendix F). The instruments were sent with a letter asking for participation to all teachers of middle school agricultural education in Virginia on November 8, 1993 (Appendix G). A Virginia Tech pencil was included in the initial mailing as an incentive. A follow-up post card was sent to all subjects on November 15, see Appendix H. A second complete packet with a letter asking for the response was sent to non-respondents on November 29 (Appendix I). A final letter was sent to non-respondents on December 19 (Appendix J). Non-response error was controlled for by comparing the mean differences of early and late respondents (Miller & Smith, 1983).

Statistical Methodology

The Number Cruncher Statistical System (NCSS) was used to analyze the data. Multiple regression, correlation, and descriptive statistics were used to summarize the data. An alpha level of .05 was set a-priori for the statistical analysis.

Chapter 4

Findings

The purpose of this study was to determine the relationship between teacher characteristics and the adoption of the middle school agriscience curriculum in Virginia middle school agricultural education programs. The specific objectives that guided this study were to determine:

1. the amount of agriscience being taught in middle school agricultural education programs in Virginia,
2. the extent to which teachers' attitude toward agriscience is related to adoption of agriscience curriculum in middle school agricultural education programs in Virginia,
3. the extent to which teachers' knowledge of agriscience curriculum content is related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia,
4. the extent to which teachers' expectations of agriscience programs are related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia,
5. the extent to which selected demographic traits of teachers are related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia and,

6. the relationships among the variables identified in objectives one through five.

The frame of the study consisted of 57 teachers of middle school agricultural education. Following the procedure outlined by Dillman (1978) for collecting survey data, an 81% response rate was obtained. The mean responses for early respondents (responding to the first mailing) and late respondents (responding to the last two mailings) were compared to determine if there were significant differences between the groups. This technique described by Miller and Smith (1983) is used to control for non-response error. No significant differences were found so the results can be generalized to the target population of middle school agricultural education teachers in Virginia.

Of the 46 responses received, 45 were deemed at least partially useable and were analyzed with the NCSS statistical package for personal computers. Descriptive statistics as well as correlation and multiple regression analysis were used to address the objectives.

The instrument was developed by the researcher utilizing a panel of experts consisting of teacher educators and administrators at Virginia Polytechnic Institute and State University (Appendix D) to establish content validity. The instrument was pilot tested on Virginia junior high school agricultural education teachers. Alpha coefficients of internal consistency (Cronbach's Alpha) were calculated for the knowledge instrument (.9109), the attitude instrument (.9389), and the expectations instrument (.8772) to establish reliability.

Objective 1 - To determine the amount of agriscience being taught in middle school agricultural education programs in Virginia

For the purposes of the study, the amount of agriscience taught in Virginia middle school agricultural education programs was defined as the number of competencies taught from the recommended curriculum, Agriscience Education for the Middle School (1990). The competencies were systematically split with a random starting point into two equal parts taking every other competency and placing it on a list (68 competencies per list). The entire list of competencies was divided in half to decrease the number of competencies on the instrument to a reasonable level. The two lists were incorporated into separate survey instruments with all other parts being identical and administered randomly to the population. The instruments were tested after the data was collected and no significant difference was discovered between the instruments. For each competency, the teachers were asked to circle a "Y" if they taught the competency and an "N" if they did not teach the competency.

Virginia middle school teachers of agricultural education averaged teaching 67.39% (46 of the 68 competencies) of the approved agriscience curriculum with a standard deviation of 15.98 and a 95% confidence interval of 62.46 - 72.17. The range of competencies taught spanned from 31% to 99% (21 to 67 of the 68 competencies). It is interesting to note in table 1 that the data has a bi-modal distribution with 22.2% of the respondents teaching between 51% and 60% of the

Table 1

Amount of Agriscience Curriculum Taught (n=45)

% of Competencies	n of Competencies	# of Respondents	% of Respondents
30 - 40	20 - 27	1	2.2
41 - 50	28 - 34	5	11.1
51 - 60	35 - 40	10	22.2
61 - 70	41 - 47	7	15.6
71 - 80	48 - 54	13	28.9
81 - 90	55 - 61	5	11.1
91 - 100	62 - 68	4	8.9
Total		45	100.0

agriscience curriculum, and 28.9% of the respondents teaching between 71% and 80% of the agriscience curriculum.

Objective 2 - To determine the extent to which teachers' attitude toward agriscience is related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia

The semantic differential used to measure the teachers' attitudes toward agriscience consisted of 10 bipolar pairs of words with a six point scale for each set. The positive word of the bipolar pair was given a value of six while the negative word had a value of one. The points between the extremes were scored five, four, three, and two from the high positive score of six to the low negative score of one.

A score was determined for each set of bipolar words and a total score calculated for the set of 10 pairs. A high score of 60 and a low score of 10 could be obtained. After the total was calculated for each respondent, it was divided by the possible high score to compute the attitude score.

The correlation coefficient between teachers' attitude and the amount of agriscience curriculum taught was .4513, see table 7. The attitude score of middle school agricultural education teachers in Virginia was 87.78 with a standard deviation of 13.61. The 95% confidence interval for the population score was between 83.65 and 91.92. The distribution of attitude scores is positively skewed with the mode at the top end of the distribution, refer to table 2.

Table 2

Teacher Attitudes Toward Agriscience (n=44)

Attitude Score	n of Respondents	% of Respondents
50 - 60	3	6.8
61 - 70	2	4.5
71 - 80	3	6.8
81 - 90	9	20.5
91 - 100	27	61.4
Total	44	100.0

Objective 3 - To determine the extent to which teachers' knowledge of agriscience curriculum content is related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia

The respondents knowledge of each competency was measured on a four point Likert-type scale. The subjects were asked to rate their knowledge of the objectives in response to the statement, "I know enough about this subject to teach it to my students." A value of four was assigned to a response of "Strongly Agree," a value of three was assigned to a response of "Agree," a value of two was assigned to a response of "Disagree," and a value of one was assigned to a response of " Strongly Disagree."

Each of the 68 competencies was accompanied by a four point scale as described. A total score for all competencies was calculated with a maximum score of 272 (68x4) possible. The total score was divided by the maximum possible score to calculate a knowledge score across the competencies.

The correlation coefficient between teachers' knowledge and the amount of agriscience curriculum taught was .6098, see table 7. Table 3 indicates the knowledge score distribution is positively skewed. The mean knowledge score for middle school agricultural education teachers was 82.23 with a standard deviation of 11.11. The 95% confidence interval for the population score is between 78.47 and 85.99. The range of knowledge scores spanned from a low score of 53.3 to a high score of 95.33. Over 61% of the teachers surveyed rated their knowledge of the

Table 3

Teacher Knowledge of Agriscience Curriculum (n=36)

Knowledge Score	n of Respondents	% of Respondents
50 - 60	1	2.8
61 - 70	3	8.3
71 - 80	10	27.8
81 - 90	12	33.3
91 - 100	10	27.8
Total	36	100.0

agriscience competencies with a score of 81 or above. Only 8.3% of the teachers evaluated their knowledge of agriscience below a score of 70.

Objective 4 - To determine the extent to which teachers' expectations of agriscience programs are related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia

The respondents expectation score was determined by their response to 10 statements that reflected positive benefits derived from the approved middle school agriscience curriculum in Virginia, Agriscience Education for the Middle School (1990). Each of the 10 statements was followed by a four point Likert-type scale of Strongly Agree (SA), Agree (A), Disagree (D), and Strongly Disagree (SD). A score of four was given if the respondent chose (SA), three was given for (A), two for (D), and one for selecting (SD).

The responses were totaled with a high score of 40 (10x4) and a low score of 10 (10x1) possible. After the total was calculated, it was divided by the total possible score to compute the respondents' expectation score.

The correlation coefficient between teachers' expectations and the amount of agriscience curriculum taught was .3435, see table 7. Table 4 illustrates the expectation scores for Virginia middle school teachers of agricultural education is positively skewed. The mean expectation score for middle school teachers of agricultural education in Virginia was 80.98 with a standard deviation of 10.38. The

Table 4

Teacher Expectations of Agriscience Curriculum (n=42)

Expectation Score	n of Respondents	% of Respondents
50 - 60	1	2.4
61 - 70	4	9.5
71 - 80	12	28.5
81 - 90	13	31.1
91 - 100	12	28.5
Total	42	100.0

95% confidence interval of the population is between 77.7 and 84.25. The scores ranged from a low of 55 to a high score of 100. Note the positive skewness of the distribution. Over 88% of the teachers had an expectation score of 71 or better.

Objective 5 - To determine the extent to which selected demographic traits of teachers are related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia

Nine demographic variables were selected to discriminate among the teachers involved in the study. They included years of teaching experience, years of middle school teaching experience, years in the present teaching position, years of high school agricultural education teaching experience, membership in the Virginia Vocational Agriculture Teachers Association (VVATA), membership in the American Vocational Association (AVA), gender, and education level.

The average teacher of middle school agricultural education in Virginia has 16.36 years of total teaching experience with a standard deviation of 9.47. The range of total teaching experience spanned from one to 35 years.

Correlation coefficients that existed between demographic variables and the amount of agriscience curriculum taught were: years of teaching experience -.2679, years of middle school teaching experience -.2122, years in the present teaching position -.3879, years of high school teaching experience -.2266, VVATA

Table 5

Teacher Experience and Age

Variable	Mean	SD	High	Low
Yrs. Exp.	16.36	9.47	35	1
Yrs. M.S. Exp.	9.91	7.77	25	1
Yrs. Pres. Pos.	11.16	8.91	29	1
Yrs H.S. Exp.	6.27	9.13	35	0
Age	39.36	9.6	58	21

membership .2716, AVA membership .0835, age -.2635, gender .1299, and educational level -.1319. See table 7 for details.

Table 5 shows the respondents averaged 9.91 years of middle school teaching experience (standard deviation of 7.77) with a minimum of one year and a maximum of 25 years teaching in the middle school. The mean number of years the respondents had been in their current school district is 11.16 (standard deviation of 8.91). The middle school teachers of agricultural education have spent an average of 6.27 years teaching in the high school. The median number of years of high school teaching experience for middle school teachers of agricultural education in Virginia was less than 2.7 years.

Professional membership among middle school teachers of agricultural education was low. Only 37.8% of the teachers belong to the Virginia Vocational Agricultural Teachers Association. Membership in the American Vocational Association is much lower, with only 13.3% of the teachers choosing to join.

Most (82.2%) of the middle school teachers are male (17.8% female). The mean age is 39.36 years with the maximum reported at 58 years and the minimum at 21 years.

The respondents' education levels ranged from a bachelors degree (31.1) to a masters degree plus 30 semester hours (4.4%). Teachers with masters degrees made up 42.2% of the population, respondents with a masters degree plus 15 hours

Table 6

Professional Membership, Gender, and Educational Level (n=45)

	n of Respondents	% of Respondents
VVATA Members	17	37.8
AVA Members	6	13.3
Male	37	82.2
Female	8	17.8
Education Level	**n of Respondents**	**% of Respondents**
Bachelors Degree	14	31.1
Bachelors Degree plus 15 hours	9	20.0
Masters Degree	19	42.2
Masters Degree plus 15 hours	1	2.2
Masters Degree plus 30 hours	2	4.4

accounted for 2.2% of the population. There are no middle school agricultural education teachers in Virginia with doctoral degrees, note table 6.

Objective 6 - To determine the relationships among the variables identified in objectives one through five

Using criteria reported by Hinkle, Wiersma & Jurs (1983) the independent variables of years of experience in middle school agricultural education programs and years in the present position (r=.7177) were determined to have a high positive intercorrelation. The independent variables of total years of experience and years in the present position (r=.7102) also had a high positive intercorrelation. The independent variables of age and total years of experience (r=.9759) had a very highly positive intercorrelation.

Interpreting Correlation Coefficients

.90 - 1.00 (-.90 - -1.00)	Very high positive (negative) correlation
.70 - .90 (-.70 - -.90)	High positive (negative) correlation
.50 - .70 (-.50 - -.70)	Moderate positive (negative) correlation
.30 - .50 (-.30 - -.50)	Low positive (negative) correlation
.00 - .30 (.00 - -.30)	Little if any correlation

Hinkle, Wiersma & Jurs (1983, p. 85)

Table 7 Correlation Matrix

	Knowledge	Expectation	Attitue	Yrs. Exp.	Yrs. M.S. Exp.	Yrs. Pres. Pos.	Yrs. H.S. Exp.	VVATA	AVA	Age	Gender	Education	Amount
Amount	.6098	.3435	.4531	-.2679	-.2112	-.3879	-.2266	.2761	.0835	-.2635	.1299	-.1319	1.000
Education	-.0102	-.2227	-.2624	.5779	.4816	.4306	.2550	.0855	.0053	.5983	-.1645	1.000	
Gender	.1245	.1514	.1310	-.4780	-.3093	.4177	-.2196	.3145	-.1852	-.5085	1.000		
Age	-.1562	.1423	-.1264	.9759	.5347	.6758	.5319	-.1166	.1036	1.000			
AVA	.1686	.1750	.0214	.1335	.1818	.2882	.1372	.4880	1.000				
VVATA	.3660	.2411	.1756	-.1152	.0754	.1372	-.0322	1.000					
Yrs. H.S. Exp.	-.1993	.2147	.0592	.5435	-.1535	-.3345	1.000						
Yrs. Pres. Exp.	.0511	-.0733	-.1978	.7102	.7117	1.000							
Yrs. M.S. Exp.	.1270	-.1815	-.1560	.5702	1.000								
Yrs. Exp.	-.0939	-.0884	-.1210	1.000									
Attitude	.1834	.6351	1.000										
Expectations	.4391	1.000											
Knowledge	1.000												

Table 7 shows the independent variable knowledge of agriscience curriculum had a moderately high correlation with the dependant variable, the amount of agriscience taught. The independent variables, teacher expectations of agriscience curriculum, and teacher attitude toward agriscience curriculum, had a low positive correlation with the dependent variable. The independent variable years in the present position had a low negative correlation with the dependent variable. All other independent variables had little if any correlation with the dependent variable.

Multiple Regression Analysis

Multiple regression analysis was used to determine the best model for explaining the variance associated with the dependent variable, amount of agriscience curriculum being taught. Step-wise regression was used to determine the multiple regression model that best explained the dependant variable, amount of agriscience taught. When all 13 variables were included in the regression equation, the sequential R^2 was .7018 (Table 8). The best fitting model consisted of the four independent variables: knowledge of agriscience curriculum, expectations of agriscience curriculum, attitude toward agriscience curriculum, and years in the present teaching position.

The model had a total R^2 value of .6382 accounting for nearly 64% of the variance in the amount of agriscience curriculum taught. Knowledge of the agriscience curriculum contributed most to the model with a zero order correlation of

Table 8

Full Model Multiple Regression Analysis with the Dependent Variable Amount of Agriscience Taught

Variable	Standard Estimate	t-value	t-prob	Seq. R-Sqr	Simple R-Sqr
Knowledge	.06451	3.99	.0008	.3718	.3718
Expectations	-.1985	-.98	.3370	.3789	.1180
Attitude	.3875	2.21	.0396	.5218	.2053
Years Experience	.0438	-.06	.9508	.5516	.0718
Years M.S. Experience	.1650	-.57	.5725	.5950	.0446
Years in Present Position	.4881	-1.92	.0701	.6578	.1505
Years H.S. Experience	.1149	-.46	.6477	.6592	.0513
VVATA	.1514	.81	.4252	.6769	.0762
AVA	.0620	.38	.7111	.6831	.0070
Age	.2599	.39	.7020	.6937	.0694
Gender	.1629	.95	.3557	.7063	.0169
Education	.0808	.44	.6622	.7094	.0174

.6098 and a simple R^2 of .3916. Attitude toward agriscience curriculum had a zero order correlation of .4531 and a simple R^2 of .2383, expectations of agriscience curriculum had a zero order correlation of .3435 and a simple R^2 of .1557, and years in the current teaching position had a zero order correlation of -.3879 and a simple R^2 of .1143. Table 9 shows the multiple regression analysis for the dependent variable, amount of agriscience taught and the independent variables of knowledge, attitude, expectations, and years in the present position.

The independent variable expectations of agriscience curriculum acted as a suppressor variable in the model. Since the variable is slightly positively correlated with knowledge of agriscience curriculum and has a moderately positive correlation with attitude toward agriscience curriculum it suppresses irrelevant variance in those variables, in effect purifying the analysis (Pedhauser, 1982). Table 10 shows the effect of removing the suppressor variable from the regression equation.

Although the addition of the variable, expectations of agriscience curriculum did not add a significant amount of unique variance in the model and did not have a significant t value, it increased the model R^2 from .5077 to .6382. Inclusion of this independent suppressor variable adds an additional .1305 to the model R^2 and carried an F value of 12.67 that tested significant at the .05 alpha level for change in R^2 value. Suppressor variables actually purify equations by filtering error variance associated with independent variables that are highly correlated with the suppressor variable.

Table 9

Step-Wise Multiple Regression Analysis Model with the Dependent Variable Amount of Agriscience Taught

Variable	Standard Estimate	t-value	t-prob	Seq R-Sqr	Simple R-Sqr
Knowledge of agriscience curriculum	.6678	4.83	.0000	.3916	.3916
Expectations of agriscience curriculum	-.249	-1.37	.1826	.3947	.1557
Attitude toward agriscience curriculum	.3863	2.34	.0265	.4949	.2383
Years in present teaching position	-.385	-3.33	.0024	.6382	.1143

Table 10

Step-Wise Multiple Regression Model with the Dependent Variable Amount of Agriscience Taught and Excluding the Independent Variable Teacher Expectations of Agriscience Curriculum

Variable	Standard Estimate	t-value	t-prob	Seq. R-Sqr	Simple R-Sqr
Knowledge	.05458	4.05	.0003	.3547	.3547
Attitude	.2087	1.54	.1325	.4137	.1988
Years in Present Position	-.3117	-2.47	.0190	.5077	.0826

Chapter 5

Summary, Conclusions and Recommendations

Teachers make the final curriculum decisions in their classroom. For curriculum innovations to be effective, they must be adopted and used by the teacher. Often the curriculum adoption process involves change on the part of the teacher that may be uncomfortable or even impossible. The review of literature revealed that teacher change and curriculum adoption are related to the teachers' knowledge of the curriculum, the teachers' expected benefits from the curriculum, and the teachers' attitude toward the curriculum.

The purpose of this study was to determine the relationship between teacher characteristics and the adoption of the middle school agriscience curriculum in Virginia middle school agricultural education programs. The specific objectives of the study were to determine:

1. the amount of agriscience being taught in middle school agricultural education programs in Virginia,
2. the extent to which teachers' attitude toward agriscience is related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia,

3. the extent to which teachers' knowledge of agriscience curriculum content is related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia,
4. the extent to which teachers' expectations of agriscience curriculum content are related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia,
5. the extent to which selected demographic traits of teachers is related to the adoption of agriscience curriculum in middle school agricultural education programs in Virginia, and
6. the relationships among the variables identified in objectives one through five.

The review of literature and personal interviews also revealed limited knowledge of middle school agricultural education curriculum adoption in Virginia. Furthermore, a search of the literature revealed little about middle school agricultural education programs in the United States. With middle school agricultural education programs on the increase, the importance of studies related to middle school agricultural education was evident.

Methodology

In order to address the objectives of this study in an orderly and logical manner, an extensive review of literature was conducted to develop a theoretical

framework in which middle school curriculum in agriscience education, middle school education, vocational education in the middle grades, educational change and adoption, behavior prediction and the teacher characteristics were considered. The literature review helped the author to identify issues related to middle school agricultural education programs and the curriculum adoption process. The literature review also provided the basis for identifying teacher characteristics that are related to the adoption of curriculum innovations.

Teacher characteristics related to the adoption of innovations identified in the review of literature were sent to a panel of experts (Appendix D) for content validation. Persons asked to serve on the panel of experts were selected based on their professional experiences in agricultural education and curriculum development. The panel suggested wording changes, additional variables to be considered, and formatting changes that would make the variables more useful. Suggestions made by the panel were implemented if 60% or more of the panel responded in the affirmative.

Development of the questionnaire further involved the use of the panel of experts and the theoretical framework developed through the literature review. Demographic variables included in the survey were gleaned from the literature and suggested by the panel. They included age, gender, education level, years in the current teaching position, total years of teaching experience, middle school teaching experience, years of high school teaching experience, and professional affiliation.

The attitudinal portion of the instrument consisted of a semantic differential developed by the researcher and the panel of experts (Appendix D) and guided by the literature. Expectations were measured with a set of 10 statements drawn from the Agriscience Education for the Middle School curriculum developed in Virginia in 1990. To measure the amount of the agriscience curriculum being taught, the teachers were asked to identify a representative random sample of competencies from the curriculum as being either taught in their program or not being taught in their program. Teachers were asked to assess their knowledge of the competency using a four point Likert-type scale on each competency.

After the panel of experts (Appendix D) and the researcher developed the instrument, it was pilot tested with Virginia junior high school agricultural education teachers. The pilot test revealed formatting errors but no major changes in the instrument were made. The frame of the research consisted of the population of middle school agricultural education teachers in Virginia. The total population of 57 teachers was surveyed. Using the methodology described by Dillman (1978) for survey research, a response rate of 81% was obtained.

The mean responses of the early respondents (respondents to the first mailing) were compared to the mean responses of the late respondents (respondents to the last two mailings) to determine if there was a significant difference between the two groups. This technique as described by Miller and Smith (1983) controls for non-

response error. The result of the analysis showed no significant differences, therefore the results were generalized to the target population.

The data were analyzed with descriptive statistics, correlations, and multiple regression. An a-priori alpha level of .05 was used to tests of significance.

The Amount of Agriscience Curriculum Being Taught in Middle School Agricultural Education Programs in Virginia

Teachers in Virginia middle school agricultural education programs were teaching an average of 67.39% of the approved agriscience curriculum, Agriscience Education for the Middle School. The data clearly indicate that there are two distinct groups of teachers in the population. One group is teaching less than 60% of the approved curriculum competencies while the other group is teaching greater than 70% of the competencies in the approved curriculum.

A moderate high positive correlation existed between the dependent variable, amount of agriscience taught and the teachers' knowledge of the agriscience curriculum. Teachers' attitude toward agriscience, and teachers' expectations of agriscience programs carried a low positive correlation with the dependent variable. A moderately low negative correlation was found between the amount of agriscience taught and the years a teacher had been in his/her present position.

The multiple regression equation that accounted for the most variance in the dependent variable, amount of agriscience taught, included the three variables identified in the correlation matrix as having low and medium high positive correlations with the dependent variable plus the variable, years in the present position which had a low negative correlation with the dependent variable. The variable of teacher expectations of agriscience programs acted as a suppressor variable and added variance to the others in the equation by filtering error variance to purify the model. The multiple regression model accounts for nearly 64% of the total variance in the dependent variable.

The Extent to Which Teachers' Attitudes Toward Agriscience is Related to the Adoption of Agriscience Curriculum in Middle School Agricultural Education Programs in Virginia

Middle school agricultural education teachers in Virginia had high positive attitudes toward agriscience. In fact, with a possible high score of 100, over 61% of the teachers had an attitude score of 91 - 100. Just over 18% of the teachers had attitude scores below 80.

In the multiple regression model, attitude has a simple R^2 of .2383 adding .1002 in unique variance to the model. With a t-value of 2.34 and a t-probability of .0265, attitude is significant at the alpha level of .05.

The Extent to Which Teachers' Knowledge of Agriscience Curriculum is Related to the Adoption of Agriscience Curriculum in Middle School Agricultural Education Programs in Virginia

Teachers in middle school agricultural education programs in Virginia consider themselves to be knowledgeable of agriscience curriculum. Out of a possible knowledge score of 100, nearly 89% of the teachers scored better than 70.

Knowledge alone accounted for over 39% of the variance in the multiple regression analysis. In the multiple regression model, knowledge had a t-value of 4.83 with a t-probability of .0000.

The Extent to Which Teachers' Expectations of Agriscience Curriculum is Related to the Adoption of Agriscience Curriculum in Middle School Agricultural Education Programs in Virginia

Middle school agricultural education teachers in Virginia had high expectations of agriscience programs. With a possible high score of 100, over 88% of the teachers had expectation scores above 70.

Expectations had a simple R^2 of .1557 in the multiple regression model. Although expectations did not carry a significant t-value in the multiple regression model and only added less than one percent to the total explained variance of the model it was retained in the model for its contribution as a suppressor variable. Since

expectations adds variance to other variables in the model by filtering error variance it is an important part of the regression equation.

The Extent to Which Selected Demographic Traits of Teachers are Related to the Adoption of Agriscience Curriculum in Middle School Agricultural Education Programs in Virginia

Years in the current position was the only demographic variable used in the multiple regression equation. When the variable years in the present position was included in the multiple regression analysis with the dependent variable, amount of agriscience curriculum taught, it contributed over 14% of unique variance to the equation. With a t-value of -3.33 and a t-probability of .0024, the variable proved significant at the .05 alpha level.

The Correlations Among the Variables Identified in the Study

There were two areas where meaningful correlations existed other than correlations with the dependent variable. An obvious area of correlation was between variables that were time oriented such as age and total years of teaching experience. Meaningful correlations also were found between the suppressor variable expectations of agriscience programs and the variables of teacher attitude toward agriscience programs and teacher knowledge of agriscience curriculum.

Conclusions

1. There are two distinct groups of teachers in middle school agricultural education programs, those who are teaching a large part of the curriculum and those who are teaching only a small portion of the curriculum.
2. Middle school teachers of agricultural education in Virginia have a high positive attitude toward agriscience.
3. Teacher attitude toward agriscience curriculum is an important predictor of the amount of agriscience curriculum taught by middle school teachers of agricultural education in Virginia.
4. Middle school teachers of agricultural education in Virginia consider themselves to be knowledgeable of agriscience curriculum.
5. Teacher knowledge of agriscience curriculum is an important predictor of the amount of agriscience curriculum taught by middle school teachers of agricultural education in Virginia.
6. Middle school teachers of agricultural education in Virginia hold high expectations of agriscience curriculum.
7. Teacher expectations of agriscience curriculum is a meaningful predictor of the amount of agriscience taught by middle school teachers of agricultural education in Virginia.

8. Years in the current teaching position is an important predictor of the amount of agriscience curriculum taught by middle school teachers of agricultural education in Virginia.

9. Positive correlations existed between the variables of amount of agriscience curriculum taught, teacher knowledge of agriscience curriculum, teacher expectations of agriscience curriculum, and teacher attitude toward agriscience curriculum.

Discussion

There are two distinct groups of teachers represented in the dependent variable, amount of agriscience taught. The groups could be interpreted to reflect teachers who are adopting the agriscience curriculum and those who have chosen not to adopt the agriscience curriculum. Factors identified in this study that affect the formation of these groups were teachers' attitude toward agriscience curriculum, teachers' knowledge of agriscience curriculum, teachers' expectations of agriscience curriculum, and years in the present teaching position.

Middle school agricultural education teachers in Virginia did possess a high positive attitude toward agriscience curriculum. Their attitudes were positively skewed, and the mean attitude score for all teachers was high. The analysis of attitude scores showed that attitude was a significant predictor of the amount of agriscience taught in

middle school agricultural education programs. This conclusion supports the findings of Trandis (1971) and Peasley (1992).

Teachers in Virginia middle school agricultural education programs consider themselves knowledgeable of agriscience curriculum. The knowledge scores of the teachers were high and positively skewed. This variable provided the largest portion of the explained variance to the regression equation. This conclusion supports the findings of House (1981), Hashew (1986), Kirby (1990), and Newman & Johnson (1992). Teacher knowledge is a major predictor of curriculum adoption.

Virginia middle school agricultural education teachers had high expectations of agriscience curriculum. Expectations scores were positively skewed indicating a mean score that was considered high. Mischel & Mischel (1977) and Trandis (1971) found expectations to be a strong indicator of change and adoption. This study supports their work and goes further by identifying expectations as a suppressor variable in the regression equation (see tables 8, 9, and 10). Expectations acts as a filter to purify the regression analysis and strengthen the relationships between the dependent variable, amount of agriscience curriculum taught and the other independent variables in the regression equation.

One significant demographic variable surfaced in the regression analysis as being a significant predictor in the regression equation. Even though it was unexpected, years in the current teaching position was found to be a significant predictor of the amount of agriscience curriculum taught. This independent variable

had a negative effect on the amount of agriscience taught such that the longer teachers had been in their current teaching position, the fewer competencies they taught from the approved agriscience curriculum. No evidence of this phenomenon was found in the literature, in fact this conclusion tends to disagree with the findings of Cheek & Beeman (1978) and Borko and Niles (1982). It is important to note that no other demographic variables were found to be significant predictors of curriculum adoption.

Implications to Knowledge

When the new curriculum was introduced for Virginia middle school agricultural education programs in 1990, some teachers were already implementing agriscience principles while others were teaching traditional vocational agriculture to middle school students. For this curriculum to gain acceptance on a large scale, change was inevitable. Haveloc (1973) identified change as a significant alteration intended to benefit those affected. Agricultural Education for the Middle School certainly meets that criteria.

Since educational change hinges on what teachers do and think (Fullam, 1982) converting to an agriscience curriculum in Virginia middle schools is greatly dependent on the teachers in the programs. At this point there are two distinct groups of middle school agricultural educators in Virginia, the ones who are attempting to teach the approved curriculum and the ones who are teaching only a portion of the curriculum.

It is probable that at this point there may be some resistance to change in the latter group. The curricular change in Virginia middle school agricultural education programs would likely fit into Watsons (1969) second stage of change. At this stage the innovation is still developing and pros and cons are still being developed. Teachers tend to teach what they know (House, 1981). Kirby (1990) found that knowledge was a barrier to teaching agriscience for teachers in North Carolina. Darr (1985) found knowledge to be a strong predictor of subjects taught by teachers. In 1978, Griner reported that middle school agricultural education teachers in Virginia were ill prepared to teach in the middle school setting. Although Griner's findings were more closely associated with pedagogy, preparedness to teach agriscience is a problem today. Horne and Key (1992) and Newman and Johnson (1992) state that agriscience teachers need more training to teach agriscience concepts.

Peasley (1990) and Trandis (1971) found teacher attitude to be a strong predictor of behavior. The results of this study tend to agree with the findings of Peasley and Trandis.

Teacher expectations of agriscience programs were found to have a meaningful influence on the amount of agriscience taught. Mischel and Mischel (1977) support this finding by emphasizing that a person's actions are based on the expected benefits of those actions. Darr (1985) also found that teachers are concerned about the expected changes brought about by innovations.

With teachers still in the change process, it is important to develop an understanding of what variables influence their decision to adopt or discard the change (new curriculum). Trandis (1971) suggested that attitude, social norms, expectations, and habits serve to predict behavior. The results of this study support the ideas of attitude and expectations predicting behavior.

The results of this study were contrary to the findings of Rush (1984) who reported that education was a strong predictor of teacher performance. This study found no significant difference between education levels and the amount of agriscience taught.

Recommendations

1. Given the existence of two distinct groups of agricultural education teachers in Virginia middle schools, more attention needs to be given to the characteristics of knowledge, attitude, expectations, and time spent in the current position to understand differences in these groups.
2. Given the existence of the significant contribution of the teachers' positive attitude toward the amount of agriscience curriculum taught by middle school teachers of agricultural education in Virginia, more effort by teacher education, the Virginia Department of Education, and agricultural interests in Virginia should be devoted to building on positive attitudes toward agriscience.

3. Given the existence of the significant contribution of the teachers' knowledge toward the amount of agriscience curriculum taught by middle school teachers of agricultural education in Virginia, more effort is needed by teacher education to prepare prospective teachers in agriscience content and methods as part of their teacher preparation. The Virginia Department of Education and agricultural interests in Virginia should also commit to teacher training through inservice and other activities involving agriscience education.
4. The positive correlations between amount of agriscience curriculum taught, teacher knowledge of agriscience curriculum, teacher attitude toward agriscience curriculum, and teacher expectations of agriscience curriculum must be taken into consideration when preparing teachers for agriscience instruction.

Discussion

Since teachers' knowledge, attitude, expectations, and time in the current teaching position have been identified as major predictors of agriscience curriculum in Virginia middle school agricultural education programs, it is important that education professionals and agricultural interest groups in Virginia use this knowledge in future efforts to promote agriscience curriculum. This study clearly indicated the importance of these variables in the successful implementation and adoption of agriscience curriculum.

It is difficult to isolate techniques for developing positive attitudes. Since attitudes are developed over time and are complicated constructs, there are no easy solutions to influencing attitude development. However, education professionals and agricultural interests in Virginia need to be concerned with developing positive attitudes among agricultural educators in the commonwealth to facilitate the adoption of agriscience curriculum. Some plausible techniques would include education at the graduate and undergraduate levels for prospective teachers of agriculture, inservice activities in agriscience, and leaders in the field exhibiting a positive attitude toward agriscience. Since it is easier to develop an attitude than to change one, the agricultural education profession should be especially concerned with fostering a positive attitude among young professionals in agricultural education.

Teacher knowledge of agriscience curriculum was the strongest predictor of agriscience curriculum adoption in the regression model in this study. The importance of teacher knowledge cannot be over emphasized. Too often curricular innovations are presented to practitioners in the field with little or no preparation for implementation. The lack of knowledge about an innovation will likely lead to its failure. Professionals in agricultural education and the industry of agriculture need to be concerned with the state of agriscience curriculum innovations. If teachers are expected to adopt a curriculum that contains material they were not prepared to teach with no additional training, agriscience curriculum innovations will surely fail. If the industry of agriculture desires new professionals that can contribute to the food and

fiber professions it must be willing to support agricultural education in the implementation of agriscience curriculum innovations.

Need for Further Study

1. Given the existence of two distinct groups of middle school teachers in agricultural education in Virginia, more research is needed to better understand the differences between the groups.
2. This study should be replicated in other states to further develop the theory behind curriculum adoption.
3. Time issues, such as the variable years in the current position, need to be studied further to understand their negative relationship with curriculum adoption.
4. More study is needed to determine the full affect of the suppressor variable, teacher expectations of agriscience curriculum.

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APPENDIX A

Pilot Test Participants

Pilot Test Participants

M.E. May
Monelison Junior High School
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R.Q. Lawing, Jr.
Buckingham Junior High School
Route 1, Box 8-A
Dillwyn, VA.

Peter Senger
Buckingham Junior High School
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Dillwyn, VA.

Darden Gillette
Culpepper Junior High School
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Culpepper VA.

Churchill Drake
Dinwiddle Junior High School
Route 1, Box 349
Dinwiddle, VA.

J.D. Williams
Cedar Lee Junior High School
Box 97
Bealton, VA.

Alan Webb
Marshall Junior High School
Box 117
Marshall, VA.

Barbara McCormack
Warrenton Junior High School
Warrenton, VA.

Pam Woodward
William C. Taylor Junior High School
Warrenton, VA.

Gary Crawfrod
Goochland Junior High School
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Goochland, VA.

Teresa Lindberg
E. W. Wyatt Junior High School
Route 3, Box 368
Emporia, VA.

Mike Dixon
Hailfax Junior High School
Box 838
South Boston, VA.

H. L. Tisdale
Lunenburg Junior High School
Route 1
Victoria, VA.

Eric Jones
Northumberland Junior High School
Box 100
Heathsville, VA.

APPENDIX B

Pilot Instrument

Please tell us about yourself

Including the current year:
How many total years of teaching experience do you have? _____
How many years have you taught middle school agriculture? _____
How many years have you been in your present position? _____
How many years have you taught high school agriculture? _____
Are you a member of: VVATA? _____ AVA _____
What is your age? _____

Please circle the appropriate response
I am: Male Female
I have a: (Circle the highest level of education)
Bachelors Degree Bachelors +15 Masters Degree
Masters Degree +15 Masters Degree +30 Doctoral Degree

Agriscience Attitudes

For the following sets of words, place an X in the space nearest to the word that best represents your attitude toward agriscience.

Please:
Be sure to mark each scale
Mark only one X for each pair of words

Example

Good ___:_X_:___:___:___:___ **Bad**

AGRISCIENCE

Necessary___:___:___:___:___:___**Unnecessary**
Boring ___:___:___:___:___:___**Interesting**
Positive ___:___:___:___:___:___**Negative**
Practical ___:___:___:___:___:___**Impractical**
Useful ___:___:___:___:___:___**Useless**
Like ___:___:___:___:___:___**Dislike**
Wanted ___:___:___:___:___:___**Unwanted**
Unknown___:___:___:___:___:___**Known**
Valuable ___:___:___:___:___:___**Worthless**
Bad ___:___:___:___:___:___**Good**

Agriscience Expectations

Please circle the response to the right of the following statements that best represent your opinion of the statement.

1 = Strongly Disagree (SD) 2 = Disagree (D)
3 = Agree (A) 4 = Strongly Agree (SA)

1. Agriscience provides my students with an understanding of basic science concepts . . . . . SD D A SA
2. My students are interested in agriscience . . . . . SD D A SA
3. My students are better able to apply school to real life through agriscience . . . . . SD D A SA
4. I enjoy teaching agriscience . . . . . SD D A SA
5. My students enjoy agriscience . . . . . SD D A SA
6. Through agriscience, my students are able to apply science to agriculture . . . . . SD D A SA
7. Agriscience makes my students more aware of the opportunities available in agriculture . . . . . SD D A SA
8. Students learn the importance of agriculture to the economy through agriscience . . . . . SD D A SA
9. Students learn how new technology impacts agriculture through agriscience . . . . . SD D A SA
10. I can teach basic science concepts through agriscience . . . . . SD D A SA

Competencies in the Virginia Middle School
Agriscience Curriculum

In the left column:

Please circle "Y"(yes) if the competency identified is taught in your program, and "N"(no) if the competency is not taught in the in your program.

In the Right column:

Please circle the appropriate number as it relates to your knowledge of the competency.

1 = No knowledge of this competency area
6 = I am an expert in this competency area

Please be sure to mark BOTH scales for each competency

Example

Y N Identify the various types of SAEP . . 1 2 3 4 5 6

		Competency	Knowledge
Y	N	Identify agricultural education concepts	1 2 3 4 5 6
Y	N	Identify class rules and procedures	1 2 3 4 5 6
Y	N	Explain the application of computers to agricultural management	1 2 3 4 5 6
Y	N	Explore new technologies in animal science	1 2 3 4 5 6
Y	N	Explore new technologies in plant science	1 2 3 4 5 6
Y	N	Explore new technologies in agricultural engineering	1 2 3 4 5 6
Y	N	Explore new technologies in environmental areas	1 2 3 4 5 6
Y	N	Explore new strategies in agricultural marketing	1 2 3 4 5 6
Y	N	Define exports	1 2 3 4 5 6
Y	N	Define imports	1 2 3 4 5 6
Y	N	Define tariffs	1 2 3 4 5 6
Y	N	Explain the relationship of international trade to Virginia agriculture	1 2 3 4 5 6
Y	N	Identify factors that effect trade agreements	1 2 3 4 5 6
Y	N	Explore careers in international agriculture	1 2 3 4 5 6
Y	N	Identify the role of agribusiness in agriculture	1 2 3 4 5 6
Y	N	Discuss free enterprise and the economy	1 2 3 4 5 6
Y	N	Define entrepreneur	1 2 3 4 5 6
Y	N	Recognize personal potential as an entrepreneur	1 2 3 4 5 6
Y	N	Identify career opportunities in agribusiness	1 2 3 4 5 6
Y	N	Describe the role and function of an agribusiness manager	1 2 3 4 5 6

		Competency	Knowledge
Y	N	Identify components of a computer system	1 2 3 4 5 6
Y	N	Define computer terms	1 2 3 4 5 6
Y	N	Explain the proper use of diskette	1 2 3 4 5 6
Y	N	Use word processing software	1 2 3 4 5 6
Y	N	Identify the uses of computers in agriculture	1 2 3 4 5 6
Y	N	Define supervised agricultural experience programs	1 2 3 4 5 6
Y	N	Identify the various types of SAEP	1 2 3 4 5 6
Y	N	Describe the characteristics of a successful SAEP	1 2 3 4 5 6
Y	N	Select and plan an individual SAEP	1 2 3 4 5 6
Y	N	Relate SAEP to individual FFA awards	1 2 3 4 5 6
Y	N	Explain, demonstrate, and practice safety in the mechanics lab	1 2 3 4 5 6
Y	N	Identify portable power equipment, hand tools and accessories	1 2 3 4 5 6
Y	N	Demonstrate the proper use of portable power equipment, hand tools and accessories	1 2 3 4 5 6
Y	N	Perform woodworking skills	1 2 3 4 5 6
Y	N	Explain basic principles of electricity	1 2 3 4 5 6
Y	N	Perform basic electrical wiring skills	1 2 3 4 5 6
Y	N	Cut, shape, and drill metal	1 2 3 4 5 6
Y	N	Explain the arc welding process	1 2 3 4 5 6
Y	N	Operate arc welding equipment	1 2 3 4 5 6
Y	N	Perform measuring skills	1 2 3 4 5 6
Y	N	Read, interpret, and construct plans for a mechanics project	1 2 3 4 5 6
Y	N	Explain operation principles of four stroke engines	1 2 3 4 5 6
Y	N	Complete a personal development inventory	1 2 3 4 5 6
Y	N	Explain opportunities for leadership development through FFA	1 2 3 4 5 6
Y	N	Use democratic principles in conducting an effective meeting	1 2 3 4 5 6
Y	N	Develop an understanding of the FFA	1 2 3 4 5 6
Y	N	Identify the components of a research project	1 2 3 4 5 6
Y	N	Practice safety procedures in performing experiments	1 2 3 4 5 6
Y	N	Perform an agricultural experiment	1 2 3 4 5 6
Y	N	Evaluate the results of an experiment	1 2 3 4 5 6
Y	N	Develop experimental reporting skills	1 2 3 4 5 6

APPENDIX C

Pilot Test Instructions

Questionnaire Evaluation

Please answer the following questions regarding the questionnaire:

1. Is the format of the questionnaire easy to follow? Do you have any suggestions for improvement?

2. In the first section (Please tell us about yourself) are there any questions that should be added or deleted? Are the directions clear?

3. In the second section (Agriscience Attitudes) are there any questions that should be added or deleted? Are the directions clear?

4. In the third section (Agriscience Expectations) are there any pairs of words that should be added or deleted? Are the directions clear?

5. In the fifth section (Competencies) are there any questions that should be added or deleted? Are the directions clear?

6. Do you have any other suggestions?

Please return this evaluation to Rick Rudd as soon as possible.

Thank you!

Dear Agricultural Educator,

You have been selected to represent junior high school agricultural education departments in a pilot test designed to measure agriscience curriculum in Virginia. You are one of eight teachers chosen for this task. It is extremely important to us to have your input on this questionnaire.

Unique curriculum efforts in Virginia agricultural education programs can serve as national models for agricultural education in middle and junior high schools. Please take a few minutes to complete the enclosed survey and return it to us in the enclosed envelope. We are interested in your responses as well as any additional comments you may have regarding the questionnaire.

Rest assured that your responses will remain anonymous and will be used as a part of the total group for the purpose of refining the questionnaire. Thank you in advance for helping us with this study.

Thank you,

Rick D. Rudd
Senior Research Assistant
College of Agriculture and
Life Sciences

John Hillison
Professor
Agricultural Education

APPENDIX D

Panel of Experts

Panel of Experts

Dr. John Hillison
Virginia Polytechnic Institute
and State University

Dr. Donald Elson
Virginia Polytechnic Institute
and State University

Dr. John Crunkilton
Virginia Polytechnic Institute
and State University

Dr. William G. Camp
Virginia Polytechnic Institute
and State University

Ms. Darla Miller
Virginia Polytechnic Institute
and State University

APPENDIX E

Instrument A

Middle School Agricultural Education Survey

Please tell us about yourself

Including the current year:

How many total years of teaching experience do you have? _____

How many years have you taught middle school agriculture? _____

How many years have you been in your present position? _____

How many years have you taught high school agriculture?_____

Are you a member of: VVATA _____ AVA _____

What is your age? _____

Please circle the appropriate response

I am: Male Female

I have a: (Circle the highest level of education)

Bachelors Degree Bachelors +15 Masters Degree

Masters Degree +15 Masters Degree +30 Doctoral Degree

Agriscience Attitudes

For the following sets of words, place an X in the space nearest to the word that best represents your attitude toward agriscience.

Please:

Be sure to mark each scale

Mark only one X for each pair of words

Example

Good ___:_X_:___:___:___:___ **Bad**

AGRISCIENCE

Necessary___:___:___:___:___:___**Unnecessary**

Boring ___:___:___:___:___:___ **Interesting**

Positive ___:___:___:___:___:___ **Negative**

Practical___:___:___:___:___:___ **Impractical**

Useful ___:___:___:___:___:___ **Useless**

Like ___:___:___:___:___:___ **Dislike**

Wanted ___:___:___:___:___:___ **Unwanted**

Unknown___:___:___:___:___:___ **Known**

Valuable___:___:___:___:___:___ **Worthless**

Bad ___:___:___:___:___:___ **Good**

Agriscience Expectations

Please circle the response to the right of the following statements that best represents your opinion of the statement.

SA = Strongly Agree, D = Disagree, A = Agree, SD = Strongly Disagree

1. Agriscience provides my students with an understanding of basic science concepts.....SA A D SD

2. My students are interested in agriscience . . . . . SA A D SD
3. My students are better able to apply school to real life through agriscience . . . . . SA A D SD

4. I enjoy teaching agriscience . . . . . SA A D SD

5. My students enjoy agriscience . . . . . SA A D SD

6. Through agriscience, my students are able to apply science to agriculture . . . . . SA A D SD

7. Agriscience makes my students more aware of the opportunities available in agriculture . . . . . SA A D SD

8. Students learn the importance of agriculture to the economy through agriscience . . . . . SA A D SD

9. Students learn how new technology impacts agriculture through agriscience . . . . . SA A D SD

10. I can teach basic science concepts through agriscience . . . . . SA A D SD

Competencies in the Virginia Middle School
Agriscience Curriculum

Please circle "Y" (yes) if the competency identified is taught in the indicated grade in your program, and "N" (no) if the competency is not taught in the indicated grade in your program.

On the far right, please circle the response that best addresses the following statement about the competency.

"I know enough about this competency to teach it to my students"

SA = Strongly agree, A = Agree, D = Disagree, SD = Strongly Disagree

Please be sure to mark both columns for each competency.
Please mark the knowledge column even if you do not teach
the competency

Example:
Identify the various types of SAE . . . . . Y N SA A D SD

Grade 6
Identify class rules and procedures . . . . . Y N SA A D SD
Discuss the impact of agriculture on the world
economy . . . . . Y N SA A D SD
Describe the interdependency of agriculture and other
segments of society . . . . . Y N SA A D SD
Identify and explain functions of plant systems . . Y N SA A D SD
Identify plants of economic importance to the
community . . . . . Y N SA A D SD
Identify careers in plant science . . . . . Y N SA A D SD
Discuss the importance of effective communication Y N SA A D SD
Communicate on the telephone . . . . . Y N SA A D SD
Communicate through newspapers, radio, and
television . . . . . Y N SA A D SD
Identify basic laboratory safety procedures . . . . . Y N SA A D SD
Identify and use basic hand tools for woodworking Y N SA A D SD
Identify conservation measures . . . . . Y N SA A D SD
Identify ecology and conservation concerns in the
community . . . . . Y N SA A D SD
Explain methods of conserving water . . . . . Y N SA A D SD
Describe how agriculture and the environment are
interrelated . . . . . Y N SA A D SD
Identify part time career opportunities in agriculture
in Virginia . . . . . Y N SA A D SD
Determine the educational requirements for certain
agricultural occupations . . . . . Y N SA A D SD

Grade 7

Identify class rules and procedures	Y N	SA	A	D	SD
Describe the relationship of agriculture to other segments of society	Y N	SA	A	D	SD
Explain factors effecting soil erosion	Y N	SA	A	D	SD
Discuss soil erosion and control measures	Y N	SA	A	D	SD
Review agriculture policies concerning air quality	Y N	SA	A	D	SD
Explain the relationship of trees and wildlife	Y N	SA	A	D	SD
Explain the importance of agricultural research	Y N	SA	A	D	SD
Identify agricultural research in plant science	Y N	SA	A	D	SD
Explore career opportunities in agricultural research	Y N	SA	A	D	SD
Describe the photosynthesis process in plants	Y N	SA	A	D	SD
Demonstrate proper watering and fertilization of plants	Y N	SA	A	D	SD
Identify methods of planting and transplanting	Y N	SA	A	D	SD
Discuss new technology in plant science	Y N	SA	A	D	SD
Determine the importance of animals to agriculture	Y N	SA	A	D	SD
Identify key scientific terms in the animal industry	Y N	SA	A	D	SD
Explore the pleasure and companion animal industry	Y N	SA	A	D	SD
Discuss ethical concerns related to animal welfare	Y N	SA	A	D	SD
Apply safety practices in the mechanics laboratory	Y N	SA	A	D	SD
Perform metal fabrication practices	Y N	SA	A	D	SD
Identify and use basic hand tools for woodworking	Y N	SA	A	D	SD
Select and use measuring devices	Y N	SA	A	D	SD
Finish and preserve wood	Y N	SA	A	D	SD
Identify personal development needs	Y N	SA	A	D	SD
Develop written communications skills	Y N	SA	A	D	SD
Develop opportunities for leadership	Y N	SA	A	D	SD

Grade 8

Identify agricultural education concepts	Y	N	SA	A	D	SD
Explain the application of computers to agricultural management	Y	N	SA	A	D	SD
Explore new technologies in plant science	Y	N	SA	A	D	SD
Explore new technologies in environmental areas	Y	N	SA	A	D	SD
Define exports	Y	N	SA	A	D	SD
Define tariffs	Y	N	SA	A	D	SD
Identify factors that effect trade agreements	Y	N	SA	A	D	SD
Identify the role of agribusiness in agriculture	Y	N	SA	A	D	SD
Define entrepreneur	Y	N	SA	A	D	SD
Identify career opportunities in agribusiness	Y	N	SA	A	D	SD
Identify components of a computer system	Y	N	SA	A	D	SD
Explain he proper use of diskette	Y	N	SA	A	D	SD
Identify the uses of computers in agriculture	Y	N	SA	A	D	SD
Identify the various types of SAE	Y	N	SA	A	D	SD
Select and plan an individual SAE	Y	N	SA	A	D	SD
Explain, demonstrate, and practice safety in the mechanics lab	Y	N	SA	A	D	SD
Demonstrate the proper use of portable equipment, hand tools and accessories	Y	N	SA	A	D	SD
Explain basic principles of electricity	Y	N	SA	A	D	SD
Cut, shape, and drill metal	Y	N	SA	A	D	SD
Operate arc welding equipment	Y	N	SA	A	D	SD
Read, interpret, and construct plans for a mechanics project	Y	N	SA	A	D	SD
Complete a personal development inventory	Y	N	SA	A	D	SD
Use democratic principles in conducting an effective meeting	Y	N	SA	A	D	SD
Identify the components of a research project	Y	N	SA	A	D	SD
Perform an agricultural experiment	Y	N	SA	A	D	SD
Develop experimental reporting skills	Y	N	SA	A	D	SD

APPENDIX F

Instrument B

Middle School Agricultural Education Survey

Please tell us about yourself
Including the current year:
How many total years of teaching experience do you have? _____
How many years have you taught middle school agriculture? _____
How many years have you been in your present position? _____
How many years have you taught high school agriculture?_____
Are you a member of: VVATA _____ AVA _____
What is your age? _____
Please circle the appropriate response
I am: Male Female
I have a: (Circle the highest level of education)

Bachelors Degree Bachelors +15 Masters Degree
Masters Degree +15 Masters Degree +30 Doctoral Degree

Agriscience Attitudes

For the following sets of words, place an X in the space nearest to the word that best represents your attitude toward agriscience.

Please:
Be sure to mark each scale
Mark only one X for each pair of words
Example

Good___:_X_:___:___:___:___ Bad

AGRISCIENCE

Necessary___:___:___:___:___:___**Unnecessary**
Boring ___:___:___:___:___:___ **Interesting**
Positive ___:___:___:___:___:___ **Negative**
Practical___:___:___:___:___:___ **Impractical**
Useful ___:___:___:___:___:___ **Useless**
Like ___:___:___:___:___:___ **Dislike**
Wanted ___:___:___:___:___:___ **Unwanted**
Unknown___:___:___:___:___:___ **Known**
Valuable___:___:___:___:___:___ **Worthless**
Bad ___:___:___:___:___:___ **Good**

Agriscience Expectations

Please circle the response to the right of the following statements that best represents your opinion of the statement.

SA = Strongly Agree, D = Disagree, A = Agree, SD = Strongly Disagree

1. Agriscience provides my students with an understanding of basic science concepts.....SA A D SD

2. My students are interested in agriscience . . . . . SA A D SD
3. My students are better able to apply school to real life through agriscience . . . . . SA A D SD

4. I enjoy teaching agriscience . . . . . SA A D SD

5. My students enjoy agriscience . . . . . SA A D SD

6. Through agriscience, my students are able to apply science to agriculture . . . . . SA A D SD

7. Agriscience makes my students more aware of the opportunities available in agriculture . . . . . SA A D SD

8. Students learn the importance of agriculture to the economy through agriscience . . . . . SA A D SD

9. Students learn how new technology impacts agriculture through agriscience . . . . . SA A D SD

10. I can teach basic science concepts through agriscience . . . . . SA A D SD

Competencies in the Virginia Middle School
Agriscience Curriculum

Please circle "Y" (yes) if the competency identified is taught in the indicated grade in your program, and "N" (no) if the competency is not taught in the indicated grade in your program.

On the far right, please circle the response that best addresses the following statement about the competency.

"I know enough about this competency to teach it to my students"

SA = Strongly agree, A = Agree, D = Disagree, SD = Strongly Disagree

Please be sure to mark both columns for each competency

Please mark the knowledge column even if you do not teach the competency

Example:
Identify the various types of SAEP . . . . . Y N SA A D SD

Grade 6

Explore ideas associated with agriculture . . . . . Y N SA A D SD
Define agriculture / agriscience . . . . . Y N SA A D SD
Identify the key factors that have shaped the agricultural industry in the United States . . . . Y N SA A D SD
Identify current research and development activities in agriculture . . . . . Y N SA A D SD
Identify basic requirements for plant growth and development . . . . . Y N SA A D SD
Identify basic requirements for animal growth and development . . . . . Y N SA A D SD
Identify careers in animal systems . . . . . Y N SA A D SD
Participate in a group discussion . . . . . Y N SA A D SD
Communicate through letters . . . . . Y N SA A D SD
Determine the importance of agricultural mechanics technology . . . . . Y N SA A D SD
Describe new agricultural engineering technologies . . . Y N SA A D SD
Explain how organisms and the environment work together . . . . . Y N SA A D SD
Identify the various types of natural resources . . . . . Y N SA A D SD
Identify clean water needs of society . . . . . Y N SA A D SD
Discuss home water conservation techniques . . . . . Y N SA A D SD
Identify full time career opportunities in agriculture in Virginia . . . . . Y N SA A D SD
Explain career opportunities in agribusiness . . . . . Y N SA A D SD

Grade 7

Explore ideas associated with agriculture	Y N	SA	A	D	SD
Explain the importance of agriculture to Virginia, the United States, and the world	Y N	SA	A	D	SD
Identify kinds of soil erosion	Y N	SA	A	D	SD
Explain the importance of conserving soil	Y N	SA	A	D	SD
Explain soil and water conservation measures	Y N	SA	A	D	SD
Give examples of air pollution control programs	Y N	SA	A	D	SD
Identify careers in soil and water conservation	Y N	SA	A	D	SD
Identify agricultural research in animal science	Y N	SA	A	D	SD
Identify research in agricultural engineering technology	Y N	SA	A	D	SD
Determine the importance of agricultural crops	Y N	SA	A	D	SD
Identify and explain methods of plant reproduction	Y N	SA	A	D	SD
Identify and label plants	Y N	SA	A	D	SD
Explain the use of hydroponics in growing plants	Y N	SA	A	D	SD
Explain career opportunities in plant science	Y N	SA	A	D	SD
Explain the importance of animal evaluation	Y N	SA	A	D	SD
Explore the meat animal industry	Y N	SA	A	D	SD
Discuss new technologies in animal science	Y N	SA	A	D	SD
Explore career opportunities in animal science	Y N	SA	A	D	SD
Identify types of metals	Y N	SA	A	D	SD
Read and interpret simple plans	Y N	SA	A	D	SD
Maintain hand tools	Y N	SA	A	D	SD
Select and use wood fasteners	Y N	SA	A	D	SD
Identify effective leadership traits	Y N	SA	A	D	SD
Develop oral communications skills	Y N	SA	A	D	SD
Develop an understanding of the FFA	Y N	SA	A	D	SD
Develop social skills	Y N	SA	A	D	SD

Grade 8

Identify class rules and procedures	Y N	SA	A	D	SD
Explore new technologies in animal science	Y N	SA	A	D	SD
Explore new technologies in agricultural engineering	Y N	SA	A	D	SD
Explore new strategies in agricultural marketing	Y N	SA	A	D	SD
Define imports	Y N	SA	A	D	SD
Explain the relationship of international trade to Virginia agriculture	Y N	SA	A	D	SD
Explore careers in international agriculture	Y N	SA	A	D	SD
Discuss free enterprise and the economy	Y N	SA	A	D	SD
Recognize personal potential as an entrepreneur	Y N	SA	A	D	SD
Describe the role and function of an agribusiness manager	Y N	SA	A	D	SD
Define computer terms	Y N	SA	A	D	SD
Use word processing software	Y N	SA	A	D	SD
Define supervised agricultural experience programs (SAEP)	Y N	SA	A	D	SD
Describe the characteristics of a successful SAEP	Y N	SA	A	D	SD
Relate SAEP to individual FFA awards	Y N	SA	A	D	SD
Identify portable power equipment, hand tools and accessories	Y N	SA	A	D	SD
Perform woodworking skills	Y N	SA	A	D	SD
Perform basic electrical wiring skills	Y N	SA	A	D	SD
Explain the arc welding process	Y N	SA	A	D	SD
Perform measuring skills	Y N	SA	A	D	SD
Explain operation principles of four stroke engines	Y N	SA	A	D	SD
Explain opportunities for leadership development through FFA	Y N	SA	A	D	SD
Develop an understanding of the FFA	Y N	SA	A	D	SD
Practice safety procedures in performing experiments	Y N	SA	A	D	SD
Evaluate the results of an experiment	Y N	SA	A	D	SD

APPENDIX G

First Letter to Subjects

November 15, 1993

Harry D. Seay
Axton M.S.
Box 426
Axton, VA. 24054

Dear Harry:

The purpose of this letter is to seek your assistance in a study of Virginia middle school agricultural education programs. We are working on a project directed at learning more about middle school curriculum. We have visited several of your schools to learn more about middle school agricultural education programs and hope this study will provide further insight.

Agricultural education in Virginia has led the country with innovative programs for many years. In 1990 a curriculum was developed for middle school agricultural education programs with an emphasis on agriscience. This curriculum effort, along with the success of middle school agricultural education programs have made Virginia a model for many states.

Please complete the enclosed survey and return it in the postage paid envelope by November 22nd. We assure you that your answers will remain confidential. We are interested only in aggregate data and not individual responses. If you have any questions about this study or completing the survey, please call collect at 703-231-9669. Thank you for your cooperation!

Sincerely,

Rick D. Rudd
Senior Research Assistant
Office of Academic Programs
College of Agriculture and Life Sciences

John Hillison
Professor and Director
Agricultural Education
Virginia Polytechnic Institute
and State University

APPENDIX H

Follow-Up Post Card

Dear Agricultural Educator,

Last week you received a survey from Virginia Tech regarding a study of Virginia middle school agricultural education curriculum. If you have already returned your survey, thank you. If you have not had a chance to complete it, please take a few moments to do so. Your response is critical to the outcome of this study!

If you did not receive a survey, or if you have misplaced it, please call me collect at 703-231-9669 and I will mail another one to you today.

Thank you for your cooperation,

Rick Rudd
Senior Research Assistant

APPENDIX I

Second Letter to Subjects

November 29, 1993

Harry D. Seay
Axton M.S.
Box 426
Axton, VA. 24054

Dear Harry:

About two weeks ago you received a survey from Virginia Tech regarding a study of middle school agricultural education curriculum in Virginia. As of today, we have not received your response. It is very important to us to have your input on this critical issue. Please take a moment to complete and return your survey at your earliest convenience. Your responses are strictly confidential.

If you have questions about the study or completing the survey, please feel free to call collect at 703-231-9669. Thank you for your assistance!

Sincerely,

Rick D. Rudd
Senior Research Assistant
Office of Academic Programs
College of Agriculture and Life Sciences

John Hillison
Professor and Director
Agricultural Education
Virginia Polytechnic Institute
and State University

APPENDIX J

Third Letter to Subjects

December 17, 1993

Harry D. Seay
Axton M.S.
Box 426
Axton, VA. 24054

Dear Harry:

Several weeks ago, you received a survey regarding a study we are conducting on middle school agricultural education curriculum in Virginia. As of today, we have not received your response. Although curriculum efforts in Virginia's middle school programs have been ahead of many states, we need your input to help keep Virginia on the cutting edge. We need to know what you think about the agriscience curriculum to make it better for our students. If you have returned your survey, thank you. If you have not, please take a few minutes to complete the enclosed survey and return it in the postage paid envelope. Rest assured that your responses are completely confidential.

If you have questions regarding this study or completing the survey, please feel free to call us collect at 703-231-9669. Thank you for your cooperation!

Sincerely,

Rick D. Rudd
Senior Research Assistant
Office of Academic Programs
College of Agriculture and Life Sciences

John Hillison
Professor and Director
Agricultural Education
Virginia Polytechnic Institute
and State University

VITA

Rick D. Rudd was born in Germany on December 5, 1962. He and his younger sister Alice were raised in New Lexington, Ohio by their parents Ronald and Elsie Rudd. Rick's interest in agriculture and youth education was developed through the high school agricultural education program at New Lexington High School.

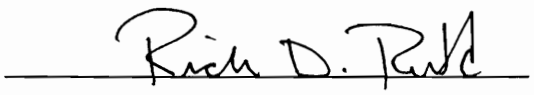
Rick was involved in the local FFA chapter serving as a local, district, and state FFA officer. This involvement with the encouragement of his agriculture teachers led Rick to pursue a degree in agricultural education from The Ohio State University.

After earning his bachelors degree with a dual major in Agricultural Education and Agricultural Economics, Rick taught agriculture at London High School in London, Ohio. While teaching he pursued a masters degree in Agricultural Education from Ohio State. After three years of teaching in London, the opportunity presented itself to teach closer to home in Baltimore, Ohio. Rick taught for four years in the Liberty Union - Thurston school district before deciding to pursue his Ph.D. in Vocational and Technical Education from Virginia Polytechnic Institute and State University.

As a doctoral candidate, Rick was involved in the Agricultural Education Program and in the Office of Academic Programs for the College of Agriculture and Life Sciences. His assistantship in the Office of Academic Programs afforded him the

opportunity to work with undergraduate student recruitment, teach in the two year and four year programs, and work with Virginia State University on a collaborative project to recruit minority students into the food and agricultural sciences.

While in graduate school, Rick was selected as the Groseclose Fellow in 1993, initiated into Alpha Tau Alpha, Gamma Sigma Delta, and Omicron Tau Theta. Rick is married to his wife Suzann and has two children, Tyler and Laura.



Rick D. Rudd