AGRICULTURE MECHANICS TOPICS BEING TAUGHT IN THE REGULAR VOCATIONAL AGRICULTURE PROGRAMS AS WELL AS IN AGRICULTURE MECHANICS I IN THE NORTHWEST SUPERVISORY DISTRICT

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CHAPTER I

PURPOSE AND DESIGN OF THE STUDY

Introduction

Traditionally, vocational agriculture departments in Oklahoma have taught production agriculture while incorporating a few welding techniques into their programs in the forms of building steel gates, repairing the stock trailer, and ultilizing the oxyacetylene torch in various other tasks. Many times vocational agriculture instructors have referred to Agriculture Mechanics as a very broad area, much broader than Farm Mechanics which is a small subdivision of Agriculture Mechanics.

Instruction of Agriculture Mechanics, as a part of a vocational agriculture program, must be incorporated hand in hand with production agriculture for those students who wish to pursue careers in farming, in an agriculture related field, or in some non-agriculture related field. According to Hutson "Students which are exposed to agriculture, either production agriculture or agriculture mechanics, acquire skills and knowledge useful in many non-agriculture related occupations (1, p. 208).

Mechanics is the basis of all occupations. Comparatively, it is seen that an accountant uses adding machines and doctors use electrocardiograms, while the scientists employ sophisticated computers, and the writer uses a pen. All occupations depend upon mechanics for their economical process and upward progress. When one thinks about or hears mechanics, and especially agriculture mechanics, he thinks about our modern, complicated machines which are becoming more complex each day. To keep up with this rapid change, development of new curriculums and teaching methods which deal specifically with Agriculture Mechanics and mechanical practices must be developed so vocational agriculture instructors can keep up-to-date in both technology and principle. With the current influx of knowledge available, vocational instructors will be more capable of ensuring proper attitudes of today's students for a stronger tomorrow in agriculture and other related fields.

In 1963 the Vocational Education Act of that year was passed and implemented which made possible the introduction of a separate course of Agriculture Mechanics. Later in 1965 the State Department of Vocational Agriculture made curriculum available for use in the instruction of Agriculture Mechanics in Oklahoma. Upon completion of the curriculum, many vocational agriculture departments implemented a course in Agriculture Mechanics. This helped to complete the need for instruction in the mechanical area for the development of new skills and teaching practices so students will

attain the level of education required to maintain themselves in the future.

Statement of the Problem

Many of the Vocational Agriculture Departments in Oklahoma are multiple teacher. This paper is dealing specifically with the Northwest District of Oklahoma where there were only eight two-teacher departments with the balance of the departments being single teacher. With this distribution of single teacher departments and the trend in animal production specialization of vocational agriculture instructors, these vocational agriculture instructors are limiting themselves to only a few areas of agriculture mechanics. With this limitation of agriculture mechanics topics, the writer felt it important to survey the Northwest District of Oklahoma to find what topics are being taught and how important they are to students who are planning careers in farming, in an agriculture related occupation, and in a non-agriculture related occupation.

Purpose of the Study

The main purpose of this study was to identify topics being taught from the Agriculture Mechanics Core Curriculum and determine the level of importance vocational agriculture instructors in the Northwest District felt the topics had for students planning different careers. At the

same time, effort was devoted to assembling tables which showed what specific topics from the Core Curriculums I, II, III, IV, were used for instruction in agriculture mechanics.

Objectives of the Study

In order to accomplish the purpose of this study, the following specific objectives were designed and formulated to enhance and set apart this study of agriculture mechanics from other similar studies.

1. To determine how many Vocational Agriculture Departments in the Northwest District of Oklahoma teach a separate course in Agriculture Mechanics.
2. To determine which topics of the Agriculture Mechanics Core Curriculum are used most often for classroom instruction, and methods used.
3. To determine the level of importance which vocational agriculture instructors feel the topics have for students who are planning careers in farming, in an agriculture related occupation, and in a non-agriculture related occupation.
4. To determine the relation between topics of agriculture mechanics taught and number and types of contests entered each year, and years of teaching experience.

Assumptions and Limitations of the Study

Assumptions

The following assumptions were made for the sole purpose of conducting an adequate research study:

1. All responses which were made or concluded were true and sincere as to the purpose of agriculture mechanics in the Northwest District of Oklahoma.
2. The responses by vocational agriculture instructors were, to the best of their knowledge and ability, true and sincere in relation to the surveying instrument which they were asked to respond to.
3. The Vocational Agriculture Departments in the Northwest District of Oklahoma have been teaching agriculture mechanics either as a separate course or incorporating agriculture mechanics in with production agriculture.
4. That some of the respondents were teaching agriculture mechanics to students every other year in the place of vocational agriculture III or IV.

Limitations and Scope

The following limitations were recognized by the researcher as horizons not possible to capture or overcome due to the ever changing conditions in the population area:

1. The instructors of vocational agriculture in Oklahoma change departments frequently, resign,

retire, and also languish.

2. The current vocational agriculture instructor was teaching agriculture mechanics in his or her department.
3. The inability of all schools in the Northwest District of Oklahoma to have sufficient funds, students, and instructors to offer a separate course in agriculture mechanics, but these departments do offer agriculture mechanics as combined with production agriculture.
4. The study was limited to the Northwest District of Oklahoma which has only eight two-teacher departments and 55 single teacher departments.
5. The surveying instrument was limited to agriculture mechanics as it is incorporated in with production agriculture and compared to those taught in a separate course of agriculture mechanics.

Procedures

In order to solve the problem set forth by the objectives which were stated earlier in the study, for compilation of data concerned specifically to agriculture mechanics in the Northwest District of Oklahoma, the following requirements were developed:

1. The development of the surveying instrument.
    a. By the review of selected materials related specifically to such instruments.

b. By the review of the agriculture mechanics core curriculum and the vocational agriculture core curriculum for topics on agriculture mechanics for the development of a list of such topics.

c. The instructions, factors, and questions on the surveying instrument were approved by selected members of the Agriculture Education Department at Oklahoma State University.

d. Upon completion of the surveying instrument the questionnaire was mailed to all vocational agriculture departments in the Northwest District of Oklahoma.

2. Upon return of the surveying instruments the data was compiled, tabulated, analyzed, and compared with other studies of the same topic for validity.

3. A summary of the findings was simplified into tables for the reader's understanding and brevity.

4. A summary of the findings is stated along with the recommendations and the conclusions drawn from the survey.

Definition of Terms

The terms defined below are defined for the reader's clearer understanding of the materials presented.

Agriculture Mechanics - Refers to the topics related to both on-farm and off-farm agriculturally related occupations

to mechanics. The instructional areas are inclusive of both the course of Agriculture Mechanics I and the segments of the regular Vocational Agriculture classes I, II, III, and IV.

Regular Vocational Agriculture Mechanics - refers to the agriculture mechanics topics taught to students in Vocational Agriculture classes I, II, III, IV.

Farm Mechanics - refers to those topics which may, or may not be, taught to students which are related to agriculture mechanics but deal only with farm related activities.

Agriculture Related Careers - those careers which employ people who are dealing with the business segment of the farming industry and who are not employed in actual production of agriculture products.

Non-Agriculture Related Careers - those careers which involve employees in an indirect way with agriculture, but whom have little influence with production of agriculture products.

CHAPTER II

REVIEW OF SELECTED LITERATURE

Agriculture Mechanics in Oklahoma and Abroad

Today's society is an everchanging race into the future using specialization in mechanics and engineering. Without mechanics, engineering would be an ideal of dreamers. Mechanics is important to every facet of the farming trades. Agriculture depends upon mechanics as well as engineering, although mechanics is needed, more often than not, due to the letdowns of the engineering phase.

Agriculture mechanics does not deal specifically with farm maintenance, but takes into account the whole spectrum of on-farm and off-farm agriculture. Many students who leave agriculture have, in the past, used the basic building skills of agriculture mechanics to seek occupations in other fields. Many times these occupational entities may be unrelated to agriculture, but the students can use these skills to better themselves in that occupation or career. Hutson (1) stated that students, upon completion of an agriculture mechanics course, or even agriculture production, acquire skills and knowledge which are useful in many non-farm occupations. According to Juby (2, p. 63):

> Agriculture mechanics courses make it possible for students to learn and use skills which were not being taught or used in other school courses. Also students who have completed a course in agriculture mechanics were more employable, utilized the shop or lab more efficiently and helped the students who were farm bound.

Farmers have employed mechanics for many years and rely exclusively on skills they have learned through trial and error, or experiences. Many skills have been handed down through the past from generation to generation, but in today's rapidly changing technological advances those skills may not apply to modern machinery. Even if such skills would apply they may not be economically feasible for a person to use on the repair of a complicated piece of equipment. Farmers and ranchers are always looking for a better or more economical form of processing their occupations into a more feasible one. Often this is accomplished by the use of new skills, or by the employment of people whom possess these skills. Many farmers and ranchers expressed on a survey by Skadburg (3) that there are six major areas that they feel are important for the students of agriculture courses to know if they are to be successful in the farming entities. Those areas which Skadburg was referring to were: "Tractors and Machinery Power and Management, Welding and Metals, Electricity and Electric Motors, Concrete, Gasoline Engines, and Carpentry". The importance of those areas is significant in all aspects of the farming phase, whether one is a farmer, rancher, or a businessman in an agriculture related business. Wood (4, p. 23), summarized:

> In areas of mechanics and engineering, it is essential that employees have technical instruction in (1) farm machinery, (2) basic mechanical skills, (3) internal combustion engines, and (4) tractors.

Mohon (5) concluded that the following areas of agriculture should receive priority: (1) use of hand tools, (2) power tools, (3) small gas engine repairs, (4) arc welding, (5) oxyacetylene cutting, (6) tractor maintenance, and (7) oxyacetylene welding.

As these areas and topics are important to the farming sector Elliott (6) points out a very obvious fact that the subject areas of farm mechanics taught and the amount of time spent on these areas will vary from community to community. Personal interests and preferences also dictate to a great extent what the vocational agriculture instructor will teach. Also the capabilities of vocational agriculture instructors can be very influential in regard to topics taught. Fog and Bear (7, p. 3) stated:

> Teachers of Agriculture mechanics should be encouraged to keep pace with the agriculture mechanics needs of the community. Encouragement can be provided by requiring more courses in agriculture.

Wolff (8) pointed out that new curriculums are needed so instructors can keep up-to-date and stay with the pace of machinery and technology in the changing times of mechanization.

The requirements for skills in these topics and areas is an important facet to the operation of any farm or ranch. It has, however, been pointed out by Webb and Knotts (9)

that the type of farming, size of the farming business, age, and educational resources were significantly important to the success of a farming enterprise. Curriculums that are available to vocational agriculture instructors are excellent sources of information, but lack depth in many areas which they cover. This is the case with all teaching guides, plans, and curriculums which are mass produced and distributed to a large population, with this population having an inconceivable amount of variables. Nichols (10) has recommended that extensive efforts should be expended to expand and to revise curriculums and courses in agriculture mechanics. Such revision of curriculums and courses would make graduates of those courses more employable in agriculture industries.

Warmbrod (11) developed a set of mastery tests which contained 934 items that could assess and field test skills which are taught in agriculture mechanics I and II. The skills which are evaluated for mastery are those which deal with those taught while using the core curriculums for agriculture mechanics I and II.

With agriculture industries becoming more mechanized each day, it is important that research in the area of agriculture mechanics be conducted so curriculums and efficient testing materials might be developed. Vocational agriculture instructors will be better equipped to teach the skills which students want and deserve. Due to the fact that more and more agriculture businesses are becoming more

mechanized, it is relevant to state that more job opportunities will be available to service these mechanisms and keep them operating.

CHAPTER III

DESIGN AND PROCEDURES

The purpose of this chapter is to describe the methods and procedures used in conducting this study. These methods and procedures were dictated by the objectives and purpose of the study.

In order to collect, analyze, and to present data which is pertinent to this study and to achieve the purpose and objectives set forth, it was necessary to accomplish the following steps:

1. Determine the population of the study.
2. Develop the instrument for data collection.
3. Develop a procedure for data collection.
4. Select the methods of data analysis.
5. Tabulate in a simplified form for presentation.

The Study Population

The population for this study included all instructors of vocational agriculture in high schools of the Northwest Supervisory District. All schools of this area which taught either a separate course of agriculture mechanics or taught agriculture mechanics incorporated in with production agriculture were surveyed to fulfill the requirements set forth

by the objectives and the purpose of the study. Both multiple and single teacher departments are used in the population of survey.

From the list of available vocational agriculture departments in the Northwest Supervisory District of Oklahoma there were 63 departments with 71 instructors. This broke down into 55 single teacher departments and eight multiple-teacher departments. Each multiple-teacher department in the population area had only two teachers.

Development of the Instrument

The information required by this study was obtained by the employment of a questionnaire. The questionnaire contained pertinent questions to the subject of the study. In order to obtain needed information for development of the surveying instrument, both members of the State Department of Vocational Agriculture and a select few members of the Agriculture Education Department of Oklahoma State University were consulted. These selected members of the writer's advisory group were used due to their infinite knowledge and wisdom in the areas of agriculture education and research.

A Likert-type scale was used since it was considered most appropriate and applicable to the possible responses in the questionnaire. The instrument, for the most part, contained importance type responses except for a few fill-in-the-blank questions and a few questions which required a

response with a check to indicate their feelings toward skills and projects.

After the initial instrument was formulated, it was submitted to the investigator's chief adviser and research advisers for their critical review and helpful refinement. The refinements were incorporated into the instrument and processed for distribution. Upon completion of the refined instrument it was ready for distribution to the study population for their critical review and completion.

Collection of the Data

The investigator initiated data collection by mailing out the final instrument to the selected population of the Northwest Supervisory District of Oklahoma. The vocational agriculture instructers were asked to complete the questionnaire fully and sincerely. Upon completion, the vocational agriculture teachers were instructed to return the surveying instrument back to the investigator at a specified place at Oklahoma State University.

Analysis of Data

The data which was collected, by use of a questionnaire, was interpreted by statistical methods and measures described below. The questionnaire, for the most part, contained four possible responses so the questionees would have to make a choice other than a middle response:

Response Categories	Importance Scale
Very Important	4
Important	3
Somewhat Important	2
Not Important	1

For the fill-in-the-blank responses, correlations were calculated, along with mean, median, standard deviation for each response. Then possible combinations of topics taught was correlated with number of contests per year and number of years of teaching experience.

In order to give the responses a mathematical value and meaning, the scale below shows the reader what importance each agriculture mechanics topic has with regard to students planning careers in farming, agriculture related, and non-agriculture related careers.

Response Categories	Range of Numerical Value
Very Important	3.30 - 4.00
Important	2.50 - 3.29
Somewhat Important	1.80 - 2.49
Not Important	1.0 - 1.79

If the mean value, or average value for each group, is determined to be a value of 3.59 or 1.74, these topics, according to their value, would have a group rating of very important and not important respectively. With this value placement for the importance groups for different careers, one can see the relationship of those topics to the different entities.

CHAPTER IV

PRESENTATION AND ANALYSIS OF THE DATA

Introduction

This chapter deals with the presentation and analysis of the obtained data and information acquired from the vocational agriculture instructors of the Northwest District of Oklahoma. The information sought was obtained from a sizeable portion of the teachers involved. The surveying instrument was sent to 71 teachers. Twenty-eight surveys were returned by mail and the balance of the questionnaires used in the study were obtained by personal visits to the teachers at several different locations. Fifty-one questionnaires were used in the analysis of data which represents 72.8%, but one survey was removed from the study due to the diversity of the data it obtained and a comment written thereon.

The tables on the following pages will represent the basis for all conclusions and assumptions which the author has perceived or implied to the reader.

Findings of the Study

Data Describing the Instructors in the Study

As shown in Table I the data representing the instructors of the study shows that out of the 50 (70.4%) teachers responding that 23 (46.0%) have five or less years of teaching experience. At the same time, one notes that 30 (60.0%) have been employed at the same school for the last five years. This would seem to depict that the teaching experience of vocational agriculture instructors is somewhat limited. The teaching experience of agriculture mechanics is also limited to vocational agriculture teachers with five years or less experience. This does not directly indicate that experience limits the amount of agriculture mechanics taught. Teaching experience and the number of agriculture mechanics topics used in the vocational agriculture departments were correlated and found to have a value of .197.

Table II shows that, of the teachers responding, contest areas are not a limiting factor. The contest areas were correlated with the number of agriculture mechanics topics taught and found to have less responsibility for limited use of agriculture mechanics than teaching experience. The correlation factor for the latter was .098.

The contest area frequented by most teams is livestock judging. Forty-nine respondents (98%) indicated that a team is trained for contest livestock judging. Speech 42 (84%), Farm shop 31 (62%), were the next most common teams used in the contesting areas.

TABLE I

DESCRIPTIVE DATA REPRESENTING THE VOCATIONAL AGRICULTURE INSTRUCTORS OF THE NORTHWEST DISTRICT USED IN THIS STUDY

Teacher Variable	Distribution N	%
Years of Teaching Experience		
1 - 5	23	46.0
6 - 10	17	34.0
11 - 15	5	10.0
16 - 20	2	4.0
21 or more	3	6.0
	50	100.0
Years at Present School		
1 - 5	30	60.0
6 - 10	10	20.0
11 - 15	5	10.0
16 - 20	4	8.0
21 or more	1	2.0
	50	100.0
Years Teaching Ag. Mech.		
1 - 5	32	64.0
6 - 10	12	24.0
11 - 15	3	6.0
16 - 20	1	2.0
21 or more	2	4.0
	50	100.0

TABLE II

DESCRIPTIVE DATA REPRESENTING THE VOCATIONAL AGRICULTURE TEACHERS, OF THE STUDY, INVOLVEMENT WITH TEAM PREPARATION FOR CONTEST AREAS

Number of Contest Areas that Teams are Trained For	Distribution N	Distribution %
0 - 1	3	6.0
2	11	22.0
3	18	36.0
4 - 5	14	28.0
6 or more	4	8.0
	50	100.0
Contest Areas and Participation		
Farm Shop	31	62.0
Farm Structures	6	12.0
Electricity	8	16.0
Soil and Water	13	26.0
Crops	17	34.0
Dairy Judging	14	28.0
Speech	42	84.0
Livestock Judging	49	98.0
Agribusiness	7	14.0
Parliamentary Procedures	18	36.0

The next table, Table III, was constructed to show the percentage of teachers using two different approaches to teaching agriculture mechanics. Teaching by skill practice is a process which involves the use of learned materials in many different manners while teaching, using projects as the instructional aid, is limiting to the number of skills a student may employ and secure. Table III indicated that vocational agriculture teachers are using both skill practice and projects together most often. Of the respondents, 37 (74%) indicated that both were used equally in their program while 9 (18%) and 4 (8%) used skills and projects respectively.

Teachers, of the survey, felt that for agriculture mechanics to be most beneficial to the student that the use of projects and skill practice together was the most useful in the student's learning experience. Table IV shows that teachers of the survey felt skill practice, in relation to projects, is more useful than projects alone. Both skill practice and projects taught equally is still the dominant practice. By comparing the data displayed in both Tables III and IV one can see the amount of skill practice deemed to be beneficial has risen. In Table IV skill practice was the most important teaching process according to 23 (46%) of the teachers while both taught equally was only 24 (48%) of the reporting teachers choice.

The next and last part of chapter four deals with the use of agriculture mechanics topics and their importance.

TABLE III

SUMMARY OF TEACHING PRACTICES EMPLOYED BY VOCATIONAL AGRICULTURE TEACHERS

Teaching Practice	Distribution N	%
Skills	9	18.0
Projects	4	8.0
Both Taught Equally	37	74.0
	50	100.0

TABLE IV

SUMMARY OF INSTRUCTORS FEELING OF MOST BENEFICIAL TEACHING PRACTICE FOR THE STUDENTS

Teaching Practice	Distribution N	%
Skills	23	46.0
Projects	3	6.0
Both Taught Equally	24	48.0
	50	100.0

TABLE V

SUMMARY OF THE AGRICULTURE MECHANICS TOPICS TAUGHT TO VO-AG I STUDENTS IN THE REGULAR PRODUCTION AGRICULTURE PROGRAMS

Topics	Distribution N	Distribution %
Orientation and General Safety	46	92.0
Farm Safety	41	82.0
Metal Work	21	42.0
Arc Welding	47	94.0
Position Welding	21	42.0
Oxyacetelene Cutting	34	68.0
Oxyacetelene Welding & Brazing	16	32.0
MIG Welding	7	14.0
Plumbing and Pipe Fittings	3	6.0
Drawing and Sketching	11	22.0
Servicing Small Gas Engines	2	4.0
Overhauling Small Gas Engines	1	2.0
Battery Service	8	16.0
Tractor Ignition Systems	7	14.0
Tractor Cooling Systems	3	6.0
Tractor Fuel Systems	3	6.0
Tractor Air Systems	3	6.0
Tractor Hydraulics	3	6.0
Tractor Lubricating Systems	4	8.0
Wheel Bearings	5	10.0
Electrical Safety	13	26.0
Fundamentals of Electricity	6	12.0
Planning the Wiring Layout	2	4.0
Electrical Wiring	1	2.0
Electric Motors	2	4.0
Building Materials	4	8.0
Bill of Materials	10	20.0
Farm Utility Buildings	6	12.0
Fasteners	8	16.0
Brush Painting	8	16.0
Spray Painting	6	12.0
Concrete	6	12.0
Using the Farm Level	5	10.0
Legal Land Description	16	32.0

TABLE VI

SUMMARY OF THE AGRICULTURE MECHANICS TOPICS TAUGHT TO VO-AG II STUDENTS IN THE REGULAR PRODUCTION AGRICULTURE PROGRAMS

Topics	Distribution N	Distribution %
Orientation and General Safety	36	72.0
Farm Safety	30	60.0
Metal Work	20	40.0
Arc Welding	32	64.0
Position Welding	28	56.0
Oxyacetelene Cutting	33	66.0
Oxyacetelene Welding & Brazing	20	40.0
MIG Welding	10	20.0
Plumbing and Pipe Fittings	11	22.0
Drawing and Sketching	13	26.0
Servicing Small Gas Engines	7	14.0
Overhauling Small Gas Engines	6	12.0
Battery Service	8	16.0
Tractor Ignition Systems	6	12.0
Tractor Cooling Systems	5	10.0
Tractor Fuel Systems	6	12.0
Tractor Air Systems	5	10.0
Tractor Hydraulics	6	12.0
Tractor Lubricating Systems	6	12.0
Wheel Bearings	8	16.0
Electrical Safety	10	20.0
Fundamentals of Electricity	12	24.0
Planning the Wiring Layout	7	14.0
Electrical Wiring	7	14.0
Electric Motors	5	10.0
Building Materials	8	16.0
Bill of Materials	12	24.0
Farm Utility Buildings	6	12.0
Fasteners	7	14.0
Brush Painting	7	14.0
Spray Painting	7	14.0
Concrete	7	14.0
Using the Farm Level	8	16.0
Legal Land Description	11	22.0

TABLE VII

SUMMARY OF THE AGRICULTURE MECHANICS TOPICS TAUGHT TO VO-AG III STUDENTS IN THE REGULAR PRODUCTION AGRICULTURE PROGRAMS

Topics	Distribution N	Distribution %
Orientation and General Safety	30	60.0
Farm Safety	27	54.0
Metal Work	20	40.0
Arc Welding	34	68.0
Position Welding	21	42.0
Oxyacetelene Cutting	30	60.0
Oxyacetelene Welding & Brazing	25	50.0
MIG Welding	11	22.0
Plumbing and Pipe Fittings	12	24.0
Drawing and Sketching	11	22.0
Servicing Small Gas Engines	8	16.0
Overhauling Small Gas Engines	6	12.0
Battery Service	11	22.0
Tractor Ignition Systems	9	18.0
Tractor Cooling Systems	9	18.0
Tractor Fuel Systems	10	20.0
Tractor Air Systems	9	18.0
Tractor Hydraulics	9	18.0
Tractor Lubricating Systems	9	18.0
Wheel Bearings	12	24.0
Electrical Safety	16	32.0
Fundamentals of Electricity	13	26.0
Planning the Wiring Layout	7	14.0
Electrical Wiring	12	24.0
Electric Motors	6	12.0
Building Materials	8	16.0
Bill of Materials	8	16.0
Farm Utility Buildings	9	18.0
Fasteners	15	30.0
Brush Painting	9	18.0
Spray Painting	9	18.0
Concrete	9	18.0
Using the Farm Level	18	36.0
Legal Land Description	19	38.0

TABLE VIII

SUMMARY OF THE AGRICULTURE MECHANICS TOPICS TAUGHT TO VO-AG IV STUDENTS IN THE REGULAR PRODUCTION AGRICULTURE PROGRAMS

Topics	Distribution N	Distribution %
Orientation and General Safety	26	52.0
Farm Safety	23	46.0
Metal Work	21	42.0
Arc Welding	24	48.0
Position Welding	22	44.0
Oxyacetelene Cutting	24	48.0
Oxyacetelene Welding & Brazing	21	42.0
MIG Welding	9	18.0
Plumbing and Pipe Fittings	8	16.0
Drawing and Sketching	10	20.0
Servicing Small Gas Engines	16	32.0
Overhauling Small Gas Engines	9	18.0
Battery Service	8	16.0
Tractor Ignition Systems	6	12.0
Tractor Cooling Systems	7	14.0
Tractor Fuel Systems	6	12.0
Tractor Air Systems	8	16.0
Tractor Hydraulics	8	16.0
Tractor Lubricating Systems	6	12.0
Wheel Bearings	13	26.0
Electrical Safety	14	28.0
Fundamentals of Electricity	10	20.0
Planning the Wiring Layout	11	22.0
Electrical Wiring	7	14.0
Electric Motors	3	6.0
Building Materials	13	26.0
Bill of Materials	13	26.0
Farm Utility Buildings	12	24.0
Fasteners	11	22.0
Brush Painting	8	16.0
Spray Painting	9	18.0
Concrete	23	46.0
Using the Farm Level	11	22.0
Legal Land Description	16	32.0

TABLE IX

SUMMARY OF THE AGRICULTURE MECHANICS TOPICS TAUGHT TO STUDENTS ENROLLED IN AGRICULTURE MECHANICS I

Topics	Distribution N	Distribution %
Orientation and General Safety	19	38.0
Farm Safety	11	22.0
Metal Work	17	34.0
Arc Welding	18	36.0
Position Welding	18	36.0
Oxyacetelene Cutting	19	38.0
Oxyacetelene Welding & Brazing	19	38.0
MIG Welding	7	14.0
Plumbing and Pipe Fittings	8	16.0
Drawing and Sketching	4	8.0
Servicing Small Gas Engines	15	30.0
Overhauling Small Gas Engines	11	22.0
Battery Service	4	8.0
Tractor Ignition Systems	7	14.0
Tractor Cooling Systems	6	12.0
Tractor Fuel Systems	8	16.0
Tractor Air Systems	7	14.0
Tractor Hydraulics	7	14.0
Tractor Lubricating Systems	8	16.0
Wheel Bearings	11	22.0
Electrical Safety	9	18.0
Fundamentals of Electricity	8	16.0
Planning the Wiring Layout	4	8.0
Electrical Wiring	9	18.0
Electric Motors	5	10.0
Building Materials	8	16.0
Bill of Materials	9	18.0
Farm Utility Buildings	6	12.0
Fasteners	7	14.0
Brush Painting	8	16.0
Spray Painting	10	20.0
Concrete	15	30.0
Using the Farm Level	11	22.0
Legal Land Description	11	22.0

Tables V through IX are revealing the percentage of each topic taught in the class levels Vocational Agriculture I, II, III, IV, and Agriculture Mechanics I. The topics are listed in order as they appear in the Agriculture Mechanics Core Curriculums and curriculums of Vocational Agriculture I, II, III, and IV. This arrangement was selected over a ranking of higher percentage so readers who are familiar with Agriculture Mechanics Core Curriculum will have a quicker response in locating their preferred topics and the level of usage.

Table V reflects the level of usage of agriculture mechanics topics taught to Vocational Agriculture I students.

Table VI shows the level of usage, or concentration, of teachers' preference to certain topics to teach to Vocational Agriculture II students.

Table VII exhibits the number of teachers and concentration level which is used by vocational agriculture teachers to teach to students in Vocational Agriculture III.

Table VIII reflects the concentration level of vocational agriculture teachers selection of agriculture mechanics topics to be used by them to teach to Vocational Agriculture IV students.

Table IX shows the percentage and number of agriculture mechanics topics taught to students in the Agriculture Mechanics I class.

By close observance of the tables one can see the noticeable changes by class levels and the domination of

certain topics. Orientation and general safety is taught by a significant number of teachers, but by the declination in teacher numbers on this topic one notes the limitation of repetitive teaching.

Courses dealing with safety are used to a higher percentage each year than the rest of the topics. Many topics increase in importance to students as indicated by the tables V, VI, VII, VIII, and IX.

The importance of each agriculture mechanics topic was found by analysis of the suveying instrument. Each topic was labeled by the vocational agriculture instructors on a basis of students returning to the farm for their selected occupation, an agriculture related career, and a career which is non-agriculturally related. The respondents of the survey had a choice of only four levels of importance. This procedure was used over the giving of a five-level choice to reduce or limit the selection of the middle choice. Respondents tend to select the middle alternative when time is a limiting factor. Therefore, the limitation to four alternatives further increases the validity of the study. The following weighted scale and ranges were used on the surveying instrument to determine, in a numerical fashion, the most important, or significance, an agriculture mechanics topics has to students choosing different entities for a career.

Response Categories	Importance Scale
Very Important	4
Important	3
Somewhat Important	2
Not Important	1

These values were used in conjunction with the next scale listed further in the study. For each category the number of respondents was tabulated and multiplied by the respective value. Upon completion of the multiplicative chore, the values for each response category were divided by the total number of respondents to find the numerical value so each topic could be rated according to a predetermined scale, found below, which can be used by instructors to value their courses for the different populations of each classroom of students each year.

Response Categories	Range of Numerical Values
Very Important	3.30 - 4.00
Important	2.59 - 3.29
Somewhat Important	1.80 - 2.49
Not Important	1.00 - 1.79

The tables which deal with the above scale are located on pages 32, 33, and 34. These are Tables X, XI, and XII. Table X deals specifically with the importance of agriculture mechanics topics as they relate to students planning a career in farming. All the topics were appraised and found to be important to students planning a farming career. The mean for the list of topics on table X was 3.204. This

TABLE X

A SUMMARY OF THE AGRICULTURE MECHANICS TOPICS IN RANK ORDER WITH RELATIONSHIP OF IMPORTANCE TO STUDENTS PLANNING A FARMING CAREER

Topics	Importance Level	
Arc Welding	3.72	
Farm Safety	3.70	
Oxyacetelene Cutting	3.66	
Oxyacetelene Welding & Brazing	3.64	
Legal Land Description	3.64	
Orientation and General Safety	3.62	
Wheel Bearings	3.60	Very Important
Position Welding	3.54	
Tractor Lubricating Systems	3.48	
Tractor Hydraulics	3.32	
Electrical Safety	3.32	
Building Materials	3.32	
Metal Work	3.22	
Tractor Air Systems	3.22	
Using the Farm Level	3.22	
Farm Utility Buildings	3.20	
Tractor Ignition Systems	3.20	
Battery Service	3.16	
Electrical Wiring	3.14	
Concrete	3.14	
Tractor Fuel Systems	3.12	
Fundamentals of Electricity	3.08	
Tractor Cooling Systems	3.06	Important
MIG Welding	3.06	
Fasteners	3.06	
Bill of Materials	3.04	
Plumbing and Pipe Fittings	2.92	
Planning the Wiring Layout	2.92	
Electric Motors	2.84	
Spray Painting	2.82	
Servicing Small Gas Engines	2.78	
Drawing and Sketching	2.74	
Overhauling Small Gas Engines	2.72	
Brush Painting	2.70	

$\bar{X}$ = 3.204
Std. Dev. = .3068
Var. = .0914

TABLE XI

A SUMMARY OF THE AGRICULTURE MECHANICS TOPICS IN RANK ORDER WITH RELATIONSHIP OF IMPORTANCE TO STUDENTS PLANNING AN AGRICULTURE RELATED CAREER

Topics	Importance Level	
Farm Safety	3.42	
Arc Welding	3.34	Very Important
Orientation and General Safety	3.30	
Electrical Safety	3.28	
Oxyacetelene Welding and Brazing	3.20	
Oxyacetelene Cutting	3.10	
Legal Land Description	3.10	
Metal Work	2.98	
Concrete	2.92	
Brush Painting	2.92	
Bill of Materials	2.90	
Position Welding	2.88	
Using the Farm Level	2.88	
Plumbing and Pipe Fittings	2.86	
Building Materials	2.82	
Electrical Wiring	2.82	
Servicing Small Gas Engines	2.78	
Drawing and Sketching	2.78	Important
Fundamentals of Electricity	2.78	
Farm Utility Buildings	2.76	
Overhauling Small Gas Engines	2.74	
Tractor Fuel Systems	2.72	
Tractor Cooling Systems	2.70	
Planning the Wiring Layout	2.70	
Battery Service	2.68	
Spray Painting	2.68	
Tractor Air Systems	2.66	
Tractor Lubricating Systems	2.66	
Wheel Bearings	2.64	
Tractor Hydraulics	2.62	
Fasteners	2.60	
Electric Motors	2.58	
MIG Welding	2.54	
Tractor Ignition Systems	2.52	

$\bar{X}$ = 2.848
Std. Dev. = .2398
Var. = .0558

TABLE XII

A SUMMARY OF THE AGRICULTURE MECHANICS TOPICS IN RANK ORDER WITH RELATIONSHIP OF IMPORTANCE TO STUDENTS PLANNING NON-AGRICULTURE RELATED CAREERS

Topics	Importance Level	
Orientation and General Safety	3.38	Very Important
Farm Safety	2.90	
Electrical Safety	2.68	
Arc Welding	2.66	
Oxyacetelene Cutting	2.64	Important
Plumbing and Pipe Fittings	2.60	
Metal Work	2.52	
Fundamentals of Electricity	2.52	
Position Welding	2.50	
Building Materials	2.48	
Bill of Materials	2.46	
Oxyacetelene Welding and Brazing	2.44	
Battery Service	2.44	
Planning the Wiring Layout	2.36	
Legal Land	2.36	
Concrete	2.34	
Servicing Small Gas Engines	2.34	
Drawing and Sketching	2.32	
Overhauling Small Gas Engines	2.30	
Electrical Wiring	2.28	Somewhat Important
Fasteners	2.20	
Wheel Bearings	2.20	
Brush Painting	2.20	
Spray Painting	2.16	
Tractor Hydraulics	2.14	
Electric Motors	2.12	
Using the Farm Level	2.12	
Tractor Air Systems	2.12	
Tractor Fuel Systems	2.08	
Tractor Lubricating Systems	2.00	
Farm Utility Buildings	2.00	
Tractor Cooling Systems	1.98	
Tractor Ignition Systems	1.96	
MIG Welding	1.88	

$\bar{X}$ = 2.34
Std. Dev. = .3006
Var. = .0877

leads one to believe that most of the topics were of significant importance to the students, but some topics were not. On an average, the topics deviated only .3068 from each other.

Arc welding (3.72) was deemed as the most important topic for students planning a career in farming while brush painting (2.70) was deemed as the least important to those same students.

The table on page 33 deals, essentially, with the same material as Table X, but Table XI deals with the importance instructors felt topics had for students planning careers in agriculture related occupations. Farm safety was judged as being the most important topic to these students. Arc welding which, according to Table X was the most important topic to farm-bound students, was rated as the second most important topic on Table XI. The mean for the group of topics on Table XI was 2.848 which suggested that these topics, as a whole, are important to students planning a career in an agriculture related occupation. The topics had a standard deviation, on the average of the whole list, of .2398 which relates each topic to the mean. The variance, .0558, is the average of the square about the mean of each topic.

Table XII, on page 34, illustrated the vocational agriculture instructors' feeling as to the importance agriculture mechanics has to students planning a career in a non-agriculture related occupation. Orientation and general

safety (3.38), farm safety (2.90), and electrical safety (2.68), ranked most important to these students. The mean for the non-agriculture group was 2.34. This points toward a level of somewhat important for the agriculture mechanics topics to non-agriculturally bound students. The responding instructors, indicated by their responses, that MIG welding is not very important to students in the non-agriculture bound category. When comparing this to Table XI one notices that MIG welding is next to last while Table X, for farm-bound students, has MIG welding eleventh from the last. Comparatively, it should be noted that data from these tables can and do illustrate the difference in each category of occupations which were in question. Each table shows topics of each category which is important or not important.

Information regarding the number of vocational agriculture departments in the Northwest District of Oklahoma that are teaching a separate course in Agriculture Mechanics I was obtained from the State Department of Vocational Education. There are 27 single teacher departments and seven multiple teacher departments that teach Agriculture Mechanics I as a separate course.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

The purpose of the fifth chapter of this study is to take the condensed information of chapter four and present an analysis of the material, make the conclusions formed by the information, and make recommendations. The requirements of this chapter are based upon information revealed in the preceding chapter.

Summary of the Study

Purpose of the Study

The primary purpose of this study was to determine the topics taught in production agriculture classes in VO-AG I, VO-AG II, VO-AG III, VO-AG IV, and Agriculture Mechanics I. A concurrent purpose was to determine the level of importance, according to teacher perception, placed on those agriculture mechanics topics used in production agriculture for students planning different occupational objectives upon graduation from high school.

Specific Objectives of the Study

The following specific objectives were designed and formulated to enhance the study:

1. To determine how many vocational agriculture departments in the Northwest Supervisory District of Oklahoma teach a separate course in agriculture mechanics.
2. To determine which topics of the Agriculture Mechanics Core Curriculum are used most often for classroom instruction, and methods used.
3. To determine the level of importance with which vocational agriculture instructors feel a topic of agriculture mechanics has to a student planning a career in farming, in an agriculture related entity, and in a non-agriculture related entity.
4. To determine the relation between topics of agriculture mechanics taught and number and types of contests entered each year, and years of teaching experience.

Procedure of Obtaining Data for the Study

Data was obtained for the study for analyzation of the findings by two methods: (1) review of literature direct-associated to this study, (2) and by development of a survey-ing instrument for distribution in the study population. Upon development of the instrument, it was mailed to each vocational agriculture department in the Northwest District

of Oklahoma. Out of 71 distributed only 51 were received, but only 50 were used for reasons discussed previously.

Summary of the Findings of the Study

From the culmination of the respondents completed instruments it was found that 46.0% of the vocation agriculture instructors in the study population have less than five years of teaching experience. Only 34% of the respondents have six to ten years of experience.

Observation of these two charts would seem to dictate a somewhat younger generation of teachers in the study population or that the respondents to the survey were mainly composed of the younger vocational agriculture instructors.

Referring to Table I, it should be noted that the teaching of agriculture mechanics topics has only been utilized to the greater extent by the younger vocational agriculture instructors. Instructors teaching five or less years of agriculture mechanics culminates to 64.0%. Teachers who have taught agriculture mechanics from six to ten years is 24%.

Data obtained over contest area would seem to indicate that three contests were frequented each year. The contest area attended most often and by the majority of the chapters was livestock judging. Speech, another contest area, was the second place contender for the number of chapters involved with training teams followed by farm shop, parliamentary procedures, crops, dairy judging, soil and water, electricity, agribusiness, and farm structures.

The percentage of school chapters involvement in different contests is outlined in Table II on page 21 if further reference is necessary.

To facilitate the learning of the agriculture mechanics topics teachers have a choice of teaching skill practice or by minimal skill and letting the student learn by doing. The author refers to these two different practices as skill practice and projects. From Table III, one may note that teaching both skill practice and with projects is the most common practice among the vocational agriculture teachers in the study. The percentage breakdown shows that skill practice received only 18.0%, projects 8.0%, and both projects and skill practice taught equally together 74.0%. The teaching practice most often found, in the study population, to be most beneficial to the student was also teaching both skill practice and projects equally. By percentage, the breakdown of the most beneficial practice was skill practice 46.0%, projects 6.0%, and both skills and projects taught equally together 48.0%. The increase in the percentage of teachers indicating that skill practice was the second most beneficial process of teaching as seen in Table IV, would seem to dictate that many of the teachers want to teach more skill practice, but are limited by some unknown factor.

The remaining segment of the data presented in chapter four dealt with the data received on the agriculture mechanics topics. Tables V, VI, VII, VIII, and IX, located on pages

24 through 28, indicate the amount of use the teachers in the survey use for instruction in their classes.

The last set of graphs deals with the level of importance that vocational agriculture instructors feel a topic of agriculture mechanics has with relation to occupations in farming, agriculture related and in non-agriculture related entities.

The topics that were judged on their importance to students planning a career in farming had an overall appraisal of 3.204 or very important. This indicated that all courses were, as a whole, important in every respect to those students even though many of the topics had individual importance levels below 3.20.

The topics judged as to their importance for students planning an agriculture related career had an overall appraisal of 2.848 or important. This tends to indicate that these topics, as a group, are important to these students also, but not as important to these students as to the students mentioned previously.

The last table of chapter four is indicative of the importance vocational agriculture instructors of the study revealed that the agriculture mechanics topics had to students planning a non-agriculture related career. The overall appraisal of this group of topics left the rating at somewhat important to the students at 2.34. In the table, only one topic received a very important rating. Orientation and general safety was the only topic to receive the very important rating while all the other topics were well below 3.20.

Conclusions

The following conclusions were made as a result of the data obtained and presented:

1. There are 27 single-teacher departments and seven multiple-teacher departments in the Northwest Supervisory District that offer a separate course in Agriculture Mechanics.
2. All respondents indicate that they teach an Agriculture mechanics course either as a separate course or incorporated agriculture mechanics into the production agriculture classes.
3. Topics dealing with safety are used most often among vocational agriculture teachers in the Northwest District of Oklahoma.
4. Arc welding is the most important agriculture mechanics topic taught to students planning a career in farming. Farm safety is the most important agriculture mechanics topic to students planning a career in some agriculture related occupations. Orientation and general safety is the most important agriculture mechanics topic to students planning a non-agriculture occupation.
5. There is no direct correlation between the number of contest areas frequented each year and the number of agriculture mechanics topics taught to students.

6. There is no direct correlation between the number of years of teaching experience and the number of agriculture mechanics topics taught to students.
7. The number of years of teaching experience for the majority of the surveyed teachers is five years or less.
8. The majority of the surveyed teachers teaching agriculture mechanics have five years or less teaching experience.
9. The teaching method most common and beneficial for students used by teachers in the study is teaching both skill practice and projects equally.
10. The number of contest areas a vocational agriculture trains teams for is three contest areas per chapter on the average.
11. The Agriculture Mechanics topics taught to students in the vocational agriculture classes who are planning a career in Farming and in an agriculture related occupation are important. The Agriculture mechanics topics taught to students in vocational agriculture classes, who are planning a non-agriculture occupation are somewhat important to those students.

Implications

1. Effort should be devoted to emphasizing agriculture mechanics skills and more involvement in agriculture

mechanics related contests so students will be more capable of doing their own tasks and home repairs.

2. Vocational agriculture teachers in this state and abroad should teach agriculture mechanics to students for the development of more mechanical skills in students so they will be more employable and self-sufficient.
3. Effort should be devoted to emphasizing agriculture mechanics skills and more involvement in agriculture mechanics related contests.
4. Vocational agriculture teachers in this state and abroad should teach agriculture mechanics to students for the development of more mechanical skills in students.

Recommendations

Based on the results, findings, and data analysis, the following recommendations are made:

1. The findings of this study should be made available to all vocational agriculture teachers who teach courses in agriculture mechanics.
2. A similar study should be made to find the results on a statewide and nationwide response to secure similar data.
3. A study should be conducted to find the responsible factor that limits the number of agriculture mechanics topics.

4. More emphasis should be placed on teaching topics of agriculture mechanics to students planning careers in agriculture related occupations and non-agriculture related occupations.

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APPENDIX

OKLAHOMA STATE UNIVERSITY • STILLWATER

Department of Agricultural Education
(405) 624-5129

74074

February 16, 1980

Dear

It has been expressed by many of our colleagues that the Northwest District emphasizes Agriculture Mechanics to a greater extent than any other supervisory district in Oklahoma. With your wealth of experience in teaching Vocational Agriculture Mechanics you could be a great help to me in determining which topics in Agriculture Mechanics are the most important to students with different occupational objectives and interests.

Would you please take a few moments out of your busy schedule and respond to the enclosed survey. Upon completion, of the survey, please return it in the self-addressed, stamped envelope by February 29, 1980.

Your cooperation and immediate responce would be deeply appreciated and remembered. Thank you.

Sincerely,

Roscoe Ray Grimes

Survey of Agriculture Mechanics Topics Which Are Being Taught In Regular Vocational Agriculture Programs

1. How long have you taught Vocational Agriculture at this school?
   _____years
2. How many years of teaching experience do you have? _____ years
3. How long have you taught Agriculture Mechanics at this school?
   _____years
4. What areas do you train teams for(please X the ones which apply)?
   _____ Farm Shop
   _____ Farm Structures
   _____ Electricity
   _____ Soil And Water
   _____ Crops
   _____ Dairy Judging
   _____ Speech
   _____ Livestock Judging
   _____ Agribusiness
   _____ Parliamentary Procedure
5. How many students are enrolled in Vocational Agriculture at your school in?
   _____ VoAg I, _____ VoAg II, _____ VoAg III, _____ VoAg IV
6. How many students are enrolled in Agriculture Mechanics?
   _____ Ag Mech I, _____ Ag Mech II
7. How many students are enrolled in your Ag Mech class(s) which are not enrolled in regular VoAg classes? _____
8. While teaching Ag Mech, if you do so, do you teach for skills, projects, or both?
   _____ Skills, _____ Projects, _____ Both Equally
9. Which teaching practice is the most important and beneficial to the students?
   _____ Skills, _____ Projects, _____ Both Equally

Directions To Survey

Column I: Please indicate which, of the following Ag. Mech topics listed, you teach in AG I - IV and also in Ag Mech I by placing an X in the corresponding columns.

Column II: Please indicate the importance the Ag Mech topics would have for a student planning a career in farming.

Column III: Please indicate the importance the Ag Mech topics would have for a student planning an Ag related career.

Column IV: Please indicate the importance the Ag Mech topics would have to a student planning a career in a non-Ag related area.

Topics In Agriculture Mechanics	Column I					Column II				Column III				Column IV			
	VO AG I	VO AG II	VO AG III	VO AG IV	AG MECH I	VERY IMPORTANT	Important	Somewhat Important	Not Important	Very Important	Important	Somewhat Important	Not Important	Very Important	Important	Somewhat Important	Not Important
Orientation and General Safety Farm Safety																	
Metal Work																	
Arc Welding																	
Position Welding																	
Oxyacetelene Cutting																	
Oxyacetelene Welding & Brazing																	
MIG Welding																	
Plumbing and Pipe Fitting																	
Drawing and Sketching																	
Servicing Small Gas Engines																	
Overhauling Small Gas Engines																	
Battery Service																	
Tractor Ignition Systems																	
Tractor Cooling Systems																	
Tractor Fuel Systems																	
Tractor Air Systems																	
Tractor Hydraulics																	
Tractor Lubricating Systems																	
Wheel Bearings																	
Electrical Safety																	
Fundamentals of Electricity																	
Planning The Wiring Layout																	
Electrical Safety																	
Electric Motors																	
Building Materials																	
Bill of Materials																	
Farm Utility Buildings																	
Fastners																	
Brush Painting																	
Spray Painting																	
Concrete																	
Using the Farm Level																	
Legal Land Description																	
Others (specify)																	

VITA

Roscoe Ray Grimes

Candidate for the Degree of

Master of Science

Thesis: AGRICULTURE MECHANICS TOPICS BEING TAUGHT IN THE REGULAR VOCATIONAL AGRICULTURE PROGRAMS AS WELL AS IN AGRICULTURE MECHANICS I IN THE NORTHWEST SUPERVISORY DISTRICT

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