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An assessment of competencies needed by agricultural cooperative education students in Hawkins County, Tennessee

Steven Wade Gass

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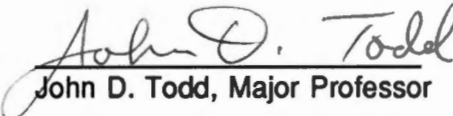
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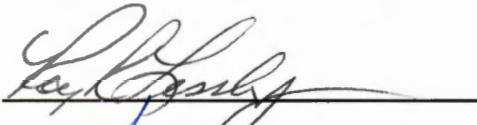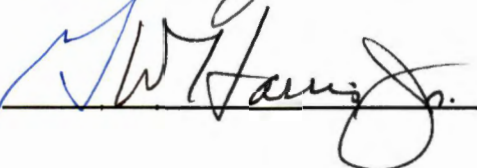
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To the Graduate Council:

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Signature _Steven Wade Glass_

Date _August 15, 1991_

AN ASSESSMENT OF COMPETENCIES NEEDED BY AGRICULTURAL

COOPERATIVE EDUCATION STUDENTS IN

HAWKINS COUNTY, TENNESSEE

A Thesis

Presented for the

Master of Science

Degree

The University of Tennessee, Knoxville

Steven Wade Gass

December 1991

DEDICATION

This thesis is dedicated to my grandmother, Juanita "Hemie" Hendry. Her faith and strength to overcome the obstacles in life has served as my motivation and inspiration to set and accomplish higher goals.

ACKNOWLEDGEMENT

ABSTRACT

Purpose. The purpose of the study was to ascertain the ability level and most desired location of training of the competencies needed for securing entry-level employment in agricultural-related occupations. The objectives were to determine: 1.) The demographic characteristics of the students, teachers and employers participating in the agricultural cooperative education program in Hawkins County, Tennessee. 2.) The types of agricultural-related businesses that are being used as a training center for the agriculture cooperative education program in Hawkins County. 3.) The agricultural-related competencies that students, teachers and employers perceive as being needed for students to be employed in agricultural-related businesses. 4.) The significant differences among the persons involved in their perceptions to the level of importance of the off-farm agricultural competencies. 5.) Places where the students, employers, and teachers perceive that the training for the needed competencies should take place.

Method. A review of literature was made. A questionnaire was developed, field tested, and was hand delivered to all participants including oral and written directions for the researcher to meet the objectives of the study. All data were summarized into tables to show percentages and significant differences among the different groups.

Findings. It was determined that of the 75 students enrolled in the agricultural cooperative education program that 70 percent were seniors and 19 percent of these students had been enrolled in the agricultural education program for three to four years.

Based on mean scores, general business competencies were rated higher than the animal science, agricultural mechanics, or crop and soil science competencies. Seven of the 25 general business competencies showed a significant difference among the groups.

The competency, following instructions, was perceived as the most important general business competency. Other competencies deemed as being of much importance with a average mean score of 3.000 or higher were care for tools and equipment, drive a car or travel safely, maintain good personal appearance, make mathematical calculation accurately, meet the public, use correct English, and use good telephone procedures.

Six of the 22 animal science competencies were perceived as being of some or much importance. Competencies related to the food technology industry were rated the highest of the animal science competencies. These competencies were recognize primal meat cuts, understanding the principles that prevent meat spoilage, identify different package procedures to prevent spoilage, and demonstrate proper sanitary meat handling procedures.

Of the 23 agricultural mechanics competencies, those dealing with safety and proper operation of tools and equipment were rated the highest of those needed for securing entry-level employment in agricultural-related occupations. These competencies were adjust and repair machinery, properly operate equipment, practice safety, use grinders, drill press and other power equipment, and use hand shop tools and equipment. Competencies dealing with diesel engines and advising customers on construction of agricultural projects were of little or no importance.

Eleven of the 20 crop and soil science competencies were rated as having some to much importance which included those dealing with horticultural plants and basic plant growth. These eleven competencies included the following advise customers on fertilizer needs, calibrate a chemical sprayer, calibrate a fertilize distributor, detect nutritional and disease symptoms of plants, grow plants in a greenhouse, grow nursery stock, identify fertilizer materials, identify field and garden seeds and plants, identify insects

that affect plants, identify ornamental plants, and identify weeds. The ability to discuss market trends with agriculturalist was rated of little or no importance.

A combination of both school and the work place was deemed as the most favorable location for the development of the needed competencies for securing entry-level employment in agricultural-related occupation. The school was rated as the best place to develop the majority of the agricultural mechanics competencies.

Implications. There should be periodic evaluations of the complete agricultural cooperative program to ensure the development of highly employable high school graduates. There is a major need to expand the program at Volunteer High School to include cooperative education for credit. There is a need for revision to the program especially in the area that were perceived as having little or no importance. More emphasis should be placed on people skills and those competencies with a rating of some and much importance.

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CHAPTER I

INTRODUCTION AND PROBLEM

This chapter is divided into six sections. The introduction is located in the first section. Statement of the problem is discussed in the second section with the significance of the problem located in the third section. The fourth section continues the purpose and objectives of the study. Scope and limitations of the study are located in the fifth section. Terms associated with the study can be found in the sixth section.

Introduction

Agricultural education programs have experienced vast changes since the passage of the Smith-Hughes Act of 1917. One stipulation of this act required that students in agricultural education classes be provided with supervised practice on the farm for at least six months each year (27) *. The concept of "Learning by Doing" established the criterion used in the development of supervised practice programs (36). Supervised agricultural farming programs was conducted by the student, supervised by the agriculture teacher and remained solely to the farm. The scope of the supervised agricultural experience program enlarged during the 1960's with the passage of the 1963 Vocational Education Act and its amendments to include distribution, processing, marketing and services dealing with agriculture products. The supervised practice program's name was changed and now is referred to as supervised agricultural experience program; however, the concept remains the same. Even with the various changes in the spectrum of the supervised agricultural experience program, it remains

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* Numbers in parenthesis refer to alphabetically numbered references in the List of References.

an integral part of the current agricultural education curriculum and a vital component in the development of competent skills and abilities needed for employment in the multi-disciplinary fields in farming and off-farm agricultural-related occupations.

After passage of the 1963 Vocational Education Act, extensive studies were conducted on the competencies needed for entry-level employment in agricultural-related occupations. This trend continued during the 1960's but research declined in the early 1970's. This has created a void in developing a strong agricultural cooperative education based curriculum for the current technologies in agriculture. Today, agriculture has a new direction of advanced technology, skills and the new fields of biotechnology. Agricultural education teachers who are trying to cope with many changes occurring in agriculture are using cooperative education programs as one strategy for occupational experience. This practice warrants a study to determine the competencies needed for employment in these types of occupations and the training institutions deemed responsible for helping develop the job entry skill.

Statement of the Problem

In attempting to meet the new role for agricultural education, the teachers in Hawkins County, Tennessee, utilized a cooperative program and placed students in off-farm agricultural occupations. This gave rise to the following problem: What agricultural competencies are needed for entry-level employment in these off-farm agricultural occupations and where should the students learn the needed skills?

To answer these questions, the following parameters were studied:

a)   Relative importance of selected agricultural competencies,

b)   Location for receiving training for these competencies.

The responses were perceived by students, teacher and employers.

Significance of the Problem

Present day agricultural education programs have changed since their beginning under the Smith-Hughes Act of 1917. It is assumed that agricultural education programs have progressed toward a non-traditional curriculum. Developing this new curriculum incorporated agribusiness with traditional agriculture. This change has forced the implementation of more technical training in secondary agricultural education programs. Cherokee High School in Hawkins County, Tennessee, implemented some of these new technologies. Since 1985, they established a full-time agribusiness program and now offer new courses in ornamental horticulture and Science 1A (Agriculture) to meet the needs of students preparing for occupations in agriculture. Like many agricultural education programs, a decline in enrollment forced changes to the curriculum. These changes, especially the addition of the agribusiness program, necessitated the need for the study. Similar changes have also been made at Volunteer High School, the other high school in Hawkins County.

Purpose and Objectives

The purpose of the study was to determine the relative importance of off-farm agricultural competencies and where these competencies are to be learned as perceived by those involved for the development of these skills. Obtaining this information will help in evaluating the present agribusiness program which is oriented toward off-farm agricultural employment and to make changes if warranted for improving the program. Teachers in Hawkins County have made many changes in the agricultural education program. Research studies of this nature are valuable in assessing the need or effects of such changes. The findings can be used to re-evaluate the curriculum in Hawkins County and other counties with similar demographics. Several elements of the problem were

analyzed in order to derive the objectives of the study. The objectives of the study were to determine:

1. The demographic characteristics of the students, teachers and employers participating in the agricultural cooperative education program in Hawkins County, Tennessee.

2. The types of agricultural-related businesses that are being used as training centers for the agriculture cooperative education program in Hawkins County.

3. The agricultural-related competencies that students, teachers and employers perceive as being needed for students to be employed in agricultural-related businesses.

4. The significant differences among the persons involved in their perceptions to the level of importance of the off-farm agricultural competencies.

5. Places where the students, employers, and teachers perceive that the training for the needed competencies should take place.

Scope and Limitations

The study was limited to all students in Hawkins County, Tennessee, enrolled in agricultural education classes who were working on jobs for their supervised agricultural experience. This included students at both high schools, Cherokee and Volunteer. Some of these students were receiving cooperative credit for their experience. This involved school released time and a formal training plan. Other students were merely working without receiving cooperative credit.

The study was limited to Hawkins County, Tennessee. The researcher felt that a sufficient number of students, employers and teachers were involved in the off-farm agricultural program to validate the study. A total population of all involved in the program was included in the study. The total population of the teachers was limited to only six.

Definition of Terms

Terms used in this study were defined as follows:

1. Competency refers to skills and/or tasks stated in terms of abilities, knowledge, and capabilities that are necessary for performing a job.

2. Cooperative Education refers to an educational program conducted between a school and a business whereby students receive part-time vocational instruction in the school and on-the-job training through part-time employment to develop vocational competencies in agriculture. Students in this program receive cooperative credit units that can be used toward graduation requirements.

3. Employer refers to the owner, manager and/or supervisor of a business or organization that supervises the student-learner or student-worker.

4. On-the-Job Training Centers refers to selected agricultural-related businesses where students in agricultural education can develop employable competencies in their area of study.

5. Off-farm Agricultural Occupations refers to a group of jobs in agriculture that are not involved with direct production of agricultural products even though they may assist in the production process. These occupations require knowledge and skill in several of the following areas: animal science, food technology, agricultural economics and rural sociology, agricultural engineering technology, forestry, and/or ornamental horticulture. They include marketing, processing, selling and servicing of the product produced on the farm.

6. Supervised Agricultural Experience Program refers to a program in agricultural education that consists of all practical agricultural activities of educational value conducted by the student outside of an organized class or on school-released time in which systematic instruction and supervision is provided by the instructor, parents and employer.

7. Student-Learner refers to a student enrolled in a course of study and receiving training in a cooperative vocational education program under the recognized state and local educational authority and who is employed on a part-time basis. The student-learner will be referred to as the student in the text of the study. The student receives credits toward graduation for being enrolled in the program.

8. Student-Worker refers to a student working part-time or employed part-time under one of many arrangements but who is not enrolled in the cooperative training program. The student-worker will be referred to as the student-worker in the text.

9. <u>Teacher-Coordinator</u> refers to an agricultural education teacher who administers the cooperative phase of a vocational education program and whose responsibilities include: teaching the related and technical subject matter relevant to student needs; coordination of classroom instruction with the on-the-job training; and supervision of all learning experiences in the class and the on-the-job training. The teacher-coordinator will be referred to as the teacher in the text.

10. <u>Training Agreement</u> refers to an understanding between the school and place of employment of a student enrolled in a cooperative educational program. This agreement is duly signed by those involved and serves as the official document governing the cooperative program for the school, employer and State Department of Education.

11. <u>Training Plan</u> refers to a list of competencies developed cooperatively by the teacher-coordinator, employer and student-learner indicatory what is to be learned and whether it is to be taught in the classroom and/or on-the-job.

12. <u>Transferable Competencies</u> refers to competencies developed by the student that may be utilized in more than one agricultural-related business.

13. <u>Agricultural Education (Ag. Ed.)</u> refers to the curriculum or program in agriculture designed to offer students at the secondary level the opportunity to explore and prepare for agricultural and other related occupations.

CHAPTER II

REVIEW OF RELATED LITERATURE

The researcher reviewed many years of research materials and found that very few studies were conducted during the past 15 year period on agricultural competencies needed by agricultural education graduates. Most of the studies on competencies were vague or irrelevant to the study.

Since the area of agricultural-related occupations takes in an unlimited scope of occupations, this chapter was divided into eight sections. The introduction of the literature review serves as the first section and the second section reveals general findings from different states about agricultural-related competencies. Computer skills needed for agricultural-related employment are discussed in the third section. Agricultural sales and services, agricultural mechanics, forestry, and ornamental horticulture are discussed in the fourth, fifth, sixth, and seventh sections, respectively. The summary is the last section of the chapter.

Introduction

Agricultural education training in secondary school programs became federally funded with the passage of the Smith-Hughes Act of 1917. This act had provisions for giving training to persons engaged in farming or preparing to enter the farming profession.

Since the establishment of vocational education, agricultural education has encountered various modifications and revisions. The Vocational Education Act of 1963 changed the intent of traditional agricultural education and diversified the training to include all careers in agriculture. Along with a multitude of amendments, the 1963 Act

authorized funding for training in agricultural-related occupational areas of agriculture, including farming. The passage of the Vocational Education Act and its amendments started a surge of research studies during the 1960's about competencies needed in the many different fields of agriculture. The number of these research studies declined during the early seventies; however, a renewed interest of research in these areas of agriculture received new emphasis in the late eighties.

General Business

As one would expect, research studies show considerable diversity among the states in the type of competencies needed for employment in entry-level agricultural-related occupations. Barwick (6) reported 20 percent or 32,776 of the 165,009 employees in Delaware, excluding farming, were employed in businesses and services other than farming in which were believed the employees would find a knowledge of agriculture useful or necessary in their occupations. Stevenson (33) in 1965 found 38 percent of all workers in non-farm agricultural businesses in Oklahoma needed competencies in agriculture. Hoover, McClay and Stevens (16) in 1966 estimated 46 percent of the employees in agricultural-oriented businesses in Pennsylvania needed a knowledge of agriculture. Judge (18) made a study in 1965 of 378 agricultural related firms in Massachusetts and indicated that 63 percent of workers in agricultural business firms needed agricultural competencies and concluded that:

1. There were more off-farm agricultural occupations than trained workers.

2. Employers wanted better trained workers in off-farm agricultural occupations and many desired further training for present workers.

3. Employers were willing to cooperate with schools in occupational programs.

4. A significant number of employers indicated that they preferred on-the-job training for employees.

Judge also found the number of non-farm workers who needed agricultural competencies were greater than the total number of persons engaged in farming. Mondart and Curtis (22) in 1965 indicated an increase of 8 percent in the metropolitan areas of Louisiana compared to Agan's (2) study in Kansas which indicated an increase of 41 percent. Cushman, Christenson, and Bice (11) in 1965 found employers desired high school graduates for 57 percent of full-time employment in non-farm occupations. In a summary of employment competencies Bingham (8), Langdon (20), Morrison (23), and Stevenson (33) indicated in their summaries that 17 percent were employed without a high school education, 18 percent needed various levels of education beyond high school, and eight percent were employed without stipulation on education. They also found that employers prefer workers who have lived or worked on a farm for the non-farm agricultural-related businesses. The findings were also substantiated by other similar studies. Fiscus (13) in 1965 found that workers in farming, in grain elevator businesses, and in agricultural equipment businesses needed competencies in the several different areas of agriculture and were a common core of competencies needed by all workers.

The University of Illinois, College of Agriculture (26), conducted a study of agricultural-related occupations in the area of agricultural business in a five county area. A random sample of these businesses was utilized. It concluded that a majority (77 percent) of the employers preferred agricultural education students as new employees. These students had extensive training in a broad spectrum of agricultural areas.

Shahrokh (29) conducted a study of agricultural-related competencies possessed by seniors in agricultural education in Michigan based on their supervised agricultural occupational programs. A random sample of all public schools offering agricultural

education made up the population. A significant difference was found between farm and off-farm supervised agricultural occupational programs. Students with a school laboratory supervised agricultural occupational program had a higher competency score on work attitudes toward fellow workers than other groups tested in the study.

A staff study at the University of Arizona (39) concluded that common competencies existed across more than one job title area such as, power and machinery, construction and maintenance, and electric power and processing. The job titles were ones that presumed an intense knowledge and/or skills in agricultural mechanics. Employers were randomly selected and interviewed with their responses recorded on a scale for each competency considered important for the job title.

When developing an off-farm agriculture education program in Oliver Springs, Tennessee, Ingram (17) interviewed all of the agriculture businesses in the area to determine the competencies and attitudes needed for entry-level occupations. He concluded that:

1.   Off-farm agricultural cooperative training stations existed in the area.

2.   The participating employers felt a degree of competence was needed in 13 general business skills, 17 agricultural mechanical skills, 13 animal science skills and 16 crop and soil science skills. Twenty-six additional skills were listed as needing special emphasis for employment in agricultural businesses.

3.   The employers felt that a development of personal traits within prospective workers was important and they, along with the school and individual, should share in the task of instilling it within prospective workers.

4.   The employers were willing to help the agricultural education departments plan and carry out an off-farm program.

5.   The employers felt that agricultural education departments have the major role of developing a knowledge of technical agriculture in prospective off-farm employees.

6.   Personality development in off-farm employment was more important than academic and technical skills.

Cheek and McGhee (10) assessed the level of mastery of agribusiness students enrolled in applied principles of agriculture by objectively testing 1,039 students using the Applied Principles Achievement Test (APAT - 60 items) and having 44 teachers to fill out a survey form indicating their assessment of the level of mastery. Fifty-two of the students scored best on questions relating to core components in leadership, agribusiness management and agricultural mechanics. The ninth grade students received lower scores. Seventy-five to 100 percent of the teachers taught 46.5 percent of the competencies and 50 to 74.9 percent of the teachers taught 36.4 percent of the needed competencies.

Stevenson (34) interviewed two thousand people in Oklahoma in 700 businesses with 200 different agricultural occupational titles. He discovered most employers desired employees possessing competencies dealing with skills and personal characteristics. The purpose of his study was threefold:

1. To determine present and future needs in the number of employees.

2. To determine the characteristics desired in employees.

3. To determine the competencies required for initial employment and advancement.

He determined there was a continued need for trained persons to work in agricultural-related companies. The managers of these companies expressed interest and willingness to assist the agricultural education teacher with providing training for future employees.

Norris (25) conducted a study on the manpower needs of Claiborne County, Tennessee. He interviewed 42 businesses with 229 workers which revealed the need for 162 agricultural oriented people for jobs in Claiborne County. Norris concluded that there was a need for better communication between the schools and businesses in order to meet the future training needs due to the shortage of adequately trained persons.

Treadway (37) studied 75 former agricultural education graduates of Hampton High School, Tennessee. Two major reasons were found determining why students of agricultural education were not returning to farms: 1) they preferred a different type of work; and 2) a lack of available land for farms. Treadway also pointed out in his summary that 19 percent of his graduates were farmers, 11 percent were in occupations related to agriculture, and the remaining 70 percent were in occupations unrelated to agriculture. However, 39 of the 75 students found their training in agriculture helpful in their primary occupation.

Taylor (35) conducted a study of the occupational needs of Hawkins County, Tennessee, which presented strong evidence of agricultural-related occupational opportunities. According to the employers, the schools were not doing an adequate job of preparing students for entry-level employment. Taylor stated that 80.61 percent of agricultural-related businesses interviewed recommended on-the-job training to develop the necessary skills. He concluded that a need existed in the county for expanded high school vocational and post-secondary technical programs to meet the occupational needs of the community. He recommended that a committee be instituted by the school board to study county occupational information and to help plan expanded vocationally oriented programs to meet the needs of the county.

Hoover, McClay, and Stevens (16) found in an Off-Farm Agriculture Occupational Study in Pennsylvania that salesmanship, human relations and business management competencies were needed by all employees in varying degrees.

Computer

Newman (24) conducted a study to determine the need for computer skills for entry-level agricultural business employment in Ohio. He found that:

1. Less than half of the agricultural businesses owned a computer.

2. Most agricultural business students were not using computers on the jobs.

3. Teachers perceived computer skills more important for employment than the employers.

4. Using database managers, spreadsheets, and knowledge of basic computer skills were the most important for entry-level employers.

Sales and Servicess

One of the first landmark studies on competencies was conducted by Kennedy (19) and revealed that in the area of sales and services, a dairy fieldman should be aware of 82.2 percent of the operations performed; understand how 54.2 percent are preformed; and be able to perform 19.6 percent of the operation conducted by the dairy farmer to be effective in performing his job. A nursery salesperson would need to be aware of 46.6 percent of the operations related to plant science, in contrast to no animal science competencies. An accountant in a farmer coop should understand 34.5 percent of the competencies in agricultural economics and be aware of one-third of all other operations performed in the business. Thus, Kennedy concluded that many agricultural-related occupations require different levels of agriculture competencies to perform the job.

Schumacher (28) studied eight different agricultural-related industries in North Dakota during 1984 to determine their employment needs and future trends. He found an increasing need for agricultural training in the next few years for meat processing and agricultural finance.

Gray (14) determined in his study on competencies in sales and services that this area should be taught as part of the agricultural education curriculum at Dongola Illinois High School and that 43 of the 245 work competencies were important. The

findings were determined by conducting a personal interview with all the agricultural sales and/or service businesses in Union County, Illinois.

A study of feed, seed, and grain entry-level competencies was conducted by Bigo (7) to identify the differences between agriculture education and industries ideas for entry-level employment. Surveys were mailed and completed by 49 or 70 percent teachers and 98 or 70 percent industry personnel. Agricultural education teachers and industry personnel both rated high the non-technical and safety competencies but disagreed on the level of instruction of sales and credit technical competencies.

Ambrosia (3) evaluated the competencies which should be taught to potential workers in the grain elevator industry in Illinois. He personally interviewed a stratified and selected sample of grain elevator operators. Using a list of one hundred and twenty competencies, it was determined that:

1. Twenty-three of the competencies were being performed by beginning workers.

2. Fifty-eight of the competencies were being performed by advanced workers.

3. Thirty-nine of the competencies were being performed by managers or owners.

Ambrosia recommended the 23 competencies performed by beginning employees should be taught at the high school level and the other two levels be taught at community colleges or universities.

Henry (15) studied agricultural suppliers and services employers to determine the competencies needed for entry-level employment in Maryland. A packet of information including a survey was mailed to 66 agribusinesses and 38 agricultural education teachers. The agricultural education teachers ranked the competencies higher than the employers; however, 20 competencies did have a significant difference in ranking between the agricultural education teachers and the agribusiness managers .

Van Loh (368) determined from 120 retail fertilizer distribution firms that successful job performance was dependent upon the understanding of agricultural competencies by the employees.

Agricultural Mechanics

Adams (1), in North Carolina, determined the occupational competencies needed for entry-level employment in agricultural mechanics. Adams mailed surveys to a ten percent random sample consisting of 100 North Carolina power and equipment dealerships in the area. The study found that among the 278 agricultural mechanic competencies which students should possess to gain employment in the area of agricultural mechanics were reading, listening, and following directions. He concluded that the two major competency areas were related to the area of safety practices and secondly to diesel and gasoline engines. Stocking self-service shelves were the only competency being irrelevant out of the 278 agricultural mechanics competencies.

A study conducted in Utah compared the employee demand and job-entry requirement in the farm implement industry. The study was a replication of a 1981 study. Spiclmaker (32) determined that competencies in safety and knowledge of OSHA standards had increased in the 1985 study with safety having the highest mean score average. Two of the 16 competencies with the highest mean scores were in the areas of agricultural business and the ability to read and write.

Anderson and Iha (4) conducted a study of 25 agribusiness firms in North-Central Colorado. The purpose of the study was to find the relationships between the occupational area and agricultural mechanical skills. The findings of the study showed a strong relationship between farm machinery areas of sales and service and processing agricultural products; however, a relatively low relationship was found existing

between mechanics skills needed in agricultural supplies, sales and services, and in horticultural sales and services.

<u>Forestry</u>

Shepard (30) conducted a study to validate and identify competencies needed for entry-level and advancement in forestry occupations in Mississippi. He determined that 25 of the 49 competencies were ranked important or above. Competencies dealing with management and technical skills were rated important and routine maintenance and timber products management were rated of some importance.

<u>Ornamental Horticulture</u>

Bahen (5) conducted a study in Utah using a random sample (38 percent) or 576 ornamental horticulture enterprises with a 20 percent response rate to present descriptive data about the industry and determined the competencies needed for a job entry into the ornamental horticulture industry. Ninety-two of the 94 competencies were rated having at least some importance with the highest rating common to all business being:

1. Human relations and communications,

2. Pest identification and control,

3. Record keeping,

4. Safety.

Dillon and Phipps (12) interviewed many of the licensed nurseries and horticultural enterprises on competencies needed by their workers. They concluded that basic courses could be offered for all job titles but with varying lengths on instruction.

Shry (31) developed an educational program for ornamental horticulture that built on the basis of competencies deemed important by horticulture businessmen. He contacted 100 nurserymen to gather information for his study. He found that most

employers preferred new employees who had instruction and work experience in ornamental horticulture. Shry found that the prospective employees needed extensive training in the following competencies:

1.   Identification of plants identification of plant diseases and insects,

2.   Propagation of plants from cuttings and seeds,

3.   Grafting and budding,

4.   Selection of soils,

5.   Lawn care and maintenance,

6.   Planting and pruning properly,

7.   Forcing plants.

He also determined that prospective employees needed general training in the following competencies: weed control, digging, pruning and transplanting ornamentals, growing house plants in greenhouses, growing vegetable plants, caring for cut flowers, arranging flowers, growing bulbs and corms, growing annuals and perennials, soil sterilization, compost and manures, mixing soluble fertilizers, potting soil mixtures and watering plants. Additional competencies that were also stressed were as follows: horticultural mechanics, basic landscaping, land surveying, business techniques, and operation and maintenance of engines and machinery.

SUMMARY

Competency based instruction has always been one of the fundamentals for agricultural education in the secondary level. It provides one of the many capillaries for agricultural education. A review of the literature shows that the exploration of these capillaries was pendulous during the seventies and eighties. However, a rejuvenated interest in competency based instruction has occurred in the late eighties.

With the expansion and variety of related agricultural occupations, the review of studies showed that the schools were not meeting the needs of their students where competencies were required for employment in off-farm agricultural occupations. This was particularly true in areas such as agricultral sales and services, agricultural mechanics, ornamental horticulture, and others.

CHAPTER III

METHODOLOGY

This chapter is divided into five sections. The major tasks in conducting the study are listed in the first section; population and sample of the study are listed in the second section; development and field testing of the instruments are presented in the third section. The procedures used in collecting the data are discussed fourth, and the statistical procedures used in testing the data are outlined in the fifth section.

The Major Tasks of the Study

The study contained five major tasks:

1. Identifying the sample population from the cooperative agriculture education program in Hawkins County, Tennessee.

2. Developing the survey instruments for collecting demographic and competency data from the students, employers, and instructors.

3. Field testing the instruments to check clarity, accuracy, and validity of the instruments.

4. Procedure for collecting the data.

5. Programming the computer and processing the data.

Population and Samples

The study was limited to the Agricultural Education Cooperative Education Program in the Hawkins County School System, Hawkins County, Tennessee, during the 1988-89 academic year. The total population of the study consisted of 75 students enrolled in agricultural education, 24 employers/supervisors in the cooperative education training centers, and six agricultural education teachers who were involved in the program.

The sample for the study was compiled from two formal school documents available to the researcher. These documents included the agricultural education registration roll and training plans that were on file in the two schools. All students involved in the program comprised the sample.

Instrumentation

There were three instruments developed for the study. A copy of each instrument is located in appendix B. The instruments were developed by the researcher after reviewing related studies on cooperative education programs. The instruments were in the form of a questionnaire. The first part of the questionnaire dealt with the demographic data of the students, training centers, and teachers. The second part, a Likert-type questionnaire, determined the needed competencies for employment in agricultural-related businesses. The competencies were rated using two different scales. The first scale allowed the participant to determine the intensity for each competency. The scale included the following factors to determine the need for each competency: (1) little to none; (2) some; (3) much; (4) very much need; and (5) not applicable. The second part of the scale indicated the location in which the competency should be taught using (1) for school, (2) for both school and work, (3) for work, and (4) for not applicable.

Upon approval from the Human Subjects Committee, the instruments were field tested in McMinn County, Tennessee. The field test site had similar demographic and educational background as the county being studied. This helped increase the validity of the study. The field test included 25 agricultural education students participating in supervised agricultural experience programs, two employers, and two agricultural education instructors. All participants were randomly selected to participate in the field test.

After completion of the field test, some changes were made to the instruments, more specific competencies were added to each sub-area on each instrument. The rating scale of the competencies were changed to 1 = little to none, 2 = some, 3 = much, 4 = very much, and 5 = not applicable and for the place of training to 1 = school, 2 = both school and work, 3 = work, and 4 = not applicable.

Procedure

After consideration of the need for the study with leaders in agricultural education in Tennessee, the instruments were developed and tested to collect valid data. Contacts were made with the appropriate school officials in Hawkins County about the feasibility for collecting data in that school system. A letter written by the researcher's major professor and a copy of the proposal were sent to the Hawkins County Superintendent of Schools requesting permission to conduct the study in that county, Cherokee and Volunteer High Schools.

The proposal and instruments were reviewed by the superintendent of schools and Hawkins County Board of Education and approval for the study was granted. A copy of the instruments, purpose of the study, and approval from Hawkins County Board of Education were sent to the Human Subjects Committee at the University of Tennessee for approval of the instruments and study.

The researcher scheduled meetings with the superintendent, vocational director, principals, and agricultural education teachers to explain the purpose and procedures to be followed during the data collecting process. A letter of consent was distributed to each student participating in a supervised agricultural experience program in the county by the researcher. The letter of consent included a brief summary of the purpose of the study. Once all necessary signatures were secured, a letter requesting participation in the study was delivered to each student's employer by the student. Employer's name,

address, and telephone number were obtained from students. Appointments were scheduled via telephone with each employer. This allowed the researcher to hand deliver and collect the employer's instrument and provide both oral and written directions to ensure a 100 percent participation rate by the employers. Student's and teacher's questionnaires and directions were distributed during the student's agricultural education class by the researcher to ensure correct completion of the instruments.

The researcher collected all data while in the school system. All information collected was considered confidential due to the nature of the data collected. The study involved the total agricultural education cooperative education program in Hawkins County School System and information collected was not associated in any way to any student, employer, or agricultural education teacher involved in the study.

Statistical Procedures

The data gathered by the researcher were computed by the University of Tennessee Computing Center on the Agricultural Campus. Descriptive statistics (mean and percentages) were used to summarize the demographic data and the perception of the location of training for each competency. Duncan's Multiple Range Test was used as the post hoc test for significant differences among the perceived competencies needed for entry-level employment.

The means were calculated according to the designated number for the assigned ability level (1 = little to none, 2 = some, 3 = much, 4 = very much). If a participant selected "not applicable" by rating a number five, this was not used in the means calculation. The same procedure was used in selecting the most desired place for receiving the training of the competencies (1 = school, 2 = both school and work, 3 = work). A rating of four, "not applicable", was not used in calculating the percentage.

Only the competencies, which showed a significant difference at the .05 level between the means of the designated groups, were treated by Duncan's Multiple Range Test. This located where the significant differences existed between the groups. The groups with the higher calculated mean rated that specific competency as being more important. A lower rated mean score indicated that the group felt that the competency was not as important.

CHAPTER IV

PRESENTATION OF DATA AND FINDINGS

This chapter presents findings regarding competencies needed for entry-level employment in agricultural-related occupations as perceived by students, employers and teachers that participated in the agricultural cooperative education program in Hawkins County, Tennessee. Raw data were collected, analyzed, and reported for four groups of participants. These groups included: 1) student-learners; 2) student-workers; 3) employers; and 4) teachers.

Chapter IV is divided into three sections. Selected demographic data for each of the group are discussed in the first section. The second section presents the findings regarding the importance of the competencies for securing gainful employment in agricultural-related occupations as perceived by the groups. These competencies are organized into four subsections as follows: 1) General Business; 2) Animal Science; 3) Agricultural Mechanics; and 4) Crop and Soil Science. The training locations for these competencies needed for entry-level employment in agricultural-related occupations as perceived by each group are presented in section three. The training locations (school, work, or both school and work) for the competencies are organized into four subsections as follows: 1) General Business; 2) Animal Science; 3) Agricultural Mechanics; and 4) Crop and Soil Science.

Demographic Data

Demographical characteristic of the students enrolled in agricultural education classes during the 1988-89 school year in Hawkins County, Tennessee, are shown in Table 1. Two types of cooperative education placements were offered to the students in

TABLE 1.   Demographic Data of the Students Participating in the Agricultural Cooperative Programs in Hawkins County, Tennessee

Characteristics	(N=75) Number	Percent
School Attending:		
Cherokee	57	76.0
Volunteer	18	24.0
TOTAL	75	100.0
Year in school		
Freshman	0	0.0
Sophomore	13	17.3
Junior	9	12.0
Senior	53	70.7
TOTAL	75	100.0
Type of placement		
Coop (Student-learners)	37	49.3
Non-Coop (Student-workers)	38	50.7
TOTAL	75	100.0
Year(s) enrolled in Agricultural Education		
One Year	33	44.0
Two Years	23	30.7
Three Years	11	14.6
Four Years	8	10.7
TOTAL	75	100.0
Which best describes your background		
Farm	27	36.0
Rural {non-farm}	41	54.7
Urban or Suburban	7	9.3
TOTAL	75	100.0

TABLE 1.   (Continued)

Characteristics	(N=75) Number	Percent
Who found your present job		
Self	53	70.7
Teacher	5	6.7
Other	17	22.6
TOTAL	75	100.0
Time with current employer		
One to Three Month(s)	22	29.3
Four to Six Months	9	12.0
Seven to Nine Months	17	22.7
Ten months or More	27	36.0
TOTAL	75	100.0
Hours work per week		
Less than 10	6	8.0
10-20	29	38.6
21-30	28	37.3
31 and over	12	16.1
TOTAL	75	100.0

Hawkins County, Tennessee. The first one being cooperative education for credit defined as student-learners and the second being cooperative education for on-the-job training defined as student-workers. The student-learners received cooperative education credit to be applied toward graduation requirement and student-workers received on-the-job training without credit. The cooperative education program at Cherokee High School had both student-learners and student-workers; where as, Volunteer High School had only student-workers. There were 75 students that participated in the study with 37 of these being student-learners and 38 being student-workers. Fifty-seven (76 percent) of these students attended Cherokee High School while 18 (24 percent) attended Volunteer High School. The cooperative education programs were offered to all agricultural education students except freshmen. The breakdown of these students by grade are as follows: 13 (17.3 percent) were sophomores; nine (12.0 percent) were juniors; and 53 (70.7 percent) were seniors. Among these 33 (44.0 percent) were enrolled in agricultural education only one year; 23 (30.7 percent) were enrolled in agricultural education for two years; 11 (14.6 percent) were enrolled in agricultural education for three years; and eight (10.7 percent) were enrolled in agricultural education for four years. Twenty-seven (36.0 percent) of the students were from a farm background while 51 (54.7 percent) being from a rural, non-farm, background and seven (9.3 percent) being of an urban or suburban background. Fifty-three (70.7 percent) of the students were employed on their own efforts while five (6.7 percent) relied on the teachers for finding them employment and 17 (22.6 percent) relied on others to help them secure employment. Length of employment varied between the students. There were 22 (29.3 percent) of the students that had worked with their current employer for the period of one to three months. Nine (12.0 percent) of the students had been with their current employer for 4 to 6 months and 17 (22.7 percent)

had been with their current employer 7 to 9 months. The majority of the students 27 (36.0 percent) had been employed with their current employer for 10 or more months. The students working hours were classified into four different categories which follows: a) Less than 10; b) 10 to 20; c) 21 to 30; and d) 31 or more. Of these categories six (8.0 percent) worked less than 10 hours per week; 29 (38.6 percent) worked 10 to 20 hours per week; 28 (37.3 percent) worked 21 to 30 hours per week; and 12 (16.1 percent) worked 31 or more hours per week.

One of the objectives of the study was to determine the characteristics of the employers participating in the agricultural cooperative education program in Hawkins County, Tennessee. These data are shown in Table 2. The businesses were placed into four categories according to the years of operation. Three (12.5 percent) were in operation from one to three years; one (4.2 percent) was in operation from 4 to 6 years; two (8.3 percent) were in operation from 7 to 9 years; and 18 (75 percent) were in operation for 10 or more years.

The supervisors of the agricultural students were classified into four groups according to years with the current business. Four (16.7 percent) had been with the company 1 to 3 years; four (16.7 percent) had been with the company from 4 to 6 years; three (12.5 percent) had been with the company from 7 to 9 years; and 13 (54.1 percent) had been with the company for 10 or more years.

The supervisors were also divided into four groups according to the number of employees supervised annually. Six (25 percent) supervised one to four employees; four (16.0 percent) supervised 5 to 9 employees; six (25 percent) supervised 10 to 12 employees; and eight (33.5 percent) supervised 13 or more employees.

Among these supervisors eight (33.3 percent) have supervised agricultural education students for 1 year or less; three (12.5 percent) have supervised

TABLE 2. Demographic Data of the Training Centers and Supervisors of Agricultural Education Students Participating in the Study

Characteristics	(N=24) Number	Percent
Years in operation		
1 to 3 year(s)	3	12.5
4 to 6 years	1	4.2
7 to 9 years	2	8.3
10 years or more	18	75.0
TOTAL	24	100.0
Years employed in this business		
1 to 3 year(s)	4	16.7
4 to 6 years	4	16.7
7 to 9 years	3	12.5
10 years or more	13	54.1
TOTAL	24	100.0
Number of employees supervised		
1 - 4	6	25.0
5 - 9	4	16.5
10 - 12	6	25.0
13 or more	8	33.5
TOTAL	24	100.0
Supervising agricultural education students		
1 year or less	8	33.3
2 years	3	12.5
3 years	4	16.7
4 years	0	0.0
5 years or more	9	37.5
TOTAL	24	100.0
Background of supervisor		
Farm	8	33.4
Rural {non-farm}	8	33.3
Urban or Suburban	8	33.3
TOTAL	24	100.0

TABLE 2.   (Continued)

Characteristics	(N=24) Number	Percent
Previously employed in Agricultural-Related Business		
No	1 2	50.0
Yes		
1 year	1	4.1
2 years	2	8.3
3 years	0	0.0
4 years	2	8.3
5 years or more	7	29.3
TOTAL	24	100.0
Formal training in agriculture		
No	8	33.3
Yes		
High School	7	29.1
College	5	20.8
State Area Vocational School or Center	2	8.3
Other	2	8.3
TOTAL	24	100.0

agricultural education students for 2 years; four (16.7 percent) have supervised agricultural education students for 3 years; and nine (37.5 percent) have supervised agricultural education students for 5 or more years.

Eight (33.4 percent) of the supervisors were from a farm background; eight (33.3 percent) from a rural, non-farm, background; eight (33.3 percent) from an urban or suburban background. Among these only 12 (50.0 percent) had no previous experience in an agricultural-related business; one (1.2 percent) had 1 year of experience; two (8.3 percent) had 2 years experience; two (8.3 percent) had 4 years experience; and seven (29.2 percent) had 5 or more years experience.

Seven (29.9 percent) had no formal training in agriculture while four (16.7 percent) had training only in high school; three (16.7 percent) had training in college; one (4.2 percent) in state area vocational schools; and one (4.2 percent) from another institution.

Data in Table 3 show the type of services provided by the training centers participating in the agricultural cooperative education program in Hawkins County, Tennessee. There were six different types of services provided by these businesses. Some of these businesses provided more than one type of service.

There were three (1.8 percent) classified as factory production; 23 (13.9 percent) as processing; 45 (27.3 percent) as retail; 71 (43.0 percent) as sales and/or services; 15 (9.2 percent) as wholesale; and eight (4.8 percent) as horticultural.

Demographical data of the teachers employed by Hawkins County School System are presented in Table 4. Hawkins County School System employed six agricultural education teachers and offered agricultural education in two of the three high schools. Cherokee had four (66.7 percent) while Volunteer had two (33.3 percent) of the

TABLE 3.   Services Provided By The Training Centers

Type of Service	Number*	Percent
Production (Factory)	3	1.8
Processing	23	13.9
Retail	45	27.3
Sales and/or Services	71	43.0
Wholesale	15	9.2
Horticultural	8	4.8
Total	165	100.0

* Some Training Centers Are Classified In More Than One Service Area.

TABLE 4.   Demographic Data of the Agricultural Education Teachers

Characteristics	(N=6) Number	Percent
School taught		
Cherokee	4	66.7
Volunteer	2	33.3
· TOTAL	6	100.0
Years of teaching		
1 to 3 year(s)	0	0.0
4 to 6 years	1	16.7
7 to 10 years	0	0.0
11 years or more	5	83.3
TOTAL	6	100.0
Years teaching Coop		
Do not teach Coop	4	66.7
1 to 3 year(s)	0	0.0
4 to 6 years	1	16.7
7 to 10 years	1	16.7
11 years or more	0	0.0
TOTAL	6	100.0
Years teaching Non-Coop		
1 to 3 year(s)	1	16.7
4 to 6 years	0	0.0
7 to 10 years	1	16.7
11 years or more	4	66.7
TOTAL	6	100.0
Level of education		
B.S	1	16.7
M.S.	3	50.0
M.S. plus 45 hours	2	33.3
Ed.S.	0	0.0
TOTAL	6	100.0

TABLE 4.   (Continued)

Characteristics	(N=6) Number	Percent
Years employed in an agricultural-related business		
No	2	33.3
Yes		
1 year	1	16.7
2 years	1	16.7
3 years	0	0.0
4 years	0	0.0
5 years or more	2	33.3
TOTAL	6	100.0
Background		
Farm	6	100.0
Rural {non-farm}	0	0.0
Urban or Suburban	0	0.0
TOTAL	6	100.0
Supervising students		
Hours spent per year		
Zero to 100	1	16.7
101 to 500	2	33.3
501 to 1000	2	33.3
1001 and Over	1	16.7
TOTAL	6	100.0
Miles traveled per year		
Zero to 100	1	16.7
101 to 500	0	0.0
501 to 1000	1	16.7
1001 and Over	3	66.6
TOTAL	6	100.0

agricultural education teachers. All six (100 percent) of the agricultural education teachers were from a farm background.

Only one (16.7 percent) of the teachers had taught for a period of 4 to 6 years while five (83.3 percent) have taught for a period of 11 or more years. Four (66.6 percent) of the teachers did not teach cooperative education for credit while one (16.7 percent) has taught cooperative education for credit for 4 to 6 years and one (16.7 percent) has taught it for a period of 7 to 10 years.

The level of education for the agricultural education teachers varied from a B.S. to a M.S. plus 45 hours. One (16.7 percent) had at least a B.S. degree while three (50.0 percent) had received a M.S. degree and two (33.3 percent) had obtained 45 hours above a masters degree.

Two (33.3 percent) of the six agricultural education teachers have never been employed in an agricultural-related business. Among the other agricultural education teachers one (16.7 percent) has been employed in an agricultural-related business for 1 year and one (16.7 percent) for 2 years. Two (33.3 percent) have been employed in an agricultural-related business for 5 or more years.

Each group of students requires supervision on the cooperative education program. One (16.7 percent) of the teachers spent up to 100 hours supervising his students. Two (33.3 percent) of the teachers spent from 101 to 500 hours supervising their students. Two (33.3 percent) of the teachers spent from 501 to 1000 hours supervising their students. One (16.7 percent) of the teachers spent over 1000 hours supervising his students.

Miles traveled supervising students varied among the teachers. Mileage was divided into four categories: 0 to 100; 101 to 500; 501 to 1000; and over 1000. The teachers rating on mileage devoted to supervision were: one (16.7 percent) traveled 0

to 100 miles; one (16.7 percent) traveled 501 to 1000 miles; and three (66.7 percent) traveled over 1000 miles.

Importance of the Competencies

This section presents the findings regarding the importance of the competencies to secure gainful employment in agricultural-related occupations as perceived by the students, teachers, and employers. These competencies are organized into four subsections as follows: 1) General Business; 2) Animal Science; 3) Agricultural Mechanics; and 4) Crop and Soil Science.

One way independent analysis of variance was used in analyzing the data for each group of participants. The probability level of .05 was used to determine significant differences among the perceived competencies.

General Business Competencies. This subsection presents findings regarding the respondents perceptions of the importance of 25 general business competencies needed for gainful employment in agricultural-related occupations in Hawkins County, Tennessee. Findings for this subsection is summarized in Table 5.

Twenty-five general business competencies were evaluated by the four groups of respondents: student-learners, student-workers, employers, and teachers. Scores given for the 25 competencies indicated the level of importance for each competency for securing entry level employment as perceived by the respondents. A score of 1.00 indicated little or no importance. A score of 2.00, 3.00 or 4.00 indicated that the competency was some, much, or very much important, respectively. A rating of 5.00 indicated not applicable and was not used in calculating the mean score.

TABLE 5. One Way Independent Analysis of Variance of 25 General Business
Competencies Needed for Gainful Employment in Agricultural-Related
Occupations as Perceived by Students, Employers, and Teachers†

Competencies		(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Apply Principles of Salesmanship*					
	MEANS	3.212	2.300	2.727	4.000
F = 6.533	df = 3, 90	p = 0.001			
Care for Tools and Equipment					
	MEANS	3.303	3.177	3.348	4.000
F = 1.507	df = 3, 95	p = 0.218			
Complete Records and Reports*					
	MEANS	2.920	2.172	2.708	3.167
F = 2.982	df = 3, 83	p = 0.036			
Direct or Supervise Others					
	MEANS	2.231	2.036	2.261	2.333
F = 0.271	df = 3, 82	p = 0.850			
Display Merchandise					
	MEANS	3.107	2.6 13	2.474	2.667
F = 1.928	df = 3, 83	p = 0.132			
Drive a Car or Travel Safely					
	MEANS	3.581	3.387	3.059	3.000
F = 1.240	df = 3, 84	p = 0.301			
Evaluate Credit Risk of Customer					
	MEANS	2.667	2.650	2.167	2.000
F = 1.105	df = 3, 66	p = 0.354			
File Records and Reports					
	MEANS	2.526	1.957	2.636	2.667
F = 1.615	df = 3, 69	p = 0.194			

TABLE 5.   (Continued)

Competencies		(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Follow Instructions					
	MEANS	3.703	3.667	3.739	4.000
F = 0.492	df = 3, 98	p = 0.689			
Inventory Merchandise					
	MEANS	2.654	2.733	3.000	3.167
F = 0.693	df = 3, 82	p = 0.559			
Keep Record of Sales and Expenses					
	MEANS	2.750	3.095	2.556	3.500
F = 1.543	df = 3, 68	p = 0.212			
Maintain Good Housekeeping					
	MEANS	3.071	2.851	3.409	3.833
F = 2.392	df = 3, 82	p = 0.075			
Maintain Good Personal Appearance					
	MEANS	3.567	3.389	3.478	3.667
F = 0.466	df = 3, 101	p = 0.706			
Make Bank Deposits					
	MEANS	2.762	1.900	2.578	2.800
F = 2.107	df = 3, 64	p = 0.109			
Make Mathematical Calculation Accurately					
	MEANS	3.200	2.862	3.476	3.667
F = 2.152	df = 3, 90	p = 0.100			
Make Out Sales Receipts*					
	MEANS	3.333	2.385	3.056	3.500
F = 3.300	df = 3, 73	p = 0.025			

TABLE 5.   (Continued)

Competencies		(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Meet the Public*					
	MEANS	3.838	3.371	3.783	3.667
F = 3.927	df = 3, 100	p = 0.011			
Use Cash Register, Adding Machine, Scales, etc. *					
	MEANS	3.657	2.692	3.476	2.833
F = 5.352	df = 3, 87	p = 0.002			
Basic Knowledge of Computer Skills*					
	MEANS	2.870	1.917	2.478	2.667
F = 3.060	df = 3, 75	p = 0.034			
Use Correct English					
	MEANS	3.351	3.029	3.087	3.500
F = 1.276	df = 3, 99	p = 0.287			
Write Legibly*					
	MEANS	3.400	2.875	3.522	3.333
F = 3.218	df = 3, 95	p = 0.026			
Use Good Telephone Procedures					
	MEANS	3.556	3.200	3.522	3.333
F = 1.057	df = 3, 94	p = 0.371			
Properly Display Seasonal Stock					
	MEANS	3.048	2.615	2.562	2.833
F = 0.777	df = 3, 68	p = 0.511			
Rotate Stock					
	MEANS	3.080	2.643	3.063	2.833
F = 0.855	df = 3, 74	p = 0.469			

TABLE 5.   (Continued)

Competencies		(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Properly Filling Out Job Applications					
	MEANS	3.500	3.133	2.895	3.667
F = 2.228	df = 3, 86	p = 0.091			

† Participants rating the competency not applicable with a mean score of 5 were not used in calculating the mean scores.

* Significant difference at .05 level.

The mean score for each of the 25 general business competencies are shown in Table 5. The scores are shown as rated by each group of respondents. The mean scores were tested for each of the 25 competencies using a one way analysis of variance to determine significant differences at the .05 level. The Duncan's Multiple Range Test was used as the post hoc test to determine where the significant differences were between the four groups of respondents.

As shown in Table 5, teachers rated 19 of the 25 general business competencies higher than the student-learners, student-workers, and employers. The student-learners rated nine competencies higher than the other groups of respondents, the employers only rated one, and the student-workers did not rate any competencies higher than any other group of respondents. The ratings were based upon mean scores, indicating the relative importance of each.

There were seven general business competencies where there was a significant difference among the means of the different groups of respondents. These differences are identified in the respective analysis of variance tables and their corresponding Duncan's Multiple Range Tests.

The first was "Apply Principles of Salesmanship", shown in Table 6. The response difference was significant at the .05 level. The multiple range test for this competency is shown in Table 7. Significant mean differences existed between teachers (group 4), and employers (group 3), teachers (group 4) and student-workers (group 2), and student-learners (group 1) and student-workers (group 2). The mean for the teachers was 4.000; student-learners, 3.212; employers, 2.727; student-workers, 2.300.

TABLE 6.   Analysis of Variance of General Business Competency, "Apply Principles of Salesmanship", Needed for Employment in Agricultural-Related Occupations

Source	df	ss	MS	F	p
Between Groups	3	21.667	7.225	6.533	.001
Within Groups	87	56.179	1.106		
TOTAL	90	117.846			

TABLE 7.   Duncan's Multiple Range Test for General Business Competency, "Apply Principles of Salesmanship", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Student Learners	Employers	Student Workers
Group Number	4	1	3	2
Mean	4.000	3.212	2.727	2.300

Tested at the .05 level

Significant mean score differences existed between groups 4 and 3, 4 and 2, and 2 and 1.

Analysis of variance for the general business competency, "Complete Records and Reports", is shown in Table 8. The response difference was significant at the .05 level. The multiple range test for this competency is shown in Table 9. Significant mean differences was between student-learners (group 1) and student-workers (group 2). The mean for the student-learners was 2.920; teachers, 3.167; employers, 2.708; student-workers, 2.172. There was no significant difference at the .05 level between the teachers' mean of 3.167 and student-workers' mean of 2.172. This was due to the liberties of the Duncan's Multiple Range Test in calculating the response of a small number of teachers. In the study there was a disapportionment between the number of teachers and students making most statistical test difficult.

Analysis of variance for the general business competency, "Make Out Sales Receipts", is shown in Table 10. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 11. A significant mean difference existed between teachers (group 4), and student-workers (group 2). The mean for the teachers was 3.500; student-learners, 3.333; employers, 3.056; student-workers, 2.385.

Analysis of variance for the general business competency, "Meet the Public", is shown in Table 12. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 13. A significant mean difference existed between student-learners (group 1) and student-workers (group 2), employers (group 3) and student-workers (group 2). The mean for the student-leaners was 3.838; employers, 3.783; teachers, 3.667; student-workers, 3.371.

TABLE 8.   Analysis of Variance for General Business Competency, "Complete Records and Reports", Needed for Employment in Agricultural-Related Occupations

Source	df	ss	MS	F	p
Between Groups	3	10.040	3.347	2.982	.036
Within Groups	80	89.770	1.122		
TOTAL	83	99.810			

TABLE 9.   Duncan's Multiple Range Test for General Business Competency, "Complete Records and Reports", Needed for Employment in Agricultural-Related Occupations

Group	Student Learners	Teachers	Employers	Student Workes
Group Number	1	4	3	2
Mean	2.920	3.167	2.708	2.172

Tested at the .05 level

Significant mean score differences existed between groups 1 and 2.

TABLE 10. Analysis of Variance for General Business Competency, "Make Out Sales Receipts", Needed for Employment in Agricultural-Related Occupations

Source	df	SS	MS	F	p
Between Groups	3	13.852	4.617	3.300	.025
Within Groups	7 0	97.932	1.399		
TOTAL	7 3	111.784			

TABLE 11. Duncan's Multiple Range Test for General Business Competency, "Make Out Sales Receipts", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Student Learners	Employers	Student Workers
Group Number	4	1	3	2
Mean	3.500	3.333	3.056	2.385

Tested at the .05 level

Significant mean score differences existed between groups 4 and 2.

TABLE 12. Analysis of Variance for General Business Competency, "Meet the Public", Needed for Employment in Agricultural-Related Occupations

Source	df	ss	MS	F	p
Between Groups	3	4.427	1.476	3.927	.011
Within Groups	9 7	36.445	0.376		
TOTAL	1 0 0	40.872			

TABLE 13. Duncan's Multiple Range Test for General Business Competency, "Meet the Public", Needed for Employment in Agricultural-Related Occupations

Group	Student Learners	Employers	Teachers	Student Workers
Group Number	1	3	4	2
Mean	3.838	3.783	3.667	3.371

Tested at the .05 level

Significant mean score differences existed between groups 2 and 3 and 2 and 1.

Analysis of variance for the general business competency, "Use Cash Register, Adding Machine, Scales, etc.", is shown in Table 14. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 15. Significant mean differences existed between student-learners (group 1) and student-workers (group 2), and employers (group 3) and student-workers (group 2). The mean for the student-learners was 3.657; employers, 3.476; teachers 2.833; student-workers, 2.692.

Analysis of variance for the general business competency, "Basic Knowledge of Computer Skills", is shown in Table 16. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 17. Significant mean differences existed between student-learners (group 1) and student-workers (group 2), and teachers (group 4) and student-workers (group 2). The mean for the student-learners was 2.870; teachers, 2.667; employers, 2.478; student-workers, 1.917.

Analysis of variance for the general business competency, "Write Legibly", is shown in Table 18. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 19. Significant mean differences existed between employers (group 3) and student-workers (group 2), and student-learners (group 1) and student-workers (group 2). The mean for the employers was 3.522; student-learners 3.400;teachers 3.333; student-workers, 2.875.

Animal Science Competencies. This section presents findings regarding the perception of importance of 22 animal science competencies needed for gainful employment in agricultural-related occupation in Hawkins County, Tennessee.

TABLE 14. Analysis of Variance for General Business Competency, "Use Cash Register, Adding Machine, Scales, etc.", Needed for Employment in Agricultural-Related Occupations

Source	df	ss	MS	F	p
Between Groups	3	15.959	5.320	5.352	.002
Within Groups	8 4	83.496	0.994		
TOTAL	8 7	99.455			

TABLE 15. Duncan's Multiple Range Test for General Business Competency, "Use Cash Register, Adding Machine, Scales, etc.", Needed for Employment in Agricultural-Related Occupations

Group	Student Learners	Employers	Teachers	Student Workers
Group Number	1	3	4	2
Mean	3.657	3.476	2.833	2.692

Tested at the .05 level

Significant mean score differences existed between groups 2 and 3 and 2 and 1.

TABLE 16.   Analysis of Variance for General Business Competency, "Basic Knowledge Of Computer Skills", Needed for Employment in Agricultural-Related Occupations

Source	df	ss	MS	F	p
Between Groups	3	11.157	3.719	3.060	.034
Within Groups	7 2	87.515	1.216		
TOTAL	7 5	98.672			

TABLE 17.   Duncan's Multiple Range Test for General Business Competency, "Basic Knowledge of Computer Skills", Needed for Employment in Agricultural-Related Occupations

Group	Student Learners	Teachers	Employers	Student Workers
Group Number	1	4	3	2
Mean	2.870	2.667	2.478	1.917

Tested at the .05 level

Significant mean score difference existed between groups 1 and 2 and 4 and 2.

TABLE 18. Analysis of Variance for General Business Competency, "Write Legibly", Needed for Employment in Agricultural-Related Occupations

Source	df	ss	MS	F	p
Between Groups	3	7.028	2.343	3.218	.026
Within Groups	9 2	66.973	0.728		
TOTAL	9 5	74.001			

TABLE 19. Duncan's Multiple Range Test for General Business Competency, "Write Legibly", Needed for Employment in Agricultural-Related Occupations

Group	Employers	Student Learners	Teachers	Student Workers
Group Number	3	1	4	2
Mean	3.522	3.400	3.333	2.875

Tested at the .05 level

Significant mean score differences existed between groups 1 and 2 and 4 and 2.

Twenty-two animal science competencies were evaluated by the four groups of respondents: student-learners, student-workers, employers, and teachers. Scores given for the 22 competencies indicated the level of importance for each competency for securing entry level employment as perceived by the respondents. A score of 1.00 indicated little or no importance. A score of 2.00, 3.00, or 4.00 indicated some, much or very importance, respectively. A rating of 5.00 indicated not applicable and was not used in calculating the mean score.

The mean score for each of the 22 animal science competencies are shown in Table 20. The scores are shown as rated by each group of respondents. The mean scores were tested for each of the 22 competencies using a one way analysis of variance to determine significant differences at the .05 level. The Duncan's Multiple Range Test was used as the post hoc test to determine where the significant differences were between the four groups of respondents.

As shown in Table 20, teachers ranked 19 of the 22 animal science competencies higher then the student-learners, employers, and student-workers. The student-learners ranked three higher than the other groups; the employers only rated one higher; and the student-workers did not rate any competencies higher than any other group of respondents. The ratings were based upon the mean scores, indicating the relative importance of each.

There were six animal science competencies where there was a significant difference between the means among the different groups of respondents. These differences are identified in the analysis of variance tables and their respective Duncan's Multiple Range Tests.

TABLE 20.   One Way Independent Analysis of Variance of 22 Animal Science
Competencies Needed for Gainful Employment in Agricultural-Related
Occupations as Perceived by Students, Employers, and Teachers†

Competencies	(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Advise Customers on Chemicals for Controlling Animal Pest				
MEANS	2.000	2.539	1.714	2.667
F = 1.167 df = 3, 29 p = 0.341				
Advise Customers on Equipment Needs for Specialized Animal Enterprises				
MEANS	2.000	2.000	1.400	2.833
F = 2.614 df = 3, 22 p = 0.081				
Advise Customers on Feeds for Farm Animals				
MEANS	2.667	2.429	2.400	2.833
F = 0.196 df = 3, 27 p = 0.898				
Advise Customers on Housing Requirements for Farm Animals*				
MEANS	2.333	1.667	1.000	2.667
F = 5.864 df = 3, 21 p = 0.006				
Advise Customers on Management Practices of Animals				
MEANS	2.500	2.000	1.333	2.833
F = 2.474 df = 3, 20 p = 0.097				
Advise Customers on Medicines or Chemicals for Controlling Common Diseases of Farm Animals*				
MEANS	1.000	1.636	1.750	2.833
F = 4.043 df = 3, 21 p = 0.023				
Balance Rations for Farm Animals*				
MEANS	1.000	1.700	1.600	3.000
F = 3.412 df = 3, 21 p = 0.040				

TABLE 20. (Continued)

Competencies	(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Demonstrate the Use of Branding, Tattooing, Castrating Equipment, etc.				
MEANS	1.000	1.727	1.250	3.000
F = 2.873 df = 3, 21 p = 0.065				
Discuss Nutrient Needs of Farm Animals*				
MEANS	1.000	1.583	1.200	2.667
F = 5.488 df = 3, 23 p = 0.006				
Identify Different Farm Animals and Their Respective Breeds*				
MEANS	1.400	1.846	2.000	3.000
F = 3.983 df = 3, 28 p = 0.019				
Operate Feed Mixing and Grinding Equipment				
MEANS	1.500	1.600	1.000	2.167
F = 1.717 df = 3, 21 p = 0.199				
Predict Price Trends and Cycles of Farm Animals				
MEANS	2.000	1.636	1.750	1.667
F = 0.059 df = 3, 21 p = 0.981				
Recognize Animal Grades*				
MEANS	3.000	1.667	1.400	2.833
F = 4.429 df = 3, 24 p = 0.015				
Recognize USDA Grades for Beef and/or Lamb				
MEANS	2.333	2.250	1.333	2.833
F = 1.446 df = 3, 27 p = 0.254				
Recognize Primal Meat Cuts				
MEANS	2.400	2.200	2.000	2.833
F = 0.578 df = 3, 30 p = 0.634				

TABLE 20. (Continued)

Competencies	(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Recognize Sub-Primal Meat Cuts				
MEANS	2.750	2.000	1.600	2.500
F = 1.030 df = 3, 26 p = 0.398				
Recognize Retail Meat Cuts				
MEANS	2.571	1.846	2.143	3.000
F = 2.007 df = 3, 32 p = 0.135				
Understand the Principles that Cause Meat Spoilage				
MEANS	2.400	1.733	2.429	3.000
F = 2.393 df = 3, 37 p = 0.086				
Understand Practices that Prevent Meat Spoilage				
MEANS	2.300	2.133	2.500	3.000
F = 1.048 df = 3, 38 p = 0.384				
Identify Different Types of Packaging Procedures to Prevent Spoilage				
MEANS	2.500	2.077	2.667	2.883
F = 0.728 df = 3, 30 p = 0.544				
Demonstrate Proper Sanitary Meat Handling Procedures				
MEANS	2.571	2.214	3.000	2.500
F = 0.593 df = 3, 32 p = 0.625				
Understand the Cutability of Meat (Cutting Yield and Dollar Value)				
MEANS	2.000	2.154	2.333	2.667
F = 0.369 df = 3, 28 p = 0.776				

† Participants rating the competency not applicable with a mean score of 5 were not used in calculating the mean scores.

* Significant at the .05 level.

The first was "Advise Customers on Housing Requirements for Farm Animals", shown in Table 21. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 22. Significant mean differences existed between employers (group 3) and student-workers (group 2), and student-learners (group 1) and student-workers (group 2). The mean for the teachers was 2.667; student-learners, 2.333; student-workers, 1.667; employers 1.000.

The first was "Advise Customers on Medicines or Chemicals for Controlling Common Diseases of Farm Animals", is shown in Table 23. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 24. Significant mean differences existed between teachers (group 4) and student-workers (group 2), and teachers (group 4) and employers (group 3). The mean for the teachers was 2.833; student-learners,1.000; student-workers, 1.636; employers, 1.750. There was no significant difference at the .05 level between the teachers mean of 2.833 and student-learners mean of 1.000. This was due to the liberties of the Duncan's Multiple Range Test and the small number of teachers as explained on page 40.

Analysis of variance for the animal science competency, "Balance Rations for Farm Animals", is shown in Table 25. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 26. Significant mean differences existed between teachers (group 4) and student-workers (group 2), and teachers (group 4) and employers (group 3). The mean for the teachers was 3.000; student-learners,1.000 ; student-workers, 1.600; employers, 1.700.

TABLE 21. Analysis of Variance for Animal Science Competency "Advise Customers on Housing Requirements of Farm Animals", Needed for Employment in Agricultural-Related Occupations

Source	df	SS	MS	F	p
Between Groups	3	7.818	2.606	5.864	.006
Within Groups	18	8.000	0.444		
TOTAL	21	15.818			

TABLE 22. Duncan's Multiple Range Test for Animal Science Competency "Advise Customers on Housing Requirements of Farm Animals", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Student Learners	Student Workers	Employers
Group Number	4	1	2	3
Mean	2.667	2.333	1.667	1.000

Tested at the .05 level

Significant mean score differences existed between groups 4 and 2, 4 and 3, and 1 and 3

TABLE 23.   Analysis of Variance for Animal Science Competency, "Advise Customers on Medicines or Chemicals for Controlling Common Diseases of Farm Animals", Needed for Employment in Agricultural-Related Occupations

Source	df	SS	MS	F	p
Between Groups	3	6.826	2.275	4.043	.023
Within Groups	1 8	10.129	0.563		
TOTAL	2 1	16.955			

TABLE 24.   Duncan's Multiple Range Test for Animal Science Competency "Advise Customers on Medicines or Chemicals for Controlling Common Diseases of Farm Animals", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Students Learners	Employers	Students Workers
Group Number	4	1	3	2
Mean	2.833	1.000	1.750	1.636

Tested at the .05 level

Significant mean score differences existed between groups 4 and 2 and 4 and 3.

TABLE 25.   Analysis of Variance for Animal Science Competency, "Balance Rations for Farm Animals", Needed for Employment in Agricultural-Related Occupations

Source	df	SS	MS	F	p
Between Groups	3	8.700	2.900	3.412	.040
Within Groups	1 8	15.300	0.850		
TOTAL	2 1	24.000			

TABLE 26.   Duncan's Multiple Range Test for Animal Science Competency, "Balance Rations for Farm Animals", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Students Learners	Students Workers	Employers
Group Number	4	1	2	3
Mean	3.000	1.000	1.700	1.600

Tested at the .05 level

Significant mean score differences existed between groups 4 and 2 and 4 and 3.

There was no significant difference at the .05 level between the teachers' mean of 3.000 and student-learners' mean of 1.000. This was due to the liberties of the Duncan's Multiple Range Test and the small number of teachers as explained on page 40.

Analysis of variance for the animal science competency, "Discuss Nutrient Needs of Farm Animals", is shown in Table 27. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 28. Significant mean differences existed between teachers (group 4) and student-learners (group 1); teachers (group 4) and student-workers (group 2); and teachers (group 4) and employers (group 3). The mean for the teachers was 2.667; student-workers, 1.583; employers, 1.200; student-learners, 1.000.

Analysis of variance for the animal science competency, "Identify Different Farm Animals and Their Respective Breeds", is shown in Table 29. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 30. Significant mean differences existed between teachers (group 4) and student-learners (group 1) and teachers (group 4) and student-workers (group 2). The mean for the teachers was 3.000; employers 2.000; student-workers 1.846; and student-learners, 1.400.

Analysis of variance for the animal science competency, "Recognize Animal Grades", is shown in Table 31. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 32. Significant mean differences existed between teachers (group 4) and student-workers (group 2); teachers (group 4) and employers (group 3); and student-learners (group 1) and employers (group 3). The mean for the teachers was 3.000; student-learners, 1.000; student-workers, 1.700; and employers, 1.600.

TABLE 27.   Analysis of Variance for Animal Science Competency, "Discuss Nutrient Needs of Farm Animals", Needed for Employment in Agricultural-Related Occupations

Source	df	SS	MS	F	p
Between Groups	3	7.450	2.483	5.488	.006
Within Groups	20	9.050	0.453		
TOTAL	23	16.500			

TABLE 28.   Duncan's Multiple Range Test for Animal Science Competency, "Discuss Nutrient Needs of Farm Animals", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Employers	Student Workers	Students Learners
Group Number	4	3	2	1
Mean	2.667	1.583	1.200	1.000

Tested at the .05 level

Significant mean score differences existed between groups 4 and 2; 4 and 3; and 4 and 1.

TABLE 29.   Analysis of Variance for Animal Science Competency, "Identify Different Farm Animals and Their Respective Breeds", Needed for Employment in Agricultural-Related Occupations

Source	df	SS	MS	F	p
Between Groups	3	8.073	2.691	3.983	.019
Within Groups	25	16.892	0.676		
TOTAL	28	24.965			

TABLE 30.   Duncan's Multiple Range Test for Animal Science Competency, "Identify Different Farm Animals and Their Respective Breeds", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Employers	Students Workers	Students Learners
Group Number	4	3	2	1
Mean	3.000	2.000	1.846	1.400

Tested at the .05 level

Significant mean score differences existed between groups 4 and 1 and 4 and 2.

TABLE 31. Analysis of Variance for Animal Science Competency, "Recognize Animal Grades", Needed for Employment in Agricultural-Related Occupations

Source	df	ss	MS	F	p
Between Groups	3	9.300	3.100	4.429	.015
Within Groups	2 1	14.700	0.700		
TOTAL	2 4	24.000			

TABLE 32. Duncan's Multiple Range Test for Animal Science Competency, "Recognize Animal Grades", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Students Learners	Students Workers	Employers
Group Number	4	1	2	3
Mean	3.000	1.000	1.700	1.600

Tested at the .05 level

Significant mean score difference existed between groups 4 and 2, 4 and 3 and 1 and 3.

Agricultural Mechanics Competencies. This section presents findings regarding the perception of importance of 23 agricultural mechanics competencies needed for gainful employment in agricultural-related occupations in Hawkins County, Tennessee.

Twenty-three agricultural mechanics competencies were evaluated by the four groups of respondents: student-learners, student-workers, employers, and teachers. Scores given for each of the 23 competencies indicated the level of importance for each competency for securing entry level employment as perceived by the respondents. A score of 1.00 indicated little or no importance. A score of 2.00, 3.00 or 4.00 indicated that the competency was some, much, or very much important, respectively. A rating of 5.00 indicated not applicable and was not used in calculating the mean score.

The mean scores for each of the 23 competencies are shown in Table 33. The scores are shown as rated by each group of respondents. The mean scores were tested for each of the 23 competencies using a one way analysis of variance to determine significant differences at the .05 level. The Duncan's Multiple Range Test was used as the post hoc test to determine where the significant differences were between the four groups of respondents.

As shown in Table 33, teachers ranked 13 of the 23 agricultural mechanics competencies higher then the student-learners, student-workers and employers. The student-learners ranked seven competencies higher than the other groups of respondents; the employers ranked only three; and the student-workers did not rate any competencies higher than any other group of respondents.

There were only two agricultural mechanics competencies where there was a significant difference between the means among the different groups of respondents.

TABLE 33.   One Way Independent Analysis of Variance of 23 Agricultural Mechanics
Competencies Needed for Gainful Employment in Agricultural-Related
Occupations as Perceived by Students, Employers, and Teachers†

Competencies	(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Adjust and Repair a Diesel Engine				
MEANS	1.500	1.948	2.000	2.500
F = 0.818 df = 3, 37 p = 0.493				
Adjust and Repair Machinery				
MEANS	2.000	2.319	2.500	3.333
F = 2.046 df = 3, 47 p = 0.121				
Advise Farmers on Machinery Needs*				
MEANS	1.000	1.765	1.600	2.833
F = 3.010 df = 3, 30 p = 0.048				
Construct Buildings Used in Agriculture				
MEANS	1.000	2.462	1.600	2.667
F = 2.114 df = 3, 25 p = 0.127				
Figure a Bill of Material for Building Construction*				
MEANS	2.333	2.214	1.500	3.500
F = 4.381 df = 3, 31 p = 0.012				
Follow a Drafting Plan for Construction Agricultural Projects				
MEANS	2.500	2.333	1.667	2.500
F = 0.994 df = 3, 29 p = 0.411				
Properly Operate Equipment				
MEANS	3.625	3.417	3.111	3.333
F = 1.034 df = 3, 62 p = 0.384				
Order and Stock Parts				
MEANS	3.500	2.800	2.375	3.167
F = 1.609 df = 3, 38 p = 0.205				

TABLE 33.   (Continued)

Competencies	(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Overhaul a Large Farm Engine				
MEANS	2.167	2.000	2.200	3.000
F = 1.091 df = 3, 29 p = 0.371				
Overhaul a Small Gasoline Engine				
MEANS	2.400	2.550	2.286	3.500
F = 1.388 df = 3, 37 p = 0.263				
Perform Electrical Wiring				
MEANS	2.000	2.056	2.167	3.000
F = 1.344 df = 3, 34 p = 0.278				
Perform Preventative Maintenance on a Farm Tractor				
MEANS	1.500	1.889	2.000	3.167
F = 2.622 df = 3, 32 p = 0.070				
Practice Safety				
MEANS	3.613	3.259	3.571	4.000
F = 1.737 df = 3, 77 p = 0.167				
Repair and Adjust a Small Gasoline Engine				
MEANS	2.250	2.619	2.286	3.667
F = 1.974 df = 3, 37 p = 0.136				
Set Up Farm Machinery				
MEANS	1.800	2.368	2.000	2.833
F = 0.689 df = 3, 32 p = 0.567				
Tune, Adjust, and Repair an Internal Combustion Engine				
MEANS	3.000	2.222	2.500	2.833
F = 0.638 df = 3, 33 p = 0.597				

TABLE 33. (Continued)

Competencies		(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Use a parts manual					
	MEANS	2.750	2.143	2.625	3.667
F = 2.663	df = 3, 42	p = 0.061			
Use an Arc Welder					
	MEANS	3.000	2.840	2.000	3.333
F = 1.246	df = 3, 42	p = 0.306			
Use an Acetylene Welder					
	MEANS	3.000	2.750	2.000	3.333
F = 1.267	df = 3, 41	p = 0.299			
Use Surveying Equipment					
	MEANS	2.400	2.467	1.500	3.000
F = 1.241	df = 3, 29	p = 0.315			
Use Grinders, Drill Press, and Other Power Equipment					
	MEANS	3.222	3.000	2.333	3.333
F = 0.929	df = 3, 43	p = 0.436			
Use Hand Shop Tools and Equipment					
	MEANS	3.222	3.040	2.429	3.500
F = 1.039	df = 3, 46	p = 0.385			
Set Up Equipment					
	MEANS	3.143	2.821	2.444	3.000
F = 0.684	df = 3, 49	p = 0.567			

† Participants rating the competency not applicable with a mean score of 5 were not used in calculating the mean scores.
* Significant at the .05 level.

These differences are identified in the analysis of variance tables and their respective Duncan's Multiple Range Tests.

Analysis of variance for the agricultural mechanics competency, "Advise Farmers on Machinery Needs", is shown in Table 34. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 35. Significant mean differences existed between teachers (group 4) and student-workers (group 2) and between teachers (group 4) and student-learners (group 1). The mean for the teachers was 3.000; employers, 1.000; student-workers, 1.700; student-learners, 1.600.

Analysis of variance for the agricultural mechanics competency, "Figure A Bill of Materials For Building Construction", is shown in Table 36. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 37. Significant mean differences existed between teachers (group 4) and student-learners (group 1), teachers (group 4) and student-workers (group 2), and teachers (group 4) and employers (group 3). The mean for the teachers was 3.500; student-learners, 2.333; student-workers, 2.214; and employers, 1.500.

Crop and Soil Science Competencies. This subsection presents findings regarding the perception of importance of 20 crop and soil science competencies needed for gainful employment in agricultural-related occupations in Hawkins County, Tennessee.

Twenty crop and soil science competencies were evaluated by the four groups of respondents: student-learners, student-workers, employers, and teachers. Scores given for each of the 20 competencies indicated level of importance for each competency for securing entry level employment as perceived by the respondents. A score of 1.00

TABLE 34. Analysis of Variance for Agricultural Mechanics Competency, "Advise Farmers on Machinery Needs", Needed for Employment in Agricultural-Related Occupations

Source	df	ss	MS	F	p
Between Groups	3	8.392	3.797	3.012	.048
Within Groups	27	25.092	0.929		
TOTAL	30	33.484			

TABLE 35. Duncan's Multiple Range Test for Agricultural Mechanics Competency, "Advise Farmers on Machinery Needs", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Employers	Students Workers	Students Learners
Group Number	4	3	2	1
Mean	3.000	1.000	1.700	1.600

Tested at the .05 level

Significant mean score differences existed between groups 4 and 2 and 4 and 1.

TABLE 36. Analysis of Variance for Agricultural Mechanics Competency, "Figure A Bill of Materials for Building Construction", Needed for Employment in Agricultural-Related Occupations

Source	df	SS	MS	F	p
Between Groups	3	12.528	4.176	4.381	.012
Within Groups	28	26.691	0.953		
TOTAL	31	39.219			

TABLE 37. Duncan's Multiple Range Test for Agricultural Mechanics Competency, "Figure A Bill of Materials for Building Construction", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Students Learners	Students Workers	Employers
Group Number	4	1	2	3
Mean	3.500	2.333	2.214	1.500

Tested at the .05 level

Significant mean score differences existed between groups 4 and 1, 4 and 2 and 4 and 3.

indicated little or no importance. A score of 2.00, 3.00, or 4.00 indicated some, much or very importance, respectively. A rating of 5.00 indicated not applicable and was not used in calculating the mean score.

The mean scores for each of the 20 crop and soil competencies are shown in Table 38. The scores are shown as rated by each group of respondents. The mean scores were tested for each of the 20 competencies using a one way analysis of variance to determine significant differences at the .05 level. The Duncan's Multiple Range Test was used as the post hoc test to determine where the significant differences were between the four groups of respondents.

As shown in Table 38, teachers ranked 18 of the 20 crop and soil science competencies higher than the other groups and ranked one competency at the same level as the student-learners. The student-learners ranked one competency higher than the other groups of respondents; the student-workers and employers did not rate any competencies higher than other groups of respondents.

There were two of the 20 crop and soil science competencies where there was a significant difference between the means among the different groups of respondents. These differences are identified in the analysis of variance tables and their respective Duncan's Multiple Range Tests.

Analysis of variance for the crop and soil science competency, "Advise Customers of Safe Chemical for Insects, Weeds, and Diseases", is shown in Table 39. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 40. Significant mean differences exist between teachers (group 4) and student-workers (group 2) and between teachers (group 4) and student-learners (group 1). The mean for the teachers was 3.500; employers, 2.250; student-workers, 2.167; student-learners, 1.750.

TABLE 38.   One Way Independent Analysis of Variance of 20 Crop and Soil Science
            Competencies Needed for Gainful Employment in Agricultural-Related
            Occupations as Perceived by Students, Employers, and Teachers†

Competencies	(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Advise Customers on Crop Varieties Adapted to the Area				
MEANS	2.000	2.250	1.667	2.833
F = 1.867 df = 3, 27 p = 0.162				
Advise Customers on Fertilizer Needs				
MEANS	2.000	2.300	2.000	3.167
F = 1.763 df = 3, 27 p = 0.181				
Advise Customers on Landscape Plant Materials				
MEANS	2.750	1.909	1.833	2.667
F = 1.492 df = 3, 26 p = 0.243				
Advise Customers on Safe Chemicals for Insect, Weeds or Herb Control*				
MEANS	2.167	1.750	2.250	3.500
F = 3.910 df = 3, 27 p = 0.021				
Calibrate a Chemical Sprayer				
MEANS	2.500	2.091	2.500	3.000
F = 1.088 df = 3, 24 p = 0.376				
Calibrate a Fertilizer Distributor				
MEANS	2.000	2.167	2.333	3.167
F = 1.598 df = 3, 24 p = 0.220				
Calibrate a Grain Drill				
MEANS	1.000	1.625	2.000	2.667
F = 2.312 df = 3, 19 p = 0.115				
Detect Nutritional and Disease Symptoms of Plants				
MEANS	2.333	2.231	2.400	3.167
F = 1.280 df = 3, 29 p = 0.302				

TABLE 38.   (Continued)

Competencies	(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Discuss Market Trends with Agriculturalist				
MEANS	1.250	1.889	1.750	2.500
F = 1.569 df = 3, 22 p = 0.230				
Establish and Maintain Landscaped Areas				
MEANS	1.600	2.625	2.667	2.833
F = 1.191 df = 3, 21 p = 0.341				
Grow Nursery Stock				
MEANS	2.500	2.818	2.000	2.500
F = 0.504 df = 3, 24 p = 0.684				
Grow Plants in a Greenhouse				
MEANS	2.333	2.813	2.000	3.000
F = 0.852 df = 3, 31 p = 0.477				
Identify Fertilizer Materials				
MEANS	2.375	2.556	2.429	3.333
F = 1.535 df = 3, 38 p = 0.223				
Identify Field and Garden Crop Seeds and Plants				
MEANS	2.375	2.500	2.000	3.333
F = 2.335 df = 3, 34 p = 0.093				
Identify Insects that Affect Plants*				
MEANS	2.143	2.786	2.143	3.333
F = 3.095 df = 3, 33 p = 0.042				
Identify Ornamental Plants				
MEANS	2.600	2.714	2.000	3.000
F = 1.207 df = 3, 32 p = 0.325				

TABLE 38. (Continued)

Competencies		(n = 37) Student Learners	(n = 37) Student Workers	(n = 24) Employers	(n = 6) Teachers
Identify Weeds					
	MEANS	2.500	2.588	2.167	3.333
F = 1.426	df = 3, 34	p = 0.254			
Read and Interpret Soil Test Results					
	MEANS	1.800	2.455	2.250	3.500
F = 2.678	df = 3, 25	p = 0.072			
Recognize Crop Grades and Plant Quality					
	MEANS	2.000	2.273	1.600	3.333
F = 2.961	df = 3, 28	p = 0.052			
Select Soil Media for Greenhouse Plants					
	MEANS	2.250	2.357	1.750	2.667
F = 0.514	df = 3, 27	p = 0.677			

† Participants rating the competency not applicable with a mean score of 5 were not used in calculating the mean scores.

* Significant at the .05 level.

TABLE 39. Analysis of Variance for Crop and Soil Science Competency, "Advise Customers on Safe Chemicals for Insect, Weeds, And Herb Control", Needed for Employment in Agricultural-Related Occupations

Source	df	SS	MS	F	p
Between Groups	3	12.381	4.127	3.910	.021
Within Groups	24	25.333	1.056		
TOTAL	27	37.714			

TABLE 40. Duncan's Multiple Range Test for Crop and Soil Science Competency, "Advise Customers on Safe Chemicals for Insect, Weeds, and Herb Control", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Employers	Students Learners	Students Workers
Group Number	4	3	1	2
Mean	3.500	2.250	2.167	1.750

Tested at the .05 level

Significant mean score differences existed between groups 4 and 1, 4 and 2.

Analysis of variance for the general business competency, "Identify Field and Garden Crop Seeds and Plants", is shown in Table 41. The response difference was significant at the .05 level. The Duncan's Multiple Range Test for this competency is shown in Table 42. Significant mean differences existed between teachers (group 4) and employers (group 3), and teachers (group 4) and student-learners (group 1). The mean for the teachers was 3.333; student-workers, 2.786; employers, 2.143; and student-learners, 2.143.

Location of Training

This section deals with the location of training for the agricultural-related competencies needed for gainful employment in agricultural-related occupations. Student-learners, student-workers, employers, and teachers selected the location for the training for each competency as they perceived using a Likert-type scale. The rating scale used was: 1 = School, 2 = Both School and Work, 3 = Work, and 4 = Not Applicable.

Those who indicated that the respective item was not applicable marked a "4" on the rating scale. There rating were not used in making the percentage tabulations. They were addeds to the total to get the complete number of respondents.

There was not a consensus among the groups for the most desired place for receiving the needed training. The mode appeared to be "school and work". Since opinion varied, only those responces with an expressed percentage above the 45-50 percentage range were discussed especially those that showed a aberration from the mode.

Section three was subdivided into four subsections. The first being the 25 general business competencies. Twenty-two animal science competencies are reported in the second section and 23 agricultural mechanics competencies in the third part. The

TABLE 41. Analysis of Variance for Crop and Soil Science Competency, "Identify Insects That Affect Plants", Needed for Employment in Agricultural-Related Occupations

Source	df	ss	MS	F	p
Between Groups	3	6.625	2.208	3.095	.042
Within Groups	30	21.405	0.714		
TOTAL	33	28.030			

TABLE 42. Duncan's Multiple Range Test for Crop and Soil Science Competency, "Identify Insects That Affect Plants", Needed for Employment in Agricultural-Related Occupations

Group	Teachers	Students Workers	Employers	Students Learners
Group Number	4	2	3	1
Mean	3.333	2.786	2.143	2.143

Tested at the .05 level

Significant mean score difference existed between groups 4 and 3 and 4 and 1.

last subsection contains data on 20 crop and soil science competencies. Each subdivision is presented as a whole with patterns discussed individually.

General Business Competencies. This subsection presents and discusses the data about the perceptions of the four groups of respondents relative to the most desired location for receiving training for the 25 general business competencies needed for employment in agricultural-related occupations in Hawkins County, Tennessee. These data are shown in Table 43. Those respondents indicating not applicable were not used in tabulating the percentage.

Data presented in this table show that the school is the least indicated place for receiving training for the general business competencies. There were exceptions to this generalization.

Acquiring basic knowledge of computer skills was given by 50 percent of the teachers and 47.6 percent of the student-workers as best acquired at school. Student-learners and employers also rated the school by 26.1 percent and 25 percent, respectively, as the best place to develop this competency. Fifty percent of the teachers and 30.4 percent of the employers also thought that the school was the best place to develop the skill of using good English, and 66.7 percent of the teachers thought that how to write legibly could best be developed at school. It is also shown that 83.3 percent of the teachers indicated that the school was the best place to develop the competency of filling out job applications.

Most of the respondents among all groups thought that the best place to receive training for the competencies was at both the school and work place. As an example, 83 percent of the teachers, 66.7 percent of the employers, and 46.2 percent of the student-workers thought that both the school and work place was the best place to develop the

TABLE 43. Locations for Training of 25 General Business Competencies Needed for Gainful Employment in Agricultural-Related Occupations as Perceived by Students, Employers, and Teachers†

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Apply Principles of Salesmanship								
School	0	0.0	3	11.5	2	11.1	1	16.7
Both School and Work	12	38.7	12	48.0	12	66.7	5	83.3
Work	19	61.3	10	40.5	4	22.2	0	0.0
Not Applicable	6	- - - -	12	- - - -	6	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Care for Tools and Equipment								
School	1	3.1	8	25.0	1	4.2	0	0.0
Both School and Work	11	34.4	19	59.4	17	70.8	6	100.0
Work	20	62.5	5	15.6	6	25.0	0	0.0
Not Applicable	5	- - - -	5	- - - -	0	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Complete Records and Reports								
School	4	16.0	9	36.0	2	9.5	1	16.7
Both School and Work	13	52.0	10	40.0	15	71.5	5	83.3
Work	8	32.0	6	24.0	4	19.0	0	0.0
Not Applicable	12	- - - -	12	- - - -	3	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Direct or Supervise Others								
School	5	20.8	3	14.3	0	0.0	0	0.0
Both School and Work	8	33.4	11	52.4	10	62.5	4	80.0
Work	11	45.8	7	33.3	6	37.5	1	20.0
Not Applicable	13	- - - -	16	- - - -	8	- - - -	1	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Display Merchandise								
School	0	0.0	1	3.8	1	5.9	1	16.7
Both School and Work	0	0.0	5	19.2	7	41.2	5	83.3
Work	26	100.0	20	77.0	9	52.9	0	0.0
Not Applicable	11	- - - -	11	- - - -	7	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 43.   (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Drive A Car or Travel Safely								
School	1	5.0	5	19.2	4	33.3	2	50.0
Both School and Work	14	70.0	13	50.0	8	66.7	2	50.0
Work	5	25.0	8	30.8	0	0.0	0	0.0
Not Applicable	17	- - - -	11	- - - -	12	- - - -	2	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Evaluate Credit Risk of Customer								
School	0	0.0	3	17.6	0	0.0	0	0.0
Both School and Work	0	0.0	4	23.6	8	66.7	2	40.0
Work	19	100.0	10	58.8	4	33.3	3	60.0
Not Applicable	18	- - - -	20	- - - -	12	- - - -	1	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
File Records and Reports								
School	3	17.6	5	25.0	2	10.5	1	16.7
Both School and Work	7	41.2	7	35.0	14	73.7	4	66.6
Work	7	41.2	8	40.0	3	15.8	1	16.7
Not Applicable	20	- - - -	17	- - - -	6	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Follow Instructions								
School	0	0.0	2	6.2	1	4.5	2	33.3
Both School and Work	31	83.8	23	71.9	21	95.5	4	66.7
Work	6	16.2	7	21.9	0	0.0	0	0.0
Not Applicable	0	- - - -	5	- - - -	2	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Inventory Merchandise								
School	0	0.0	2	7.7	0	0.0	0	0.0
Both School and Work	1	4.2	10	38.5	14	70.0	4	66.7
Work	23	95.8	14	53.8	6	30.0	2	33.3
Not Applicable	13	- - - -	11	- - - -	4	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 43. (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Keep Record of Sales and Expenses								
School	2	8.4	1	5.0	1	6.7	0	0.0
Both School and Work	8	20.8	7	35.0	13	86.6	6	100.0
Work	17	70.8	12	60.0	1	6.7	0	0.0
Not Applicable	10	- - - -	17	- - - -	9	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Maintain Good Housekeeping								
School	0	0.0	3	12.0	0	0.0	1	16.7
Both School and Work	6	26.1	10	40.0	17	77.3	5	83.3
Work	17	73.9	12	48.0	5	22.7	0	0.0
Not Applicable	14	- - - -	12	- - - -	2	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Maintain Good Personal Appearance								
School	0	0.0	1	3.0	1	5.6	0	0.0
Both School and Work	29	82.9	26	78.8	16	88.8	6	100.0
Work	6	17.1	6	18.2	1	5.6	0	0.0
Not Applicable	2	- - - -	4	- - - -	6	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Make Bank Deposits								
School	1	5.3	2	15.4	0	0.0	0	0.0
Both School and Work	5	26.3	3	23.1	8	61.5	4	80.0
Work	13	68.4	8	61.5	5	38.5	1	20.0
Not Applicable	18	- - - -	24	- - - -	11	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Make Mathematical Calculation Accurately								
School	1	2.9	5	17.2	4	21.1	4	66.7
Both School and Work	21	60.0	20	69.0	15	78.9	2	33.3
Work	13	37.1	4	13.8	0	0.0	0	0.0
Not Applicable	2	- - - -	8	- - - -	5	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 43.   (Continued)

Competencies	(n = 37) Student Learners No.	%	(n = 37) Student Workers No.	%	(n = 24) Employers No.	%	(n = 6) Teachers No.	%
Make Out Sales Receipts								
School	2	7.7	4	23.0	0	0.0	1	16.7
Both School and Work	4	15.4	6	32.0	1 2	80.0	5	83.3
Work	20	76.9	9	45.0	3	20.0	0	0.0
Not Applicable	11	- - - -	18	- - - -	9	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Meet the Public								
School	0	0.0	2	6.0	0	0.0	1	16.7
Both School and Work	31	83.8	22	66.7	19	82.6	5	83.3
Work	6	16.2	9	27.3	4	17.4	0	0.0
Not Applicable	0	- - - -	4	- - - -	1	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Use Cash Register, Adding Machine, Scales, etc.								
School	0	0.0	2	10.5	1	5.0	0	0.0
Both School and Work	6	17.1	3	15.8	14	70.0	4	66.7
Work	29	82.9	14	73.7	5	25.0	2	33.3
Not Applicable	2	- - - -	18	- - - -	4	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Basic Knowledge of Computer Skills								
School	6	26.1	10	47.6	5	25.0	3	50.0
Both School and Work	12	52.2	7	33.3	15	75.0	2	33.3
Work	5	21.7	4	19.1	0	0.0	1	16.7
Not Applicable	14	- - - -	16	- - - -	4	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Use Correct English								
School	7	18.9	9	27.3	7	30.4	3	50.0
Both School and Work	29	78.4	19	57.6	16	69.6	3	50.0
Work	1	2.7	5	15.1	0	0.0	0	0.0
Not Applicable	0	- - - -	4	- - - -	1	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 43. (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Write Legibly								
School	5	14.7	7	22.6	6	27.3	4	66.7
Both School and Work	27	79.4	22	71.0	16	72.7	2	33.3
Work	2	5.9	2	6.4	0	0.0	0	0.0
Not Applicable	3	- - - -	6	- - - -	2	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Use Good Telephone Procedures								
School	1	2.7	2	6.9	2	9.5	1	16.7
Both School and Work	17	45.9	15	51.7	14	66.7	5	83.3
Work	19	51.4	12	41.4	5	23.8	0	0.0
Not Applicable	0	- - - -	8	- - - -	3	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Properly Display Seasonal Stock								
School	0	4.8	1	4.8	0	0.0	0	0.0
Both School and Work	1	0.0	4	19.0	6	54.5	2	33.3
Work	25	95.2	16	76.2	5	45.5	4	66.7
Not Applicable	11	- - - -	16	- - - -	13	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Rotate Stock								
School	0	0.0	1	4.0	0	0.0	0	0.0
Both School and Work	1	3.8	4	16.0	6	46.2	2	33.3
Work	5	96.2	20	80.0	7	53.8	4	66.7
Not Applicable	31	- - - -	12	- - - -	11	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 43.   (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Properly Filling Out Job Applications								
School	10	31.3	6	23.1	5	27.8	5	83.3
Both School and Work	17	53.1	9	34.6	13	72.2	1	16.7
Work	5	15.6	11	42.3	0	0.0	0	0.0
Not Applicable	5	- - - -	11	- - - -	6	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

† Participants rating the competency not applicable with a rating of 5 were not used in calculating the percentage but used in the total number of participants.

skill "applying principles of salesmanship." This was in contrast to 61.3 percent of the student-learners indicating that the work place was the best place to develop this skill.

This mode was consistent with most of the 25 general business competencies. The student-learners placed more emphasis on the work place than the other groups of respondents. The student-learners were those enrolled in a cooperative education program for credit. This was apparent with the following competencies care for tools and equipment, direct or supervise others, keep record of sales and receipts, maintain good housekeeping, make bank deposits, make out a sales receipt, use of cash registers, adding machines, and scales, use good telephone procedure, properly display seasonal stock, and rotate stock.

Animal Science Competencies.   This subsection presents and discusses the data about the perceptions of the four groups of respondents relative to the most desired location for receiving training for the 22 animal science competencies needed for employment in agricultural-related occupations in Hawkins County, Tennessee. These data are shown in Table 44. Those respondents indicating not applicable were not used in tabulating the percentage.

Data presented in this table show that a combination of both school and work is the least indicated place for receiving training for the general business competencies. There were exceptions to this generalization. Demonstrating the use of branding, tattooing, castrating equipment was given by 50 percent of the teachers and employers as best acquired at school or a combination of both school and work. Student-workers rated school or a combination of both school and work by 44 percent as being the best place for training. Student-learners did not rate the best place of training for the competency. Balance rations for farm animals were given by 75 of the employers and 66.7 percent of the teachers as best acquired at school. Student-workers rated the

TABLE 44. Locations for Training of 22 Animal Science Competencies Needed for Gainful Employment in Agricultural-Related Occupations as Perceived by Students, Employers, and Teachers†

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Advise Customers on Chemicals for Controlling Animal Pest								
School	2	40.0	1	10.0	0	0.0	2	33.3
Both School and Work	0	0.0	8	80.0	3	60.0	4	66.7
Work	3	60.0	1	10.0	2	40.0	0	0.0
Not Applicable	32	- - - -	27	- - - -	19	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Advise Customers on Equipment Needs for Specialized Animal Enterprises								
School	0	0.0	0	0.0	0	0.0	3	50.0
Both School and Work	0	0.0	7	70.0	1	100.0	3	50.0
Work	0	0.0	3	30.0	0	0.0	0	0.0
Not Applicable	37	- - - -	27	- - - -	23	- - - -	0	- - - -
TOTAL	37	0.0	37	100.0	24	100.0	6	100.0
Advise Customers on Feeds for Farm Animals								
School	0	0.0	2	15.4	0	0.0	2	33.3
Both School and Work	0	0.0	7	53.8	3	100.0	4	66.7
Work	4	100.0	4	30.8	0	0.0	0	0.0
Not Applicable	33	- - - -	24	- - - -	21	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Advise Customers on Housing Requirements for Farm Animals								
School	0	0.0	1	12.5	1	100.0	3	50.0
Both School and Work	0	0.0	4	50.0	0	0.0	3	50.0
Work	1	100.0	3	37.5	0	0.0	0	0.0
Not Applicable	36	- - - -	29	- - - -	23	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Advise Customers on Management Practices of Animals								
School	1	100.0	2	22.2	0	0.0	3	50.0
Both School and Work	0	0.0	5	55.6	1	100.0	3	50.0
Work	0	0.0	2	22.2	0	0.0	0	0.0
Not Applicable	36	- - - -	28	- - - -	23	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 44.   (Continued)

Competencies	(n = 37) Student Learners No.	%	(n = 37) Student Workers No.	%	(n = 24) Employers No.	%	(n = 6) Teachers No.	%
Advise Customers on Medicines or Chemicals for Controlling Common Diseases of Farm Animals								
School	0	0.0	3	30.0	0	0.0	3	50.0
Both School and Work	0	0.0	6	60.0	1	100.0	3	50.0
Work	1	100.0	1	10.0	0	0.0	0	0.0
Not Applicable	36	- - - -	27	- - - -	23	- - - -	0	- - - -
TOTAL	3 7	100.0	3 7	100.0	2 4	100.0	6	100.0
Balance Rations for Farm Animals								
School	0	0.0	2	22.2	3	75.0	4	66.7
Both School and Work	0	0.0	5	55.6	1	25.0	2	33.3
Work	0	0.0	2	22.2	0	0.0	0	0.0
Not Applicable	37	- - - -	28	- - - -	20	- - - -	0	- - - -
TOTAL	3 7	0.0	3 7	100.0	2 4	100.0	6	100.0
Demonstrate the Use of Branding, Tattooing, Castrating Equipment, etc.								
School	0	0.0	4	44.4	1	50.0	3	50.0
Both School and Work	0	0.0	4	44.4	1	50.0	3	50.0
Work	0	0.0	1	11.2	0	0.0	0	0.0
Not Applicable	37	- - - -	28	- - - -	22	- - - -	0	- - - -
TOTAL	3 7	0.0	3 7	100.0	2 4	100.0	6	100.0
Discuss Nutrient Needs of Farm Animals								
School	0	0.0	4	36.4	2	50.0	3	50.0
Both School and Work	0	0.0	5	45.5	2	50.0	3	50.0
Work	0	0.0	2	18.1	0	0.0	0	0.0
Not Applicable	37	- - - -	26	- - - -	20	- - - -	0	- - - -
TOTAL	3 7	0.0	3 7	100.0	2 4	100.0	6	100.0
Identify Different Farm Animals and Their Respective Breeds								
School	1	50.0	6	46.2	2	50.0	6	100.0
Both School and Work	1	50.0	2	15.4	2	50.0	0	0.0
Work	0	0.0	5	38.4	0	0.0	0	0.0
Not Applicable	35	- - - -	24	- - - -	20	- - - -	0	- - - -
TOTAL	3 7	100.0	3 7	100.0	2 4	100.0	6	100.0

TABLE 44. (Continued)

Competencies	Student Learners (n = 37)		Student Workers (n = 37)		Employers (n = 24)		Teachers (n = 6)	
	No.	%	No.	%	No.	%	No.	%
Operate Feed Mixing and Grinding Equipment								
School	0	0.0	4	44.4	1	100.0	3	50.0
Both School and Work	1	100.0	3	33.3	0	0.0	1	16.7
Work	0	0.0	2	22.3	0	0.0	2	33.3
Not Applicable	36	- - - -	28	- - - -	23	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Predict Price Trends and Cycles of Farm Animals								
School	0	0.0	4	44.4	1	50.0	5	83.3
Both School and Work	0	0.0	4	44.4	0	0.0	1	16.7
Work	1	100.0	1	11.2	1	50.0	0	0.0
Not Applicable	36	- - - -	28	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Recognize Animal Grades								
School	0	0.0	5	50.0	1	50.0	4	66.7
Both School and Work	0	0.0	2	20.0	1	50.0	2	33.3
Work	1	100.0	3	30.0	0	0.0	0	0.0
Not Applicable	36	- - - -	27	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Recognize USDA Grades for Beef and/or Lamb								
School	0	0.0	4	28.6	1	50.0	1	16.7
Both School and Work	0	0.0	5	35.7	1	50.0	4	66.6
Work	2	100.0	5	35.7	0	0.0	1	16.7
Not Applicable	35	- - - -	23	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Recognize Primal Meat Cuts								
School	1	20.0	2	16.7	1	25.0	2	33.3
Both School and Work	0	0.0	3	25.0	2	50.0	3	50.0
Work	4	80.0	7	58.3	1	25.0	1	16.7
Not Applicable	32	- - - -	25	- - - -	20	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 44. (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Recognize Sub-Primal Meat Cuts								
School	0	0.0	1	11.2	1	33.3	2	40.0
Both School and Work	0	0.0	4	44.4	1	33.4	2	40.0
Work	3	100.0	4	44.4	1	33.3	1	20.0
Not Applicable	34	- - - -	28	- - - -	21	- - - -	1	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Recognize Retail Meat Cuts								
School	1	14.3	2	22.3	0	0.0	1	16.7
Both School and Work	1	14.3	3	33.3	4	66.7	4	66.6
Work	5	71.4	4	44.4	2	33.3	1	16.7
Not Applicable	30	- - - -	28	- - - -	18	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Understand the Principles that Cause Meat Spoilage								
School	2	18.2	1	8.2	0	0.0	4	66.7
Both School and Work	1	9.1	4	30.6	3	50.0	2	33.3
Work	8	72.7	8	61.2	3	50.0	0	0.0
Not Applicable	26	- - - -	24	- - - -	18	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Understand Practices that Prevent Meat Spoilage								
School	3	25.0	1	9.1	0	0.0	3	50.0
Both School and Work	1	8.3	6	54.6	4	57.1	3	50.0
Work	8	66.7	4	36.3	3	42.9	0	0.0
Not Applicable	25	- - - -	26	- - - -	17	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Identify Different Types of Packaging Procedures to Prevent Spoilage								
School	2	28.6	1	10.0	0	0.0	1	16.7
Both School and Work	0	0.0	5	50.0	3	75.0	5	83.3
Work	5	71.4	4	40.0	1	25.0	0	0.0
Not Applicable	30	- - - -	27	- - - -	20	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 44. (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Demonstrate Proper Sanitary Meat Handling Procedures								
School	1	14.3	1	8.2	0	0.0	2	33.3
Both School and Work	1	14.3	4	30.6	2	40.0	0	0.0
Work	5	71.4	7	61.2	3	60.0	4	66.7
Not Applicable	30	- - - -	25	- - - -	19	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Understand the Cutability of Meat (Cutting Yield and Dollar Value)								
School	0	0.0	1	10.0	0	0.0	2	33.3
Both School and Work	0	0.0	4	40.0	3	75.0	4	66.7
Work	4	100.0	5	50.0	1	25.0	0	0.0
Not Applicable	33	- - - -	27	- - - -	20	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

† Participants rating the competency not applicable with a rating of 5 were not used in calculating the percentage but used in the total number of participants.

school by 22.2 percent and the student-learners did not rate the school as the best place to develop this competency.

Most of the respondents among all groups thought that the best place to receive training for the competencies was at both the school and work place. As an example, 66.6 percent of the teachers, 50 percent of the employers, and 35.7 percent of the student-workers thought that both the school and work place was the best place to develop the skill "recognize USDA grades for beef and/or lamb." This was in contrast to 100 percent of the student-learners indicating that the work place was the best place to develop this skill.

This response was consistent with most of the 22 animal science competencies. The student-learners placed more emphasis on the work place than the other groups of respondents. The student-learners were those enrolled in a cooperative education program for credit. This was apparent with the following competencies advise customers on chemicals for controlling animal pest, advise customers on medicines or chemicals for controlling common diseases of farm animals, understand practices that prevent meat spoilage, and identify different types of packaging procedures to prevent spoilage.

Agricultural Mechanics Competencies. This subsection presents and discusses the data about the perceptions of the four groups of respondents relative to the most desired location for receiving training for the 23 agricultural mechanics competencies needed for employment in agricultural-related occupations in Hawkins County, Tennessee. These data are shown in Table 45. Those respondents indicating not applicable were not used in tabulating the percentage.

TABLE 45. Locations for Training of 23 Agricultural Mechanics Competencies Needed for Gainful Employment in Agricultural-Related Occupations as Perceived by Students, Employers, and Teachers†

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Adjust and Repair A Diesel Engine								
School	1	25.0	3	18.8	0	0.0	1	16.7
Both School and Work	0	0.0	6	37.4	3	100.0	3	50.0
Work	3	75.0	7	43.8	0	0.0	2	33.3
Not Applicable	33	- - - -	21	- - - -	21	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Adjust and Repair Machinery								
School	2	20.0	4	20.0	0	0.0	1	16.7
Both School and Work	1	10.0	7	35.0	7	87.5	5	83.3
Work	7	70.0	9	45.0	1	12.5	0	0.0
Not Applicable	27	- - - -	17	- - - -	16	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Advise Farmers on Machinery Needs								
School	0	0.0	3	25.0	0	0.0	0	0.0
Both School and Work	0	0.0	4	33.3	1	100.0	4	66.7
Work	0	0.0	5	41.7	0	0.0	2	33.3
Not Applicable	37	- - - -	25	- - - -	23	- - - -	0	- - - -
TOTAL	37	0.0	37	100.0	24	100.0	6	100.0
Properly Operate Equipment								
School	1	4.3	4	15.3	0	0.0	0	0.0
Both School and Work	8	34.8	12	46.2	7	87.5	5	83.3
Work	14	60.9	10	38.5	1	12.5	1	16.7
Not Applicable	14	- - - -	11	- - - -	16	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Construct Buildings Used in Agriculture								
School	0	0.0	3	27.3	1	50.0	2	33.3
Both School and Work	0	0.0	3	27.3	1	50.0	4	66.7
Work	0	0.0	5	45.4	0	0.0	0	0.0
Not Applicable	37	- - - -	26	- - - -	22	- - - -	0	- - - -
TOTAL	37	0.0	37	100.0	24	100.0	6	100.0

TABLE 45.   (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Figure A Bill of Material for Building Construction								
School	1	25.0	5	41.7	0	0.0	5	83.3
Both School and Work	1	25.0	5	41.7	2	100.0	1	16.7
Work	2	50.0	2	16.6	0	0.0	0	0.0
Not Applicable	33	- - - -	25	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Follow A Drafting Plan for Construction Agricultural Projects								
School	4	66.6	6	54.5	0	0.0	5	83.3
Both School and Work	1	16.7	3	27.3	2	100.0	1	16.7
Work	1	16.7	2	18.2	0	0.0	0	0.0
Not Applicable	31	- - - -	26	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Order and Stock Parts								
School	0	0.0	0	0.0	0	0.0	0	0.0
Both School and Work	2	20.0	10	71.4	4	80.0	5	83.3
Work	8	80.0	4	28.6	1	20.0	1	16.7
Not Applicable	27	- - - -	23	- - - -	19	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Overhaul A Large Farm Engine								
School	1	25.0	2	20.0	0	0.0	2	33.3
Both School and Work	1	25.0	4	40.0	1	50.0	3	50.0
Work	2	50.0	4	40.0	1	50.0	1	16.7
Not Applicable	33	- - - -	27	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Overhaul A Small Gasoline Engine								
School	1	33.3	7	41.2	0	0.0	4	66.7
Both School and Work	1	33.4	4	23.5	3	75.0	2	33.3
Work	1	33.3	6	35.3	1	25.0	0	0.0
Not Applicable	34	- - - -	20	- - - -	20	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 45. (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Perform Electrical Wiring								
School	1	25.0	4	30.8	1	25.0	2	33.3
Both School and Work	1	25.0	4	30.8	2	50.0	4	66.7
Work	2	50.0	5	38.4	1	25.0	0	0.0
Not Applicable	33	- - - -	24	- - - -	20	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Perform Preventative Maintenance on A Farm Tractor								
School	1	50.0	3	20.0	0	0.0	4	66.7
Both School and Work	0	0.0	7	46.7	2	100.0	2	33.3
Work	1	50.0	5	33.3	0	0.0	0	0.0
Not Applicable	35	- - - -	22	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Practice Safety								
School	1	3.3	2	8.0	0	0.0	1	16.7
Both School and Work	23	76.7	21	84.0	12	85.7	5	83.3
Work	6	20.0	2	8.0	2	14.3	0	0.0
Not Applicable	7	- - - -	12	- - - -	10	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Repair and Adjust A Small Gasoline Engine								
School	1	50.0	4	21.1	0	0.0	5	83.3
Both School and Work	1	50.0	11	57.9	4	100.0	1	16.7
Work	0	0.0	4	21.0	0	0.0	0	0.0
Not Applicable	35	- - - -	18	- - - -	20	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Set Up Farm Machinery								
School	2	66.7	4	25.0	0	0.0	2	33.3
Both School and Work	0	0.0	8	50.0	1	100.0	4	66.7
Work	1	33.3	4	25.0	0	0.0	0	0.0
Not Applicable	34	- - - -	21	- - - -	23	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 45.   (Continued)

Competencies	(n = 37) Student Learners No.	%	(n = 37) Student Workers No.	%	(n = 24) Employers No.	%	(n = 6) Teachers No.	%
Tune, Adjust, and Repair an Internal Combustion Engine								
School	1	33.3	4	28.6	0	0.0	4	66.7
Both School and Work	1	33.4	6	42.8	4	100.0	2	33.3
Work	1	33.3	4	28.6	0	0.0	0	0.0
Not Applicable	34	- - - -	23	- - - -	20	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Use A Parts Manual								
School	3	37.5	3	17.6	0	0.0	2	33.3
Both School and Work	0	0.0	9	52.9	4	80.0	4	66.7
Work	5	62.5	5	29.5	1	20.0	0	0.0
Not Applicable	29	- - - -	20	- - - -	19	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Use An Arc Welder								
School	2	50.0	15	57.7	0	0.0	6	100.0
Both School and Work	1	25.0	11	42.3	3	100.0	0	0.0
Work	1	25.0	0	0.0	0	0.0	0	0.0
Not Applicable	33	- - - -	11	- - - -	21	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Use an Acetylene Welder								
School	2	50.0	13	50.0	0	0.0	6	100.0
Both School and Work	1	25.0	11	42.3	3	100.0	0	0.0
Work	1	25.0	2	7.7	0	0.0	0	0.0
Not Applicable	33	- - - -	11	- - - -	21	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Use Surveying Equipment								
School	3	60.0	4	33.3	0	0.0	4	66.7
Both School and Work	1	20.0	6	50.0	1	100.0	2	33.3
Work	1	20.0	2	16.7	0	0.0	0	0.0
Not Applicable	32	- - - -	25	- - - -	23	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 45   (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Use Grinders, Drill Press, and Other Power Equipment								
School	2	28.6	10	38.5	0	0.0	5	83.3
Both School and Work	1	14.3	13	50.0	3	100.0	1	16.7
Work	4	57.1	3	11.5	0	0.0	0	0.0
Not Applicable	30	- - - -	11	- - - -	21	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Use Hand Shop Tools and Equipment								
School	2	28.6	10	38.5	0	0.0	4	66.7
Both School and Work	2	28.6	12	46.2	5	100.0	2	33.3
Work	3	42.8	4	15.3	0	0.0	0	0.0
Not Applicable	30	- - - -	11	- - - -	19	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Set Up Equipment								
School	1	16.7	8	32.0	0	0.0	3	50.0
Both School and Work	2	33.3	12	48.0	6	85.7	2	33.3
Work	3	50.0	5	20.0	1	14.3	1	16.7
Not Applicable	31	- - - -	12	- - - -	17	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

† Participants rating the competency not applicable with a rating of 5 were not used in calculating the percentage but used in the total number of participants.

Data presented in this table show that the school is the least indicated place for receiving training for the agricultural mechanics competencies. There were exceptions to this generalization. Follow a drafting plan for construction agricultural projects was given by 83.3 percent of the teachers and 66.6 percent of the student-workers as best acquired at school. Student-learners rated the school by 54.5 percent as the best place to develop this competency.

Most of the respondents among all groups thought that the best place to receive training for the competencies was at both the school and work place. As an example, 83.3 percent of the teachers, 85.7 percent of the employers, 84 percent of the student-learners, and 76.6 percent of the student-workers thought that both the school and work place was the best place to develop the skill of " practice safety".

This response was consistent with most of the 23 agricultural mechanics competencies. The student-learners placed more emphasis on the work place than the other groups of respondents. The student-learners were those enrolled in a cooperative education program. This was apparent with the following competencies adjust and repair a diesel engine, adjust and repair machinery, properly operate equipment, and perform electric wiring.

Crop and Soil Science Competencies.   This subsection presents and discusses the data about the perceptions of the four groups of respondents relative to the most desired location for receiving training for the 20 crop and soil science competencies needed for employment in agricultural-related occupations in Hawkins County, Tennessee. These data are shown in Table 46. Those respondents indicating not applicable were not used in tabulating the percentage.

Data presented in this table show that the school is the least indicated place for receiving training for the crop and soil science competencies. There were exceptions to

TABLE 46. Locations for Training of 20 Crop and Soil Science Competencies Needed for Gainful Employment in Agricultural-Related Occupations as Perceived by Students, Employers, and Teachers†

Competencies	(n = 37) Student Learners No.	%	(n = 37) Student Workers No.	%	(n = 24) Employers No.	%	(n = 6) Teachers No.	%
Advise Customers on Crop Varieties Adapted to the Area								
School	0	0.0	5	45.5	1	25.0	1	16.7
Both School and Work	0	0.0	6	54.5	2	50.0	5	83.3
Work	2	100.0	0	0.0	1	25.0	0	0.0
Not Applicable	35	- - - -	26	- - - -	20	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Advise Customers on Fertilizer Needs								
School	1	25.0	3	33.3	0	0.0	1	16.7
Both School and Work	0	0.0	5	55.6	4	80.0	5	83.3
Work	3	75.0	1	11.1	1	20.0	0	0.0
Not Applicable	33	- - - -	28	- - - -	19	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Advise Customers on Landscape Plant Materials								
School	1	33.3	5	45.5	0	0.0	2	33.3
Both School and Work	0	0.0	6	54.5	3	100.0	4	66.7
Work	2	66.7	0	0.0	0	0.0	0	0.0
Not Applicable	34	- - - -	26	- - - -	21	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Advise Customers on Safe Chemicals for Insect, Weeds or Herb Control								
School	2	40.0	7	58.4	0	0.0	1	16.7
Both School and Work	0	0.0	4	33.3	2	100.0	5	83.3
Work	3	60.0	1	8.3	0	0.0	0	0.0
Not Applicable	32	- - - -	25	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 46. (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Calibrate A Chemical Sprayer								
School	0	0.0	6	54.5	0	0.0	1	16.7
Both School and Work	0	0.0	4	36.4	2	66.7	4	66.6
Work	3	100.0	1	9.1	1	33.3	1	16.7
Not Applicable	34	- - - -	26	- - - -	21	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Calibrate A Fertilizer Distributor								
School	0	0.0	6	50.0	0	0.0	1	16.7
Both School and Work	0	0.0	4	33.3	2	100.0	4	66.6
Work	2	100.0	2	16.7	0	0.0	1	16.7
Not Applicable	35	- - - -	25	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Calibrate A Grain Drill								
School	0	0.0	3	42.9	0	0.0	1	16.7
Both School and Work	0	0.0	3	42.9	1	100.0	4	66.6
Work	1	100.0	1	14.2	0	0.0	1	16.7
Not Applicable	36	- - - -	30	- - - -	23	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Detect Nutritional and Disease Symptoms of Plants								
School	2	40.0	8	61.5	0	0.0	1	16.7
Both School and Work	0	0.0	4	30.8	4	100.0	5	83.3
Work	3	60.0	1	7.7	0	0.0	0	0.0
Not Applicable	32	- - - -	24	- - - -	20	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Discuss Market Trends with Agriculturalist								
School	0	0.0	2	25.0	0	0.0	2	33.3
Both School and Work	1	100.0	4	50.0	2	100.0	4	66.7
Work	0	0.0	2	25.0	0	0.0	0	0.0
Not Applicable	36	- - - -	29	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 46.   (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Establish and Maintain Landscaped Areas								
School	2	100.0	3	33.4	0	0.0	3	50.0
Both School and Work	0	0.0	4	44.4	2	100.0	3	50.0
Work	0	0.0	2	22.2	0	0.0	0	0.0
Not Applicable	35	- - - -	28	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Grow Nursery Stock								
School	0	0.0	6	50.0	0	0.0	2	33.3
Both School and Work	0	0.0	4	33.3	2	100.0	3	50.0
Work	2	100.0	2	16.7	0	0.0	1	16.7
Not Applicable	35	- - - -	25	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Grow Plants in A Greenhouse								
School	4	66.7	11	61.1	0	0.0	3	50.0
Both School and Work	0	0.0	3	16.7	2	100.0	3	50.0
Work	2	33.3	4	22.2	0	0.0	0	0.0
Not Applicable	31	- - - -	19	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Identify Fertilizer Materials								
School	2	28.6	7	38.9	0	0.0	3	50.0
Both School and Work	1	14.3	8	44.4	6	100.0	3	50.0
Work	4	57.1	3	16.7	0	0.0	0	0.0
Not Applicable	30	- - - -	19	- - - -	18	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Identify Field and Garden Crop Seeds and Plants								
School	2	28.6	7	43.7	0	0.0	3	50.0
Both School and Work	1	14.3	6	37.5	5	100.0	3	50.0
Work	4	57.1	3	18.8	0	0.0	0	0.0
Not Applicable	30	- - - -	21	- - - -	19	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 46. (Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Identify Insects that Affect Plants								
School	1	16.7	7	46.7	1	16.7	2	33.3
Both School and Work	2	33.3	6	40.0	5	83.3	4	66.7
Work	3	50.0	2	13.3	0	0.0	0	0.0
Not Applicable	31	- - - -	22	- - - -	18	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Identify Ornamental Plants								
School	1	25.0	8	50.0	0	0.0	2	33.3
Both School and Work	0	0.0	5	31.3	7	100.0	4	66.7
Work	3	75.0	3	18.7	0	0.0	0	0.0
Not Applicable	33	- - - -	21	- - - -	17	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Identify Weeds								
School	1	16.7	8	37.5	1	20.0	2	33.3
Both School and Work	3	50.0	8	37.5	4	80.0	4	66.7
Work	2	33.3	4	25.0	0	0.0	0	0.0
Not Applicable	31	- - - -	17	- - - -	19	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Read and Interpret Soil Test Results								
School	1	33.3	5	45.5	0	0.0	4	66.7
Both School and Work	0	0.0	5	45.5	2	66.7	2	33.3
Work	2	66.7	1	9.0	1	33.3	0	0.0
Not Applicable	34	- - - -	26	- - - -	21	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0
Recognize Crop Grades and Plant Quality								
School	1	20.0	5	45.5	0	0.0	3	50.0
Both School and Work	1	20.0	4	36.4	2	100.0	3	50.0
Work	3	60.0	2	18.1	0	0.0	0	0.0
Not Applicable	32	- - - -	26	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

TABLE 46.　(Continued)

Competencies	(n = 37) Student Learners		(n = 37) Student Workers		(n = 24) Employers		(n = 6) Teachers	
	No.	%	No.	%	No.	%	No.	%
Select Soil Media for Greenhouse Plants								
School	1	33.3	7	50.0	0	0.0	5	83.3
Both School and Work	0	0.0	3	21.4	2	100.0	1	16.7
Work	2	66.7	4	28.6	0	0.0	0	0.0
Not Applicable	34	- - - -	23	- - - -	22	- - - -	0	- - - -
TOTAL	37	100.0	37	100.0	24	100.0	6	100.0

† Participants rating the competency not applicable with a rating of 5 were not used in calculating the percentage but used in the total number of participants.

this generalization. Growing plants in a green house was given by 66.7 percent of the student-learners, 61.1 percent of the student-workers, and 50 percent of the teachers as best acquired at school. Employers did not rate the school as a place to develop this competency. Eighty-three percent of the teachers, 50 percent of the student-workers, and 33.3 percent of the student-learners also thought that the school was the best place to develop the skill of selecting soil media for greenhouse plants, and 66.7 percent of the teachers thought that reading and interpreting soil test results could best be developed at school.

Most of the respondents among all groups thought that the best place to receive training for the competencies was at both the school and work place. As an example, 83.3 percent of the teachers, 54.5 percent of the student-workers, and 50 percent of the employers thought that both the school and work place was the best place to develop the skill "advise customers on crop varities adapted to the area." This was in contrast with 100 percent of the student-learners who indicated the work place was the best place to develop the skill.

This response was consistent with most of the 20 crop and soil competencies. The student-learners placed more emphasis on the work place than the other groups of respondents. The student-learners were those enrolled in a cooperative education program. This was apparent with the following competencies advise customers on fertilizer needs, advise customers on landscape plant materials, calibrate a grain drill, establish and maintain landscaped areas, and identify fertilizer materials.

CHAPTER V

SUMMARY OF MAJOR FINDINGS

This chapter is divided into five major sections. The problem and specific objectives of the study are discussed in the first section. Procedures of the study are summarized in the second section. The third section contains the major findings of the study. Implications and recommendations are located in the fourth section and recommendations for further study are discussed in the fifth section.

Statement of the Problem

In attempting to meet the new role for agricultural education, the teachers in Hawkins County, Tennessee, utilized a cooperative program and placed students in off-farm agricultural occupations. This gave rise to the following problem: What agricultural competencies are needed for entry-level employment in these off-farm agricultural occupations and where should the students learn the needed skills?

To answer these questions, the following parameters were studied: 1.) relative importance of selected agricultural competencies; and 2.) location for receiving training for these competencies. The responses were perceived by students, teachers and employers.

Purpose and Objectives

Several elements of the problem were analyzed in order to derive the objectives of the study. The objectives of the study were to determine: 1.) The demographic characteristics of the students, teachers and employers participating in the agricultural cooperative education program in Hawkins County, Tennessee; 2.) The types of agricultural-related businesses that are participating as a training center for the

agricultural cooperative education program in Hawkins County; 3.) The agricultural-related competencies that students, teachers and employers perceive as being needed for students to be employed in agricultural-related businesses; 4.) The significant differences among the persons involved in their perceptions to the level of importance of the off-farm agricultural competencies; 5) Places where the students, employers, and teachers perceive that the training for the needed competencies should take place.

Scope and Limitation

The study was limited to all students in Hawkins County, Tennessee, enrolled in agricultural education classes who were working on jobs for their supervised agricultural experience programs. This included student-learners and student-workers at both Cherokee and Volunteer High Schools. The study was limited to Hawkins County, Tennessee. The researcher felt that a sufficient number of students, employers and teachers were involved in the off-farm agricultural program to validate the study. A total population of all involved in the program was included in the study. The total population of the teachers was limited to only six. The low number of teachers involved in the study may have altered these data on a few competencies, but the researcher felt that extension of the same research to a larger scale would still produce similar findings.

Procedures

This division is subdivided into four subsections. Population and samples used for collecting the data are discussed in the first subsection. Discussion of the instrument used to collect the data is in the second subsection. The third subsection contains the procedures used in collecting the data while the statistical procedures are located in the fourth subsection.

Population and Samples

The study was limited to the Agricultural Education Cooperative Education Program in Hawkins County School System, Hawkins County, Tennessee, during the 1988-89 academic year. The total population of the study consisted of 75 students enrolled in agricultural education, 24 employers/supervisors in the cooperative education training centers, and six agricultural education teachers involved in the program. The student sample for the study was compiled from the agricultural education registration roll and cooperative education training plans on file at the two schools.

Instrumentation

The instruments, found in appendix B, were developed by the researcher after reviewing related studies on cooperative education programs. The instruments were in the form of a questionnaire. The first part of the questionnaire dealt with the demographic data of the students, training centers, and teachers. The second part, a Likert-type questionnaire, determined the need for the competencies to become gainfully employed in agricultural-related businesses and the perceptions of each group on area training of the competencies. The competencies were rated using two different scales. The first scale allowed the participants to determine the intensity for each competency, which included the following determinants: 1) little or none; 2) some; 3) much; 4) very much; and 5) not applicable. The second part of the scale indicated the location in which the competency should be taught using: 1) school; 2) both school and work; 3) work; and 4) not applicable.

Procedure for Collecting Data

Contacts were made with the appropriate school officials in Hawkins County about the feasibility for collecting data in that school system. The proposal and instruments were reviewed by Hawkins County Superintendent of Schools and the Hawkins County

Board of Education and approval for the study was granted. A letter of consent was distributed to each student participating in a supervised agricultural experience program in the county by the researcher. The letter of consent included a brief summary of the purpose of the study. Once all necessary signatures were secured, a letter requesting participation in the study was delivered to each student's employer by the student. Employer's name, address, and telephone number were obtained from students. Appointments were scheduled via telephone with each employer. This allowed the researcher to hand deliver and collect the employer's instrument and provide both oral and written directions to ensure a 100 percent participation rate by the employers. Student's and teacher's questionnaires and directions were distributed during the student's agricultural education class by the researcher to ensure correct completion of the instruments.

Statistical Procedures

The data gathered by the researcher were computed by the University of Tennessee Computing Center. Descriptive statistics and analysis of variance were used to summarize the data. Duncan's Multiple Range Test was used as the post hoc test to check for significant differences among the groups for each perceived competency. The means were calculated according to the designated number for the assigned ability level (1 = little to none, 2 = some, 3 = much, 4 = very much). If a participant selected "not applicable" by rating a number five, this was not used in the means calculation. The same procedure was in selecting the most desired place for receiving the training of the competencies (1 = school, 2 = both school and work, 3 = work). A rating of four, "not applicable", was not used in calculating the percentage.

Only the competencies which showed a significant difference at the .05 level between the means of the designated groups were treated by Duncan's Multiple Range

Test. This located where the significant differences existed between the groups. The groups with the higher calculated mean rated that specific competency as being more important. A lower rated mean score would indicate that the group felt that the competency was not as important.

Major Findings

The following summary statements were based upon the preceding findings of the study.

There were 75 students receiving cooperative education training through the agricultural education program in Hawkins County, Tennessee, during the 1988-89 school year. Of these nearly 71 percent were seniors, 12 percent juniors and 17 percent sophomores. Forty-four percent of the students had only one year of agricultural education, in contrast to about 25 percent being enrolled in agricultural education for three to four years. A majority of the participants, 66.7 percent of the employers and 90.7 percent of the students were from a rural or farm background while all of the teachers were from a farm background.

About 83.3 percent of the teachers had taught for 11 or more years and 66.7 percent had offered on-the-job training for 11 or more years in contrast to 33.3 percent of the teachers offering on-the-job training for school credit for a period of 4 to 10 years.

Twenty-five general business competencies were preceived as being more important by all groups as evident by higher mean scores than the agricultural mechanics, animal science or the crop and soil science competencies. The competency, "following instructions", was ranked the highest as being the most important business competency for entry-level employment as perceived by the four groups. The teachers mean scores for this competency was 4.000; employers, 3.739; student-learners,

3.703; and the student-workers, 3.667. Even with the student-workers placing less importance on the general business competencies than the other groups, there were six skills which had a mean score of 3.000 or higher among the groups. The other competencies perceived of much importance included care for tools and equipment maintain good personal appearance, meet the public, use correct English, and use good telephone procedures. The student-workers placed less importance on the business competencies than the other groups. This was evident with the competencies basic knowledge of computer skills, making bank deposits, and filing records and reports. The ability to direct or supervise others and file records and reports were ranked of least importance by the groups.

Among the 22 animal science competencies the mean scores were rated higher by the agricultural education teachers than the other groups. Six of the 22 animal science competencies were perceived as having some or much importance which pertained to the food technology area. The student-learners and student-workers felt that the abilities to advise customer on equipment needs for specialized animal enterprises; to recognize USDA grades for beef and/or lamb; to recognize primal meat cuts were ranked as some importance. However, employers felt little or no importance for these competencies to secure entry-level employment in agricultural-related occupations. Student-learners felt that the competencies that dealt with raising farm animals were of the least importance by giving a mean score of 1.000.

The teachers assessed the 23 agricultural mechanics competencies higher than the other groups. The employers deemed the majority of these competencies as having some importance for securing entry-level employment. Of the 23 agricultural mechanics competencies, practicing safety and properly operating equipment were perceived as the most important agricultural mechanics competencies for securing

entry-level employment by all groups which received mean scores of 3.111 through 4.000. All of the agricultural mechanic competencies were perceived as having some importance by all the groups except the competencies dealing with diesel engines, advising farmers on machinery needs and the construction of agricultural building and projects.

Eleven of the 20 crop and soil science competencies were perceived as having some to much importance for securing entry-level employment by all four groups of participants. Of these 11 competencies the majority dealt with horticultural plants and basic plant growth. Student-workers perceived 16 of the 20 crop and soil science competencies being of more importance in securing entry-level employment than the student-learners which placed a higher value on only four of the competencies. Discussing market trends with agriculturalist was the only crop and soil science competency perceived as having little or no importance for securing entry-level employment by three of the four groups of participants.

Implications

Critical analysis of the data presented in this study in relationship to the new thrust and technologies in agriculture suggest the following implications:

1. The agricultural education cooperative education programs in Hawkins County, Tennessee, should continue and be expanded in both of the high schools, especially in the area of agricultural business competencies to meet the demand of the industry and community needs.

2. According to the mean scores of the individual groups, the student-learners which receive cooperative credit toward graduation rated the competencies more like the employers than the student-workers. Thus making the student-learners more employable for entry level occupations than the student-workers. The cooperative

education program in the agricultural education department at Volunteer High School should be expanded to include cooperative education for credit using the cooperative education program at Cherokee High School as a guide.

3. More emphasis should be placed on skills dealing with safety, proper operation of tools and equipment, basic office management, and people skills.

4. Enrollment in the agricultural cooperative education programs should be of a selective process based on the needs and goals of the students.

5. Guidance of the high school students should include more information about the opportunities in agricultural-related occupations. This should include the opportunities through the cooperative education program for the average and college bound students.

6. Better communication should exist between the guidance councelors, agricultural education teachers, and industry personnel to ensure the commitment of quality education in the area of agricultural-related occupations for the students.

According to the findings of the study, the cooperative education program in Hawkins County, Tennessee, needs to be revised in order to better prepare the students for gainful employment in the agricultural industry or for continuing their training through post secondary institutions. The first step of these revisions should be the implementation of a cooperative education program for credit at Volunteer High School. The cooperative education program for credit at Cherokee High School should be used as the model for this revision. The second step should be the revision of the cooperative education program for the student-workers at both high schools. This is evident by the deviation from the mean of the student-workers and the other groups. Revisions for the cooperative education for credit at Cherokee High School should include an increased emphasis on people and basic office management skills.

Recommendations for Further Study

Similar studies should be made individually for each competency area every fourth year to keep an updated curriculum and provide the best possible training for agricultural education students in Hawkins County, Tennessee, to secure gainful employment in agricultural-related occupations. A study should be conducted every five to ten years to determine the needed competencies to keep up with changing technologies.

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APPENDICES

Appendix A

To: Mr. Mike Gentry
             Agricultural Education Teacher
             McMinn County Vocational Center

From: Steven W. Gass, Graduate Assistant
             Department of Agricultural and Extension Education

Date: January 25, 1989

Subject: Field Testing of Survey Instruments

This letter is in regard to our telephone conversation on January 25, 1989, about field testing the survey instrument for my thesis. The Human Subjects Committee at the University of Tennessee has granted permission to conduct my master thesis study, "An Assessment of Competencies Needed by Agricultural Cooperative Education Students in Hawkins County, Tennessee". The field test has been scheduled for Thursday, February 2, 1989.

As mentioned before, the agricultural education program at Athens is similar to the program that was selected for the study. Field testing the instruments in a similar situation is vital to the accuracy and validity of the study. Three individual instruments, student, employer, and teacher will be tested during the field test. Each survey instrument will take approximately 30 minutes to complete.

Your assistance and cooperation in conducting the field test for the study will be greatly appreciated.

cc: James Parris

To: Hawkins County Agricultural Education Teachers

From: Steven W. Gass, Graduate Assistant
            Department of Agricultural and Extension Education

Date: January 27, 1989

Subject: Assessment of Agricultural Competencies

This letter is in regard to our telephone conversation on Janurary 30, 1989, about assessment of agricultural-related competencies. To prevent excess disruption to your schedule, I will need to have the following information:

> -Number of students placed for experience in agricultural-related
>   occupations (non-farm).
> -The number of these students in each class period.
> -Number of employers currently employing your students.

Upon my arrival to the county on February 13, 1989, I will need to schedule the administration of the survey for the students and employers with you. This will be an attempt to increase the efficieny of the study.

Your participation, help, and guidance in collecting the data for this study will be greatly appreciated.

cc: Bill Justice
     Lynn Norris

To: Participants of the Study

From: Dr. John Todd, Professor
                    Agricultural and Extension Education

                    Steven W. Gass, Graduate Assistant
                    Agricultural and Extension Education

Date: February 9, 1989

Subject: Consent for Participation

       A study is being conducted in the Hawkins County School System to determine the basic competencies and/or skills that are required for a high school graduate to be employed in an agricultural-related business in the county. Findings from the study will help improve the quality of training that students are now receiving in the agricultural education programs at Cherokee and Volunteer High Schools. The Hawkins County Board of Education has endorsed the study and encourages full participation from all persons involved with the study.

       All information gathered by the researcher will be kept highly <u>confidential</u>. The findings from the study will be reported as whole and not narrowed down to a specific student, employer, or teacher.

       Your participation will be appreciated and all information will be kept <u>confidential</u>. Your involvement in the study will help ensure a high quality of education for future students in Hawkins County Schools.

       I have read the above and fully understand that any information that I provide will not in any way be connected with me, my employer, or my teacher.

<u>Any participant under the age of eighteen (18) must have a parent or guardian signature.</u>

Participant's Signature	Date

Parent's or Guardian's Signature	Date

LIST OF TRAINING CENTERS PARTICIPATING IN THE STUDY

CLASSIFICATION AND NAME

TECHNICAL SERVICES

> Hawkins County Highway Department
> Johnson & Johnson Real Estate

SUPPLY/SERVICE

> Fawbush Market
> Goody's Family Clothing, Inc.
> Growers & Planters Tobacco Warehouse
> Kingsport Livestock Auction Corporation
> Revco Drug #792
> Rogersville Livestock Market
> Whitesbury Market

MECHANICS

> Hood's Metal Finishing
> Rogersville Natural Gas Company
> Tate's Small Engine Repair

FOOD SERVICES

> Food City-- Highway 66
> Food City--Mt. Carmel
> Food Lion
> Hardee's
> Long John Silvers
> McDonald's
> Oakwood Food Market
> Southside Market

HORTICULTURAL

> Hawkins County Memorial Hospital
> K-Mart 9301
> Martin's Greenhouse
> Silver Lake Garden Center

Appendix B

AN ASSESSMENT OF COMPETENCIES NEEDED BY AGRICULTURAL COOPERATIVE EDUCATION STUDENTS IN HAWKINS COUNTY, TENNESSEE

PURPOSE FOR THE STUDY

The purpose for this survey is to assess the competencies needed by agricultural education students to be employed in agricultural-related occupations. The results of this study will help improve the quality of education for students in Hawkins County participating in supervised agricultural experience programs. Your participation will have an impact on the quality of future supervised agricultural experience programs conducted by the agricultural education programs in Hawkins County and in the state of Tennessee. Information collected for this study will be kept highly confidential and will not be connected with any student, employer, or agricultural education teacher. Your participation and input will be greatly appreciated.

DIRECTIONS

The survey is divided into two parts. The first part will be to gather demographic data of the individual completing the questionnaire. The second part will be to gather the importance and need of each competence listed; as well as, the location of where training of the competence should be obtained. Please read each competency carefully. Additional competencies may be added at the end of each sub category in the space provided that you feel are necessary in the business you are employed. If more room is needed for extra competencies, please feel free to add them on the back of the survey.

The first part of the survey can be completed by filling in the blank provided or checking the appropriate answer. In the second part, circle the appropriate ability level and the location of training for that competency.

COMPETENCIES NEEDED FOR EMPLOYMENT IN AGRICULTURAL RELATED BUSINESSES

(1) Card Number 1

(2) STUDENT REPORT 1

(3-5) Respondant Number 000

I. General Information

(6)   1. School Attending:

               ____ (01) Cherokee   ____ (02) Volunteer

(7)   2. Year in school

               ____ (01) Freshman   ____ (03) Junior
               ____ (02) Sophomore   ____ (04) Senior

(8)   3. Year(s) enrolled in Agricultural Education?

               ____ (01) one year   ____ (03) three years
               ____ (02) two years   ____ (04) four years

(9)   4. Which of the following best describes your background?

               ____ (01) Farm

               ____ (02) Rural {non farm}

               ____ (03) Urban or Suburban

(10-11) 5. Place of employment _____

(12-13) 6. Job title _____

(14-15) 7. Average hours worked per week _____

        8. Type of business:

               (01) Yes   (02) No

        Please use the above code to answer each of the following business classifications.

               ____ (16) Production (factory)   ____ (20) Sales/Services
               ____ (17) Processing   ____ (21) Wholesale
               ____ (18) Retail   ____ (22) Horticulture
               ____ (19) Production Agriculture ____ (23) Other

(24-25)   9.   Who found your present job?

       _____   (01)   Self
       _____   (02)   Teacher
       _____   (03)   Other _____

(26)   10.   How long have you been working with your current employer?

       ____ (01) One to Three Month(s)
       ____ (02) Four to Six Months
       ____ (03) Seven to Nine Months
       ____ (04) Ten Months or More

II. Needed Competencies

Circle the appropriate ability level of the needed competences and the place where the student should receive instruction and/or training of the needed competencies to be employed in your business. The ability level represents or reflect the ability or accuracy needed to perform the competency or skill and not the number of times the student performs that competency or skill. (Note: Circle only one ability level and one place of training for each competency.)

Ability levels:

        1 - Little to None   4 - Very Much
        2 - Some   5 - Not Applicable
        3 - Much

Place of Training:

        1 - School   3 - Work
        2 - Both School and Work   4 - Not Applicable

			Ability Level	Place of Training
A. General Business Competencies				
(37-38)	1.	Apply principles of salesmanship	1 2 3 4 5	1 2 3 4
(39-40)	2.	Care for tools and equipment	1 2 3 4 5	1 2 3 4
(41-42)	3.	Complete records and reports	1 2 3 4 5	1 2 3 4
(43-44)	4.	Direct or supervise others	1 2 3 4 5	1 2 3 4
(45-46)	5.	Display merchandise	1 2 3 4 5	1 2 3 4
(47-48)	6.	Drive a car or travel safely	1 2 3 4 5	1 2 3 4
(49-50)	7.	Evaluate credit risk of customer	1 2 3 4 5	1 2 3 4
(51-52)	8.	File records and reports	1 2 3 4 5	1 2 3 4
(53-54)	9.	Follow instructions	1 2 3 4 5	1 2 3 4
(55-56)	10.	Inventory merchandise	1 2 3 4 5	1 2 3 4
(57-58)	11.	Keep record of sales and expenses	1 2 3 4 5	1 2 3 4

			Ability Level	Place of Training
(59-60)	12.	Maintain good housekeeping	1 2 3 4 5	1 2 3 4
(61-62)	13.	Maintain good personal appearance	1 2 3 4 5	1 2 3 4
(63-64)	14.	Make bank deposits	1 2 3 4 5	1 2 3 4
(65-66)	15.	Make mathematical calculation accurately	1 2 3 4 5	1 2 3 4
(67-68)	16.	Make out a sales receipt	1 2 3 4 5	1 2 3 4
(69-70)	17.	Meet the public	1 2 3 4 5	1 2 3 4
(71-72)	18.	Use cash register, adding machine, scales, etc.	1 2 3 4 5	1 2 3 4
(73-74)	19.	Basic knowledge of computer skills	1 2 3 4 5	1 2 3 4
(75-76)	20.	Use correct English	1 2 3 4 5	1 2 3 4
(77-78)	21.	Write legibly	1 2 3 4 5	1 2 3 4
(79-80)	22.	Use good telephone procedures	1 2 3 4 5	1 2 3 4

(1)Card No. 2

			Ability Level	Place of Training
(2-3)	23.	Properly display seasonal stock	1 2 3 4 5	1 2 3 4
(4-5)	24.	Rotate stock	1 2 3 4 5	1 2 3 4
(6-7)	25.	Properly filling out job applications	1 2 3 4 5	1 2 3 4
(8-10)	26.	OTHER _____	1 2 3 4 5	1 2 3 4
	27.	OTHER _____	1 2 3 4 5	1 2 3 4
	28.	OTHER _____	1 2 3 4 5	1 2 3 4

B. Animal Science Competencies

			Ability Level	Place of Training
(11-12)	1.	Advise customers on chemicals for controlling animal pests	1 2 3 4 5	1 2 3 4

			Ability Level	Place of Training
(13-14)	2.	Advise customers on equipment needs for specialized animal enterprises	1 2 3 4 5	1 2 3 4
(15-16)	3.	Advise customers on feeds for farm animals.	1 2 3 4 5	1 2 3 4
(17-18)	4.	Advise customers on housing requirements for farm animals	1 2 3 4 5	1 2 3 4
(19-20)	5.	Advise customers on management practices of animals	1 2 3 4 5	1 2 3 4
(21-22)	6.	Advise customers on medicines or chemicals for controlling common diseases of farm animals	1 2 3 4 5	1 2 3 4
(23-24)	7.	Balance rations for farm animals	1 2 3 4 5	1 2 3 4
(25-26)	8.	Demonstrate the use of branding, tattooing, castrating equipment, etc.	1 2 3 4 5	1 2 3 4
(27-28)	9.	Discuss nutrient needs of farm animals	1 2 3 4 5	1 2 3 4
(29-30)	10.	Identify different farm animals and their respective breeds	1 2 3 4 5	1 2 3 4
(31-32)	11.	Operate feed mixing and grinding equipment	1 2 3 4 5	1 2 3 4
(33-34)	12.	Predict price trends and cycles of farm animals	1 2 3 4 5	1 2 3 4
(35-36)	13.	Recognize animal grades	1 2 3 4 5	1 2 3 4
(37-38)	14.	Recognize USDA grades for beef, and/or lamb	1 2 3 4 5	1 2 3 4
(39-40)	15.	Recognize primal meat cuts	1 2 3 4 5	1 2 3 4
(41-42)	16.	Recognize sub-primal meat cuts	1 2 3 4 5	1 2 3 4
(43-44)	17.	Recognize retail meat cuts	1 2 3 4 5	1 2 3 4

			Ability Level	Place of Training

(45-46) 18. Understand the principles that cause meat spoilage   1 2 3 4 5   1 2 3 4

(47-48) 19. Understand practices that prevent meat spoilage   1 2 3 4 5   1 2 3 4

(49-50) 20. Identify different types of packaging procedures to prevent spoilage   1 2 3 4 5   1 2 3 4

(51-52) 21. Demonstrate proper sanitary meat handling procedures   1 2 3 4 5   1 2 3 4

(53-54) 22. Understand the cutability of meat. (cutting yield and dollar value)   1 2 3 4 5   1 2 3 4

(55-57) 23. OTHER _____   1 2 3 4 5   1 2 3 4

              24. OTHER _____   1 2 3 4 5   1 2 3 4

              25. OTHER _____   1 2 3 4 5   1 2 3 4

C. Agricultural Mechanics Competencies

(58-59) 1. Adjust and repair a diesel engine   1 2 3 4 5   1 2 3 4

(60-61) 2. Adjust and repair machinery   1 2 3 4 5   1 2 3 4

(62-63) 3. Advise farmers on machinery needs   1 2 3 4 5   1 2 3 4

(64-65) 4. Construct buildings used in agriculture   1 2 3 4 5   1 2 3 4

(66-67) 5. Figure a bill of material for building construction   1 2 3 4 5   1 2 3 4

(68-69) 6. Follow a drafting plan for construction agricultural projects   1 2 3 4 5   1 2 3 4

(70-71) 7. Properly operate equipment   1 2 3 4 5   1 2 3 4

(72-73) 8. Order and stock parts   1 2 3 4 5   1 2 3 4

			Ability Level	Place of Training
(74-75)	9.	Overhaul a large farm engine	1 2 3 4 5	1 2 3 4
(76-77)	10.	Overhaul a small gasoline engine	1 2 3 4 5	1 2 3 4
(78-79)	11.	Perform electrical wiring	1 2 3 4 5	1 2 3 4

(1) Card No. 3

(2-3)	12.	Perform preventative maintenance on a farm tractor	1 2 3 4 5	1 2 3 4
(4-5)	13.	Practice safety	1 2 3 4 5	1 2 3 4
(6-7)	14.	Repair and adjust a small gasoline engine	1 2 3 4 5	1 2 3 4
(8-9)	15.	Set up farm machinery	1 2 3 4 5	1 2 3 4
(10-11)	16.	Tune, adjust, and repair an internal combustion engine	1 2 3 4 5	1 2 3 4
(12-13)	17.	Use a parts manual	1 2 3 4 5	1 2 3 4
(14-15)	18.	Use an arc welder	1 2 3 4 5	1 2 3 4
(16-17)	19.	Use an acetylene welder	1 2 3 4 5	1 2 3 4
(18-19)	20.	Use surveying equipment	1 2 3 4 5	1 2 3 4
(20-21)	21.	Use grinders, drill press, and other power equipment	1 2 3 4 5	1 2 3 4
(22-23)	22.	Use hand shop tools and equipment	1 2 3 4 5	1 2 3 4
(24-25)	23.	Set up equipment	1 2 3 4 5	1 2 3 4
(26-28)	24.	OTHER _____	1 2 3 4 5	1 2 3 4
	25.	OTHER _____	1 2 3 4 5	1 2 3 4
	26.	OTHER _____	1 2 3 4 5	1 2 3 4

D. Crop and Soil Science Competencies

(29-30)	1.	Advise customers on crop varieties adapted to the area	1 2 3 4 5	1 2 3 4

			Ability Level						Place of Training			

(31-32)   2.   Advise customers on fertilizer needs   1 2 3 4 5   1 2 3 4

(33-34)   3.   Advise customers on landscape plants material   1 2 3 4 5   1 2 3 4

(35-36)   4.   Advise customers on safe chemicals for insect, weeds or herb control   1 2 3 4 5   1 2 3 4

(37-38)   5.   Calibrate a chemical sprayer   1 2 3 4 5   1 2 3 4

(39-40)   6.   Calibrate a fertilizer distributor   1 2 3 4 5   1 2 3 4

(41-42)   7.   Calibrate a grain drill   1 2 3 4 5   1 2 3 4

(43-44)   8.   Detect nutritional and disease symptoms of plants   1 2 3 4 5   1 2 3 4

(45-46)   9.   Discuss market trends with agriculturalist   1 2 3 4 5   1 2 3 4

(47-48) 10.   Establish and maintain landscaped areas   1 2 3 4 5   1 2 3 4

(49-50) 11.   Grow nursery stock   1 2 3 4 5   1 2 3 4

(51-52) 12.   Grow plants in a greenhouse   1 2 3 4 5   1 2 3 4

(53-54) 13.   Identify fertilizer materials   1 2 3 4 5   1 2 3 4

(55-56) 14.   Identify field and garden crop seeds and plants   1 2 3 4 5   1 2 3 4

(57-58) 15.   Identify insects that affect plants   1 2 3 4 5   1 2 3 4

(59-60) 16.   Identify ornamental plants   1 2 3 4 5   1 2 3 4

(61-62) 17.   Identify weeds   1 2 3 4 5   1 2 3 4

(63-64) 18.   Read and interpret soil test results   1 2 3 4 5   1 2 3 4

(65-66) 19.   Recognize crop grades and plant quality   1 2 3 4 5   1 2 3 4

(67-68) 20.   Select soil media for greenhouse plants   1 2 3 4 5   1 2 3 4

			Ability Level	Place of Training
(69-71)	21.	OTHER _____	1 2 3 4 5	1 2 3 4
	22.	OTHER _____	1 2 3 4 5	1 2 3 4
	23.	OTHER _____	1 2 3 4 5	1 2 3 4

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SWG 1-89

An Assessment of Competencies Needed by Agricultural Cooperative Education Students in Hawkins County, Tennessee

Purpose for the Study

The University of Tennessee is conducting a study of competencies needed by high school graduates to become employed in entry-level occupations in Hawkins County, Tennessee. The findings from the study will be used by Hawkins County School System and Tennessee Department of Education to update the present cooperative education program within the high schools.

Directions for Completing the Questionnaire Form

Each questionnaire will contain computer codes necessary to tabulate the information collected from the questionnaire. Some of these codes are as follows:

(1)   Card Number 1
(2)   Business Report 2
(3-4) Respondent Number   00

The name of your establishment will only be used on a master list of businesses participating in the study and not connected individually to any of the findings in the study.

The questionnaire is divided into two parts. The first part deals with general information about the business and the person completing the questionnaire. This section can be completed by placing a check mark beside the appropriate response. **Note:** Use the code (01) for yes and (02) for no in regards to classification of your business in question number four {4}.

The second part contains a list of general competencies needed by high school graduates to be employed in entry-level occupation. To avoid repetition, each competency is listed only once under one of the sub headings. Therefore, it is very important to read all the competencies under each sub heading.

Each competency will need to be ranked twice by circling the correct number on each scale. The first ranking is a 1 to 5 Ability Level Scale. The ability level refers to the ability in which the student needs to perform the competency (skill) and not the number of times performed. When ranking each competency use the following ability levels: 1-Little to None; 2-Some; 3-Much; 4-Very Much; and 5- Not Applicable (Does not Apply). The second ranking is a 1 to 4 Place of Training Scale. This scale refers to the place in which the student should receive the training for each individual competency. Use the following Place of Training Scale: 1-School; 2-Both School and Work; 3-Work; and 4-Not Applicable (Does Not Apply).

At the end of each sub-heading, a space is provided for you to list additional competencies needed for entry-level employment in your business not covered in the questionnaire.

COMPETENCIES NEEDED FOR EMPLOYMENT IN
AGRICULTURAL RELATED BUSINESSES

(1) Card Number. _1_
(2) BUSINESS REPORT _2_
(3-4) Respondent Number _00_

I. <u>General Information</u>

(5-6)   1. Name of firm: _____

           2. Address: _____

(7-8)   3. Job title: _____

(9)   4. Type of business:

               (01) Yes   (02) No

               Please use the above code to answer each of the following business classifications.

               ____ (10) Production (factory)   ____ (14) Sales/Services
               ____ (11) Processing   ____ (15) Wholesale
               ____ (12) Retail   ____ (16) Horticulture
               ____ (13) Production Agriculture   ____ (17) Other

(18-19) 5. Product produced, manufactured, sold, or serviced:

           _____

(20-21) 6. How many years have you been employed in this agriculture related business?

               ____ (01) 1 to 3 year(s)   ____ (03) 7 to 9 years
               ____ (02) 4 to 6 years   ____ (04) 10 years or more

(22)   7. How many years has this business been in operation?

               ____ (01) 1 to 3 year(s)   ____ (03) 7 to 9 years
               ____ (02) 4 to 6 years   ____ (04) 10 years or more

(23)   8. Which category best describes your background?

               ____ (01) Farm
               ____ (02) Rural {non farm}
               ____ (03) Urban or Suburban

(24)   9. Were you ever employed in an agriculture-related business before your present position?

     ____ (01) Yes   ____ (02) No

(25)   (9. cont.) If yes, how many years?

     ____ (01) 1 year   ____ (04) 4 years
     ____ (02) 2 years   ____ (05) 5 years or more
     ____ (03) 3 years

(26)   10. Have you ever had formal training in agriculture?

     ____ (01) Yes   ____ (02) No

(27)   If yes, which one(s) applies:

     ____ (01) High School
     ____ (02) College
     ____ (03) State Area Vocational School or Center
     ____ (04) Other (Specify)_____

(28)   11. How many years have you been supervising vocational agriculture cooperative education students?

     ____ (01) 1 year   ____ (04) 4 years
     ____ (02) 2 years   ____ (05) 5 years or more
     ____ (03) 3 years

(29-31)   12. Number of employees supervised: _____

(32-34)   13. Turn over rate of employees per year: _____

(35-36)   14. What is the most desirable competency or skill you want in a new employee?_____

II. Needed Competencies

Circle the appropriate ability level of the needed competences and the place where the student should receive instruction and/or training of the needed competencies to be employed in your business. The ability level represents or reflect the ability or accuracy needed to perform the competency or skill and not the number of times the student performs that competency or skill. (Note: Circle only one ability level and one place of training for each competency.)

Ability levels:

1 - Little to None	4 - Very Much
2 - Some	5 - Not Applicable
3 - Much	

Place of Training:

1 - School	3 - Work
2 - Both School and Work	4 - Not Applicable

			Ability Level	Place of Training

A. General Business Competencies

(37-38)	1.	Apply principles of salesmanship	1 2 3 4 5	1 2 3 4
(39-40)	2.	Care for tools and equipment	1 2 3 4 5	1 2 3 4
(41-42)	3.	Complete records and reports	1 2 3 4 5	1 2 3 4
(43-44)	4.	Direct or supervise others	1 2 3 4 5	1 2 3 4
(45-46)	5.	Display merchandise	1 2 3 4 5	1 2 3 4
(47-48)	6.	Drive a car or travel safely	1 2 3 4 5	1 2 3 4
(49-50)	7.	Evaluate credit risk of customer	1 2 3 4 5	1 2 3 4
(51-52)	8.	File records and reports	1 2 3 4 5	1 2 3 4
(53-54)	9.	Follow instructions	1 2 3 4 5	1 2 3 4
(55-56)	10.	Inventory merchandise	1 2 3 4 5	1 2 3 4
(57-58)	11.	Keep record of sales and expenses	1 2 3 4 5	1 2 3 4

			Ability Level	Place of Training
(59-60)	12.	Maintain good housekeeping	1 2 3 4 5	1 2 3 4
(61-62)	13.	Maintain good personal appearance	1 2 3 4 5	1 2 3 4
(63-64)	14.	Make bank deposits	1 2 3 4 5	1 2 3 4
(65-66)	15.	Make mathematical calculation accurately	1 2 3 4 5	1 2 3 4
(67-68)	16.	Make out a sales receipt	1 2 3 4 5	1 2 3 4
(69-70)	17.	Meet the public	1 2 3 4 5	1 2 3 4
(71-72)	18.	Use cash register, adding machine, scales, etc.	1 2 3 4 5	1 2 3 4
(73-74)	19.	Basic knowledge of computer skills	1 2 3 4 5	1 2 3 4
(75-76)	20.	Use correct English	1 2 3 4 5	1 2 3 4
(77-78)	21.	Write legibly	1 2 3 4 5	1 2 3 4
(79-80)	22.	Use good telephone procedures	1 2 3 4 5	1 2 3 4

(1)Card No. 2

			Ability Level	Place of Training
(2-3)	23.	Properly display seasonal stock	1 2 3 4 5	1 2 3 4
(4-5)	24.	Rotate stock	1 2 3 4 5	1 2 3 4
(6-7)	25.	Properly filling out job applications	1 2 3 4 5	1 2 3 4
(8-10)	26.	OTHER _____	1 2 3 4 5	1 2 3 4
	27.	OTHER _____	1 2 3 4 5	1 2 3 4
	28.	OTHER _____	1 2 3 4 5	1 2 3 4

B. Animal Science Competencies

			Ability Level	Place of Training
(11-12)	1.	Advise customers on chemicals for controlling animal pests	1 2 3 4 5	1 2 3 4

			Ability Level	Place of Training
(13-14)	2.	Advise customers on equipment needs for specialized animal enterprises	1 2 3 4 5	1 2 3 4
(15-16)	3.	Advise customers on feeds for farm animals.	1 2 3 4 5	1 2 3 4
(17-18)	4.	Advise customers on housing requirements for farm animals	1 2 3 4 5	1 2 3 4
(19-20)	5.	Advise customers on management practices of animals	1 2 3 4 5	1 2 3 4
(21-22)	6.	Advise customers on medicines or chemicals for controlling common diseases of farm animals	1 2 3 4 5	1 2 3 4
(23-24)	7.	Balance rations for farm animals	1 2 3 4 5	1 2 3 4
(25-26)	8.	Demonstrate the use of branding, tattooing, castrating equipment, etc.	1 2 3 4 5	1 2 3 4
(27-28)	9.	Discuss nutrient needs of farm animals	1 2 3 4 5	1 2 3 4
(29-30)	10.	Identify different farm animals and their respective breeds	1 2 3 4 5	1 2 3 4
(31-32)	11.	Operate feed mixing and grinding equipment	1 2 3 4 5	1 2 3 4
(33-34)	12.	Predict price trends and cycles of farm animals	1 2 3 4 5	1 2 3 4
(35-36)	13.	Recognize animal grades	1 2 3 4 5	1 2 3 4
(37-38)	14.	Recognize USDA grades for beef, and/or lamb	1 2 3 4 5	1 2 3 4
(39-40)	15.	Recognize primal meat cuts	1 2 3 4 5	1 2 3 4
(41-42)	16.	Recognize sub-primal meat cuts	1 2 3 4 5	1 2 3 4
(43-44)	17.	Recognize retail meat cuts	1 2 3 4 5	1 2 3 4

			Ability Level	Place of Training

(45-46) 18. Understand the principles that cause meat spoilage
1 2 3 4 5 1 2 3 4

(47-48) 19. Understand practices that prevent meat spoilage
1 2 3 4 5 1 2 3 4

(49-50) 20. Identify different types of packaging procedures to prevent spoilage
1 2 3 4 5 1 2 3 4

(51-52) 21. Demonstrate proper sanitary meat handling procedures
1 2 3 4 5 1 2 3 4

(53-54) 22. Understand the cutability of meat. (cutting yield and dollar value)
1 2 3 4 5 1 2 3 4

(55-57) 23. OTHER _____
1 2 3 4 5 1 2 3 4

24. OTHER _____
1 2 3 4 5 1 2 3 4

25. OTHER _____
1 2 3 4 5 1 2 3 4

C. Agricultural Mechanics Competencies

(58-59) 1. Adjust and repair a diesel engine
1 2 3 4 5 1 2 3 4

(60-61) 2. Adjust and repair machinery
1 2 3 4 5 1 2 3 4

(62-63) 3. Advise farmers on machinery needs
1 2 3 4 5 1 2 3 4

(64-65) 4. Construct buildings used in agriculture
1 2 3 4 5 1 2 3 4

(66-67) 5. Figure a bill of material for building construction
1 2 3 4 5 1 2 3 4

(68-69) 6. Follow a drafting plan for construction agricultural projects
1 2 3 4 5 1 2 3 4

(70-71) 7. Properly operate equipment
1 2 3 4 5 1 2 3 4

(72-73) 8. Order and stock parts
1 2 3 4 5 1 2 3 4

			Ability Level	Place of Training
(74-75)	9.	Overhaul a large farm engine	1 2 3 4 5	1 2 3 4
(76-77)	10.	Overhaul a small gasoline engine	1 2 3 4 5	1 2 3 4
(78-79)	11.	Perform electrical wiring	1 2 3 4 5	1 2 3 4
(1) Card No. 3				
(2-3)	12.	Perform preventative maintenance on a farm tractor	1 2 3 4 5	1 2 3 4
(4-5)	13.	Practice safety	1 2 3 4 5	1 2 3 4
(6-7)	14.	Repair and adjust a small gasoline engine	1 2 3 4 5	1 2 3 4
(8-9)	15.	Set up farm machinery	1 2 3 4 5	1 2 3 4
(10-11)	16.	Tune, adjust, and repair an internal combustion engine	1 2 3 4 5	1 2 3 4
(12-13)	17.	Use a parts manual	1 2 3 4 5	1 2 3 4
(14-15)	18.	Use an arc welder	1 2 3 4 5	1 2 3 4
(16-17)	19.	Use an acetylene welder	1 2 3 4 5	1 2 3 4
(18-19)	20.	Use surveying equipment	1 2 3 4 5	1 2 3 4
(20-21)	21.	Use grinders, drill press, and other power equipment	1 2 3 4 5	1 2 3 4
(22-23)	22.	Use hand shop tools and equipment	1 2 3 4 5	1 2 3 4
(24-25)	23.	Set up equipment	1 2 3 4 5	1 2 3 4
(26-28)	24.	OTHER _____	1 2 3 4 5	1 2 3 4
	25.	OTHER _____	1 2 3 4 5	1 2 3 4
	26.	OTHER _____	1 2 3 4 5	1 2 3 4

D. Crop and Soil Science Competencies

| (29-30) | 1. | Advise customers on crop varieties adapted to the area | 1 2 3 4 5 | 1 2 3 4 |

			Ability Level	Place of Training

(31-32) 2. Advise customers on fertilizer needs — 1 2 3 4 5 — 1 2 3 4

(33-34) 3. Advise customers on landscape plants material — 1 2 3 4 5 — 1 2 3 4

(35-36) 4. Advise customers on safe chemicals for insect, weeds or herb control — 1 2 3 4 5 — 1 2 3 4

(37-38) 5. Calibrate a chemical sprayer — 1 2 3 4 5 — 1 2 3 4

(39-40) 6. Calibrate a fertilizer distributor — 1 2 3 4 5 — 1 2 3 4

(41-42) 7. Calibrate a grain drill — 1 2 3 4 5 — 1 2 3 4

(43-44) 8. Detect nutritional and disease symptoms of plants — 1 2 3 4 5 — 1 2 3 4

(45-46) 9. Discuss market trends with agriculturalist — 1 2 3 4 5 — 1 2 3 4

(47-48) 10. Establish and maintain landscaped areas — 1 2 3 4 5 — 1 2 3 4

(49-50) 11. Grow nursery stock — 1 2 3 4 5 — 1 2 3 4

(51-52) 12. Grow plants in a greenhouse — 1 2 3 4 5 — 1 2 3 4

(53-54) 13. Identify fertilizer materials — 1 2 3 4 5 — 1 2 3 4

(55-56) 14. Identify field and garden crop seeds and plants — 1 2 3 4 5 — 1 2 3 4

(57-58) 15. Identify insects that affect plants — 1 2 3 4 5 — 1 2 3 4

(59-60) 16. Identify ornamental plants — 1 2 3 4 5 — 1 2 3 4

(61-62) 17. Identify weeds — 1 2 3 4 5 — 1 2 3 4

(63-64) 18. Read and interpret soil test results — 1 2 3 4 5 — 1 2 3 4

(65-66) 19. Recognize crop grades and plant quality — 1 2 3 4 5 — 1 2 3 4

(67-68) 20. Select soil media for greenhouse plants — 1 2 3 4 5 — 1 2 3 4

			Ability Level	Place of Training
(69-71)	21.	OTHER _____	1 2 3 4 5	1 2 3 4
	22.	OTHER _____	1 2 3 4 5	1 2 3 4
	23.	OTHER _____	1 2 3 4 5	1 2 3 4

#745-B
SWG 1-89

AN ASSESSMENT OF COMPETENCIES NEEDED BY AGRICULTURAL COOPERATIVE EDUCATION STUDENTS IN HAWKINS COUNTY, TENNESSEE

PURPOSE FOR THE STUDY

The purpose for this survey is to assess the competencies needed by agricultural education students to be employed in agricultural-related occupations. The results of this study will help improve the quality of education for students in Hawkins County participating in supervised agricultural experience programs. Your participation will have an impact on the quality of future supervised agricultural experience programs conducted by the agricultural education programs in Hawkins County and in the state of Tennessee. Information collected for this study will be kept highly confidential and will not be connected with any student, employer, or agricultural education teacher. Your participation and input will be greatly appreciated.

DIRECTIONS

The survey is divided into two parts. The first part will be to gather demographic data of the individual completing the questionnaire. The second part will be to gather the importance and need of each competence listed; as well as, the location of where training of the competence should be obtained. Please read each competency carefully. Additional competencies may be added at the end of each sub category in the space provided that you feel are necessary in the business you are employed. If more room is needed for extra competencies, please feel free to add them on the back of the survey.

The first part of the survey can be completed by filling in the blank provided or checking the appropriate answer. In the second part, circle the appropriate ability level and the location of training for that competency.

COMPETENCIES NEEDED FOR EMPLOYMENT IN
AGRICULTURALLY RELATED BUSINESSES

(1) Card Number 1
(2) TEACHER'S REPORT 3
(3) Respondent Number 0

I. General Information

(4)   1. School:

        ____ (01) Cherokee   ____ (02) Volunteer

(5)   2. Years of teaching?

        ____ (01) 1 to 3 year(s)   ____ (03) 7 to 10 years
        ____ (02) 4 to 6 years   ____ (04) 11 years or more

(6)   3. Years teaching Agricultural Coop?

        ____ (01) Do not teach Coop   ____ (04) 7 to 10 years
        ____ (02) 1 to 3 year(s)   ____ (05) 11 years or more
        ____ (03) 4 to 6 years

(7)   4. Years teaching Agricultural Non-Coop?

        ____ (01) 1 to 3 year(s)   ____ (03) 7 to 10 years
        ____ (02) 4 to 6 years   ____ (04) 11 years or more

(8)   5. What is your highest education level?

        ____ (01) B.S   ____ (03) M.S. plus 45 hours
        ____ (02) M.S.   ____ (04) Ed.S.

(9)   6. Have you ever been employed in an agricultural-related business?

        ____ (01) Yes   ____ (02) No

(10)   (6 cont.) If yes, how many years?

        ____ (01) One year   ____ (04) Four years
        ____ (02) Two years   ____ (05) Five years or more
        ____ (03) Three years   ____ (06) Not applicable

(11)   7. Which category best describes your background?

        ____ (01) Farm
        ____ (02) Rural {non farm}
        ____ (03) Urban or Suburban

(12-13)   8.   Hours spent supervising coop students per year? _____

(14-16)   9.   Miles traveled per year supervising agricultural coop students?
                _____

(17-18)   10. Number of coop students that you taught during the 1988-89 school
                year?   _____

II. Needed Competencies

Circle the appropriate ability level of the needed competences and the place where the student should receive instruction and/or training of the needed competencies to be employed in your business. The ability level represents or reflect the ability or accuracy needed to perform the competency or skill and not the number of times the student performs that competency or skill. (Note: Circle only one ability level and one place of training for each competency.)

Ability levels:

1 - Little to None	4 - Very Much
2 - Some	5 - Not Applicable
3 - Much	

Place of Training:

1 - School	3 - Work
2 - Both School and Work	4 - Not Applicable

			Ability Level	Place of Training
A. General Business Competencies				
(37-38)	1.	Apply principles of salesmanship	1 2 3 4 5	1 2 3 4
(39-40)	2.	Care for tools and equipment	1 2 3 4 5	1 2 3 4
(41-42)	3.	Complete records and reports	1 2 3 4 5	1 2 3 4
(43-44)	4.	Direct or supervise others	1 2 3 4 5	1 2 3 4
(45-46)	5.	Display merchandise	1 2 3 4 5	1 2 3 4
(47-48)	6.	Drive a car or travel safely	1 2 3 4 5	1 2 3 4
(49-50)	7.	Evaluate credit risk of customer	1 2 3 4 5	1 2 3 4
(51-52)	8.	File records and reports	1 2 3 4 5	1 2 3 4
(53-54)	9.	Follow instructions	1 2 3 4 5	1 2 3 4
(55-56)	10.	Inventory merchandise	1 2 3 4 5	1 2 3 4
(57-58)	11.	Keep record of sales and expenses	1 2 3 4 5	1 2 3 4

			Ability Level	Place of Training
(59-60)	12.	Maintain good housekeeping	1 2 3 4 5	1 2 3 4
(61-62)	13.	Maintain good personal appearance	1 2 3 4 5	1 2 3 4
(63-64)	14.	Make bank deposits	1 2 3 4 5	1 2 3 4
(65-66)	15.	Make mathematical calculation accurately	1 2 3 4 5	1 2 3 4
(67-68)	16.	Make out a sales receipt	1 2 3 4 5	1 2 3 4
(69-70)	17.	Meet the public	1 2 3 4 5	1 2 3 4
(71-72)	18.	Use cash register, adding machine, scales, etc.	1 2 3 4 5	1 2 3 4
(73-74)	19.	Basic knowledge of computer skills	1 2 3 4 5	1 2 3 4
(75-76)	20.	Use correct English	1 2 3 4 5	1 2 3 4
(77-78)	21.	Write legibly	1 2 3 4 5	1 2 3 4
(79-80)	22.	Use good telephone procedures	1 2 3 4 5	1 2 3 4

(1)Card No. 2

(2-3)	23.	Properly display seasonal stock	1 2 3 4 5	1 2 3 4
(4-5)	24.	Rotate stock	1 2 3 4 5	1 2 3 4
(6-7)	25.	Properly filling out job applications	1 2 3 4 5	1 2 3 4
(8-10)	26.	OTHER _____	1 2 3 4 5	1 2 3 4
	27.	OTHER _____	1 2 3 4 5	1 2 3 4
	28.	OTHER _____	1 2 3 4 5	1 2 3 4

B. Animal Science Competencies

| (11-12) | 1. | Advise customers on chemicals for controlling animal pests | 1 2 3 4 5 | 1 2 3 4 |

			Ability Level	Place of Training

(13-14) 2. Advise customers on equipment needs for specialized animal enterprises 1 2 3 4 5   1 2 3 4

(15-16) 3. Advise customers on feeds for farm animals. 1 2 3 4 5   1 2 3 4

(17-18) 4. Advise customers on housing requirements for farm animals 1 2 3 4 5   1 2 3 4

(19-20) 5. Advise customers on management practices of animals 1 2 3 4 5   1 2 3 4

(21-22) 6. Advise customers on medicines or chemicals for controlling common diseases of farm animals 1 2 3 4 5   1 2 3 4

(23-24) 7. Balance rations for farm animals 1 2 3 4 5   1 2 3 4

(25-26) 8. Demonstrate the use of branding, tattooing, castrating equipment, etc. 1 2 3 4 5   1 2 3 4

(27-28) 9. Discuss nutrient needs of farm animals 1 2 3 4 5   1 2 3 4

(29-30) 10. Identify different farm animals and their respective breeds 1 2 3 4 5   1 2 3 4

(31-32) 11. Operate feed mixing and grinding equipment 1 2 3 4 5   1 2 3 4

(33-34) 12. Predict price trends and cycles of farm animals 1 2 3 4 5   1 2 3 4

(35-36) 13. Recognize animal grades 1 2 3 4 5   1 2 3 4

(37-38) 14. Recognize USDA grades for beef, and/or lamb 1 2 3 4 5   1 2 3 4

(39-40) 15. Recognize primal meat cuts 1 2 3 4 5   1 2 3 4

(41-42) 16. Recognize sub-primal meat cuts 1 2 3 4 5   1 2 3 4

(43-44) 17. Recognize retail meat cuts 1 2 3 4 5   1 2 3 4

			Ability Level	Place of Training
(45-46)	18.	Understand the principles that cause meat spoilage	1 2 3 4 5	1 2 3 4
(47-48)	19.	Understand practices that prevent meat spoilage	1 2 3 4 5	1 2 3 4
(49-50)	20.	Identify different types of packaging procedures to prevent spoilage	1 2 3 4 5	1 2 3 4
(51-52)	21.	Demonstrate proper sanitary meat handling procedures	1 2 3 4 5	1 2 3 4
(53-54)	22.	Understand the cutability of meat. (cutting yield and dollar value)	1 2 3 4 5	1 2 3 4
(55-57)	23.	OTHER _____	1 2 3 4 5	1 2 3 4
	24.	OTHER _____	1 2 3 4 5	1 2 3 4
	25.	OTHER _____	1 2 3 4 5	1 2 3 4

C. Agricultural Mechanics Competencies

			Ability Level	Place of Training
(58-59)	1.	Adjust and repair a diesel engine	1 2 3 4 5	1 2 3 4
(60-61)	2.	Adjust and repair machinery	1 2 3 4 5	1 2 3 4
(62-63)	3.	Advise farmers on machinery needs	1 2 3 4 5	1 2 3 4
(64-65)	4.	Construct buildings used in agriculture	1 2 3 4 5	1 2 3 4
(66-67)	5.	Figure a bill of material for building construction	1 2 3 4 5	1 2 3 4
(68-69)	6.	Follow a drafting plan for construction agricultural projects	1 2 3 4 5	1 2 3 4
(70-71)	7.	Properly operate equipment	1 2 3 4 5	1 2 3 4
(72-73)	8.	Order and stock parts	1 2 3 4 5	1 2 3 4

			Ability Level	Place of Training
(74-75)	9.	Overhaul a large farm engine	1 2 3 4 5	1 2 3 4
(76-77)	10.	Overhaul a small gasoline engine	1 2 3 4 5	1 2 3 4
(78-79)	11.	Perform electrical wiring	1 2 3 4 5	1 2 3 4
(1) Card No. 3				
(2-3)	12.	Perform preventative maintenance on a farm tractor	1 2 3 4 5	1 2 3 4
(4-5)	13.	Practice safety	1 2 3 4 5	1 2 3 4
(6-7)	14.	Repair and adjust a small gasoline engine	1 2 3 4 5	1 2 3 4
(8-9)	15.	Set up farm machinery	1 2 3 4 5	1 2 3 4
(10-11)	16.	Tune, adjust, and repair an internal combustion engine	1 2 3 4 5	1 2 3 4
(12-13)	17.	Use a parts manual	1 2 3 4 5	1 2 3 4
(14-15)	18.	Use an arc welder	1 2 3 4 5	1 2 3 4
(16-17)	19.	Use an acetylene welder	1 2 3 4 5	1 2 3 4
(18-19)	20.	Use surveying equipment	1 2 3 4 5	1 2 3 4
(20-21)	21.	Use grinders, drill press, and other power equipment	1 2 3 4 5	1 2 3 4
(22-23)	22.	Use hand shop tools and equipment	1 2 3 4 5	1 2 3 4
(24-25)	23.	Set up equipment	1 2 3 4 5	1 2 3 4
(26-28)	24.	OTHER _____	1 2 3 4 5	1 2 3 4
	25.	OTHER _____	1 2 3 4 5	1 2 3 4
	26.	OTHER _____	1 2 3 4 5	1 2 3 4

D. Crop and Soil Science Competencies

| (29-30) | 1. | Advise customers on crop varieties adapted to the area | 1 2 3 4 5 | 1 2 3 4 |

			Ability Level	Place of Training
(31-32)	2.	Advise customers on fertilizer needs	1 2 3 4 5	1 2 3 4
(33-34)	3.	Advise customers on landscape plants material	1 2 3 4 5	1 2 3 4
(35-36)	4.	Advise customers on safe chemicals for insect, weeds or herb control	1 2 3 4 5	1 2 3 4
(37-38)	5.	Calibrate a chemical sprayer	1 2 3 4 5	1 2 3 4
(39-40)	6.	Calibrate a fertilizer distributor	1 2 3 4 5	1 2 3 4
(41-42)	7.	Calibrate a grain drill	1 2 3 4 5	1 2 3 4
(43-44)	8.	Detect nutritional and disease symptoms of plants	1 2 3 4 5	1 2 3 4
(45-46)	9.	Discuss market trends with agriculturalist	1 2 3 4 5	1 2 3 4
(47-48)	10.	Establish and maintain landscaped areas	1 2 3 4 5	1 2 3 4
(49-50)	11.	Grow nursery stock	1 2 3 4 5	1 2 3 4
(51-52)	12.	Grow plants in a greenhouse	1 2 3 4 5	1 2 3 4
(53-54)	13.	Identify fertilizer materials	1 2 3 4 5	1 2 3 4
(55-56)	14.	Identify field and garden crop seeds and plants	1 2 3 4 5	1 2 3 4
(57-58)	15.	Identify insects that affect plants	1 2 3 4 5	1 2 3 4
(59-60)	16.	Identify ornamental plants	1 2 3 4 5	1 2 3 4
(61-62)	17.	Identify weeds	1 2 3 4 5	1 2 3 4
(63-64)	18.	Read and interpret soil test results	1 2 3 4 5	1 2 3 4
(65-66)	19.	Recognize crop grades and plant quality	1 2 3 4 5	1 2 3 4
(67-68)	20.	Select soil media for greenhouse plants	1 2 3 4 5	1 2 3 4

			Ability Level	Place of Training
(69-71)	21.	OTHER _____	1 2 3 4 5	1 2 3 4
	22.	OTHER _____	1 2 3 4 5	1 2 3 4
	23.	OTHER _____	1 2 3 4 5	1 2 3 4

#745-T

SWG 1-89

VITA

Steven Wade Gass was born November 5, 1961 to Kyle and Sarah Gass of Mosheim, Greene County, Tennessee. He began his agricultural training on the family's 310 acre dairy farm. He began his formal agricultural education training at West Greene High School under the advisement of Donald E. Swanay. Upon his high school graduation in 1980, he served as the 1980-81 Tennessee FFA State Reporter. He attended Walter State Community College at Morristown, Tennessee, where he received an Associate of Science Degree in the Agricultural Resource Management-Business Option. While at Walter State Community College, he served as president of the Horticulture Society and served as the organizational chairman for the development of the Agriculture Club. Upon graduation from Walter State, he was a participate in the FFA Work Experience Abroad Program in the Netherlands.

He transferred to the University of Tennessee, Knoxville, and received a Bachelor of Science in Agriculture with a major in Agricultural Education in December, 1986. Besides his studies, he was a member and president of the Society of Ag Ed Students, where he received the Outstanding Junior and Senior Member Award in addition to the Outstanding Student Teacher of the Year for the College of Education.

He was employed by Hawkins County Board of Education as the J. T. P. A. Coordinator and Teacher for the in-school youth programs in January of 1987.

He returned to the University of Tennessee, Knoxville, in August of 1987 as a Graduate Assistant in Agricultural and Extension Education Department. He was initiated into Gamma Sigma Delta The Honor Society of Agriculture in November of 1988.

He was employed by Putnam County Board of Education in August of 1989 as an agricultural education teacher. He is presently employed in the Putnam County School System as the agricultural education teacher at Cookeville High School.

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LH