A STUDY OF EXPERIENCES AND TRAINING THAT BEGINNING TEACHERS SHOULD HAVE TO TEACH AGRICULTURAL MECHANICS

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The writer also wishes to express special thanks to Professor Emeritus Don M. Orr for his counsel and assistance in preparation of the survey in order that a more complete study of agricultural mechanics could be obtained.

Acknowledgment should also be given to Professor Chris White, who, as supervising teacher in the apprentice training program, agreed that such a study could be beneficial to the student training program.

Sincere appreciation is also expressed for the splendid cooperation of the twenty-four first-year teachers and the forty-six student teachers who returned questionnaires and gave statements of supplementary information concerning problems in agricultural mechanics.

This acknowledgment would be incomplete without recognition of the encouragement and assistance rendered by my wife, Maidee, and my son, Spencer.

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CHAPTER I

INTRODUCTION

Since it is the responsibility of the teacher of vocational agriculture to provide adequate training in agricultural mechanics to high school students, young farmers, adults, and others, it is essential that he be highly trained in this area. The teacher of vocational agriculture is generally employed to teach upon his graduation from Oklahoma State University. To keep his students from being denied adequate training in agricultural mechanics, even in his early years of teaching, it is very necessary that his agricultural education curriculum as an undergraduate, and in his apprentice teaching, provide substantial training for him to be highly effective in this important phase of his teaching program.

Many teachers of vocational agriculture devote 40 to 60 per cent of teaching time to agricultural mechanics.[1] This is an increase of approximately 20 to 40 per cent of their scheduled teaching time over past years. Vocational agriculture teachers need to have an increased amount of their undergraduate technical training in this field. To successfully teach the use and repair of mechanical equipment, future teachers of vocational agriculture need extensive training in its

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[1]Eddie Lynn Dye, An Analysis of Factors Associated with the Quality, Nature and Extent of Farm Mechanics Experiences Received by Student Teachers of Vocational Agriculture, (Unpublished Master's thesis, Oklahoma State University, May 1961), p. 10.

operation and service. More education in agricultural engineering technology is needed to adequately prepare teachers for their work with young farmers and adults.[2] Also, it has become the responsibility of the vocational agriculture teacher in many communities to teach others requiring this type of training to be gainfully employed.

The Agriculture Education Department recognizes that students as undergraduates cannot receive adequate instruction in all areas. Furthermore, this would not be desirable even if possible since the educational needs of teachers are constantly changing. At the present a minimum of six semester credit hours are required in agricultural engineering (excluding AGEN 422, which is a required professional course). Seven semester credit hours are required in participating experiences in student teaching.

Leaders of vocational agriculture have for many years regarded the apprentice teaching period as being the strongest part of the preservice training program for vocational agriculture. It has generally been recognized among vocational agriculture training personnel and student teachers that the student teaching period and/or apprenticeship period of the teacher program is probably the most effective and valuable phase of their training.[3]

The ultimate goal in agricultural education is to provide

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[2] Agriculture Engineering Phases of Teacher Education in Agriculture, a report of the Committee on Agriculture Teacher Training, Education and Research Division, American Society of Agriculture Engineers prepared in collaboration with an advisory group of agriculture education specialists, June 1960.

[3] Fred G. Lechner, "Factors Influencing the Experiences of Student Teaching," Agriculture Education Magazine, March 1953, p. 196.

pre-service training for prospective teachers of vocational agriculture, and in-service training for vocational agriculture teachers in order to produce quality teachers that are abreast with current trends in agriculture. Continued studies in the rapidly changing mechanization area must be maintained to meet this goal.

The agricultural mechanics program should be designed to meet the needs of this rapid development of agricultural mechanization and to better serve the vocational agriculture student and the community.

PLAN FOR A GRADUATE PROBLEM

1. Tentative title:

   A study of experiences and training that beginning teachers should have to teach agricultural mechanics.

2. Statement of the problem or situation:

   The student teachers should receive more training and teaching experiences in agricultural mechanics to adequately teach Vocational Agriculture in Oklahoma.

3. Purpose or purposes to be realized as a result of making the study:

   A. To determine what phases of agricultural mechanics should be added or strengthened for our student teachers in the training centers.

   B. To determine the effectiveness of the present undergraduate training in agricultural mechanics.

   C. To improve the agricultural mechanics instruction for beginning teachers.

4. General outline of the information needed to complete the study:

   A. The experiences received by student teachers in teaching and observing agricultural mechanics classes.

   B. Phases of agricultural mechanics taught by first-year teachers of Vocational Agriculture.

5. Scope of study:

   A. A study of approximately 45 student teachers concerning experiences in teaching and observing agricultural mechanics.

   B. A study of approximately 16 first-year Vocational Agriculture teachers concerning phases of agricultural mechanics taught.

6. Procedure for securing the information:

   A. Secure names and training center placement of each student teacher from Agricultural Education Department.

   B. Secure names of first-year teachers from State Office of Vocational Agriculture.

   C. A questionnaire and check sheet of various phases of agricultural mechanics taught or observed by student teachers.

   D. A questionnaire and check sheet of various phases to be sent to each of the first-year Vocational Agriculture teachers in Oklahoma.

   E. Compile and analyze the information.

CHAPTER II

REVIEW OF RELATED LITERATURE

Teachers have been confronted with problems relative to teaching agricultural mechanics. Some of these pressing questions are: "What shall I teach? How much time shall I devote to teaching agricultural mechanics? Have I received adequate training to adequately teach young boys? What should be my objectives in agricultural mechanics program?"

These questions cannot be answered directly, or maybe these problems are localized and do not need extensive investigation. It is the purpose of the review of related literature to investigate the occurrence of identical or similar problems in other sections of the nation.

It is assumed that teachers will conduct an agricultural mechanics program as outlined in their pre-service training. Since this report is directed toward possible curriculum changes to improve the agricultural mechanics program, it becomes imperative to establish a foundation on which to begin evaluation.

Matthews[4] conducted a survey in Illinois to determine some of the basic issues in agricultural mechanics with implications for pre-service education. His conclusions suggested the following principles: (1) course objectives should be determined and stated in terms of

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[4]Matthews, John W., "Basic Issues in Farm Mechanics Education with Implications for the Pre-Service Education of Teachers of Vocational Agriculture," Summaries of Studies in Agricultural Education, Supplement No. 12, 1957-58, p. 32.

student needs and abilities to be developed; (2) students should participate in planning, setting goals, and evaluating outcomes of instruction; (3) considerable understanding should be placed on developing abilities and understanding in farm power and machinery with emphasis on maintenance, service, and field adjustment; (4) students should be provided ample opportunity to solve problems and exercise mechanical judgment; (5) course content should be revised frequently to keep abreast of new developments and (6) pre-service training should not be considered terminal. Opportunities should be provided for the development of additional agricultural mechanics abilities through graduate and other in-service courses for teachers.

Albrecht[5] stated that teachers must continually plan for the future to determine the needs of the community in maintaining a well equipped shop. Secondary factors become involved in the planning stage which includes population increase, urbanization, consolidation, and general economic conditions.

In 1954 Hamilton[6] predicted the future trend in the need for more and better instruction in farm mechanics. The American farmer literally "farms on wheels" today with the promise of more mechanization in the future. More and more school officials ask when hiring a teacher, "Is he a good shop man?" Teachers must have more pre-service training in farm mechanics to meet the demands of a growing and changing agriculture.

A study conducted by Jacobs of the Agricultural Engineering

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[5]Albrecht, Carl F., "Equipping the Farm Mechanics Shop," Agricultural Education Magazine, Vol. 26, January, 1954, pp. 154-157.

[6]Hamilton, J. R., "Improved Facilities in the Farm Shop," Agricultural Education Magazine, Vol. 26, January, 1954, pp. 156-157.

Department, Kansas State College, showed need for college course work in farm electrification and farm shop work for students of agricultural education in addition to the required courses. This evaluation was contributed to increased mechanization with emphasis on basic skills.[7]

Alabama sponsored a phase of professional improvement in farm mechanics for teachers of vocational agriculture. Bottoms reported that many teachers frankly admitted that the reason they were not doing a better job of teaching agricultural mechanics was that they did not possess many of the farm mechanics skills needed.[8]

Opinions from teachers of vocational agriculture may assist in determining job experiences required for teaching. Stafford[9] recommended from his survey of teachers in the east Texas area that the pre-service training program emphasizes agricultural engineering, especially geared toward training all-day students, owners, part owners, part-time farmers, and regular and seasonal workers in the use of farm equipment.

A survey of 90 teachers in Arkansas[10] in 1955 revealed that teachers tend to allot little time to areas in agricultural mechanics in which they feel their training was inadequate. It is therefore assumed that pre-service training was limited in agricultural mechanics to major

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[7]Jacobs, C. O., "Evaluation of Job Activities in Farm Mechanics," Agricultural Education Magazine, Volume 26, February, 1954, pp. 177-180.

[8]Bottoms, D. N., "The Farm Mechanics Program," Agricultural Education Magazine, Volume 26, February, 1954, pp. 185-189.

[9]Stafford, George H., "What Agricultural Knowledge Should be Emphasized in the Preparation of Teachers of Vocational Agriculture for the East Texas Area," Summaries of Studies in Agricultural Education, Supplement No. 11, 1956-57, p. 73.

[10]Hutson, Denver B., "Instruction in Farm Mechanics as Conducted by Vocational Agriculture in Arkansas," Summaries of Studies in Agricultural Education, Supplement No. 9, 1954-55.

areas or inadequate time was devoted to a complete understanding of the mechanics program.

White[11] conducted a survey of 200 selected graduates in agricultural education from Oklahoma State University between the years 1925 and 1955, inclusive. The graduates were asked to express opinions and make judgments concerning the degree of adequacy of their major course emphasis which they believe would have resulted in an improvement in preparation for their field of work.

Teachers listed agricultural engineering second to soils as the area needing additional emphasis in subject matter areas. Teachers stated that their opinions were based on community needs caused by a changing agriculture.

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[11] White, Billie L., "Opinions Expressed by Agricultural Education Graduates Regarding the Adequacy of the Agricultural Education Curriculum at the Oklahoma Agricultural and Mechanical College," Summaries of Studies in Agricultural Education, Supplement No. 11, 1956-57, p. 81.

CHAPTER III

PRESENTATION AND ANALYSIS OF DATA

The information presented in this chapter was obtained by meeting with 22 student teachers upon their return to the University from their training centers. These student teachers had spent eight weeks of the first semester in the training center. They completed surveys and the data will follow.

Other student teacher data were secured from 24 student teachers taking their practice training experiences in the spring. The surveys were sent to these student teachers at the time they finished their apprentice training.

Also, surveys were sent to 31 first-year teachers and data were received from 24 of these teachers.

Of the 46 student teachers, the undergraduate training in agricultural mechanics averaged 7.5 hours. The high reporting was 12 hours and the low was four hours.

The 46 students reported an average of 39.5 per cent of their class time was devoted to agricultural mechanics. The highest was 98 per cent, and five student teachers reported no class time in this important phase of training. One training center had no facilities for agricultural mechanics.

Another interesting fact reported was of the 46 student teachers only 24 observed or taught adult or young farmer classes in agricultural

mechanics. Sixteen reported facilities at the training centers were inadequate for teaching agricultural mechanics.

The 24 first-year teachers reported an average of ten hours undergraduate training in agricultural mechanics. The highest reported was 22 hours and the lowest four hours.

These same teachers reported an average of 30 per cent of their class time was devoted to agricultural mechanics. The high was 67 per cent and one teacher devoted no time to this training.

Of the 24 teachers reporting, only five taught adult or young farmer classes in agricultural mechanics. Five of the 24 teachers indicated their facilities were inadequate for this area of training.

TABLE I

DEGREE OF USE OF WELDING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers			Student Teachers		
	Frequently	Seldom	Never	Frequently	Seldom	Never
Arc welders	23	0	1	42	1	3
Oxyacetylene welders	17	6	1	28	8	10
Oxyacetylene cutting torch	22	1	1	39	1	6
Inert gas welders	0	2	22	0	1	45

TABLE II

THE LACK OF ADEQUATE WELDING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers		Student Teachers	
	No. Reporting Inadequacy	Per Cent	No. Reporting Inadequacy	Per Cent
Arc welders	6	25	14	30
Oxyacetylene welders	4	17	25	54
Oxyacetylene cutting torch	4	17	16	35
Inert gas welders	11	46	26	56

TABLE III

DEGREE OF USE OF POWER SAWING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers			Student Teachers		
	Frequently	Seldom	Never	Frequently	Seldom	Never
Metal cutting band saw	12	2	10	17	1	28
Power hack saw	8	3	13	16	6	22
Power wood saws	13	8	3	8	14	22

TABLE IV

THE LACK OF ADEQUATE POWER SAWING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers		Student Teachers	
	No. Reporting Inadequacy	Per Cent	No. Reporting Inadequacy	Per Cent
Metal cutting band saw	6	25	19	41
Power hack saw	8	33	12	26
Power wood saws	0	0	16	35

TABLE V

DEGREE OF USE OF METAL HEATING, HOLDING, AND SHAPING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers			Student Teachers		
	Frequently	Seldom	Never	Frequently	Seldom	Never
Forges	3	4	17	0	3	43
Metal Shear	4	7	13	9	3	34
Lathes	0	2	22	0	0	46
Grinders	22	1	1	37	6	3
Anvils	18	4	2	18	16	12
Vises	22	1	1	34	9	3

TABLE VI

THE LACK OF ADEQUATE HEATING, HOLDING, AND SHAPING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers		Student Teachers	
	No. Reporting Inadequacy	Per Cent	No. Reporting Inadequacy	Per Cent
Forges	7	29	30	65
Metal Shear	12	50	24	52
Lathes	8	33	23	50
Grinders	5	21	16	35
Anvils	2	8	13	26
Vises	3	13	17	35

TABLE VII

DEGREE OF USE OF DRILLING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers			Student Teachers		
	Frequently	Seldom	Never	Frequently	Seldom	Never
Drill presses	20	2	2	21	16	9
Electric drills	19	3	2	18	22	6

TABLE VIII

THE LACK OF ADEQUATE DRILLING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers		Student Teachers	
	No. Reporting Inadequacy	Per Cent	No. Reporting Inadequacy	Per Cent
Drill presses	3	13	16	35
Electric drills	5	21	12	26

TABLE IX

DEGREE OF USE OF PLUMBING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers			Student Teachers		
	Frequently	Seldom	Never	Frequently	Seldom	Never
Pipe threading sets	8	12	4	10	27	9
Pipe cutters	12	9	3	15	22	9

TABLE X

THE LACK OF ADEQUATE PLUMBING EQUIPMENT AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers		Student Teachers	
	No. Reporting Inadequacy	Per Cent	No. Reporting Inadequacy	Per Cent
Pipe threading sets	3	13	14	30
Pipe cutters	3	13	12	26

TABLE XI

DEGREE OF USE OF OTHER LISTED SHOP EQUIPMENT
AS REPORTED BY FIRST-YEAR TEACHERS
AND STUDENT TEACHERS

	First-Year Teachers			Student Teachers		
	Frequently	Seldom	Never	Frequently	Seldom	Never
Air compressors	9	7	8	8	25	13
Screw plate sets	6	6	12	2	24	20
Chain hoists	3	10	11	0	7	39
Floor jacks	3	6	15	1	9	36
Wrenches	20	3	1	18	17	11
Soldering coppers	4	12	8	1	24	21

TABLE XII

THE LACK OF ADEQUATE OTHER LISTED SHOP EQUIPMENT
AS REPORTED BY FIRST-YEAR TEACHERS
AND STUDENT TEACHERS

	First-Year Teachers		Student Teachers	
	No. Reporting Inadequacy	Per Cent	No. Reporting Inadequacy	Per Cent
Air compressors	6	25	14	30
Screw plate sets	9	38	20	43
Chair hoists	5	21	27	59
Floor jacks	7	29	22	48
Wrenches	10	42	24	52
Soldering coppers	4	17	18	39

TABLE XIII

DEGREES OF USE OF SHOP REFERENCES AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers			Student Teachers		
	Frequently	Seldom	Never	Frequently	Seldom	Never
Shopwork on the Farm, Jones	16	3	5	31	7	8
Farm Mechanics, Phipps, McCally, Scranton, Cook	10	4	10	11	10	23
Farm Shop Skills, Sampson, Mowery, Kugler	1	6	17	3	3	40
Farm Shop Book, Roehl	0	3	21	2	4	40
Farm Arc Welding, Morford	2	4	18	8	8	30

TABLE XIV

THE NEED FOR SHOP REFERENCES AS REPORTED BY FIRST-YEAR TEACHERS AND STUDENT TEACHERS

	First-Year Teachers		Student Teachers	
	No. Reporting Inadequacy	Per Cent	No. Reporting Inadequacy	Per Cent
Shopwork on the Farm, Jones	12	50	13	26
Farm Mechanics, Phipps, McCally, Scranton, Cook	9	38	17	35
Farm Shop Skills, Sampson, Mowery, Kugler	10	42	26	56
Farm Shop Book, Roehl	10	42	23	50
Farm Arc Welding, Morford	10	42	22	48

TABLE XV

DISTRIBUTION OF TEACHING HOURS FOR FARM POWER AND MACHINERY AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Number Who Taught	Average Hours of Those Who Taught	Number Planning to Teach	Average Hours of Those Planning to Teach
Repairing small engines	13	8.7	14	11.6
Repairing and maintaining tractors	9	6.9	11	10.5
Repairing and maintaining trucks	3	3.3	3	4.0
Repairing and maintaining farm equipment	12	7.5	12	5.0

TABLE XVI

DISTRIBUTION OF TEACHING HOURS FOR FARM BUILDINGS AND CONVENIENCES AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Number Who Taught	Average Hours of Those Who Taught	Number Planning to Teach	Average Hours of Those Planning to Teach
Use of paint and painting equipment	15	5.3	13	5.5
Plumbing, installation, repairing	10	4.2	12	5.9
Construction, remodeling, repairing buildings	7	5.7	10	4.6
Mixing, pouring, curing concrete	13	4.8	15	6.1
Building and repairing fences	9	2.9	8	2.6

TABLE XV

DISTRIBUTION OF TEACHING HOURS FOR FARM POWER AND MACHINERY AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Number Who Taught	Average Hours of Those Who Taught	Number Planning to Teach	Average Hours of Those Planning to Teach
Repairing small engines	13	8.7	14	11.6
Repairing and maintaining tractors	9	6.9	11	10.5
Repairing and maintaining trucks	3	3.3	3	4.0
Repairing and maintaining farm equipment	12	7.5	12	5.0

TABLE XVI

DISTRIBUTION OF TEACHING HOURS FOR FARM BUILDINGS AND CONVENIENCES AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Number Who Taught	Average Hours of Those Who Taught	Number Planning to Teach	Average Hours of Those Planning to Teach
Use of paint and painting equipment	15	5.3	13	5.5
Plumbing, installation, repairing	10	4.2	12	5.9
Construction, remodeling, repairing buildings	7	5.7	10	4.6
Mixing, pouring, curing concrete	13	4.8	15	6.1
Building and repairing fences	9	2.9	8	2.6

TABLE XVII

DISTRIBUTION OF TEACHING HOURS FOR AGRICULTURAL SHOP SKILLS AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Number Who Taught	Average Hours of Those Who Taught	Number Planning to Teach	Average Hours of Those Planning to Teach
Planning shop projects	17	9.0	18	10.4
Oxyacetylene welding	20	7.9	17	10.5
Oxyacetylene cutting	21	5.8	17	7.2
Arc welding	19	24.2	17	19.7
Inert gas welding	3	4.0	5	6.0
Brazing metals	16	3.8	13	5.5
Hardsurfacing	7	3.3	12	4.0
Forge work	5	8.6	5	8.2
Using metal lathes	0	0.0	1	1.0
Using screw plates	11	4.5	12	4.9
Cutting and threading pipe	17	4.2	15	5.0
Use of woodworking tools	13	8.1	12	8.8

TABLE XVIII

DISTRIBUTION OF TEACHING HOURS FOR ELECTRICITY AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Number Who Taught	Average Hours of Those Who Taught	Number Planning to Teach	Average Hours of Those Planning to Teach
Selecting and using electrical equipment	11	5.1	9	6.8
Selecting and using electrical materials	9	3.8	9	6.7
Wiring buildings	9	6.7	9	9.2

TABLE XIX

DISTRIBUTION OF TEACHING HOURS FOR SOIL AND WATER MANAGEMENT AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Number Who Taught	Average Hours of Those Who Taught	Number Planning to Teach	Average Hours of Those Planning to Teach
Using the farm level	14	7.4	14	9.3
Running contours and terraces	8	3.8	8	4.3
Selecting and using irrigation systems	4	16.3	7	11.1

TABLE XX

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON FARM POWER AND MACHINERY AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Very Adequate	Adequate	Inadequate
Repairing small engines	0	4	20
Repairing and maintaining tractors	1	3	20
Repairing and maintaining trucks	0	3	21
Repairing and maintaining farm equipment	2	8	14

TABLE XXI

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON FARM BUILDINGS AND CONVENIENCES AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Very Adequate	Adequate	Inadequate
Use of paint and painting equipment	2	4	18
Plumbing, installation, and repairing	0	11	13
Construction, remodeling and repairing buildings	3	8	13
Mixing, pouring, and curing concrete	8	12	4
Building and repairing fences	2	8	14

TABLE XXII

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON AGRICULTURAL SHOP SKILLS AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Very Adequate	Adequate	Inadequate
Planning shop projects	6	13	5
Oxyacetylene welding	14	8	2
Oxyacetylene cutting	15	8	1
Arc welding	17	6	1
Inert gas welding	1	1	22
Brazing metals	10	8	6
Hardsurfacing	0	7	17
Forge work	0	1	23
Using metal lathes	0	0	24
Using screw plates	6	9	9
Cutting and threading pipe	18	5	1
Use of woodworking tools	2	12	10

TABLE XXIII

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON ELECTRICITY AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Very Adequate	Adequate	Inadequate
Selecting and using electrical equipment	4	10	10
Selecting and using electrical materials	2	12	10
Wiring buildings	2	7	15

TABLE XXIV

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON SOIL AND WATER MANAGEMENT AS REPORTED BY TWENTY-FOUR FIRST-YEAR TEACHERS

	Very Adequate	Adequate	Inadequate
Using the farm level	2	7	15
Running contours and terraces	1	7	16
Selecting and using irrigation systems	2	5	17

TABLE XXV

EXPERIENCES RECEIVED IN TEACHING OF AND/OR OBSERVATION OF TEACHING OF FARM POWER AND MACHINERY AS REPORTED BY FORTY-SIX STUDENT TEACHERS

	Total Hours	Average Hours	Per Cent Teaching and/or Observing
Repairing small engines	56	1.2	22
Repairing and maintaining tractors	15	0.3	11
Repairing and maintaining trucks	0	0.0	0
Repairing and maintaining farm equipment	35	0.8	15

TABLE XXVI

EXPERIENCES RECEIVED IN TEACHING OF AND/OR OBSERVATION OF TEACHING OF FARM BUILDINGS AND CONVENIENCES AS REPORTED BY FORTY-SIX STUDENT TEACHERS

	Total Hours	Average Hours	Per Cent Teaching and/or Observing
Use of paint and painting equipment	51	1.1	30
Plumbing, installation, and repairing	34	0.7	17
Construction, remodeling, and repairing buildings	27	0.6	13
Mixing, pouring, and curing concrete	42	0.9	17
Building and repairing fences	21	0.5	15

TABLE XXVII

EXPERIENCES RECEIVED IN TEACHING OF AND/OR OBSERVATION OF TEACHING OF AGRICULTURAL SHOP SKILLS AS REPORTED BY FORTY-SIX STUDENT TEACHERS

	Total Hours	Average Hours	Per Cent Teaching and/or Observing
Planning shop projects	319	6.9	63
Oxyacetylene welding	313	6.8	61
Oxyacetylene cutting	287	6.2	67
Arc welding	555	12.1	80
Inert gas welding	6	0.1	7
Brazing metals	71	1.5	43
Hardsurfacing	43	0.9	30
Forge work	2	less than 0.1	2
Using metal lathes	6	0.1	2
Using screw plates	25	0.5	17
Cutting and threading pipe	107	2.3	54
Use of woodworking tools	240	5.2	26

TABLE XXVIII

EXPERIENCES RECEIVED IN TEACHING OF AND/OR OBSERVATION OF TEACHING OF ELECTRICITY AS REPORTED BY FORTY-SIX STUDENT TEACHERS

	Total Hours	Average Hours	Per Cent Teaching and/or Observing
Selecting and using electrical equipment	36	0.8	17
Selecting and using electrical materials	48	1.0	26
Wiring buildings	15	0.3	11

TABLE XXIX

EXPERIENCES RECEIVED IN TEACHING OF AND/OR OBSERVATION OF TEACHING OF SOIL AND WATER MANAGEMENT AS REPORTED BY FORTY-SIX STUDENT TEACHERR

	Total Hours	Average Hours	Per Cent Teaching and/or Observing
Using the farm level	65	1.4	26
Running contours and terraces	43	0.9	17
Selecting and using irrigation systems	1	less than 0.1	2

TABLE XXX

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON FARM POWER AND MACHINERY AS REPORTED BY FORTY-SIX STUDENT TEACHERS

	Very Adequate	Adequate	Inadequate
Repairing small engines	2	9	35
Repairing and maintaining tractors	1	11	34
Repairing and maintaining trucks	0	4	42
Repairing and maintaining farm equipment	1	19	26

TABLE XXXI

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON FARM BUILDINGS AND CONVENIENCES ARE REPORTED BY FORTY-SIX STUDENT TEACHERS

	Very Adequate	Adequate	Inadequate
Use of paint and painting equipment	3	14	29
Plumbing, installation, and repairing	0	23	23
Construction, remodeling and repairing buildings	2	14	30
Mixing, pouring, and curing concrete	5	35	6
Building and repairing fences	5	19	22

TABLE XXXII

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON AGRICULTURAL SHOP SKILLS AS REPORTED BY FORTY-SIX FIRST-YEAR TEACHERS

	Very Adequate	Adequate	Inadequate
Planning shop projects	7	21	18
Oxyacetylene welding	15	25	6
Oxyacetylene cutting	21	23	2
Arc welding	22	21	3
Inert gas welding	1	1	44
Brazing metals	2	28	16
Hardsurfacing	0	12	34
Forge work	0	4	42
Using metal lathes	0	2	44
Using screw plates	5	22	19
Cutting and threading pipe	18	28	0
Use of woodworking tools	4	16	26

TABLE XXXIII

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON ELECTRICITY AS REPORTED BY FORTY-SIX STUDENT TEACHERS

	Very Adequate	Adequate	Inadequate
Selecting and using electrical equipment	5	23	18
Selecting and using electrical materials	5	23	18
Wiring buildings	5	22	19

TABLE XXXIV

DEGREE OF ADEQUACY OF UNDERGRADUATE TRAINING ON SOIL AND WATER MANAGEMENT AS REPORTED BY FORTY-SIX STUDENT TEACHERS

	Very Adequate	Adequate	Inadequate
Using the farm level	2	20	24
Running contours and terraces	1	16	29
Selecting and using irrigation systems	1	7	38

DATA RECEIVED ON NON-LISTED EQUIPMENT AND REFERENCES

Some equipment and references were not listed on the survey; however, it was suggested that the teachers and student teachers add to the list if they desired.

Four of the first-year teachers indicated a need for pipe and metal benders while six student teachers indicated the same need. Four student teachers reported a need for carbon arc torches and metal punches.

Eleven of the 24 first-year teachers reported references for teaching agricultural mechanics in their schools were inadequate. Also, 11 of the 46 student teachers reported agricultural mechanics references inadequate in the training centers.

To the references listed, four teachers added Forney, Arc Welding Manual, as being used very frequently. Three student teachers also listed Forney, Arc Welding Manual, as being used very frequently. Also, six student teachers added Lincoln, Welding for Beginners, to the list and reported their use very frequently.

CHAPTER IV

SUMMARY AND CONCLUSIONS

This chapter presents a summary of this study and conclusions based upon the findings.

The purpose of this study has been to investigate in a review of literature the thinking of present-day educators on the trend vocational agriculture should take regarding the curriculum of agricultural mechanics in vocational agriculture; to investigate the data reported by 24 first-year teachers and 46 student teachers regarding information reported on undergraduate training, apprentice teaching, and first-year teaching in their respective schools and training centers; to ascertain if selected factors concerning expriences in the student training program of agricultural mechanics affected the quality and extent of agricultural mechanics taught to high school students, young farmers, adults, and others.

Data for this study were secured from 24 of 31 first-year vocational agriculture teachers. These teachers are graduates of Oklahoma State University and are teaching in schools located in five states. Data were also secured from 46 student teachers who did their apprentice teaching in 23 approved training centers. The survey data were secured by two methods. The first group of 24 student teachers completed the survey in a meeting on the university campus, and the other 46 surveys were sent to the schools and training centers.

The 24 first-year teachers included in this study devoted 30 per cent of their class time to the teaching of agricultural mechanics. In the training centers 39.5 per cent of class time was used for agricultural mechanics.

Twenty-four of 46 student teachers, or 52 per cent, observed or taught young farmers or adult classes in agricultural mechanics. Whereas, five of the 24 first-year teachers, or 20.8 per cent, taught agricultural mechanics to adult or young farmer classes.

Fourteen, or 30.4 per cent, of the student teachers reported inadequate facilities at the training center for teaching agricultural mechanics, while 20.8 per cent of the 24 first-year teachers reported inadequate teaching facilities for agricultural mechanics.

Of the 24 kinds of listed equipment, 23 of the 24 teachers reported the arc welder was the most frequently used. Forty-two of the 46 reported the arc welder most frequently used. Both groups reported the inert gas welder as being the least used. However, this could be insignificant as they might not be in the school shops.

Thirty of the 46 student teachers reported a need for chain hoists. In the training centers only 13 student teachers indicated a need for pipe cutters. This ranked lowest of all the shop equipment. Among the first-year teachers, 12 of the 24 reported a need for metal shears, while the power wood saw rated zero.

The study showed that 37.5 per cent of the first-year teachers thought their references were inadequate, compared to 21.7 in the training centers.

The average hours for teaching arc welding was 24.2 compared to zero hours for metal lathes. These two were high and low for first-year

teachers. This same comparison applies to the training centers where 80 per cent of the student teachers taught or observed arc welding for an average of 12.1 hours. Metal lathes and forge work ranked lowest where only two per cent taught or observed.

The 24 teachers rated their undergraduate training very adequate in the skills of arc welding, oxyacetylene welding and cutting, and pipe cutting and threading; 83 per cent adequate in concrete, 46 per cent adequate in plumbing and 58 per cent adequate in electricity. In power and machinery and soil and water management, they rated their undergraduate training inadequate.

The findings indicate 80 per cent of the 46 student teachers taught or observed arc welding. None of the students taught or observed the repairing and maintenance of trucks. These same 46 student teachers ranked pipe cutting and threading as most adequate undergraduate training of all shop skills. They ranked their training in inert gas welding as the least adequate.

The problem of keeping curriculum up to date in this fast-changing technological society is increasing rapidly. Continued studies must be made in the training of teachers for this important phase of vocational agriculture. Progressive steps should be taken immediately to up-date the quality and to balance areas of agricultural mechanics. In the past changes in education have been a slow process.

The undergraduate training in agriculture engineering and the training center should be continually evaluated and changed to produce a quality agricultural mechanics teacher. Progress has been made in recent years, but continued progress in improvement is still very much in order.

More agricultural engineering as an undergraduate and a longer apprentice training period could enhance the possibilities for a higher quality vocational agriculture teacher in agricultural mechanics.

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APPENDIX

TEACHERS COOPERATING IN STUDY

Teacher	School
Arthand, Alan	Mutual, Oklahoma
Beach, James	Watts, Oklahoma
Bynum, Austin	Arnett, Oklahoma
Childers, Ralph	Blue Mound, Kansas
Cronkhite, Larry	Sweetwater, Oklahoma
Dills, Robert	Lebanon, Kansas
Duke, Harvey	Thackerville, Oklahoma
DeVilbis, Mac	Yukon, Oklahoma
Ferris, Ted	Cordell, Oklahoma
Hager, Norman	Loyal, Oklahoma
Harkey, Donald	Eloy, Arizona
Harvey, Ralph	Parker, Kansas
Hill, Jerry	Beverly, Kansas
Howell, Elvis	Eureka, Kansas
Jackson, Dale	Coweta, Oklahoma
Jobes, Raleigh	Davenport, Oklahoma
Jones, Henry	Anthony, New Mexico
Johndraw, James	Capron, Oklahoma
Mayfield, Jerry	Dibble, Oklahoma
Moore, Gary	Panama, Oklahoma
Newell, Oran	Kinsington, Kansas
Reece, Ray	Eldorado, Illinois
Robertson, Ray	Panola, Oklahoma
Thurman, Jerry	Stillwater, Oklahoma

STUDENT TEACHERS COOPERATING IN STUDY

Name	Training Center
Wylie, R. L.	Pond Creek
Price, R. A.	Pond Creek
Clark, Bert	Lindsay
Clymer, Bill	Lindsay
Walker, D. J.	Adair
Stookesberry, Gary	Adair
Oakes, Charles	Washington
Whitehead, Ray	Washington
Northup, Larry	Lexington
Wright, Larry	Lexington
Fenton, Wendell	Custer
Kibby, J. R.	Custer
Dunham, James	Stuart
Jackson, Dale	Stuart
Green, Robert	Prague
Marsh, Jerry	Prague
Starr, Rex	Beggs
Fenton, Freddie	Beggs
Berninger, Tom	Alva
Carter, Louis	Alva
Fisher, Dennis	Roosevelt
Woody, Jimmy	Roosevelt
Sumintaredja, Edy	Fairview
Cross, Paul	Fairview

Student Teachers (Continued)

Name	Training Center
Golliver, John	Sayre
Getz, Will	Sayre
Maddux, Larry	Marlow
McLaren, Norman	Marlow
Ring, Joe	Duncan
Smith, Wendell	Duncan
Haskit, Joe	Muskogee
Cox, Cecil	Muskogee
Lessly, Roy	Garber
Thur, John	Garber
Teel, Alan	Ames
Starks, Leslie	Ames
Cannon, Dlyle	Purcell
Holland, Kenneth	Purcell
Lookingbill, Bill	Marshall
Mayton, Larry	Soper
Melot, Richard	Soper
Skinner, Joe D.	Morris
Harrel, Frankie	Shattuck
Laubach, Robert	Shattuck
Beavers, Warren	Coalgate
Perry, Jerry D.	Coalgate

QUESTIONNAIRE TO BE COMPLETED BY THE FIRST-YEAR
TEACHER OF VOCATIONAL AGRICULTURE
ON AGRICULTURAL MECHANICS

I. Teacher _____

II. School _____

III. Number of college undergraduate hours in agriculture mechanics _____

IV. What per cent of your teaching assignments were devoted to agricultural mechanics? _____

V. Did you teach adult or young farmer classes in agricultural mechanics? Check one. Yes____ No____

VI. To what degree of adequacy for teaching agricultural mechanics are the facilities in your school?

Very Adequate_____, Adequate_____, Inadequate_____

VII. Check appropriate column for degree of use of shop equipment in your school.

	Frequently Used	Seldom Used	Never Used
1. Arc welders			
2. Oxyacetylene welders			
3. Oxyacetylene cutting torch			
4. Inert gas welders			
5. Forges			
6. Metal cutting band saw			
7. Power hack saw			
8. Metal shear			
9. Metal lathes			
10. Drill presses			

11. Electric drills

12. Grinders

13. Anvils

14. Vises

15. Air compressors

16. Power saws (wood)

17. Pipe threading sets

18. Pipe cutters

19. Screw plate sets

20. Chair hoist

21. Floor jacks

22. Wrenches (socket, end, combination)

23. Soldering coppers

Others-list

24.

25.

VIII. Check the additional shop equipment needed to make your agricultural mechanics program more adequate.

1. Arc welders _____
2. Oxyacetylene welders _____
3. Oxyacetylene cutting torches _____
4. Inert gas welders _____
5. Forges _____
6. Metal cutting band saw _____
7. Power hack saw _____
8. Metal shear _____
9. Metal lathes _____

10. Drill presses _____

11. Electric drills _____

12. Grinders _____

13. Anvils _____

14. Vises _____

15. Air compressors _____

16. Power saws (wood) _____

17. Pipe threading sets _____

18. Pipe cutters _____

19. Screw plate sets _____

20. Chair hoist _____

21. Floor jacks _____

22. Wrenches (socket, end, combination) _____

23. Soldering coppers _____

Others-list

24. _____

25. _____

IX. To what degree of adequacy for teaching agricultural mechanics are the references in your school?

Very Adequate_____, Adequate_____, Inadequate_____

X. Check appropriate column for degree of use of shop references in your school.

	Frequently Used	Seldom Used	Never Used
1. Shopwork on the Farm, Jones			
2. Farm Mechanics, Phipps, McCally, Scranton, and Cook			

	Frequently Used	Seldom Used	Never Used
3. Farm Shop Skills, Sampson, Mowery, and Kugler			
4. Farm Shop Book, Roehl			
5. Farm Arc Welding, Marford			

Others-List

6. _____

7. _____

8. _____

XI. Check the additional references needed to make your agricultural mechanics program more adequate.

1. Shopwork on the Farm, Jones _____
2. Farm Mechanics, Phipps, McCally, Scranton, and Cook _____
3. Farm Shop Skills, Sampson, Mowery, Kugler _____
4. Farm Shop Book, Roehl _____
5. Farm Arc Welding, Morford _____

Others-List

6. _____
7. _____
8. _____

XII. Write in the number of hours you taught and/or plan to teach in the following areas.

	Taught this year	Plan to teach in the future
1. Planning shop projects	_____	_____
2. Oxyacetylene welding	_____	_____
3. Oxyacetylene cutting	_____	_____

		Taught this year	Plan to teach in the future
4.	Arc welding		
5.	Inert gas welding		
6.	Brazing metals		
7.	Hardsurfacing		
8.	Forge work		
9.	Using metal lathes		
10.	Using screw plates		
11.	Cutting and threading pipe		
12.	Use of woodworking tools		
13.	Use of paint and painting equipment		
14.	Rope work		
15.	Repairing small engines		
16.	Repairing and maintaining tractors		
17.	Repairing and maintaining trucks		
18.	Repairing and maintaining farm equipment		
19.	Plumbing, installation, and repairing		
20.	Constructing, remodeling and repairing buildings		
21.	Mixing, pouring and curing concrete		
22.	Building and repairing fences		
23.	Selecting and using electrical equipment		
24.	Selecting and using electrical materials		
25.	Wiring buildings		
26.	Using the farm level		
27.	Running contours and terraces		

	Taught this year	Plan to teach in the future
28. Selecting and using irrigation systems	_____	_____
Others-List		
29. _____	_____	_____
30. _____	_____	_____

XIII. Check appropriate column for the degree of undergraduate training in the following.

	Very Adequate	Adequate	Inadequate
1. Planning shop projects	____	____	____
2. Oxyacetylene welding	____	____	____
3. Oxyacetylene cutting	____	____	____
4. Arc welding	____	____	____
5. Inert gas welding	____	____	____
6. Brazing metals	____	____	____
7. Hardsurfacing	____	____	____
8. Forge work	____	____	____
9. Using metal lathes	____	____	____
10. Using screw plates	____	____	____
11. Cutting and threading pipe	____	____	____
12. Use of woodworking tools	____	____	____
13. Use of paint and paint equipment	____	____	____
14. Rope work	____	____	____
15. Repairing small engines	____	____	____
16. Repairing and maintaining tractors	____	____	____
17. Repairing and maintaining trucks	____	____	____

	Very Adequate	Adequate	Inadequate
18. Repairing, maintaining, and constructing equipment	____	____	____
19. Plumbing, installation and repairing	____	____	____
20. Construction, remodeling, and repairing buildings	____	____	____
21. Mixing, pouring, and curing concrete	____	____	____
22. Building and repairing fences	____	____	____
23. Selecting and using electrical equipment	____	____	____
24. Selecting and using electrical materials	____	____	____
25. Wiring buildings	____	____	____
26. Using the farm level	____	____	____
27. Running contours and terraces	____	____	____
28. Selecting and using irrigation systems	____	____	____
Others-List			
29. _____	____	____	____
30. _____	____	____	____

VITA

Leroy LeForce

Candidate for the Degree of

Master of Science

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