SELECTED CHARACTERISTICS OF VOCATIONAL AGRICULTURAL MECHANICS PROGRAMS IN THE STATE OF OKLAHOMA

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CHAPTER I

INTRODUCTION

As of January, 1982, the American farmer, comprising only 2.7% of the total United States population, was producing enough food to feed himself and 68 other people (38). Agriculture in the United States has total assets of over 1.1 trillion dollars making it one of the largest businesses in the world. There are fewer farmers in the U. S. now than in the history of our nation; yet they are feeding more people than any nation in the history of the world.

One primary factor in these statistics is the advancements made in agricultural mechanization. Modern farm implements and machinery, handling systems and processing account for much of this progress. These advancements have not been brought about without creating major changes in the farmers' ever continuing education.

Today's farmer must wear many caps in mechanized agriculture if he is to be competitive and financially successful. Basic skills in power and machinery, construction, electrification, soil and water management, shop processes and products handling dictate a better informed and better educated farmer.

Due to the increase in farm size (the average farm size

in 1980 was 453 acres (35) as compared to 340 acres in 1965 (34)) and the demand for complete and effective utilization of time, today's farmer can not afford the down time from machinery breakdowns nor can he pay the expensive bills from repairmen for minor jobs he should be equipped to handle himself. Many of the jobs which once required manual labor are being replaced by electric motors making the need for basic electricity skills such as basic wiring, electrical switches and motor controls more common. Irrigation equipment and grain handling equipment call for special needs in educating the farmer in the field of mechanics. Today's farmers have become more aware and concerned about two of America's greatest natural resources; soil and water. Progressive farmers are designing grass waterways, building terraces, reworking watersheds and building reservoirs for water utilization and flood control. Many progressive farmers are searching for better livestock facilities and are constructing better waste disposal systems and new methods of building energy efficient facilities.

Since early in the history of mechanized agriculture, farmers and people associated with agriculture mechanics and related fields have seen a growing need for the development and implementation of curriculum to better educate people in the safe, effective and proper use of mechanics. The first classes in agriculture mechanics were limited mostly to the basic skills which could be performed in farm shops. But today's vocational agriculture mechanics classes and instructors

face an obligation to educate and prepare students in this increasingly complex area.

Many areas of agricultural mechanics are changing at such a rapid rate that keeping up to date has made teaching a marathon of gathering and disseminating new material. Hopefully, researchers will continue to gather data which can provide answers to meet the challenges facing today's and future generations of curriculum developers, agriculture instructors and others in the field of agricultural education.

Statement of the Problem

This study was undertaken due to the concern by agricultural educators and vocational agriculture district supervisors in Oklahoma for quality vocational education in the field of agriculture mechanics. Although several studies have surveyed various aspects of the agricultural mechanics field in the past, recent information on how far agriculture machanics in Oklahoma has progressed has not been collected. As previously stated in the introduction, technological changes in the field of agriculture mechanics warrant the constant update of vocational education programs for them to remain current with the needs of the American farmer.

The main problem was that current information giving the strengths and weaknesses of the vocational agriculture mechanic programs and the change which could best benefit the building of a stronger program in Oklahoma was limited. The most recent study which provides insight into the status of vocational

programs in Oklahoma was a study by Juby (21) in 1972. A more comprehensive up-to-date form of data was needed to provide a more complete picture of where the competencies of the programs are and what changes could be made to provide for any weakness that may currently exist. Another question which was considered as very important by the State Department of Vocational Technical Education, Division of Agricultural Education in Oklahoma was directed toward teacher preparation in the five areas of agricultural mechanization. It was also considered very important to find out if all of the areas were being taught and to what extent.

Purpose of the Study

The purpose of this study was to determine selected characteristics of the agricultural mechanics programs in the state of Oklahoma.

Objectives of the Study

In order to better comprehend and accomplish the purposes of this study, the following specific objectives were formulated:

1. To determine which major subjects comprising the five areas of agricultural mechanics are currently being taught in one year specialized agricultural mechanics programs in Oklahoma.
2. To determine the perceptions of vocational agricultural instructors regarding the appropriateness of

the various subjects included in the five areas of agricultural mechanics.

3. To determine the vocational agricultural instructors' perceptions of their current competencies in the five areas.
4. To determine the vocational agricultural instructors' perceptions of the adequacy of tools and equipment that are available for use in instruction.
5. To determine the amount of training and skills vocational agriculture instructors received in mechanics at the university level.
6. To determine the quality of training and skills vocational agriculture instructors received in agricultural mechanics at the university level.

Rationale for the Study

Oklahoma is recognized throughout the nation as one of the leaders in vocational agriculture. This fact is evident by the large number of national FFA officers from Oklahoma as well as silver and gold emblem chapters, the number and quality of American farmers and national contest winners.

The 1981 national contest results support the above statement. There were four gold emblem, eleven silver and eight bronze emblem winners in the National Chapter Contest. Twenty-five members received the FFA's prestigious American Farmer Degree. The National FFA Alumni President and the National FFA President are both from Oklahoma. The winners

of the public speaking contest, placement in agricultural production contest, proficiency award winner in sales and service and the salute to agriculture contest were all won nationally by chapters from Oklahoma. Oklahoma had the best meats team in the nation. In addition, the dairy cattle team, poultry, and farm business teams all placed gold emblem ratings. Further research through the FFA History in Oklahoma (33) revealed comparable findings.

However, there is one area of vocational agriculture in Oklahoma that has not produced as impressive results and is a growing concern to many teachers and state department personnel. Ralph Dreessen (4), State Supervisor and State FFA Advisor in Oklahoma, commended the need for further studies into agricultural mechanics in Oklahoma. Verlin Hart (13), Agricultural Mechanics Specialist and Central District Supervisor for Oklahoma, expressed a genuine concern in trying to determine the problems in Oklahoma's agricultural mechanics programs.

In the history of the National FFA contest, Oklahoma has never had an agricultural mechanics team to win nor rate a gold emblem. In past years, only three chapters have had agricultural mechanics teams to compete from Oklahoma in the National Agricultural Mechanics Contest; namely, Guthrie, Spiro, and Ponca City. In 1981, Oklahoma did have one regional finalist in the FFA Agricultural Electrification Proficiency Contest and the agricultural mechanics team rated a Bronze Emblem (13).

The question has been asked if the curriculum dictates

the National Agricultural Mechanics Contest. Four well-known instructors in the field of agricultural mechanics responded to this question in The Visitor (30). Billy Harrell from Sam Houston State University responded as follows:

> The contest should be based on curriculum recommended for vocational agriculture. Our reward is the improvement of course content in agriculture mechanics in local high schools (30, p. 1).

Forrest Bear, from the University of Minnesota stated:

> I believe the factors influencing agricultural production and employment should determine curriculum in agricultural mechanics. If the contest is not assessing essential knowledge and skills, then our curriculum should provide direction for the contest (30, p. 3).

Iowa State University professor of Agricultural Education, Thomas Hoerner (18) said that he felt that the curriculum determines the contest, but the contest can lead and provide emphasis for the curriculum. And Clinton Jacobs (30), University of Arizona, said:

> Ideally curriculum should determine content of contests and curriculum should be developed based upon information obtained from job analysis studies. Probably more than any one single effort, the National Agriculture Mechanics Contest has helped to solidify the curriculum thought of a large group of professional educators in agricultural education and agricultural engineering (30, p. 3).

If Oklahoma's curriculum is current and comparable to the curriculums which our national FFA contest is based upon, then why have our chapters not placed higher. If the curriculum is comparable, then is the curriculum being taught? What are the limiting factors which are hindering better agricultural mechanics in Oklahoma? These questions left presently unanswered as well as the information on how Oklahoma

agriculture mechanics presently rates on a national scale has led to this study which should provide data which will give some indication as to the various factors which are influencing and shaping the agricultural mechanics programs in Oklahoma today.

Although much emphasis has been placed upon the National FFA Contest as an indicator of the scope of agricultural mechanics, it is only one of many considerations which must be observed. The placement of students which have taken vocational agriculture mechanics in high school should be the primary concern for any program. Therefore, it is most important that the training is in the skill areas which will best aid an individual in job placement. Other rationale for this study can be related to the perceptions of the vocational agricultural instructors on important subjects in relation to those currently offered in the curriculum.

Since information obtained will be a direct result of a questionnaire developed as a joint effort by this author, the Agricultural Education faculty at Oklahoma State University and various administrators at the Oklahoma State Department of Vocational Agriculture, the data obtained should give insight into some of the weaknesses and strengths of the agriculture mechanics programs.

Will all of this in mind, careful interpretation and analysis of the resulting data will hopefully provide information that can be used to assist in further studies and ultimately help produce a well-rounded, comprehensive and

complete up-to-date agricultural mechanics program for the state of Oklahoma.

Assumptions and Limitations of the Study

Assumptions

For the purpose of this study, the following assumption was made:

1. The responses, opinions, and perceptions obtained from the questionnaire were answered honestly and conscientionusly by the vocational agriculture instructors.

Limitations

The following limitations were recognized by the author:

1. The questionnaire was limited to the vocational agriculture teachers which responded to the questionnaire.
2. The investigator realized that much of the data which expressed strengths and weaknesses of the whole state can not be generalized to specific teachers or agriculture departments.

Definition of Terms

Agricultural Mechanics--Refers to the instructional areas of agricultural power and machinery, agricultural construction and structures, agricultural electrification, soil and water management, and agriculture mechanic skills. Agricultural

mechanics develops skills and abilities in these areas for both on-the-farm and off-the-farm activities.

Farm--According to the United States Department of Agriculture, a farm is defined as a place having annual sales of agriculture products of one thousand dollars or more.

Vocational Agriculture--Refers to courses of instruction designed to train high school students for careers in production agriculture and agricultural related fields.

Vocational Agriculture Instructor--Certified personnel employed by high schools to direct programs designed to meet the needs in agriculture of high school youth and adult/young farmers.

Professional Improvement (P. I.) Meeting--A regularly scheduled meeting which is designed to update agriculture instructors in policy, procedures and technical skills. Attendance at these meetings is required of the agriculture instructors.

Statistical Analysis System (S.A.S.)--A complete system for data analysis which combines all the computer jobs into one job.

CHAPTER II

REVIEW OF RELATED LITERATURE

The purpose of this chapter is to present a collection of information which is relevant to this investigation. Few studies were found that could be proven directly related to the factors affecting agriculture mechanics programs in Oklahoma. One study was made in relation to selected aspects of agriculture mechanics in Oklahoma and other studies were conducted in Texas, but these studies did not provide current material for use today.

Involved in this review were research studies, books, personal interviews, periodicals, and professional magazines which had pertinent information. For a more meaningful review, the literature has been broken down into the following headings:

1. The importance of the five areas of agricultural mechanics to the vocational agriculture program.
2. The need for adequate teacher training in agriculture mechanics.
3. Factors which limit what agriculture mechanics instructors teach.

Importance of the Five Areas of Agricultural Mechanics to the Vocational Agriculture Program

The areas of agricultural mechanics suggested by the American Society of Agricultural Engineers are agricultural shop skills, agricultural power and machinery, agricultural structures/construction, rural electrification and soil and water management.

> Observing classes and talking to vocational agriculture teachers over the years convinces me that skills in all of the five areas of agricultural mechanics are essential (24, p. 14).

The above statement was by M.C. Knox (24), a supervisor of agriculture education at Washington University. His thought is typical of the observations made by many professionals in vocational agriculture today.

But are these five areas being taught, and if they are being taught, are these areas given an adequate time frame? As asked by Key (23):

> Do we adequately organize and plan the program so our students learn skills in all five areas recommended rather than concentrating on our favorite areas (p. 244)?

It is obvious from the collected information preceding that much of what is being taught in the five agriculture mechanics areas in our colleges and high schools today is the instructors' favorite area. It may also be an area which the instructor was very well versed, but an area which the instructor is now outdated. Many skills and competencies are orchestrated daily to a new generation of students which

are being held back because progress is years ahead of education.

In the early 1920's and 1930's, farm mechanics consisted of common repairs and construction jobs on small farms. According to Wolff (39), agriculture mechanics was often referred to then as the "farm shop". But the state of mechanized agriculture has evolved over the past years at such a rapid pace that the farm shop can claim only a portion of a once dominate role.

Flesher (6) states that since 1940, based on his figures which he obtained from the Nebraska Tractor Test information, the average size of farm tractors has quadrupled. Many of the tractors of today have comfortable cabs which are air-conditioned, contain electronic monitors, hydraulic controls and a varying lists of possible options. Implement dealers are looking for service people not only capable of servicing and maintaining engines, transmissions and final drives, but people who are trained in air-conditioning, hydraulics, electronic metering devices, etc.

In a recent, 1980, followup study by Darcy (3) concerning how mechanized agricultural graduates from Texas A & M University felt about what was taught in the mechanics program supports Flesher's view. It was determined that there was a further need for instruction in the practical mechanics areas of diesel fuel systems, hydraulics, electrical systems, and power transmissions systems. It was recommended that more emphasis should be placed in these areas by offering more

depth in the existing courses and by developing new courses in these areas. Darcy also recommended that a study group comprised of former students, departmental personnel and representatives from industry might suggest other options that would be beneficial to the program.

Pruitt (29) surveyed 93 high school teachers and five university professors in Texas on four instructional areas; namely, hydraulics, power trains, diesel fuel systems and tractor electrical systems. This population responded by indicating that this four instructional areas mentioned were of much importance and should have a high priority in their curriculum. It was noted that in the classroom, most of the instructional time was devoted to the tractors electrical system and power trains than time devoted to diesel fuel systems and hydraulics. These teachers rated themselves on the average as possessing 'some' level of competence in these areas. Depending on the selected topics included in the survey, 5.92% to 17.69% of the teachers had not received any training in these selected four areas which they were now engaged in teaching.

Various research has produced favorable results on automatic guidance systems for combines and tractors. Flesher (5) stated that large driverless, self-monitoring complex trains of equipment will be moving across fields in America, possibly before the end of this century. According to Gilman (9), the problem facing many family members on today's farms is few have the opportunity to learn the skills

and competencies necessary to operate, repair and maintain this highly mechanized, expensive production equipment.

Other areas in agriculture mechanics have also progressed rapidly. Electrical competencies on the farm have become a major need. Grain handling facilities are common place on many farms today because of their economic advantages. Electric motors for powering augers, running dryeration systems, aeration fans and stirators along with electric sensing devices for controlled systems flow requires a better understanding of maintenance and service in electrification. Farm structures and livestock facilities utilize electricity to run pumps for handling waste materials and electrical sensing devices for pre-measured distribution of rations.

The same emphasis may be placed on soil and water management and agriculture structures. The need to teach these five areas is evident due to what the scope of vocational agriculture has been expanded to include. As stated by Wolff (39), the majority of job opportunities exist in the services and other nonfarm related areas. As vocational agriculture teachers, it is our responsibility to prepare students for employment in non-farm occupations and for pre-professional training.

The Need for Adequate Teacher Training in Agriculture Mechanics

There are many problems associated with teaching agricultural mechanics in each of the five areas. Research indicates

that one of the biggest problems is associated with the lack of training for teachers in these vital areas. Weston (37) clearly points out this problem when he assumes that fifteen semester credit hours in agricultural engineering and mechanics is typical of most graduates in agriculture education. Weston went on to say:

> How educated persons can continue to think that teachers are qualified in agricultural mechanics with this type of undergraduate training is incomprehensible to me (37, p. 171).

Weston's theory is supported by the conclusions and findings in a study by Jones (20). He investigated several selected components regarding mechanics preparation and concluded that formal teacher preparation for teaching in farm machinery mechanics had been inadequate at both the undergraduate and graduate levels. The instructor listed informal training in farm machinery and repair as constituting the bulk of the useful experiences they needed in their current mechanics teaching. It was also concluded that non-credit workshops in these areas were the major means for up-dating but presented a problem due to their expense, the time demanded by the course, and the location in relation to where most agriculture teachers resided.

Many in the field of education state that people tend to teach what they know and what they have been taught. Another problem adding to the lack of adequate teacher preparation in agriculture mechanics is associated with rigid curriculum set down by many universities and colleges. Gilman (9) believes that the problem of being unable to take necessary instruction

in the vocational teaching field of mechanics could be reduced if requirements were cut to a minimum for courses in humanities and social sciences. This would allow for increased training in the skills and competencies needed by vocational agriculture instructors.

A study by Smith (32) produced the following data pertaining to this matter. Beginning teachers were surveyed on their perceptions of how often competencies are needed in agricultural mechanics in the five areas. The following data is based on a likert scale of one to five, where one is the least important and five is the most important. The teachers rated agriculture mechanic skills as being the most important with a mean of 4.34. Electricity and structures followed with a tie mean of 3.16, soil and water with a mean of 3.10 and the lowest mean of the group was in power and machinery at 3.07. As far as the perceptions beginning teachers had as to the extent competencies should be taught, agriculture mechanic skills rated the highest with a mean of 4.13, soil and water second with a mean of 3.59, electricity third with a mean of 3.53, power and machinery fourth with a mean of 3.38, and structures last with a mean of 3.16. The perceptions made by these beginning teachers clearly indicate where they have been taught to put their emphasis in agriculture mechanics. Further probing showed that two agricultural mechanics shop skill classes were required for their education degree. One additional agriculture mechanics class was required, but it could be chosen by the student from any one of several,

including another shop skills oriented class.

According to Wolff (39), agricultural mechanics programs across the nation have, in many cases, been totally shop skills. Shop skills are vital to the program but shop skills should not be considered as the total program. A recent study conducted by Skadburg (31) on how farmers rated the current skills and abilities needed on the farm for successful farming operations resulted as follows: Tractor power and machinery, and management of equipment was surveyed most important with a mean of 3.31; welding and metals had a mean value of 2.80; and electric motors a mean value of 2.79. The mean value was based on a scale of 4.00 being most important and 0.00 least important. Wolff (39), Flesher (6), and Gilman (9) all agree with the increased importance of power and machinery and the fact that this area is being neglected.

Heimgartner and Foster (15) conducted a survey of five northwestern states and found respondents devoting the greatest percentage of their teaching time to agriculture mechanics (39.0%). The survey revealed that 30.9 percent of the instructors' preparation in agriculture mechanics came from farm backgrounds and experiences. College accounted for 28.4 percent of the preparation, industry for 17.4 percent and previous vocational agriculture training in high school accounted for 12.4 percent. Data from the study also included the perceptions of how teachers felt about which areas of agriculture mechanics they felt most competent in teaching. A scale of

one indicated insufficient knowledge to teach the unit, five indicated average knowledge and nine was indicative of journeyman's knowledge of the unit.

The units of arc welding, oxy-acetylene welding, and small engines were observed as areas where instructors had their strongest knowledge (7.60, 7.52, and 7.11, respectively). These instructors also selected the units of arc welding (mean of 8.22) and oxy-acetylene (mean, 8.13) as being the most important units. In this particular study, units rated other than those previously mentioned were ropework, cold metal work, sheet metal work, fencing, masonry, lathe work and glazing. Electricity, power and machinery (other than small engines), and soil and water management were not included in the survey.

Their major conclusions were that universities and colleges in northwestern states needed to accept more of a role in teaching agriculture mechanic skills and that re-evaluation of current curriculum guidelines should possibly be up-dated or revised for a better balanced vocational agriculture program.

Oomes and Jurshak (26) recognized yet another problem by looking at the numbers of agricultural mechanics instructors. The problem of increased enrollment causing overcrowding in both classrooms and laboratories has increased work loads and increased the demand for instructors. Many schools are facing the loss of good instructors in the field of agriculture mechanics to higher paying jobs in the industries. Many industries look for experience and qualified agriculture

mechanics instructors because of their ability to work well with others, their ability to convey thoughts and ideas, and because of their working knowledge of mechanics. Oomes and Jurshak also recognized the need for more efficient methods of teaching.

In Hoerner's (18) judgement of the complete agricultural mechanics instructional program, three phases of instruction are extremely critical for a quality program. The first phase is where basic concepts, principles and understandings are taught and labeled as classroom instruction. Hoerner feels that one third of the total time should be allotted to total instruction time. The second phase is labeled as required activities which Hoerner defines as "an activity involving no more than 2-3 individiual skills or abilities, preferably one over a short duration of time and related directly to the classroom instruction" (p. 246). One third of the total time should be devoted to the second phase.

The third phase is approved activities which Hoerner defines as:

> an activity, selected by the student, of large scope, involving numerous skills and abilities, following the required activity phase and allowing for more indepth skill development (18, p. 247).

Hoerner allows that one third of the time should be approved for this phase also. Hoerner's major criticism is that "too many programs have projects as the end rather than as a means to the end" (p. 247).

Teachers of vocational agriculture have been made more aware of changes in agriculture mechanics. The Vocational

Education Act of 1963 and 1968 accomplished many changes in bringing about updates in the technical fields of agriculture mechanics. But as Farmer (5) pointed out, there still remains a lack of teacher competency in mechanical skills due to the rapid advancements in technology.

It should be noted that the Oklahoma State Department of Vocational Technical Education has developed a Student Occupational Achievement Testing program (SOCAT). According to Keith Harp (12), curriculum specialist, one part of SOCAT deals with a written test in the five subject areas of mechanized agriculture. In October, 1982, thirty four students were tested in mechanized agriculture. Although no conclusions can be drawn from such a small sample, it is interesting to observe that agriculture power and machinery rated as the lowest percent of achieved competency of the five areas of agriculture mechanics. As more results of the SOCAT test are collected and analyzed, more conclusive evidence and a better overall view of the agricultural mechanic skills (as well as other agricultural areas) will become available.

Some Factors Which Limit What Agriculture Mechanics Instructors Teach

Although the need for adequate teacher training seems to have dominated the review of literature up to this point, there are many other factors which influence agriculture mechanic instructors as to exactly what they will teach. Fog and Bear (7) list five factors which were considered

most significant in the number of weeks vocational agriculture mechanics were taught. According to their results, the most significant factor was the availability of tools. The more tools, the greater number of weeks spent in the shop. The second factor was whether or not a teacher had complete use of the agriculture shop facilities. The more room and use of facilities in the shop, due to other classes and projects from other groups being completed and removed from the shop area, led to an increase in the time spent in the shop.

The third most significant factor was the amount of space provided in the shop. As floor space increased, so did the weeks of agricultural mechanics being taught. The fourth factor was enrollment. The schools with larger enrollments spent more time in the shop than did schools with a smaller enrollment. The fifth factor was in relation to the amount of credit hours earned by teachers. As the number of hours increased, so did the weeks of agriculture mechanics taught.

In a study by Jones (20), findings regarding facilities and equipment prompted the following conclusions. Most 'pre-lab' training programs had adequate small handtools, small power tools and general tools. The classroom facilities provided an adequate teaching environment. The equipment used for painting was adequate in all programs surveyed. The tool areas were adequate in most of the schools but improvement in a few schools was necessary for better management and

storage. Despite these adequacies, the larger equipment and training devices labeled by Jones as being "more expensive and valuable" (20, p. 69) in the training program are not available. In most schools, the shop floor space was found inadequate and most of the painting facilities were inadequate and a few were labeled as unsafe.

Jones (20) recommended that all programs follow a tool guide titled Suggested Basic Course Outline for Agricultural Machinery Service and Repair. It was recommended that the larger more expensive lab training devices be purchased and incorporated into the training programs to develop effective programs. The painting facilities situation was to be corrected by building separate painting facilities with safety and health guiding construction.

Another factor which was noted by Juby (21) and Knox (24) was the question of whose needs must the vocational agriculture mechanics program meet and how will those needs be met. The surrounding area, potential employers, and related agriculture industries often influence what areas of mechanics are taught.

Weston (37) fears that many program needs in mechanics are not being met because of teachers in agricultural mechanics being oriented by many universities in what he terms as watered down engineering courses. He feels that these departments are departing from practical approaches in teaching mechanics and that many students are deliberately avoiding classes in electricity and power and machinery because of

their engineering orientation rather than being a mechanics training program.

Weston (37) also notes the lack of classes offered at many major universities in mechanics as well as the fact that it is next to impossible to obtain a doctorate in agriculture mechanics. Since Weston's study, only one university, Michigan State University, has offered a doctorate in agricultural mechanization.

Summary of Review of Literature

"Agricultural mechanics has been an integral part of the vocational agriculture curriculum since the passage of the Smith-Hughes Act" (15, p. 57). From this time, agriculture mechanics had evolved from the skills needed in doing practical farm repair into five major areas. Advancement in technology and mechanization in these areas has accelerated at such a dramatic pace that many vocational teachers have failed to keep up-to-date. Many universities and colleges need to offer more mechanics classes and allow more flexibility in the number of required classes in mechanics which they need.

The classes which are offered in mechanics should be oriented toward a practical approach to teaching in mechanics and should not be watered down engineering classes. Preparing teachers to teach up-to-date agricultural mechanics seemed to be the biggest overall problem which needed to be corrected.

Other problems associated with agricultural mechanics

instruction were availability of tools, the availability of time allotted for shop use, the size (floor space) of the shop, enrollment in the mechanics classes and the credit hours earned by the teachers.

"Vocational teachers have for years rationalized by saying that they did not have the facilities, funds, or background to teach in specialized areas" (39, p.49). With continuing research, updating of programs and constant evaluation of programs, the day may soon arrive when these excuses will no longer have merit.

CHAPTER III

DESIGN AND CONDUCT OF THE STUDY

The purpose of this chapter is to describe in detail the methodology used to accomplish the purpose of this study. The methodology used was determined by the purpose of the study and the objectives which were previously presented in chapter one.

In order for the information to be meaningful and useable, guidelines for collecting and analyzing the data required the following specific tasks to be formulated:

1. To determine a general description of the population for the study.
2. To develop an instrument for data collection with the aid of the Oklahoma State University Agriculture Education faculty and the Oklahoma State Department of Vocational and Technical Education which would provide useful data for further research and possible improvements.
3. To develop the most effective, yet short and concise procedure for collecting the data.
4. To select methods most significant for analysis of the data.

The Study Population

The population for this study consisted of all the vocational agriculture instructors in the state of Oklahoma which were engaged in teaching a one year specialized agricultural mechanics program. This list was compiled by searching through records at the Oklahoma State Department of Vocational and Technical Education for current high school teachers engaged in a one year specialized Ag-mechanics program. It was determined that there were 222 chapters with a total of 236 vocational agriculture mechanic instructors which compose the specialized one year Ag-mechanics programs in Oklahoma.

Development of the Instrument

In the formulation and development of the instrument, a thorough review of related literature and instruments which had previously been used by researchers was conducted. Educational research books and selected materials on developing questionnaires were studied to determine correct procedures.

In addition to the research, additions and deletions were given by the Agricultural Education faculty at Oklahome State University along with valuable assistance from other doctoral candidates working on similar questionnaires. Input from Verlin Hart, Agricultural Mechanics Specialist, Department of Vocational and Technical Education, was incorporated into the instrument.

A mailed questionnaire was chosen while keeping in mind the characteristics associated with this method of data collection.

> First mailings will typically produce at least a forty percent return. A second mailing should bring your percentage up to at least seventy percent, or the validity of your conclusions will be weak (8, p. 132).

Time and cost of mailing were also factors that were considered. For vocational agricultural instructors that did not respond to the mailings, a telephone call was used to solicit responses.

The questionnaire was developed by keeping the guidelines and characteristics of good educational research in mind. Gay (8) lists the following guidelines for questionnaire development.

1. The questionnaire should be neat and attractive, brief and easy to respond to.
2. No item should be included which does not directly relate to the objective of the study.
3. Questions should be structured or of a closed formed item. An example is multiple choice, yes or no answers, etc.
4. Questionnaires should include an 'other' category for each item and a space for the subject to write in responses not anticipated.
5. The number one rule is that each question should deal with a single concept and be worded as clearly as possible; any term or concept which might mean different things to different people should be defined (p. 129).

In addition to these guidelines, Best (2) lists characteristics to be observed in questionnaire construction. Please note that characteristics which Best presented that overlapped with Gay's guidelines were omitted.

1. A questionnaire seeks only information which cannot be obtained from other sources such as school reports or census data.
2. There are no leading suggestions to the responses desired.

3. Questions are presented in good psychological order, proceding from general to more specific responses. This order helps the respondent to organize his own thinking so he can answer in a logical and objective manner.
4. Avoid asking embarrassing questions.
5. The response should be structured for easy tabulation and interpretation (pp. 89-90).

After structuring the wording of the questionnaire to meet the guidelines which Best and Gay suggest, careful thought was given to Best's fifth guideline on structuring for tabulation and interpretation. Due to the large number of responses that required analysis, the statistical analysis system (SAS) was chosen as the means for statistical computations. SAS is a statistical analysis computer program which is available at Oklahoma State University but developed by SAS Institue, Inc., Cary, North Carolina. The advantage of using SAS is mainly due to the computer system's ability to work with a group of computer programs so a series of jobs (example: plot data, perform regressions, etc.) can all be in one statistical job (16).

The first column was labeled check if you teach. A checkmark was assigned a value of one and a blank space was assigned a value of two. All other five columns were given five blanks with a range which stretched from the first blank indicating no response to the fifth blank in the column which represented the highest response numerically. The instructions explained the purpose of the numbers under each area of agricultural mechanics as being for computer tabulation. The first number outside the parenthesis indicates the computer card number. There were four cards required per

questionnaire. The numbers inside the parenthesis were to identify where the column on the questionnaire would be in relation to the columns on each computer card.

As stated in the cover letter and following the rules of good educational research, it is absolutely essential to hold each response in strict confidence. Each questionnaire was discretely numbered so that a respondent would not receive a second mailing or phone call, thus saving his time and the researcher's time and money.

Researchers should be aware that recent federal legislation has been established to protect human rights. Any study that is federally funded is included in recent legislation (1974) and have certain guidelines that must be followed (16).

After the questionnaire was developed and revisions were made, close scrutiny determined how well the instrument measured what it was developed to measure. A review of Questionology brought out many points which are used to determine accurate measurement of the instrument (19). Upon initial acceptance, it was decided that the instrument should be field tested.

A pilot test was conducted with the population consisting of selected graduate students who had taught vocational agriculture either as student teachers or as full-time instructors. The questionnaire was also submitted to an upper level agricultural mechanics skills class at Oklahoma State University. All but four of the eighteen students in the class were

future agriculture teachers who student taught in the 1983 spring semester. These sample groups were encouraged to make comments and suggestions in regards to making any changes in directions, recording procedures and other items which could be better presented. Since the two groups did not express any problems in understanding the directions and procedures of the questionnaire, it was finalized.

Collection of the Data

The instrument was completed the last week of January, 1983. All additions and deletions had been made and the field test conducted which indicated a valid questionnaire had been constructed.

On February 1, 1983, the first mailing was distributed to the population. Of the 236 Ag-mechanics instructors surveyed, 38 percent responded to the first mailing. The second mailing was distributed on February 15, 1983, to all the population that had not responded to the first mailing. After the week following the second mailing, 55 percent of the total population had responded. To improve the validity of the study, telephone calls to all instructors that had not responded to the first two mailing were made at the Oklahoma Vocational and Technical Education State Department on February 22, 1983.

As was stated via instructions in the questionnaire, the deadline date for those questionnaires to be considered in the study was March 1, 1983. At this time, all responses were collected and keypunched for computer analysis.

Analysis of the Data

The following description of the analysis procedure is included to provide an overview of the statistical treatment of the data collected from the responding vocational agricultural teachers. The instrument used in making the data collection was a Likert Type scale. The scale was designed so that the perceptions of the population could be rated on a scale with a range of one to five; one signifying a null answer in response to the question and five indicating a very high positive response. The response categories are as follow:

Response Category	Scale	Range Limits
Very High	5	4.50 - 5.00
High	4	3.50 - 4.49
Average	3	2.50 - 3.49
Little	2	1.50 - 2.49
None	1	1.00 - 1.49

These responses were possible ratings in five categories concerning the appropriateness of the area for high school, the competency of the instructor to teach the area, the adequacy of tools and equipment for teaching the area, the amount of training and skills received at the university and the quality of those skills.

Descriptive statistics were used since the entire population was surveyed. The analysis of the data was expressed in the form of the arithmetic mean, in percentages, and by standard deviation.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Introduction

The purpose of this study was to determine selected characteristics of specialized one year agricultural mechanic programs in the state of Oklahoma. In order to accomplish this purpose, the following objectives were formulated:

1. To determine which major subjects comprising the five areas of agricultural mechanics are currently being taught in one year specialized agricultural mechanics programs in Oklahoma.
2. To determine the perceptions of vocational agricultural instructors regarding the appropriateness of the various subjects included in the five areas.
3. To determine the vocational agricultural instructors' perceptions of their current compentencies in the five areas of agricultural mechanics.
4. To determine the vocational agricultural instructors' perception of the adequacy of tools and equipment that are available for use in instruction.
5. To determine the amount of training and skills vocational agricultural instructors received in agricultural mechanics at the university level.

6. To determine the quality of training and skills vocational agricultural instructors received in agricultural mechanics at the university level.

As was noted in preceding chapters, the questionnaire was designed to measure these objectives on thirty-seven selected topics comprised by the five areas of agricultural mechanics.

Population

The population for this study was identified as 236 instructors in one year specialized vocational agricultural mechanics programs across Oklahoma. The instrument used in this study received a 69.56 percent return representing a total of 164 respondents. The cut-off date was established as March 1, 1983, but all questionnaires received through March 14, 1983, were included in the study. As of March 1, 60 percent had responded to the second mailing. A phone survey to encourage instructors to return the survey revealed several interesting responses. It should be noted that not all instructors were reached by phone.

Although not requested, the majority of explanations for failure to respond were that the instructors had not found the time to do so. Six instructors claimed they had not received either of the two questionnaires and two instructors said that they would not have time to participate due to their busy schedules.

A copy of the instruments used to solicit data for this

study is included in Appendixes A, B, C and D. Although specific directions were given in the first mailing to check all columns, even if the subject was not taught, thirty responses were returned with whole areas left blank. These responses were copied and then returned to the instructor to be filled out completely. Twenty of these questionnaires were completed by the instructors and returned. In order to alleviate future misunderstanding, directions were taped to the second mailing on colored construction paper so they would be noticed and read. Only one was returned uncompleted from the second mailing.

Selected Characteristics of the Vocational Agriculture Teachers Comprising the Population of This Study

Table I presents information on some of the aspects which describes the population. The college hours in agricultural mechanics presented figures showing 59.3 percent of the instructors with 15 hours in agricultural mechanics. It is also interesting to note that 21.1 percent of the population had between eight and ten hours in their total college program.

Further examination of Table I draws information on the number of years that an instructor has taught agricultural mechanics. A large portion (46 percent) of agriculture teachers in Oklahoma have been teaching mechanics five years or less. The teachers which have taught mechanics for over 25 years comprised 9.7 percent of the total population.

TABLE I

SELECTED CHARACTERISTICS OF THE VOCATIONAL AGRICULTURE TEACHERS COMPRISING THE POPULATION OF THIS STUDY

CHARACTERISTIC	FREQUENCY DISTRIBUTION									
COLLEGE HOURS IN AG. MECHANICS	8-10		11-15		16-20		21-25		25+	
	N	%	N	%	N	%	N	%	N	%
	32	21.1	58	38.2	21	13.8	9	5.9	32	21.0
NUMBER OF YEARS INSTRUCTOR HAS TAUGHT AG. MECHANICS	1-5		6-10		11-15		16-20		25+	
	N	%	N	%	N	%	N	%	N	%
	72	46.0	35	22.7	27	17.5	5	3.2	15	9.7
PLACE WHERE MOST TRAINING AND SKILLS WERE AQUIRED	UNIVERSITY		FARM		SELF-TAUGHT		VO. TECH.		OTHER	
	N	%	N	%	N	%	N	%	N	%
	69	44.8	39	25.3	26	16.9	5	3.2	15	9.7
DISTRICT WHERE TEACHER IS NOW EMPLOYED	NORTHWEST		SOUTHWEST		CENTRAL		NORTHEAST		SOUTHEAST	
	N	%	N	%	N	%	N	%	N	%
	21	13.6	36	23.4	32	20.8	41	26.6	24	15.6

Table I revealed that most of the training and skills acquired by vocational agriculture teachers was through the university (44.8 percent). The next place listed for skills and training acquired were the farm at 25.3 percent, self-taught at 16.9 percent, other at 9.7 percent, and vocational technical schools at 3.2 percent. By far the one place mentioned most often under 'other' was training received through the military.

The final aspect of Table I was the district where the vocational agriculture teacher was employed. The largest percentage of the 164 respondents came from the northeast district, 26.6 percent, while the smallest percentage came from the northwest district, 13.6 percent.

Subjects Currently Taught in Specialized One Year Vocational Agricultural Mechanics Programs

One of the major objectives of this study was to determine the subjects that were currently being taught in specialized one year vocational agricultural mechanics programs. For a more meaningful look at subjects which are currently taught, each subject will be listed under the appropriate heading in each of the five areas of agriculture mechanics as follows: mechanics skills, agricultural structures/construction, agricultural electrification, power and machinery, ans soil and water.

It should be noted that the questionnaire asked for a

check mark if the instructor taught the subject area. Since this part of the instrument was not set up on a Likert scale, the mean and standard deviation columns will be omitted.

Mechanic Skills Currently Being Taught

Table II contains the frequency distribution of the mechanic skills presently taught in Oklahoma. Data presented in this table shows that the subjects being taught to the greatest extent are oxyacetylene cutting at 93.9 percent, arc welding at 93.3 percent, oxyacetylene welding at 89.6 percent and oxyacetylene brazing at 85.4 percent. These percentages of welding and cutting skills taught illustrate the importance the teachers place upon these subjects. The mechanic skills surveyed that expressed the lowest percentages of being taught were woodworking handtools, 23.8 percent, and woodworking powertools, 29.9 percent. Subjects that were taught by less than fifty percent of the instructors were soldering, 49.4 percent; hot metal work, 48.2 percent; and cold metal work, 46.3 percent.

Agricultural Structures/Construction
Subjects Currently Taught

The overall responses listed as percentages in the area of agriculture structures/construction are found in Table III. The subject taught most often in agricultural structures/construction was bill of materials at 74.4 percent followed by selection of materials at 61.6 percent. The only subject

TABLE II

SUBJECTS CURRENTLY TAUGHT IN SPECIALIZED ONE YEAR VOCATIONAL AGRICULTURAL MECHANICS PROGRAMS IN THE AREA OF MECHANIC SKILLS

SUBJECT	FREQUENCY DISTRIBUTION			
	TAUGHT		NOT TAUGHT	
	N	%	N	%
OXYACETYLENE WELDING	147	89.6	17	10.4
OXYACETYLENE CUTTING	154	93.9	10	6.1
ARC WELDING	153	93.3	11	6.7
MIG WELDING	129	78.7	35	21.3
HOT METAL WORK	79	48.2	85	51.8
COLD METAL WORK	76	46.3	88	53.7
TOOL CONDITIONING	92	56.1	72	43.9
OXYACETYLENE BRAZING	140	85.4	24	14.6
SOLDERING	81	49.4	83	50.6
PIPECUTTING AND THREADING	125	76.2	39	23.8
PLUMBING	86	52.4	78	47.6
FENCING	105	64.0	59	36.0
WOODWORKING HANDTOOLS	39	23.8	125	76.2
WOODWORKING POWERTOOLS	49	29.9	115	70.1

TABLE III

SUBJECTS CURRENTLY TAUGHT IN SPECIALIZED ONE YEAR VOCATIONAL AGRICULTRUAL MECHANICS PROGRAMS IN THE AREA OF STRUCTURES/CONSTRUCTION

SUBJECTS	FREQUENCY DISTRIBUTION			
	TAUGHT		NOT TAUGHT	
	N	%	N	%
DRAWING AND SKETCHING	75	45.7	89	54.3
CONCRETE	94	57.3	70	42.7
SELECTION OF MATERIALS	101	61.6	63	38.4
BILL OF MATERIALS	122	74.4	42	25.6
FASTENERS	98	59.8	66	40.2

not taught by at least fifty percent of the instructors was drawing and sketching at 45.7 percent. It is possible that drawing and sketching may be taught less than these other four subjects because a section is not included in the Oklahoma Vocational Agricultural Mechanics Core Curriculum.

Agricultural Electrification Subjects
Currently Being Taught

Of the four subjects listed in Table IV under agricultural electrification, only one was taught by more than fifty percent of the vocational agricultural mechanics teachers. Wiring practices was taught by 58.5 percent of the teachers followed by electrician tools at 43.9 percent, types of motors at 34.1 percent and cleaning motors at 23.2 percent.

Power and Machinery Subjects
Currently Being Taught

Although there were ten subjects in the power and machinery table, Table V, small engine service at 58.5 percent was the only subject taught by more than half the population. Approaching fifty percent was small engine overhaul, 47.0 percent; tractor maintenance, 45.7 percent, and tractor service, 42.7 percent. Tractor operation, service machinery, and machinery operation all fell in the 30 percent range. Machinery operation and tractor selection rounded out the twenty percent range while tractor overhaul rated the lowest of all subjects taught at a very low 15.2 percent. It might

TABLE IV

SUBJECTS CURRENTLY TAUGHT IN SPECIALIZED ONE YEAR VOCATIONAL AGRICULTURAL MECHANICS PROGRAMS IN THE AREA OF AGRICULTURAL ELECTRIFICATION

SUBJECTS	FREQUENCY DISTRIBUTION			
	TAUGHT		NOT TAUGHT	
	N	%	N	%
WIRING PRACTICES	96	58.5	68	41.5
ELECTRICIAN TOOLS	72	43.9	92	56.1
TYPES OF MOTORS	56	34.1	108	65.9
CLEANING MOTORS	38	23.2	126	76.8

TABLE V

SUBJECTS CURRENTLY TAUGHT IN SPECIALIZED ONE YEAR VOCATIONAL AGRICULTURAL MECHANICS PROGRAMS IN THE AREA OF POWER AND MACHINERY

SUBJECT	FREQUENCY DISTRIBUTION			
	TAUGHT		NOT TAUGHT	
	N	%	N	%
SMALL ENGINE SERVICE	96	58.5	68	41.5
SMALL ENGINE OVERHAUL	77	47.0	87	53.0
TRACTOR SERVICE	70	42.7	94	57.3
TRACTOR MAINTENANCE	75	45.7	89	54.3
TRACTOR OVERHAUL	25	15.2	139	84.8
SERVICE MACHINERY	55	33.5	109	66.5
TRACTOR SELECTION	33	20.1	131	79.9
MACHINERY SELECTION	41	25.0	123	75.0
TRACTOR OPERATION	60	36.6	104	63.4
MACHINERY OPERATION	51	31.1	113	68.9

also be noted that tractor overhaul was, by far, the subject that is least taught out of thirty-seven subjects surveyed in agricultural mechanics.

Soil and Water Subjects Currently Being Taught

As shown in Table VI, legal land description was the subject taught by the highest percentage of departments in the soil and water area at a level of 73.2 percent. Legal land description was followed by the use of survey equipment by 58.5 percent, profile leveling at 46.3 percent and differential leveling at 45.7 percent of the departments, respectively.

Perceptions of Vocational Agriculture Instructors Which Affect Teaching Agricultural Mechanic Subjects

As previously stated, the Vo. Ag. instructors were surveyed to determine the appropriateness of the selected areas for high school, the current competency each instructor felt he possessed in each area, the adequacy of tools and equipment which were available for instruction, the amount of training and skills received at the university and the quality of training and skills received at the university level. The perceptions of appropriateness of the area for high school were measured on a likert scale from 'not appropriate' to 'very appropriate'. The remaining four

TABLE VI

SUBJECTS CURRENTLY TAUGHT IN SPECIALIZED ONE YEAR VOCATIONAL AGRICULTURAL MECHANICS PROGRAMS IN THE AREA OF SOIL AND WATER

SUBJECT	FREQUENCY DISTRIBUTION			
	TAUGHT		NOT TAUGHT	
	N	%	N	%
USE OF SURVEY EQUIPMENT	96	58.5	68	41.5
DIFFERENTIAL LEVELING	75	45.7	89	54.3
PROFILE LEVELING	76	46.3	88	53.7
LEGAL LAND DESCRIPTION	120	73.2	44	26.8

areas were measured with a scale from 'none' to 'high'.

In this section, each of the thirty-seven subjects will be looked at in individual tables in relation to the five factors studied. It should be noted that all of the tables will report a variance in the total N due to respondents either accidentally overlooking spaces or intentionally leaving those spaces blank.

Data Concerning Mechanic Skills

Subjects

Inspection of Table VII on oxyacetylene welding reveals that the factor of appropriateness of area for high school received a mean of 4.34 with a standard deviation of 1.14. The standard deviation of 1.14 illustrates the extent to which the responses varied around the mean. Current competency in the area of oxyacetylene welding received a mean of 3.91 with a standard deviation of .84. The majority perceived tools as adequate with a mean response of 3.92 and a standard deviation of .94. The amount of training received at the university level scored a mean of 3.35 with a standard deviation of 1.07.

Table VIII revealed that a majority of 73.9 percent of the teachers gave oxyacetylene cutting the highest rating in being appropriate for high school. This produced a mean of 4.61 with a standard deviation of .79. The teachers rated their competencies high with a mean of 4.22 and a standard deviation of .80. The tools were adequate with

TABLE VII

PERCEPTIONS AFFECTING THE TEACHING OF OXYACETYLENE WELDING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	1	.6	4	2.5	20	12.7	48	30.4	85	53.8	4.34	1.14	158
CURRENT COMPETENCY IN THIS AREA	2	1.3	7	4.4	31	19.4	83	51.9	37	23.1	3.91	.84	160
ADEQUACY OF TOOLS	2	1.3	10	6.3	35	22.0	64	40.3	48	30.2	3.92	.94	159
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	10	6.3	19	12.0	59	37.1	48	30.2	23	14.5	3.35	1.07	159
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	11	7.0	20	12.7	40	25.3	57	36.1	30	19.0	3.47	1.14	158

TABLE VIII

PERCEPTIONS AFFECTING THE TEACHING OF
OXYACETYLENE CUTTING

	NONE (1)		(2)		(3)		(4)		HIGH (5)				
FACTORS SURVEYED	N	%	N	%	N	%	N	%	N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	3	1.9	2	1.2	7	4.3	30	18.6	119	73.9	4.61	.79	161
CURRENT COMPETENCY IN THIS AREA	3	1.9	2	1.2	14	8.6	81	50.0	63	38.7	4.22	.80	163
ADEQUACY OF TOOLS	3	1.9	4	2.5	24	14.8	60	37.0	71	43.8	4.19	.91	162
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	7	4.3	15	9.3	55	34.0	54	33.3	31	19.1	3.54	1.04	162
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	9	5.6	13	8.1	46	28.6	51	31.7	42	26.1	3.65	1.12	161

only 1.9 percent reporting no oxyacetylene cutting equipment. The amount of training was rated at 3.54 with a standard deviation of 1.04 while the quality was rated slightly higher with a mean of 3.65 but slightly less agreement with a standard deviation of 1.12.

Table IX had the unique distinction of having arc welding given the highest rating of all subjects in the appropriateness category for being taught in high school (83.1 percent). This generated a mean of 4.74 with a .70 standard deviation. The competency was established at 4.35 with a standard deviation of .75. Only 1.8 percent reported that the tools were inadequate. The amount and quality of training and skills had means calculated at 3.60 and 3.71, respectively.

Table X presents the following observations on MIG welding. Most of the teachers felt MIG welding was appropriate with a mean of 4.24 and a standard deviation of 1.05. The majority of teachers also felt competent in this subject area with a mean of 3.69. Tools were adequate for the general population with a mean of 3.67. There were 12.7 percent of the teachers however, that did not have MIG welders. It is interesting to observe that 34.2 percent of the vocational agriculture instructors received no training in MIG welding at the university level which is a big factor in explaining the mean of 2.34. Overall quality of training received was rated below average with a mean of 2.46 and a standard deviation of 1.30.

TABLE IX

PERCEPTIONS AFFECTING THE TEACHING OF ARC WELDING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	3	1.9	1	.63	3	1.9	20	12.5	133	83.1	4.74	.70	160
CURRENT COMPETENCY IN THIS AREA	3	1.8	4	2.5	16	9.9	74	45.7	75	46.3	4.35	.75	162
ADEQUACY OF TOOLS	3	1.8	4	2.5	16	9.9	44	27.3	94	58.4	4.38	.90	161
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	4	2.5	16	9.9	54	33.3	54	33.3	34	21.0	3.60	1.00	162
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	4	2.5	18	11.3	42	26.3	52	32.5	44	27.5	3.71	1.07	160

TABLE X

PERCEPTIONS AFFECTING THE TEACHING OF MIG WELDING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	6	3.8	4	2.6	23	14.7	36	23.1	87	55.8	4.24	1.05	156
CURRENT COMPETENCY IN THIS AREA	9	5.7	12	7.5	38	23.9	61	38.4	39	24.5	3.69	1.00	159
ADEQUACY OF TOOLS	20	12.7	9	5.7	32	20.4	38	24.2	58	36.9	3.67	1.36	157
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	54	34.2	38	24.1	34	21.5	22	13.9	10	6.3	2.34	1.26	158
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	53	34.0	27	17.3	40	25.6	24	15.4	12	7.7	2.46	1.30	156

Table XI presented data on hot metal work. The majority place hot metal work as appropriate with a mean of 3.22 and a standard deviation of 1.17. The current competency in this area was slightly above average with a mean of 3.11. Adequacy of tools was considered less than adequate by the teachers with a mean of 2.76 and widely scattered scores producing a 1.23 standard deviation. Amount and quality of skills and training were given means of 2.27 and 2.36, respectively. Approximately one quarter of the teachers, 27.8 percent, had received no training in hot metal work.

Table XII reported data concerned with cold metal work. The majority of teachers felt that cold metal work was appropriate with a mean of 3.33 but lacked uniform agreement with a standard deviation of 1.22. Current competency had a mean of 3.09 but adequacy of tools fell to 2.89 with 13.4 percent having no tools available. Amount and quality of skills and training had means of 2.26 and 2.36, respectively.

Table XIII revealed information on tool conditioning. The majority of instructors responded that tool conditioning was appropriate for high school with a mean of 3.69 and a standard deviation of 1.26. Most were confident of their competency with a mean of 3.24 and only 6.7 percent expressing no current competencies. Some, 12.8 percent, expressed no adequate tools to teach tool conditioning. Most instructors felt the amount of training and skills, mean of 2.55, and the quality of training and skills,

TABLE XI

PERCEPTIONS AFFECTING THE TEACHING OF
HOT METAL WORK

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	12	8.1	26	17.5	55	36.9	29	19.5	27	18.1	3.22	1.17	149
CURRENT COMPETENCY IN THIS AREA	12	8.0	27	18.0	63	42.0	28	18.7	20	13.3	3.11	1.10	150
ADEQUACY OF TOOLS	26	17.2	40	26.5	47	31.1	20	13.2	18	11.9	2.76	1.23	151
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	42	27.8	50	33.1	39	25.8	16	10.6	4	2.6	2.27	1.06	151
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	41	27.3	44	29.3	42	28.0	16	10.7	7	4.7	2.36	1.13	150

TABLE XII

PERCEPTIONS AFFECTING THE TEACHING OF
COLD METAL WORK

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	13	9.0	21	14.5	47	32.4	33	22.8	31	21.4	3.33	1.22	145
CURRENT COMPETENCY IN THIS AREA	13	8.8	30	20.3	55	37.3	31	20.0	19	12.8	3.09	1.13	148
ADEQUACY OF TOOLS	20	13.4	43	28.9	37	24.8	32	21.4	17	11.4	2.89	1.22	149
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	39	26.4	50	33.8	44	29.7	12	8.1	3	2.0	2.26	1.00	148
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	38	25.9	45	30.6	42	28.6	16	10.9	6	4.1	2.36	1.10	147

TABLE XIII

PERCEPTIONS AFFECTING THE TEACHING OF TOOL CONDITIONING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	11	7.5	17	11.6	28	19.2	40	27.4	50	34.2	3.69	1.26	146
CURRENT COMPETENCY IN THIS AREA	10	6.7	28	18.8	45	30.2	48	32.2	18	12.1	3.24	1.10	149
ADEQUACY OF TOOLS	19	12.8	27	18.1	46	30.9	39	26.2	18	12.1	3.07	1.20	149
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	31	20.9	43	29.1	41	27.7	28	18.9	5	3.4	2.55	1.12	148
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	31	20.9	44	29.7	36	24.3	25	16.9	12	8.1	2.61	1.22	148

mean of 2.61, were below average.

Table XIV presented data on the subject of oxyacetylene brazing. Appropriateness of oxyacetylene brazing received a mean response of 4.04 with a standard deviation of .98. Teachers felt competent in their ability to teach this area as expressed by the 3.65 mean and standard deviation of .99. Tools were adequate with only 1.9 percent expressing that there were no tools for brazing. The amount of training received averaged a 3.0 mean and the quality of training received an average of 3.06 mean response.

Table XV persents data on the subject of soldering. A mean response of 3.47 was given the appropriateness of teaching soldering. Current competency received a mean of 3.26. There were 13.3 percent of the teachers who reported no tools for soldering with a mean response of 2.99 with a standard deviation of 1.20. The amount of training and skills received and the quality of those skills had a mean of 2.47 and 2.52, respectively.

Table XVI revealed that most instructors felt that pipecutting and threading was appropriate for high school with a mean of 3.88 and a standard deviation of .99. Most felt competent in this area exhibited by a 3.79 mean and .90 standard deviation. Few teachers, 8.8 percent, expressed a lack of adequate tools. The training and skills were rated much lower however, with a 2.67 mean on the amount and a 2.79 mean on quality of training and skills. It should also be noted the variability on amount of

TABLE XIV

PERCEPTIONS AFFECTING THE TEACHING OF
OXYACETYLENE BRAZING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	3	1.9	9	5.7	27	17.2	58	36.9	60	38.2	4.04	.98	157
CURRENT COMPETENCY IN THIS AREA	4	2.5	14	8.8	50	31.3	58	36.3	34	21.3	3.65	.99	160
ADEQUACY OF TOOLS	3	1.9	13	8.1	52	32.5	53	33.1	39	24.4	3.70	.99	160
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	14	8.8	41	25.6	46	28.8	48	30.0	11	6.9	3.00	1.09	160
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	14	8.8	37	23.3	50	31.4	42	26.4	16	10.0	3.06	1.12	159

TABLE XV

PERCEPTIONS AFFECTING THE TEACHING OF SOLDERING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	9	6.2	21	14.4	44	30.1	37	25.3	35	24.0	3.47	1.18	146
CURRENT COMPETENCY IN THIS AREA	8	5.4	26	17.5	53	35.6	44	29.5	18	12.1	3.25	1.05	149
ADEQUACY OF TOOLS	20	13.3	31	20.7	47	31.3	35	23.3	17	11.3	2.99	1.20	150
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	36	24.3	42	28.4	41	27.7	23	15.5	6	4.1	2.17	1.14	148
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	36	24.2	44	29.5	35	23.5	23	15.4	11	7.4	2.52	1.22	149

TABLE XVI

PERCEPTIONS AFFECTING THE TEACHING OF
PIPE CUTTING AND THREADING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	4	2.6	6	3.8	44	28.2	53	34.0	49	31.4	3.88	.99	156
CURRENT COMPETENCY IN THIS AREA	3	1.9	9	5.9	39	24.5	76	47.8	32	20.1	3.79	.90	159
ADEQUACY OF TOOLS	14	8.8	23	14.5	29	18.2	60	37.7	33	20.8	3.47	1.22	159
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	36	22.7	41	25.8	35	22.0	34	21.4	13	8.2	2.67	1.27	159
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	34	21.5	34	21.5	39	24.7	33	20.9	18	11.4	2.79	1.31	158

training and skills with a standard deviation of 1.27 on amount and a standard deviation of 1.31 on quality of training and skills received.

Table XVII reported data on the mechanic's skill of plumbing. A mean of 3.57 expressed the perceived appropriateness of plumbing for high school instruction. Only 5.4 percent felt that they were not competent in this area. The adequacy of tools had a mean of 2.96 but the responses were scattered around the mean with a standard deviation of 1.21. The amount of training and skills received at the university level had a mean of 2.28 and a standard deviation of 1.14. The quality of training and skills had a mean of 2.41 and a standard deviation of 1.22.

Table XVIII was collected on the mechanic skill of fencing. The information showed a mean of 3.81 for the appropriateness of fencing with a standard deviation of 1.12. Most instructors expressed competency in this area with a mean of 3.84. Only 9.2 percent did not have adequate tools. It should be noted that 47.7 percent responded as having no university skills or training in fencing resulting in a low mean of 1.95. The quality was rated a low mean of 2.06 with a standard deviation of 1.20.

Table XIX reported data on woodworking handtools. This was the only subject in the mechanics skills area that received a mean below 3.00 for an appropriateness of subject taught for high school vocational agriculture. The current competency in the area had a mean of 2.93, 30.0 percent of

TABLE XVII

PERCEPTIONS AFFECTING THE TEACHING OF PLUMBING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	9	6.1	21	14.3	32	21.8	47	31.0	38	25.9	3.57	1.19	147
CURRENT COMPETENCY IN THIS AREA	8	5.4	22	14.8	59	39.6	44	29.5	16	10.7	3.26	1.01	149
ADEQUACY OF TOOLS	18	12.1	41	27.5	36	24.2	37	24.8	17	11.4	2.96	1.21	149
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	48	32.2	40	26.8	38	25.5	18	12.1	5	3.4	2.28	1.14	149
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	45	30.4	34	23.0	42	28.4	17	11.5	10	6.8	2.41	1.22	148

TABLE XVIII

PERCEPTIONS AFFECTING THE TEACHING OF FENCING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	8	5.3	9	6.0	37	24.5	47	31.1	50	33.1	3.81	1.12	151
CURRENT COMPETENCY IN THIS AREA	5	3.2	8	5.2	40	26.0	54	35.1	47	30.5	3.84	1.02	154
ADEQUACY OF TOOLS	14	9.2	30	19.6	56	36.6	31	20.3	22	14.4	3.11	1.16	153
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	73	47.7	38	24.8	25	16.3	11	7.2	6	3.9	1.95	1.13	153
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	69	45.7	31	20.5	32	21.2	11	7.3	8	5.3	2.06	1.20	151

TABLE XIX

PERCEPTIONS AFFECTING THE TEACHING OF WOODWORKING HANDTOOLS

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	21	15.1	30	21.6	39	28.1	30	21.6	19	13.7	2.97	1.26	139
CURRENT COMPETENCY IN THIS AREA	18	12.9	31	22.1	47	33.6	31	22.1	13	9.3	2.93	1.15	140
ADEQUACY OF TOOLS	42	30.0	32	22.9	36	25.7	23	16.4	7	5.0	2.44	1.21	140
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	61	43.3	48	34.0	16	11.3	11	7.8	5	3.5	1.94	1.09	141
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	63	45.0	39	27.9	17	12.1	12	8.6	9	6.4	2.04	1.23	140

the population did not have adequate tools. Of the teachers, 43.3 percent did not receive any training or skills in woodworking handtools and 45.0 percent rated the quality of training and skills as none.

Woodworking powertools completed the subjects listed under mechanic skills. Data is presented in Table XX. The appropriateness of woodworking powertools was represented by a mean of 3.10 and varied responses illustrated by a standard deviation of 1.25. The mean for the current competency was 3.03. A mean response of 2.56 expressed the adequacy of tools with 25.4 percent of the population acknowledging that they had none. As with the wood handtools, the amount of training was low for the power handtools with 44.8 percent having received no training at the university level. The mean response was 1.94 as to the amount of training. The quality of training had a mean response of 2.04 with 44.4 percent rating the quality as none.

Data Concerning Agricultural Structures/Construction

Table XXI reported data on the structures/construction area of agricultural mechanics. The appropriateness of this subject was expressed by a mean of 3.26 and a standard deviation of 1.26. The majority expressed a lack of competency with a mean of 2.88. Of the instructors surveyed, 22.1 percent stated that tools were not adequate. Adequacy of tools was represented by a mean of 2.58. On the amount of

TABLE XX

PERCEPTIONS AFFECTING THE TEACHING OF
WOODWORKING POWERTOOLS

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	17	12.0	29	20.4	43	30.3	29	20.4	24	16.9	3.10	1.25	142
CURRENT COMPETENCY IN THIS AREA	14	9.8	33	23.1	48	33.6	30	21.0	18	12.6	3.03	1.16	143
ADEQUACY OF TOOLS	36	25.4	32	22.5	42	29.6	23	16.2	9	6.3	2.56	1.21	142
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	64	44.8	45	31.5	17	11.9	12	8.4	5	3.5	1.94	1.11	143
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	63	44.4	38	26.8	22	15.5	10	7.0	9	6.3	2.04	1.21	142

TABLE XXI

PERCEPTIONS AFFECTING THE TEACHING OF
DRAWING AND SKETCHING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	17	11.8	23	16.0	36	25.0	42	29.2	26	18.1	3.26	1.26	144
CURRENT COMPETENCY IN THIS AREA	21	14.4	27	18.5	56	38.4	33	22.6	9	6.2	2.88	1.11	146
ADEQUACY OF TOOLS	32	22.1	40	27.6	40	27.6	23	15.9	10	6.9	2.58	1.19	145
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	64	43.8	31	21.2	27	18.5	17	11.6	7	4.8	2.12	1.23	146
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	58	40.0	33	22.8	27	18.6	17	11.7	10	6.9	2.23	1.28	145

training and skills received at the university level, 43.8 percent stated that they had received none. The quality of training and skills were represented by 40.0 percent of the population expressing none. The means for amount and quality were 2.12 and 2.23, respectively.

Table XXII contains data pertinent to concrete. The majority of instructors indicated the appropriateness of concrete for high school with a 3.72 mean. The perception of the competency in this area was a mean of 3.27 and a .92 standard deviation. Adequacy of tools showed a mean of 2.70 with 15.9 percent of the population not having adequate concrete tools. The amount of training and skills received at the university received a mean value of 2.76 with 19.9 percent receiving no skills and training. Of the teachers, 22.8 percent rated the quality of those skills as none. The mean for the quality was 2.63 with a standard deviation of 1.21.

Table XXIII reports data on selection of materials. This subject was considered the second most appropriate of those subjects listed under agricultural structures/construction with a mean value of 3.75 and a standard deviation of 1.07. Only 2.6 percent of the population checked no competency in helping establish a high mean of 3.54. The adequacy of tools had a mean of 3.13. The amount of training and skills received at the university level was below average with a mean of 2.52 and a standard deviation of 1.11. The quality of those skills received a mean value of 2.57.

TABLE XXII

PERCEPTIONS AFFECTING THE TEACHING OF CONCRETE

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	6	4.2	10	6.9	34	23.6	63	43.8	31	21.5	3.72	1.02	144
CURRENT COMPETENCY IN THIS AREA	7	4.8	17	11.6	60	41.1	53	36.3	9	6.2	3.27	.92	146
ADEQUACY OF TOOLS	23	15.9	38	26.2	52	35.9	23	15.9	9	6.2	2.70	1.11	145
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	29	19.9	47	32.2	36	24.7	27	18.5	7	4.8	2.56	1.14	146
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	33	22.8	35	24.1	39	26.9	29	20.0	9	6.2	2.63	1.21	145

TABLE XXIII

PERCEPTIONS AFFECTING THE TEACHING OF SELECTION OF MATERIALS

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	7	4.6	13	8.6	29	19.1	65	42.8	38	25.0	3.75	1.07	152
CURRENT COMPETENCY IN THIS AREA	4	2.6	10	6.5	59	38.6	59	38.6	21	13.7	3.54	.90	153
ADEQUACY OF TOOLS	13	8.6	24	15.8	56	36.8	49	32.2	10	6.6	3.13	1.04	152
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	34	22.2	40	26.1	29	32.0	25	16.3	5	3.3	2.52	1.11	153
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	35	23.0	36	23.7	47	30.9	26	17.1	8	5.3	2.57	1.17	152

Table XXIV contains data reported on the bill of materials. This was considered the most appropriate subject in agricultural structures/construction with a mean response of 4.03. The competency in this area also received the highest mean value (3.76) as did the adequacy of tools with a mean of 3.40, and the amount and quality of training and skills received with means of 2.69 and 2.82, respectively. It would seem that bill of materials was by far the most important subject taught in structures/construction. Table III also backs this thought up with 74.4 percent of the population teaching this subject.

Table XXV contains data describing fasteners. The appropriateness of this area for high school was indicated by a mean of 3.56 with a standard deviation of 1.23. Most instructors indicated their current competency expressed best by a mean of 3.50. Adequacy of tools had a mean of 3.11 while the amount of training and quality of training received means of 2.53 and 2.64, respectively.

Data Concerning the Agricultural Electrification Subjects

Table XXVI presents the following information on wiring practices. Of the four subjects listed in electricity, wiring practices was considered most appropriate with a mean of 3.72 and a standard deviation of 1.06. The current competencies in this area was given a 3.14 mean while the adequacy of the tools was 2.52. The population had 2.32

TABLE XXIV

PERCEPTIONS AFFECTING THE TEACHING OF
BILL OF MATERIALS

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	4	2.6	12	7.8	19	12.3	59	38.3	60	39.0	4.03	1.03	154
CURRENT COMPETENCY IN THIS AREA	3	1.9	9	5.8	46	29.7	61	39.4	36	23.2	3.76	.94	155
ADEQUACY OF TOOLS	10	6.5	21	13.6	44	28.6	56	36.4	23	14.9	3.40	1.10	154
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	25	16.2	43	27.9	51	33.1	25	16.2	10	6.5	2.69	1.12	154
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	25	16.2	35	22.7	50	32.5	31	20.1	13	8.4	2.82	1.18	154

TABLE XXV

PERCEPTIONS AFFECTING THE TEACHING OF FASTENERS

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	11	7.5	20	13.6	30	20.4	47	32.0	39	26.5	3.56	1.23	147
CURRENT COMPETENCY IN THIS AREA	7	4.7	14	9.3	50	33.3	55	36.7	24	16.0	3.50	1.02	150
ADEQUACY OF TOOLS	14	9.4	26	17.5	54	36.2	39	26.2	16	10.7	3.11	1.11	149
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	34	22.7	44	29.3	43	28.7	17	11.3	12	8.0	2.53	1.19	150
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	35	23.5	36	24.2	40	26.8	24	16.1	14	9.4	2.64	1.26	149

TABLE XXVI

PERCEPTIONS AFFECTING THE TEACHING OF WIRING PRACTICES

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	8	5.3	9	6.0	49	2.5	51	33.8	34	22.5	3.62	1.06	151
CURRENT COMPETENCY IN THIS AREA	11	7.3	29	19.2	57	37.7	35	23.2	19	12.6	3.14	1.09	151
ADEQUACY OF TOOLS	32	21.2	42	27.8	48	31.8	25	16.6	4	2.6	2.52	1.08	151
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	35	23.2	39	25.8	37	24.5	31	20.5	9	6.0	2.60	1.22	151
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	35	23.5	37	24.9	33	22.1	30	20.1	14	9.4	2.67	1.29	149

percent which had no training. The mean on amount of training and skills figured out to 2.60 with a standard deviation of 1.22. The quality of training had a mean of 2.67 and a standard deviation of 1.29.

Table XXVII was concerned with data pertaining to electrician tools. The appropriateness of electrician tools to be taught in high schools was above average with a mean of 3.31. The competency in this subject was figured to be average with a mean of 3.04. Adequacy of electrician tools was a problem with a mean of 2.35. The amount of training and skills received at the university received means of 2.51 and 2.53, respectively.

Table XXVIII presents data on the types of electric motors. It was shown that instructors felt it was appropriate to teach electric motors in high school as exhibited by the mean value of 3.08. The current competency was not judged to be average as related by a mean of 2.61. A notable 37.1 percent felt tools were not adequate and the mean figured to be a low 2.04. The amount of training and skills had a mean of 2.25 while the standard deviation was 1.15. The quality of training and skills also noted a low mean of 2.22.

Table XXIX revealed the lowest means of all the tables regarding electricity. Table XXIX has data which pertained to the cleaning of electric motors. Data placed appropriateness for high school low with a 2.85 mean, competency to teach the subject low with a 3.42 mean, adequacy of tools

TABLE XXVII

PERCEPTIONS AFFECTING THE TEACHING OF ELECTRICIAN TOOLS

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	14	9.7	14	9.7	50	34.5	47	32.4	20	13.8	3.31	1.13	145
CURRENT COMPETENCY IN THIS AREA	16	10.9	26	17.7	57	38.8	32	21.8	16	10.9	3.04	1.13	147
ADEQUACY OF TOOLS	39	26.5	45	30.6	41	27.9	16	10.9	6	4.1	2.35	1.11	147
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	39	26.5	36	24.5	37	25.2	28	19.0	7	4.8	2.51	1.21	147
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	39	26.9	38	26.2	32	22.1	24	16.6	12	8.3	2.53	1.28	145

TABLE XXVIII

PERCEPTIONS AFFECTING THE TEACHING OF TYPES OF MOTORS

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	18	12.7	21	14.8	50	35.2	38	26.8	15	10.6	3.08	1.16	142
CURRENT COMPETENCY IN THIS AREA	22	15.5	43	30.3	52	36.6	18	12.7	7	4.9	2.61	1.05	142
ADEQUACY OF TOOLS	53	37.1	46	32.2	31	21.7	11	7.7	2	1.4	2.04	1.01	143
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	46	32.6	43	30.5	38	19.9	19	13.5	5	3.5	2.25	1.15	141
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	50	35.1	39	27.9	28	20.0	16	11.4	7	5.0	2.22	1.19	140

TABLE XXIX

PERCEPTIONS AFFECTING THE TEACHING OF CLEANING MOTORS

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	25	18.1	27	19.6	44	31.9	28	20.3	14	10.1	2.85	1.23	138
CURRENT COMPETENCY IN THIS AREA	35	25.2	40	28.8	43	30.9	13	9.4	8	5.8	2.42	1.14	139
ADEQUACY OF TOOLS	50	35.7	50	35.7	28	20.0	11	7.9	1	.7	2.02	.97	140
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	58	41.7	37	26.6	22	15.8	19	13.7	3	2.2	2.08	1.14	139
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	61	44.2	31	22.5	25	18.1	15	10.9	6	4.3	2.09	1.21	138

low with a mean of 2.02 and the amount and quality of training and skills received at the university level low with respective means of 2.08 and 2.09.

Data Concerning the Power and Machinery Subjects

Table XXX presents data on servicing small engines. Small engine service was considered the most appropriate to teach of the ten subjects listed in power and machinery with a mean of 3.68 and a standard deviation of 1.08. Competency in this area had a mean of 3.33 with only 6.7 percent of the population expressing no current competency. Most felt tools could be more adequate indicated by a 2.81 mean. The amount and quality of training and skills received at the university level had means of 2.83 and 2.86, respectively. It is important to note the variability of these last two as illustrated by their large standard deviation.

Table XXXI reveals data on small engine overhaul. Overall, the instructors rated small engine overhaul appropriate for high school with a mean of 3.56. Only 7.6 percent responded as having no competency in small engine overhaul. The mean of 3.22 described how the current population rated their competency in small engine overhaul. Instructors on the average indicated a need for more adequate tools with a mean of 2.66 and 24.1 percent responding that they had no tools. Scores were widely dispersed on the amount of training and skills and the quality of training

TABLE XXX

PERCEPTIONS AFFECTING THE TEACHING OF
SMALL ENGINE SERVICE

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	8	5.4	9	6.0	42	28.2	53	35.6	37	24.8	3.68	1.08	149
CURRENT COMPETENCY IN THIS AREA	10	6.7	28	18.7	39	26.0	48	32.0	25	16.7	3.33	1.16	150
ADEQUACY OF TOOLS	24	16.0	42	28.0	36	24.0	35	23.3	13	8.7	2.81	1.21	150
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	40	26.7	21	14.0	33	22.0	36	24.0	20	13.3	2.83	1.40	150
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	43	29.1	19	12.8	26	17.6	36	24.3	24	16.2	2.86	1.48	148

TABLE XXXI

PERCEPTIONS AFFECTING THE TEACHING OF
SMALL ENGINE OVERHAUL

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	9	6.3	11	7.6	49	34.0	41	28.5	34	23.6	3.56	1.12	144
CURRENT COMPETENCY IN THIS AREA	11	7.6	34	23.4	38	26.2	36	24.8	26	17.9	3.22	1.21	145
ADEQUACY OF TOOLS	35	24.1	37	25.5	29	20.0	30	20.7	14	9.7	2.66	1.31	145
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	41	28.1	17	11.6	37	25.3	30	20.5	21	14.4	2.82	1.41	146
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	43	30.1	19	13.3	27	18.9	31	21.7	23	16.1	2.80	1.47	143

and skills. Amount of training and skills had a mean of 2.82 with a standard deviation of 1.41 while quality of training and skills had a 2.80 mean with a standard deviation of 1.47.

Table XXXII presents data on tractor service. A mean of 3.56 was recorded for the appropriateness of tractor service. It was disturbing to this investigator that 10.1 percent of the vocational teachers surveyed indicated that they possessed no current competencies in the area of tractor service. The mean for current competencies was 3.24 with a standard deviation of 1.17. It also seemed odd to this investigator that 27.3 percent reported that their tools were not adequate for tractor servicing since few tools are required. Adequacy of tools received a 2.43 mean with a 1.20 standard deviation. It is noted at this point that 43.0 percent reported that they had no training and skills received at the university and 46.3 percent reported none on the quality of training and skills received.

Table XXXIII presents data on tractor maintenance. A 3.62 mean was recorded for the appropriateness of tractor maintenance for high school. Of the instructors, 8.7 percent checked that they had no current competency in this area. Inadequate tools were reported by 28.5 percent of the teachers and the mean for the adequacy of the tools was 2.42. Amount of training and skills at the university level seemed lacking with 46 percent receiving none and by the low mean of 2.05. Quality of training and skills received at the

TABLE XXXII

PERCEPTIONS AFFECTING THE TEACHING OF TRACTOR SERVICE

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	12	8.1	12	8.1	46	30.9	39	26.2	40	26.8	3.56	1.20	149
CURRENT COMPETENCY IN THIS AREA	15	10.1	21	14.1	49	32.9	41	27.5	23	15.4	3.24	1.17	149
ADEQUACY OF TOOLS	41	27.3	44	29.3	33	22.0	24	16.0	8	5.3	2.43	1.20	150
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	64	43.0	37	24.8	25	16.8	15	10.0	8	5.4	2.10	1.22	149
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	68	46.3	34	23.1	19	12.9	17	11.6	9	6.1	2.08	1.27	147

TABLE XXXIII

PERCEPTIONS AFFECTING THE TEACHING OF TRACTOR MAINTENANCE

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	11	7.3	13	8.7	42	28.0	40	26.7	44	29.3	3.62	1.20	150
CURRENT COMPETENCY IN THIS AREA	13	8.7	22	14.7	48	32.0	39	26.0	28	18.7	3.31	1.19	150
ADEQUACY OF TOOLS	43	28.5	40	26.5	39	25.8	20	13.2	9	6.0	2.42	1.20	151
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	69	46.0	36	24.0	21	14.0	17	11.3	7	4.7	2.05	1.22	150
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	72	49.3	31	21.2	20	13.7	16	11.0	7	4.8	2.01	1.23	146

university level received a low mean of 2.01 with 49.3 percent of the population expressing that they had no quality in the training.

Table XXXIV presents data collected on tractor overhaul. The appropriateness of tractor overhaul for high school received a mean rating of 2.84. Instructors rated current competencies with a mean of 2.43 while 29.0 percent indicated no competencies. The population rated adequacy of tools low with a 1.94 mean and 49.3 percent reported their adequacy of tools as none. A majority of the agriculture teachers, 60.9 percent, reported that they had received no training on tractor overhaul. The mean for amount of training and skills received was 1.78 with a standard deviation of 1.13. Quality rated a mean of 1.75 and a standard deviation of 1.12 with 62.2 percent indicating no quality of training and skills received.

Table XXXV contains data presented on servicing machinery. Most instructors rated servicing machinery as important with a mean of 3.42. Competency in this area received a mean value of 3.17 with only 9.7 percent indicating no competency. Of the teachers, 29.2 percent indicated they had no adequate tools. The majority of instructors, 51.7 percent, indicated that they received no training in the amount of training in servicing machinery. The means for servicing machinery in relation to the amount and quality were 1.86 and 1.80, respectively.

Table XXXVI contains data collected on tractor selection.

TABLE XXXIV

PERCEPTIONS AFFECTING THE TEACHING OF TRACTOR OVERHAUL

	NONE (1)		(2)		(3)		(4)		HIGH (5)				
FACTORS SURVEYED	N	%	N	%	N	%	N	%	N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	24	17.5	28	20.4	44	32.1	28	20.4	13	9.5	2.84	1.21	137
CURRENT COMPETENCY IN THIS AREA	40	29.0	36	26.1	35	25.4	17	12.3	10	7.2	2.43	1.23	138
ADEQUACY OF TOOLS	68	49.3	29	21.0	26	18.8	11	8.0	4	2.9	1.94	1.13	138
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	84	60.9	19	13.8	22	15.9	8	5.8	5	3.6	1.78	1.13	138
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSTIY LEVEL	84	62.2	19	14.1	18	13.3	10	7.4	4	3.0	1.75	1.12	135

TABLE XXXV

PERCEPTIONS AFFECTING THE TEACHING OF SERVICING MACHINERY

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	13	9.1	17	11.9	44	30.8	35	24.5	34	23.8	3.42	1.23	143
CURRENT COMPETENCY IN THIS AREA	14	9.7	25	17.4	49	34.0	35	24.3	21	14.6	3.17	1.17	144
ADEQUACY OF TOOLS	42	29.2	37	25.7	45	31.3	10	6.9	10	6.9	2.37	1.18	144
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	74	51.7	28	19.6	31	21.7	7	4.9	3	2.1	1.86	1.05	143
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	78	55.7	28	20.0	21	15.0	10	7.1	3	2.1	1.80	1.07	140

TABLE XXXVI

PERCEPTIONS AFFECTING THE TEACHING OF TRACTOR SELECTION

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	16	11.5	22	15.8	49	35.3	34	24.5	18	13.0	3.12	1.17	139
CURRENT COMPETENCY IN THIS AREA	17	12.1	31	22.1	51	36.4	22	15.7	19	13.6	2.96	1.19	140
ADEQUACY OF TOOLS	43	30.9	31	22.3	50	36.0	9	6.5	6	4.3	2.31	1.11	139
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	75	54.0	28	20.1	24	17.3	10	7.2	2	1.4	1.82	1.05	139
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	78	57.4	26	19.1	18	13.2	11	8.1	3	2.2	1.79	1.09	136

Only 11.5 percent of the instructors felt that tractor selection was not appropriate. A mean response of 3.12 described the general attitude toward the appropriateness of this subject. The current competency in the area was perceived as slightly below average with a mean of 2.96. A mean of 2.31 was found for adequacy of tools with 30.9 percent indicating no tools and 22.3 percent below average in their adequacy for tools. Instructors' perceptions of amount of training and skills at the university was very low with a 1.82 mean and a 54.0 percent majority which expressed no training and skills received. The quality of training in this subject was perceived as low with a 1.79 mean and 57.4 percent of the population expressing no quality.

Table XXXVII reveals data describing machinery selection. The general concensus of the instructors was machinery selection was appropriate for high school students as indicated by a 3.19 mean and only 11.8 percent expressing that it was not appropriate. Of the instructors surveyed, 10.5 percent indicated that they had no current competency in this area. Adequacy of tools were viewed below average with a 2.34 mean and 29.4 percent of the instructors expressing the adequacy of the tools as being none. Amount and quality of training was perceived low with a mean of 1.85 and 1.82, respectively. The majority of instructors, 52.8 percent in amount and 56.1 percent quality, indicated none in amount and quality of training and skills received

TABLE XXXVII

PERCEPTIONS AFFECTING THE TEACHING OF MACHINERY SELECTION

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	17	11.8	18	12.5	53	36.8	32	22.2	24	16.7	3.19	1.21	144
CURRENT COMPETENCY IN THIS AREA	15	10.5	30	21.0	52	36.4	28	19.6	18	12.6	3.03	1.16	143
ADEQUACY OF TOOLS	42	29.4	35	24.5	47	32.9	14	9.8	5	3.5	2.34	1.11	143
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	75	52.8	27	19.0	29	20.4	8	5.6	3	2.1	1.85	1.07	142
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	78	56.1	25	18.0	22	15.8	11	7.9	3	2.2	1.82	1.10	139

at the university level.

Table XXXVIII contains data relating to tractor operation. Only 6.8 percent of the instructors responding felt tractor operation was not appropriate. Competency was perceived as being high with a 3.52 mean. Tools were considered to be not adequate by 32.2 percent of the instructors. Overall, the adequacy of tools was rated low with a mean value of 2.36. Again, a majority of the instructors rated both the amount of training and skills received, 54.1 percent, and the quality of training and skills received at the university, 56.6 percent, as none.

Table XXXIX has data collected to describe machinery operation. Only 7.0 percent of the instructors felt machinery operation was not appropriate for high school. The mean for appropriateness was established by the instructors at 3.58 with a standard deviation of 1.20. Of the respondents, 9.0 percent felt they possessed no current competencies in this subject. The instructors' responses for current competencies produced a 3.42 mean value with a standard deviation of 1.22. Adequacy of tools were again viewed low by respondents with a mean of 2.35 and 34.7 percent responding none. The amount and quality of training and skills (below 50 percent for the third time in a row) was rated as none by 54.5 and 57.1 percent, respectively. The means were again low with a 1.85 mean for amount and a 1.82 mean for quality.

TABLE XXXVIII

PERCEPTIONS AFFECTING THE TEACHING OF TRACTOR OPERATION

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPORPRIATENESS OF AREA FOR HIGH SCHOOL	10	6.8	18	12.3	38	26.0	39	26.7	41	28.1	3.57	1.21	146
CURRENT COMPETENCY IN THIS AREA	12	8.2	17	11.6	36	24.5	47	32.0	35	23.8	3.52	1.21	147
ADEQUACY OF TOOLS	47	32.2	30	20.5	46	31.5	16	11.0	7	4.8	2.36	1.17	146
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	79	54.1	24	16.4	30	20.5	8	5.5	5	3.4	1.88	1.13	146
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	81	56.6	26	18.1	20	14.0	11	7.9	5	3.5	1.83	1.14	143

TABLE XXXIX

PERCEPTIONS AFFECTING THE TEACHING OF MACHINERY OPERATION

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	10	7.0	15	10.5	41	28.7	36	25.2	41	28.7	3.58	1.20	143
CURRENT COMPETENCY IN THIS AREA	13	9.0	18	12.5	40	27.8	41	28.5	32	22.2	3.42	1.22	144
ADEQUACY OF TOOLS	50	34.7	27	18.8	45	31.3	10	6.9	12	8.3	2.35	1.25	144
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	78	54.5	24	16.8	30	21.0	7	4.9	4	2.8	1.85	1.09	143
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	80	57.1	22	15.7	25	17.9	9	6.4	4	2.9	1.82	1.12	140

Data Concerning Soil
and Water Subjects

Table XL presents data collected to describe the subject of use of survey equipment. Of the vocational agriculture instructors surveyed, 4.8 percent checked surveying equipment as not appropriate for high school. Appropriateness received a mean of 3.55 with a standard deviation of 1.09. Most teachers expressed a current competency in this area with a mean of 3.41. Adequacy of tools had a mean of 3.14 with 16.9 percent checking that they had no tools. Over one-fourth of the instructors, 25.7 percent, had not received any training and skills at the university level. The quality of the training and skills also fell below one-fourth with 29.5 percent expressing none. The means for amount and quality were 2.76 and 2.82, respectively.

Data collected to describe differential leveling is found in Table XLI. A low five percent thought that differential leveling was not appropriate for high school. The mean value for appropriateness was 3.37 with a standard deviation of 1.07. Instructors expressed an average feeling of competency with a mean value of 3.18 even though 10.6 percent had no competency in this subject. Nearly one-fifth of the instructors listed equipment as a problem with 18.3 percent having no adequate tools available for teaching. The mean value for adequate tools was 3.01. The amount of training and skills received found the mean dropped to

TABLE XL

PERCEPTIONS AFFECTING THE TEACHING OF
THE USE OF SURVEYING EQUIPMENT

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	7	4.8	18	12.2	38	25.9	55	37.4	29	19.7	3.55	1.09	147
CURRENT COMPETENCY IN THIS AREA	8	5.4	26	17.6	37	25.0	51	34.5	26	17.6	3.41	1.13	148
ADEQUACY OF TOOLS	25	16.9	20	13.5	38	25.7	40	27.0	25	16.9	3.14	1.32	148
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	38	25.7	24	16.2	36	24.3	36	24.3	14	9.5	2.76	1.33	148
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	44	29.5	21	14.1	26	17.5	34	22.8	24	16.1	2.82	1.48	149

TABLE XLI

PERCEPTIONS AFFECTING THE TEACHING OF DIFFERENTIAL LEVELING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	7	5.0	22	15.7	43	30.7	48	34.3	20	14.3	3.37	1.07	140
CURRENT COMPETENCY IN THIS AREA	15	10.6	22	15.6	44	31.2	42	29.8	18	12.8	3.18	1.17	141
ADEQUACY OF TOOLS	26	18.3	24	16.9	36	25.4	34	23.9	22	15.5	3.01	1.33	142
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	42	29.6	22	15.5	34	23.9	33	23.2	11	7.7	2.64	1.33	142
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	47	33.1	19	13.4	23	16.2	31	21.8	22	15.5	2.73	1.50	142

2.64 with 29.6 percent checking the response column under none. The quality of the training received a 2.73 mean with a 1.50 standard deviation. On quality, 33.1 percent rated the training and skills as none.

Table XLII lists data concerning profile leveling. Profile leveling was given a slightly higher mean response at 3.39 as compared to differential leveling. The instructors also rated the competency slightly higher than differential with a 3.22 mean (versus 3.18). The mean for adequacy of tools was at 3.05 with 18.2 percent expressing no adequate tools. Adequacy of tools had quite a bit of variability with a standard deviation of 1.35. The amount of training and quality of training had less than average means at 2.70 and 2.74, respectively. The variability was great on both the amount and quality with standard deviations of 1.36 and 1.49, respectively.

Table XLIII was on the subject of legal land description. Of the four subjects in the area of soil and water, legal land description was rated as most appropriate with a mean of 3.89 with only 3.3 percent of the population feeling it was not appropriate. The instructors indicated a high degree of competency in this area with a mean of 3.80 with a standard deviation of 1.00. Tools were adequate with a mean of 3.58 and only 6.0 percent indicating no adequate tools. The amount of training had a mean of 2.82 with a standard deviation of 1.31. The quality of training had a mean of 2.88 with a standard deviation of 1.39.

TABLE XLII

PERCEPTIONS AFFECTING THE TEACHING OF
PROFILE LEVELING

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	8	5.7	18	12.8	46	32.6	49	34.8	20	14.2	3.39	1.06	141
CURRENT COMPETENCY IN THIS AREA	13	9.2	27	19.0	38	26.8	44	31.0	20	14.1	3.22	1.18	142
ADEQUACY OF TOOLS	26	18.2	24	16.8	34	23.8	35	24.5	24	16.8	3.05	1.35	143
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	43	29.9	18	12.5	36	25.0	33	22.9	14	9.7	2.70	1.36	144
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	48	33.3	17	11.8	25	17.4	32	22.2	22	15.3	2.74	1.49	144

TABLE XLIII

PERCEPTIONS AFFECTING THE TEACHING OF
LEGAL LAND DESCRIPTION

FACTORS SURVEYED	NONE (1) N	%	(2) N	%	(3) N	%	(4) N	%	HIGH (5) N	%	MEAN	STD. DEV.	TOTAL N
APPROPRIATENESS OF AREA FOR HIGH SCHOOL	5	3.3	10	6.6	28	18.5	62	41.1	46	30.5	3.89	1.02	151
CURRENT COMPETENCY IN THIS AREA	4	2.6	13	8.6	31	20.4	65	42.8	39	25.7	3.80	1.00	152
ADEQUACY OF TOOLS	9	6.0	18	11.9	36	23.8	53	35.1	35	23.2	3.58	1.15	151
AMOUNT OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	35	23.0	24	15.8	42	27.6	35	23.0	16	10.5	2.82	1.31	152
QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL	36	23.5	27	17.6	32	20.9	36	23.5	22	14.1	2.88	1.39	153

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of this chapter is to present a brief review of the study problem, a summary of the findings of this study, and to present conclusions and recommendations based upon the observations and impressions resulting from the design and conduct of the study. The summary is presented under the following headings: Purpose of the Study, Objectives of the Study, Rationale for the Study, Design and Conduct of the Study, and Major Findings of the Research.

Summary of the Study

Purpose of the Study

The purpose of this study was to determine selected characteristics of the agricultural mechanic programs in the state of Oklahoma.

Objectives of the Study

In order to better comprehend and accomplish the purposes of this study, the following specific objectives were formulated:

1. To determine which major subjects comprising the five areas of agricultural mechanics are currently being

taught in one year specialized agricultural mechanic programs in Oklahoma.

2. To determine the perceptions of vocational agricultural instructors regarding the appropriateness of the various subjects included in the five areas of agricultural mechanics.
3. To determine the vocational agricultural instructors' perceptions of their current competencies in the five areas.
4. To determine the vocational agricultural instructors' perceptions of the adequacy of tools and equipment that are available for use in instruction.
5. To determine the amount of training and skills vocational agriculture instructors received in mechanics at the university level.
6. To determine the quality of training and skills vocational agriculture instructors received in agriculture mechanics at the university level.

Rationale for the Study

The basic rationale behind this study was the belief that throughout the nation Oklahoma is recognized as a leader in vocational agriculture. This belief is based in part by the impressive showing Oklahoma has made when compared to other states' vocational agriculture programs when they have competed at the National level and the placings, awards, national officers and members receiving the American Farmer

Degree when in competition.

Although these are impressive facts, the area of agricultural mechanics has been a black sheep with no Oklahoma team ever winning or rating a gold emblem. Why does Oklahoma do so well in other contests and agricultural related areas but fair so poorly in agricultural mechanics? This and other similar questions prompted this study.

Design and Conduct of the Study

Questionnaires were mailed to each vocational agriculture teacher in the state of Oklahoma which was engaged in teaching a specialized one year program in agricultural mechanics. It was determined through Oklahoma State Department of Vocational and Technical Education records that there were 236 teachers which fit this description during the 1982-83 school year. A phone call urged deliquent instructors to return the survey instrument after the first two mailings.

The responsdents in the study included 164 of the 236 teachers surveyed. A cut-off date of March 1 was extended to March 14. Questionnaires received after March 14 were not included.

Findings of the Study

Selected Characteristics of the Vocational Agriculture Teachers Comprising the Population. The 164 responding vocational agriculture teachers had a variety of college

training in the hours of agricultural mechanics. The range scattered from 21.1 percent with eight to ten hours to 21.0 percent with over 25 hours. But more than half (59.3 percent) had fifteen hours or less. The number of years the agriculture teachers had taught agricultural mechanics ranged from 46 percent with one to five years experience up to 9.7 percent with over 25 years experience. The majority (68.7 percent) had taught agricultural mechanics ten years or less. The one place where most of the agriculture teachers training and skills was acquired was the university (44.8 percent), followed by the farm (25.3 percent), being self-taught (16.9 percent), other (9.7 percent; which was listed in the majority of instances as being the military services), and vocational technical schools (3.2 percent). The districts had a fairly uniform sharing of the total return with the highest portion from the northeast with 26.6 percent and the least coming form the northwest, 13.6 percent.

Summary Comparison of Responses as to Appropriateness and Adequacy of Tools and Equipment for Teaching Mechanic Skills

Not only did oxyacetylene cutting, arc welding, oxyacetylene welding, and oxyacetylene brazing rate first, second, third and fourth as being the subjects most often taught in mechanic skills, but they also rated as being the most taught areas in the entire field of agricultural mechanics. These mechanic skills were followed in order by MIG welding,

pipecutting, fencing, tool conditioning, plumbing, hot metal work, cold metal work, woodworking powertools and woodworking handtools. It should be noted that many schools in Oklahoma view woodworking skills as part of their industrial arts and shop programs. This is likely the reason that only approximately one in four teachers of vocational agricultural mechanics covers this area.

For ease of interpretation and comparison, all the means have been constructed in Summary Table XLIV which compares the perceptions of adequacy of the tools and equipment. The subjects have been ranked and are listed in the table from the highest mean to the lowest mean on the perceptions of appropriateness for high school Vo. Ag. in each area.

The first area in Table XLIV is mechanic skills. Although a larger percentage taught oxyactylene cutting, arc welding was considered by instructors as the most appropriate area for high school vocational agriculture (not only in mechanic skills but in all areas). The fourteen subjects ranked as follows: arc welding, oxyacetylene cutting, oxyacetylene welding, MIG welding, oxyacetylene brazing, pipecutting and threading, fencing, tool conditioning, plumbing, soldering, cold metal work, hot metal work, power woodworking tools and hand woodworking tools. The only mechanics skill listed that was not considered appropriate by the majority of instructors was woodworking handtools.

The majority of agriculture instructors indicated

TABLE XLIV

SUMMARY COMPARISON OF RESPONSES AS TO APPROPRIATENESS AND ADEQUACY OF TOOLS AND EQUIPMENT FOR TEACHING SELECTED AREAS/SUBJECTS IN AGRICULTURAL MECHANICS

AREA/SUBJECT	APPROPRIATENESS OF AREA FOR HIGH SCHOOL VO. AG. MEAN	STD. DEV.	ADEQUACY OF TOOLS/EQUIPMENT MEAN	STD. DEV.
MECHANICS SKILLS				
Arc Welding	4.74	.70	4.38	.90
Oxyacetylene Cutting	4.61	.79	4.19	.91
Oxyacetylene Welding	4.34	.84	3.92	.94
MIG Welding	4.24	1.05	3.67	1.36
Oxyacetylene Brazing	4.04	.98	3.70	.99
Pipecutting & Threading	3.88	.99	3.47	1.22
Fencing	3.81	1.12	3.11	1.16
Tool Conditioning	3.69	1.26	3.07	1.20
Plumbing	3.57	1.19	2.96	1.21
Soldering	3.47	1.18	2.99	1.20
Cold Metal Work	3.33	1.22	2.89	1.22
Hot Metal Work	3.22	1.17	2.76	1.23
Woodworking Powertools	3.10	1.25	2.56	1.21
Woodworking Handtools	2.97	1.26	2.44	1.22
STRUCTURES/CONSTRUCTION				
Bill of Materials	4.03	1.03	3.40	1.10
Selction of Materials	3.75	1.07	3.13	1.04
Concrete	3.72	1.02	2.70	1.11
Fasteners	3.56	1.23	3.11	1.11
Drawing & Sketching	3.26	1.26	2.58	1.19
AGRICULTURAL ELECTRIFICATION				
Wiring Paractices	3.62	1.06	2.52	1.08
Electrician Tools	3.31	1.13	3.04	1.11
Types of Motors	3.08	1.16	2.04	1.01
Cleaning of Motors	2.85	1.23	2.02	.97

TABLE XLIV (CONTINUED)

AREA/SUBJECT	APPROPRIATENESS OF AREA FOR HIGH SCHOOL VO. AG. MEAN	STD. DEV.	ADEQUACY OF TOOLS/EQUIPMENT MEAN	STD. DEV.
POWER & MACHINERY				
Small Engine Service	3.68	1.08	2.81	1.21
Tractor Maintenance	3.62	1.20	2.42	1.20
Machinery Operation	3.58	1.21	2.35	1.25
Tractor Operation	3.57	1.21	2.36	1.18
Small Engine Overhaul	3.56[a]	1.12	2.66	1.31
Tractor Service	3.56[a]	1.20	2.43	1.20
Service Machinery	3.42	1.23	2.37	1.18
Machinery Selection	3.19	1.21	2.34	1.11
Tractor Selection	3.12	1.17	2.31	1.11
Tractor Overhaul	2.84	1.21	1.94	1.13
SOIL AND WATER				
Legal Land Description	3.89	1.02	3.58	1.15
Use of Survey Equipment	3.55	1.09	3.14	1.32
Profile Leveling	3.39	1.06	3.05	1.35
Differential Leveling	3.37	1.07	3.01	1.33

[a]Tied means.

adequate tools and equipment for the welding and cutting processes, tool conditions, pipecutting and threading, and fencing. Thoses subjects which fell below the average mean for the majority of instructors were soldering, plumbing, cold metal work, hot metal work, and power and hand woodworking tools.

When looking at the means on appropriateness from high school vocational agriculture programs and the adequacy of tools and equipment, it is interesting to note that the means closely parallel each other in their rankings. The only differences in the adequacy of tools and equipment when comparing to appropriateness of the subject for high school Vo. Ag. was oxyacetylene brazing tools and equipment were slightly more adequate than MIG welding tools and equipment; and soldering tools and equipment were slightly more adequate than plumbing tools and equipment.

Summary Comparison of Responses as to Appropriateness and Adequacy of Tools and Equipment for Teaching Structures/Construction

The second area listed in Table XLIV concerns five subjects in agriculture structures/construction. Bill of materials is currently the most often taught subject in structures/construction with approximately three out of four instructors teaching this subject. Selection of materials was taught slightly more often than fasteners. Concrete was taught by approximately half the instructors.

Drawing and sketching was taught by less than half the instructors and was the lowest percentage subject taught in structures and construction.

The majority of all instructors indicated each subject as appropriate for high school vocational agriculture with bill of materials chosen as the most appropriate and drawing and sketching the least important.

The majority of instructors signified adequate tools and equipment in bills of materials, selection of materials and fasteners while finding concrete and drawing and sketching tools less than adequate.

When looking at the means on appropriateness for high school Vo. Ag. and the adequacy of tools and equipment, the means were almost parallel in ranking with the exception of the adequacy of tools and equipment for fasteners having a slightly higher mean than the adequacy of tools and equipment for concrete.

Summary Comparison of Responses as to Appropriateness and Adequacy of Tools and Equipment for Teaching Agricultural Electrification

The third area listed in Table XLIV concerns four subjects in agricultural electrification. Slightly over half (58.5 percent) of the instructors taught wiring practices making it the most taught subject in the area of electrification. Wiring parctices was followed in order from most taught to least taught by electrician tools, types of motors

and cleaning motors. Only 23.2 percent of the teachers currently teach the cleaning of electric motors.

The only subject of the four subjects surveyed which dropped below a 3.00 mean on appropriateness of area for high school vocational agriculture was cleaning electric motors. Wiring practices was considered most appropriate followed by electrician tools and types of motors.

A very small majority of vocational agriculture instructors signified that electrician tools were adequate making it the only subject in the area of agricultural electrification with an above average figure. Types of motors and cleaning motors both rated very low mean values. In fact, only tractor overhaul rated lower on tool adequacy.

Once again the rankings for the mean values on appropriateness of area and adequacy of tools and equipment closely paralleled each other. Electrician tools was perceived as being slightly more adequate than wiring practices when looking at tools and equipment.

Summary Comparison of Responses as to Appropriateness and Adequacy of Tools and Equipment for Teaching Power and Machinery

The fourth area listed in Table XLIV concerns ten subjects in agricultural power and machinery. The subject most often taught in this area was small engine service with just over half of the instructors (58.5 percent) teaching this subject. This was the only subject out of the

ten which had at least fifty percent of the instructors teaching it. The other subjects following in order from most to least are: small engine overhaul, tractor maintenance, tractor service, tractor operation, service machinery, machinery operation, machinery selection, tractor selection, and tractor overhaul.

The majority of instructors indicated that each of the ten subjects except tractor overhaul was appropriate for high school vocational agriculture. The most appropriate subject was indicated as small engine service, followed by tractor maintenance, machinery operation, tractor operation, small engine overhaul, tractor service, service machiney, machinery selection, tractor selection and tractor overhaul. It is noted that small engine service and tractor service had a tie mean of 3.56.

The majority of vocational agriculture instructors rated all ten subjects below average when looking at the adequacy of tools and equipment for high school in the area of power and machinery. Small engine service was rated highest with tractor overhaul lowest. Tractor overhaul was not only the lowest subject in power and machinery but the lowest of the 37 subjects when looking at adequate tools.

When comparing the power and machinery means of adequacy of tools and equipment to the appropriateness of the subjects for high school, it was determined that small engine service had the largest mean for both of the categories. The other means with parallel rankings were the

lowest three rankings (eighth, ninth, and tenth places).

Summary Comparison of Responses as to Appropriateness and Adequacy of Tools and Equipment for Teaching Soil and Water

The fifth and final area in Table XLIV was soil and water. There were four subjects listed in this area. The subject taught most often in this area was legal land description with nearly three out of four teaching it. This was followed by the subjects ranging from the most taught to the least as follows: use of survey equipment, profile leveling and differential leveling. The majority of instructors indicated that each of the four subjects listed were appropriate for high school vocational agriculture students. Legal land description had the highest mean followed by use of survey equipment, profile and differential leveling.

The majority of vocational agriculture teachers indicated that they had adequate tools for all four subjects in the area of soil and water. Legal land description tools were most adequate with tools and equipment used in differential leveling being least adequate. It is odd that the tools and equipment used in profile leveling would be rated a higher mean than differential leveling since the tools for profile leveling can be used in differential leveling.

When comparing the rankings of the means found in

appropriateness of area for high school Vo. Ag. to the rankings of the means found in adequacy of tools and equipment, the means for both categories placed the subjects in the same rank order, more specifically from highest mean to lowest as follows: legal land description, use of survey equipment, profile leveling and differential leveling.

The following observations were made in the five mechanic areas when ranking means for appropriateness of area for high school Vo. Ag. to adequacy of tools and equipment. In all areas except power and machinery, the mean ranking for appropriateness of area for high school was closely parallel to the mean ranking for the adequacy of tools and equipment. In all five areas, the means were lower for adequacy of tools and equipment, in every subject, than the means of appropriateness of area for high school.

The subjects that received a mean value for appropriateness above a 4.00 were arc welding, oxyacetylene cutting, oxyacetylene welding, MIG welding, oxyacetylene brazing and bill of materials. The subjects receiving a mean below 3.00 when observing appropriateness for high school were woodworking handtools, cleaning of motors and tractor overhaul. Of the thirty-seven subjects surveyed, twenty-one subjects had a mean response of less than 3.00 when observing the adequacy of tools and equipment. Arc welding and oxyacetylene cutting received a mean above

4.00 in adequacy of tools making them the most adequate tools and equipment surveyed.

Summary Comparison of Current Competency in Mechanic Skills and the Amount, Quality and Site of Training

Table XLV is a summary of the means and standard deviations pertaining to the perceptions of the current competency in each subject/area, the perceptions of the amount of training and skills received at the university level and the quality of training and skills received at the university level. For ease in interpretation, the subjects have been ranked in order from highest mean value to lowest mean value in each area for the current competency possessed in that area.

When looking at competencies in the area of mechanic skills, the mean of woodworking handtools was the only mean of the fourteen mechanic skills that fell below 3.00. The majority of instructors listed the welding and cutting skills as the strongest area for their current competencies in agriculture mechanics with arc welding, oxyacetylene cutting and oxyacetylene welding taking the top three places. Although the competency in MIG welding remained high, it fell below fencing and pipecutting and threading.

The majority of agriculture instructors rated the amount of training and skills received at the university

TABLE XLV

SUMMARY COMPARISON OF RESPONSES AS TO INSTRUCTORS' CURRENT COMPETENCY IN THE AREA AND THE AMOUNT AND QUALITY OF TRAINING AND SKILLS RECEIVED AT THE UNIVERSITY LEVEL

AREA/SUBJECT	CURRENT COMPETENCY IN THIS AREA		AMOUNT OF TRAINING & SKILLS RECEIVED AT THE UNIVERSITY LEVEL		QUALITY OF TRAINING & SKILLS RECEIVED AT THE UNIVERSITY LEVEL	
	MEAN	STD. DEV.	MEAN	STD. DEV.	MEAN	STD. DEV.
MECHANIC SKILLS						
Arc Welding	4.35	.75	3.60	1.00	3.71	1.07
Oxyacetylene Cutting	4.22	.80	3.58	1.04	3.65	1.12
Oxyacetylene Welding	3.91	.84	3.35	1.07	3.47	1.14
Fencing	3.84	1.02	1.95	1.13	2.06	1.20
Pipecutting & Threading	3.79	.90	2.67	1.27	2.79	1.31
MIG Welding	3.69	1.10	2.34	1.26	2.46	1.31
Oxyacetylene Brazing	3.65	.99	3.01	1.09	3.06	1.12
Plumbing	3.26[a]	1.01	2.28	1.14	2.41	1.22
Soldering	3.26[a]	1.05	2.46	1.14	2.52	1.22
Tool Conditioning	3.24	1.10	2.55	1.12	2.61	1.22
Hot Metal Work	3.11	1.10	2.27	1.06	2.36	1.13
Cold Metal Work	3.09	1.13	2.26	1.00	2.37	1.10
Woodworking Powertools	3.03	1.16	1.94	1.09	2.04	1.23

TABLE XLV (CONTINUED)

AREA/SUBJECT	CURRENT COMPETENCY IN THIS AREA MEAN	CURRENT COMPETENCY IN THIS AREA STD. DEV.	AMOUNT OF TRAINING & SKILLS RECEIVED AT THE UNIVERSITY LEVEL MEAN	AMOUNT OF TRAINING & SKILLS RECEIVED AT THE UNIVERSITY LEVEL STD. DEV.	QUALITY OF TRAINING & SKILLS RECEIVED AT THE UNIVERSITY LEVEL MEAN	QUALITY OF TRAINING & SKILLS RECEIVED AT THE UNIVERSITY LEVEL STD. DEV.
MECHANIC SKILLS (Continued)						
Woodworking Handtools	2.92	1.15	1.94	1.09	2.04	1.23
STRUCTURES/CONSTRUCTION						
Bill of Materials	3.76	.94	2.69	1.12	2.82	1.18
Selection of Materials	3.54	.90	2.52	1.11	2.58	1.17
Fasteners	3.50	1.02	2.53	1.19	2.64	1.26
Concrete	3.27	.92	2.56	1.14	2.63	1.21
Drawing & Sketching	2.88	1.11	2.12	1.23	2.23	1.28
AGRICULTURAL ELECTRIFICATION						
Electrician Tools	3.31	1.13	2.35	1.21	2.51	1.28
Wiring Practices	3.15	1.10	2.60	1.22	2.67	1.29
Type of Motors	2.61	1.05	2.25	1.15	2.22	1.19
Cleaning Motors	2.42	1.14	2.08	1.15	2.09	1.21
POWER & MACHINERY						
Tractor Operation	3.52	1.21	1.88	1.13	1.83	1.14

TABLE XLV (CONTINUED)

AREA/SUBJECT	CURRENT COMPETENCY IN THIS AREA		AMOUNT OF TRAINING & SKILLS RECEIVED AT THE UNIVERSITY LEVEL		QUALITY OF TRAINING & SKILLS RECEIVED AT THE UNIVERSITY LEVEL	
	MEAN	STD. DEV.	MEAN	STD. DEV.	MEAN	STD. DEV.
POWER & MACHINERY (Continued)						
Machinery Operation	3.42	1.22	1.85	1.09	1.82	1.11
Small Engine Operation	3.33	1.16	2.83	1.40	2.86	1.48
Tractor Maintenance	3.31	1.19	2.05	1.22	2.01	1.23
Tractor Service	3.24	1.18	2.10	1.22	2.08	1.27
Small Engine Overhaul	3.22	1.21	2.82	1.41	2.80	1.47
Service Machinery	3.17	1.17	1.86	1.05	1.80	1.07
Machinery Selection	3.02	1.16	1.85	1.06	1.82	1.10
Tractor Selection	2.96	1.19	1.82	1.05	1.79	1.09
Tractor Overhaul	2.43	1.23	1.78	1.13	1.75	1.12
SOIL & WATER						
Legal Land Description	3.80	1.00	2.82	1.31	2.88	1.39
Use of Survey Equipment	3.41	1.13	2.76	1.33	2.82	1.48
Profile Leveling	3.22	1.18	2.70	1.36	2.74	1.49
Differential Leveling	3.18	1.17	2.64	1.33	2.73	1.50

[a]Tied means.

level above average in the following subjects: arc welding, oxyaceylene cutting, oxyacetylene welding, and oxyacetylene brazing. Those subjects which rated below an average mean of 3.00 but above an average mean of 2.00 are as follows: pipecutting and threading, tool conditioning, soldering, MIG welding, plumbing, hot metal work and cold metal work. These subjects following fell below a 2.00 mean and are ranked from highest to lowest as follow: fencing and power and hand woodworking tools.

The quality of training and skills received at the university level in mechanic skills are rated as follow: above average quality in arc welding, oxyacetylene cutting, oxyacetylene welding and oxyacetylene brazing. The areas with means between 3.00 and 2.00 were pipecutting and threading, tool conditioning, soldering, MIG welding, plumbing, cold metal work, hot metal work, fencing and hand and power woodworking tools.

The mechanic skills of arc welding, oxyacetylene cutting and oxyacetylene welding are ranked 1, 2 and 3 respectively in current competency in the area, amount of training and skills received at the university level and quality of training and skills received at the university level. Most of the mean rankings for these three categories closely correspond with each other. The one glaring difference in the three category rankings is fencing. Most instructors possess a high level of competency in this subject probably due to on-the-farm training but rated it

very low on amount and quality of university training.

Summary Comparison of Current Competency in Structures/ Construction and the Amount, Quality and Site of Training

It was noted that drawing and sketching was the only subject in structures/construction that the majority of instructors indicated a less than average (3.00) competency. The instructors indicated the highest competency in bill of materials followed by selection of materials, fasteners, concrete and drawing and sketching.

The majority of teachers indicated that both the amount and quality of training and skills received at the university level was below average in all subjects in structures and construction.

Amount and quality closely correspond with their mean rankings to the current competency in this area. The noticeable difference was a higher ranking for concrete, second, in amount of training and the lower ranking in quality of training for selection of materials, third.

Summary Comparison of Current Competency in Agricultural Electrification and the Amount, Quality and Site of Training

The majority of agriculture teachers indicated above average competency in the subjects of wiring practices and electrician tools. Types of motors and cleaning motors fell

slightly below the average.

Both amount of training and skills and quality of training and skills at the university level rated below average in all subjects in agricultural electrification although the means on amount and quality approached a mean of 2.00, none fell below a mean of 2.00.

When comparing the amount and quality of training to the current competency in the area, the means ranked about the same with the exception of wiring practices. Wiring pactices had the highest mean ranking in both amount and quality of training and skills received.

Summary Comparison of Current Competency in Power and Machinery and the Amount, Quality and Site of Training

Not surprisingly, tractor overhaul was shown by the majority of teachers to be their least competent area. Tractor selection and tractor overhaul were the only two subjects rated below a 3.00 mean. The subject the majority felt most competent in was tractor operation.

The amount and quality of training and skills received at the university level in the area of power and machinery found all subjects rated below average by the majority of the instructors. Only four subjects rated above an average mean of 2.00 and are listed as follows: Small engine service, small engine overhaul, tractor service and tractor maintenance. Six subjects rated below an average of 2.00

and are listed as follows: tractor operation, service machinery, machinery selection, machinery operation, tractor selection, and tractor overhaul.

The mean rankings for these three categories failed to correspond very well to each other. This is probably due to the competencies most instructors possess due to on-the-farm training in these subjects compared to the lack of training provided by the university in these areas.

Summary Comparison of Current Competency in Soil and Water and the Amount, Quality and Site of Training

The majority of instructors signified that they possessed an above average competency in the area of soil and water. Legal land description was considered by the majority of the teachers as the subject in which they had the greatest competency followed by use of survey equipment, profile leveling and differential leveling.

The amount of training and the quality of that training and skills taught at the university level again was noted below average for every subject by the majority of vocational agriculture teachers.

It should be noted in the final summary that all 37 subjects except three; namely arc welding, oxyacetylene cutting, and oxyacetylene welding were viewed by the majority of agriculture teachers in the state of Oklahoma as being below average when describing the amount of

training and skills and the quality of training and skills received at the university level.

Conclusions

After analysis of the findings relative to this study, the investigator has been led to the following conclusions:

1. Since 54.3 percent of all instructors had 15 hours or less in agricultural mechanics at the university level, perceptions of teachers in the subject areas of agricultural mechanics might be changed to some degree by more exposure to the various subjects and the five areas. It is noted that many instructors have received the majority, and some instructors all of their training in the mechanic skills agrea with only little or no exposure to other mechanic areas.
2. The majority of vocational agricultural mechanics instructors are not teaching a well-rounded mechanics program in Oklahoma. Although one subject may be taught in each area, the majority of subjects surveyed are not being taught in agricultural electrification and power and machinery.
3. The area of mechanic skills was overemphasized and is excessively taught at the secondary level.

4. The majority of instructors are not receiving the amount of training and skills or the quality of training and skills in agricultural mechanics at the university level that they need in the subjects surveyed.
5. The majority of Oklahoma vocational agricultural instructors need more adequate tools if they are to teach each of the subjects surveyed in the five areas.
6. A better understanding of the importance of all subjects listed and their value to mechanics would probably lead to all subjects being considered appropriate for high school Vo. Ag. programs.
7. It is possible that some subjects were taught less by vocational agricultural instructors because those subjects were not included in the core curriculum.

Recommendations

The following recommendations were made by the researcher based on the information obtained as a result of the conduct of this study. The recommendations are based on the findings and conclusions.

1. The agricultural education department, as well as other governing bodies which determine requirements for vocational agriculture instructors, should

require more agriculture mechanics classes with more variety in each of the five areas.

2. The Oklahoma core curriculum for vocational agriculture should be expanded to include other subjects in the five areas since the subjects surveyed which were not in the core were perceived of less importance.
3. Inadequate tools and equipment and/or inadequate training in a subject should not be used as an excuse to completely avoid a subject or area.
4. Vocational agricultural mechanics instructors should use available monies to purchase adequate tools for all five areas of agricultural mechanics.
5. It should be stressed by the university and State Department of Vocational Technical Education that all subjects and areas are equally important and should be taught on the secondary and university levels without overemphasizing one or two areas to the sacrifice of the remaining areas.
6. The Agricultural Engineering and Mechanics Department should work with Agricultural Education and develop classes and labs which are hands-on, skill-type agriculture mechanics and not watered down engineering theory. Either teach mechanics and call it mechanics, or teach engineering and call it engineering, but do not teach engineering and call it mechanics.

7. This study should be the first in a series. Further studies are needed to probe into agriculture mechanics to develop better curriculum, to better train our vocational education instructors, and to help train and place students in the field of agriculture mechanics.

It is in the interest of students at both high school and university levels that these recommendations were made.

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APPENDIXES

APPENDIX A

COVER LETTERS FOR THE FIRST AND SECOND MAILINGS

February 1, 1983

Dear

Whether you are a Vocational Agricultural instructor in Southern Oklahoma or an instructor in the Panhandle, some form of Agricultural Mechanics is playing a vital role in your area. Have you given any thought of the impact Agricultural Mechanics has on the average Oklahoma farmer? Regardless of the agricultural enterprise in your county, competencies in the five areas, specifically mechanic skills, electrification, power and machinery, soil and water and construction/structures largely determine or have an impact on production, efficiency, and profits.

However, are all of these areas being taught? Do you possess the training and skills to meet the needs of your students? Are tools, teaching aids, and facilities available?

These are important questions concerning Ag. Mechanics. Accordingly, a research study has been designed to survey teachers who have been identified as providing specialized agricultural mechanics classes and selected characteristics of their programs.

Please assist us by participating in filling out the enclosed questionnaire. A puzzle is never complete if there is a piece missing, so please return your response at your earliest convience. Since some information might be regarded as personal, no signature is requested. This study will be completed by Spring 1983. All questionnaires must be completed and returned by March 1. If you want a copy of the completed study, please indicate so below.

Sincerely yours,

Dwayne

C. Dwayne Driskill
Agricultural Ed. Dept.
Oklahoma State Univ.
Stillwater, Ok. 74074

Do you want a copy of this study after completion? Yes___ No____
Did you graduate from O.S.U. Yes___ No___

Dear Vocational Agricultural Instructor,

Two weeks ago you received a questionnaire concerning Agricultural Mechanics in your school. This mailing contains a second copy for those of you who may have misplaced or lost the first copy before it could be returned.

Please let me stress the importance that this study could have on agricultural mechanics in Oklahoma. We need your reply in assessing the situation so accurate recommendations can be made. ALL COLUMNS SHOULD BE CHECKED, EVEN IF YOU DO NOT TEACH THE SUBJECT.

Remember, all questionnaires must be returned by March 1, 1983. Thank you.

Sincerely yours,

C. Dwayne Driskill

C. Dwayne Driskill
Agricultural Ed. Dept.
Oklahoma State Univ.
Stillwater, Okla.

Do you want a copy of this study after completion? Yes__ No__

Did you graduate from O.S.U. ? Yes___ NO___

APPENDIX B

QUESTIONNAIRE-DEMOGRAPHIC DATA

INSTRUCTIONS

Please check the most appropiate blank.

1. How many hours total do you have in agricultural mechanics?

   8-10___ 11-15___ 16-20___ 21-25___ Over 25___

2. How many years have you taught Ag. Mechanics?

   1-5___ 6-10___ 11-15___ 16-20___ Over 20___

3. At which one of the following was most of your training and skills acquired?

   At the Univ. ___ On the Farm ___ Self Taught ___ Vo.Tech___

   Other___

4. What district in Oklahoma is your high school located in?

   Northwest___ Southwest___ Central___ Northeast___ Southeast

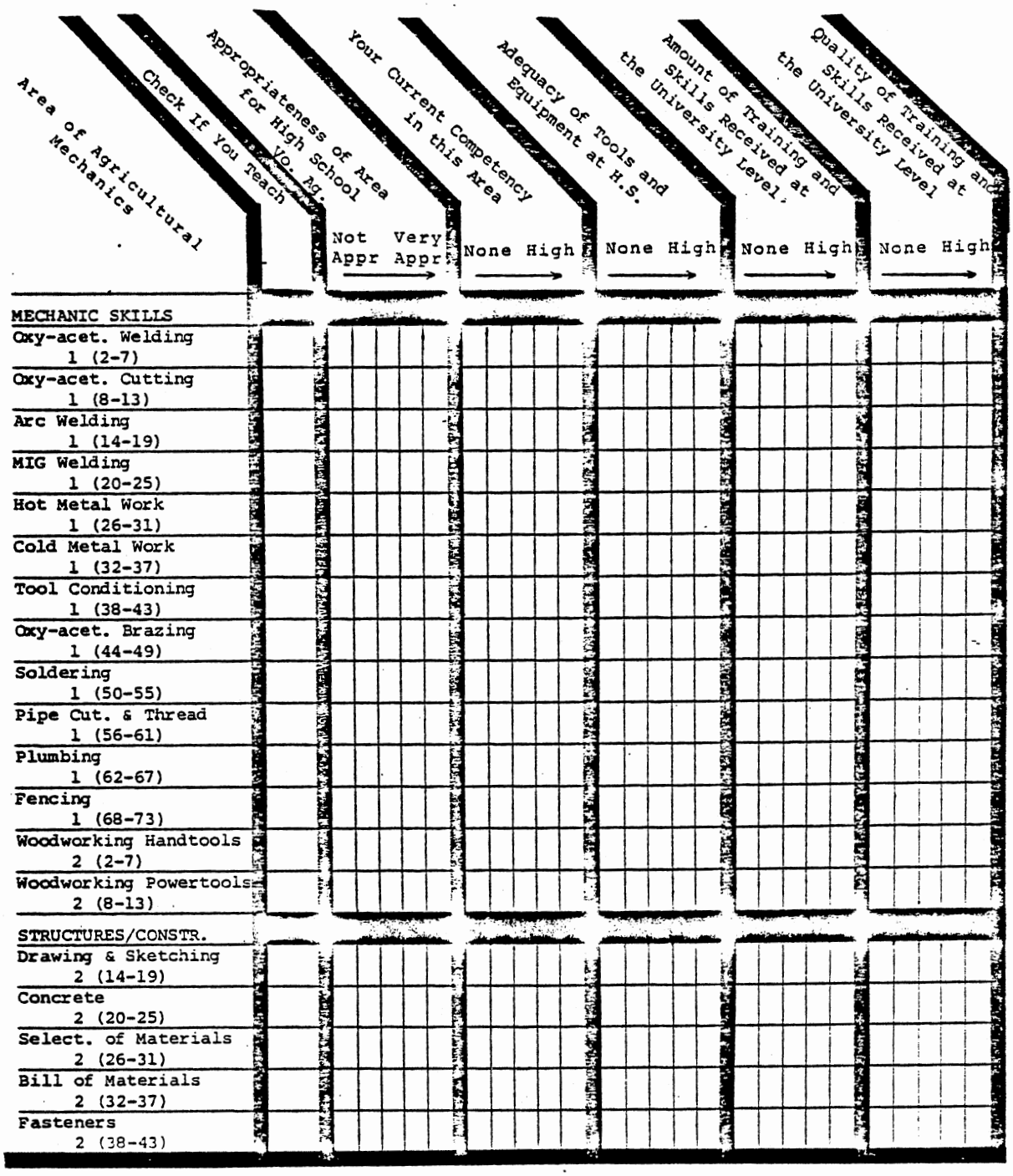
INSTRUCTIONS

Place a check (✓) in the most appropiate column under each heading. Please answer even if you do not teach the subject. The numbers under each subject are for computer tabulation.

APPENDIX C

QUESTIONNAIRE-MECHANIC SKILLS AND STRUCTURES/CONSTRUCTION

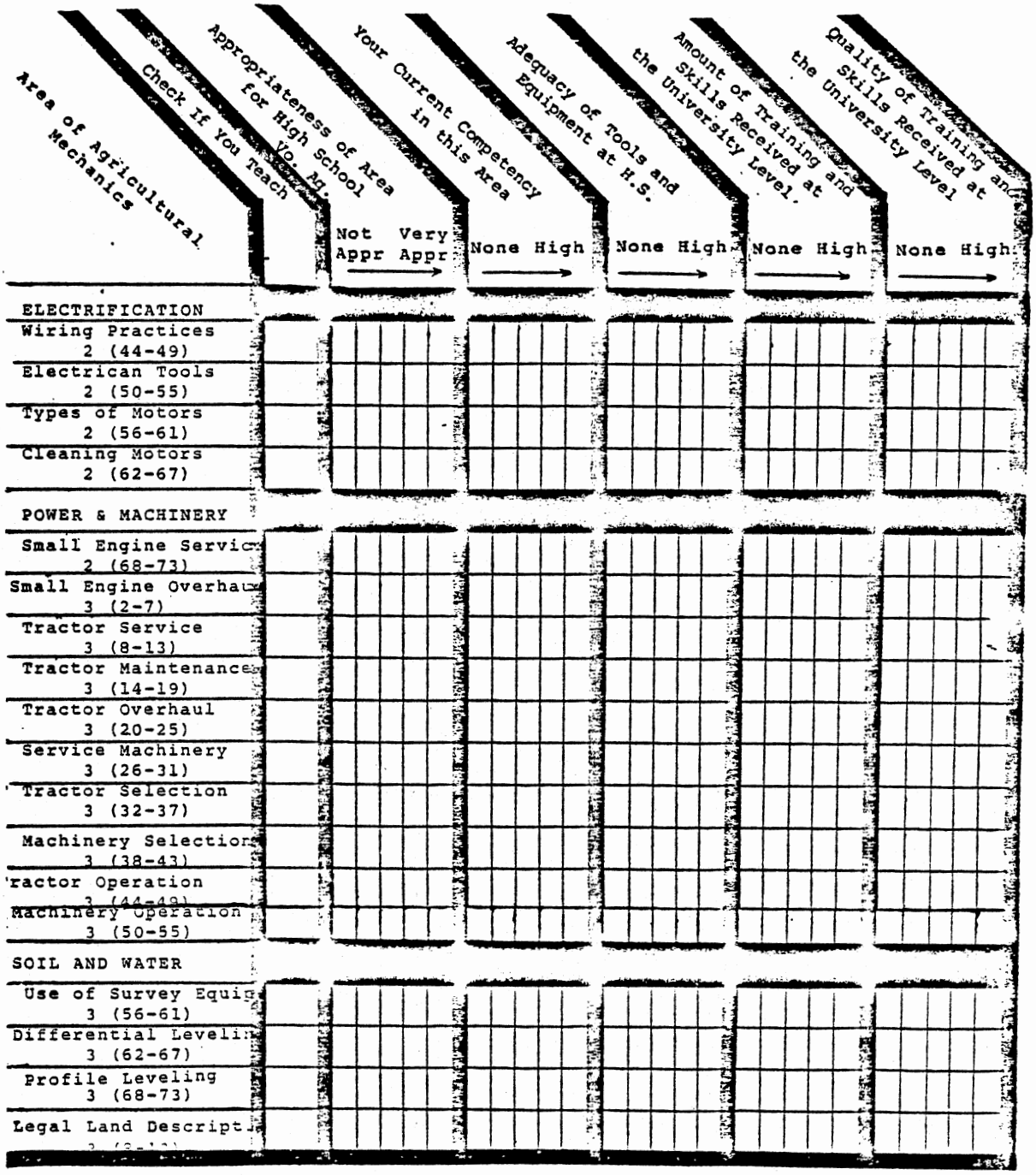
RATINGS OF FACTORS AFFECTING TEACHING OF THIS AREA



APPENDIX D

QUESTIONNAIRE-AGRICULTURAL ELECTRIFICATION, POWER AND MACHINERY AND SOIL AND WATER

RATINGS OF FACTORS AFFECTING TEACHING OF THIS AREA



VITA 2

Charles Dwayne Driskill

Candidate for the Degree of

Doctor of Education

Thesis: SELECTED CHARACTERISTICS OF VOCATIONAL AGRICULTURAL MECHANICS PROGRAMS IN THE STATE OF OKLAHOMA

Major Field: Agricultural Education

Biographical:

Personal Data: Born in Benton, Kentucky, March 27, 1954, the son of Charles and June Driskill.

Education: Attended Livingston County Public School Systems in Livingston County, Kentucky, graduated from Livingston Central High School in May 1972; received the Bachelor of Science in Agriculture degree from Murray State University, Murray, Kentucky, May, 1976, with a major in Agricultural Education; received the Master of Science degree from Murray State University, Murray, Kentucky, May, 1978, with a double major in Agriculture Education and Agricultural Engineering and Mechanics; competed requirements for the Doctor of Education degree at Oklahoma State University in May, 1983.

Professional Experience: Beef cattle farming background, nine years experience with heavy equipment on highway construction, teaching assistant in drivers education, Murray State University, Murray, Kentucky, January to May 1976; graduate teaching assistant, Agriculture Engineering Department, Murray State University, Murray, Kentucky, 1976-77; Agricultural Engineering and Mechanics instructor, Western Illinois University, Macomb, Illinois, August 1978 to May, 1980; Faculty Advisor and Advisor to the Agriculture Mechanization Club, Western Illinois University, Macomb, Illinois, 1978 through 1980; Electrical and Welding instructor, Spoon River College, Macomb Illinois, January 1979 to May, 1980;

graduate teaching assistant, Agricultural Engineering Department, Oklahoma State University, with responsibilities in assisting and skills training for student teachers and graduate students in agricultural education from August, 1981 through May, 1983.

Professional Organizations: Member of Alpha Tau Alpha, Red Red Rose, and Charter member of Alpha Zeta.