

AN EVALUATION OF THE EFFECTIVENESS OF PRE-EMPLOYMENT  
LABORATORY TRAINING IN MEETING THE MANPOWER  
NEEDS OF FARM IMPLEMENT DEALERS FOR  
FARM MACHINERY SERVICE AND  
REPAIR OCCUPATIONS

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## CHAPTER ONE

### INTRODUCTION

The matching of manpower supply and demand is a critical activity in a society where employment is necessary to share in economic benefits. This is particularly so in the agricultural sector of the economy where there is a rapid transition from on-farm employment to farm-related occupations. Several federal agencies, e.g., the United States Departments of Labor; Agriculture; Commerce; Health, Education, and Welfare; and Housing and Urban Development, are developing systems which hopefully will aid in resolving this problem. Until such systems are fully developed and implemented, there will exist a need for manpower researchers at all levels to actively assess occupations and training programs for imbalances. The need for training personnel to alleviate the manpower shortages in farm machinery service and repair occupations is recognized in most states of the nation. Various states are employing a variety of ways to develop curriculum content and to incorporate it into useful training programs in order to produce farm machinery service and repair mechanics.

It seems logical to give this problem some serious consideration. Today's new machinery is more mechanized as a result of the much-advanced technology of recent years. Various studies and surveys reveal the average age of farm machinery service and repair mechanics is near fifty years of age. These studies also reveal

that too few young men are being trained to replace the older mechanics, let alone fill the new demands that the newer mechanized machinery requires.

This shortage of farm machinery mechanics seems to be present and of concern to manpower planners in all of the states. The Texas Education Agency inaugurated a training program, as a part of the vocational agriculture program, in the school year 1966-67 entitled "Pre-employment Programs in Farm Machinery Service and Repair." The main objective of the program is to supply farm machinery dealers with competently trained mechanics, mechanics helpers, and machinery repairmen.

#### Need and Purpose of the Study

The central problem facing agricultural education in the training of farm machinery service and repair mechanics is that of establishing and maintaining relevant curriculum content. Since the farm machinery industry was actively involved in developing the basic content of the Texas programs and also provided employment opportunities for program graduates, it was concluded that industry personnel should also be utilized in assessing the effectiveness of these programs. The farm implement dealers who had employed program graduates were considered to be most knowledgeable of any weaknesses in the preparation of these workers and thus could provide feedback which, after an in-depth study, could be utilized to strengthen and improve programs. Specifically, there appeared to be a need to follow-up graduates of the Texas programs in order to evaluate their performance in an industrial setting. Also, an investigation of certain other

aspects of the programs could yield information useful for the betterment of programs.

Therefore, this study was conducted to obtain follow-up data on graduates of the Texas Pre-Employment Laboratory Training Program in Farm Machinery Service and Repair and to identify and describe selected variables associated with these programs. This emphasis was selected as a possible means of assessing the effectiveness of instruction in farm machinery service and repair.

The findings of this research effort should be useful to all segments of the educational complex which is concerned with decision-making relative to vocational and technical program planning both in the short and long run. Specifically, the findings should be useful to: (1) local school programs, (2) state departments of vocational education, (3) farm implement dealers, and associated businesses such as the manufacturer and district distribution centers, and (4) colleges and universities engaged in vocational teacher preparation programs.

#### Information Related to the Development of Research Objectives and Questions

Vocational Agriculture had a rather stable period in the secondary schools from its conception in 1917 until 1963. In this period there were some changes in the basic program due to improvements and additions made possible by new legislation. Educators and legislators began to question the basic objectives of vocational education in the early 1960's. President John F. Kennedy appointed a committee in 1961 to make a study of the total vocational program in the secondary schools. This committee was known as the President's Panel of

Consultants on Vocational Education. Several groups were represented on this committee. People from general education, vocational education, labor unions, news media, industry, farm organizations, state supervisors of vocational education, and the federal extension services shared responsibilities for reviewing, evaluating, and making recommendations to the President on the status of vocational education at the secondary school level in the United States.

The Panel of Consultants made their study in 1961-62 and reported their findings, evaluations, and recommendations to President Kennedy in 1962. The results of their findings were incorporated into the Vocational Education Act of 1963. President Lyndon Johnson signed this bill into legislation on December 18, 1963. It confirmed the determination of the United States to provide persons of all ages and ability levels with training to qualify them for gainful employment in almost all recognized non-professional occupations. Consequently, states were given authority and financial assistance to improve and expand existing vocational education programs and to establish new programs.

The Vocational Education Act of 1963 made it possible to broaden vocational agriculture from the narrow base of farming to a broadened base encompassing many agriculturally related fields (2). Even before the passage of the Act many students were going to colleges of agriculture and into fields of agriculture other than farming. Many students who were enrolled in classes of agriculture did not plan to enter farming. The leadership of agricultural education saw the immediate need to change and adopt programs that would meet the demands of students for training in agriculturally related occupations.

As a result of this legislation, the Texas Education Agency inaugurated, as a part of vocational agriculture, a new program in the school year of 1966-67 entitled "Pre-Employment Laboratory Programs in Farm Machinery Service and Repair." Persons enrolled in this program were to be junior and senior secondary students who had expressed a desire to become farm machinery mechanics. All instruction was to be provided in the school setting. Facilities simulate, insofar as possible, those found in commercial establishments. The intent of this program was to provide training that would enable a young man to enter the mechanics trade and to make satisfactory progress in it.

Like all other areas of vocational agriculture, the content of programs in the farm mechanics area has varied widely not only because of varying local needs, but also because of the development of farm mechanization (11). As the nation moved from war production to consumer goods, much of the country's resources were put into development of mechanical devices to improve the production of goods and services and to make it easier and less costly to produce each unit. As each mechanical marvel was produced, more were invented, until today almost any farm activity involves mechanical devices.

In an effort to achieve unity in the new program, a group of persons knowledgeable in the area of farm machinery maintenance and repair met in Austin, Texas, and formulated an extensive list of competencies needed by mechanics. This group kept the guiding principle of course construction in vocational education in view that content must be based upon knowledge and skills needed in the occupations.

They also realized that the most important content must be taught first. The group recognized that they had insufficient information available to prospective mechanics. Consequently, counselors and teachers were unable to discuss with students the career opportunities available in the trade on a short- or long-range basis.

A thorough study was conducted by Webb (12), of the Department of Agricultural Education, Texas A & M University. The study was sponsored cooperatively by the Occupational Research Coordinating Unit, the Texas Education Agency, and the Texas Agricultural Experiment Station. The data were collected by various groups of people throughout the state. This study was conducted in an attempt to identify and establish competencies that implement dealers desired graduates to possess when they were to enter the labor work force. Items used to assess the entry level of beginning mechanics were taken from a report entitled Suggested Basic Course Outline for Agricultural Machinery Service and Repair published in 1966 by the Vocational Division of the Texas Education Agency. The data were gathered from farm implement dealers across the state and were returned to A & M University. Webb and others analyzed the data and incorporated it into a basic core curriculum for Agricultural Machinery Service and Repair.

#### Objectives of the Study

In order to accomplish the major purpose of the study, the following specific objectives were formulated and served as guidelines for the design and conduct of the investigation:

- 1) To describe selected components of the "Pre- Lab" training programs.
- 2) To describe selected characteristics of students

who had completed the programs relative to their school activities and certain personal data.

- 3) To determine if the "Pre-Lab" programs were meeting the manpower needs of the farm machinery industry in terms of producing sufficient numbers of graduates who were capable of suitable on-the-job performance.

### Research Questions

Central to the attainment of the specific objectives was the collection of data which would provide adequate answers to the following research questions:

- 1) What is the nature of components of the "Pre-Lab" training programs such as: (1) teacher preparation for this type instruction, (2) facilities and equipment available for the programs, (3) assistance and/or cooperation available to the program from various sources and (4) perceptions of the program by various groups?
- 2) What are the characteristics of students who have completed these programs regarding (1) grades earned in the "Pre-Lab" training programs, (2) grades earned in all high school work, (3) nature of participation in FFA activities, (4) nature of participation in school activities other than the FFA, (5) FFA degrees earned, current status, and (6) personal and socio-economic backgrounds?
- 3) How do the farm machinery personnel who have employed program graduates feel about the adequacy of knowledge and skills possessed by these new employees?
- 4) How do employers rate the graduates in terms of selected personal traits? What general observations do employers have regarding their satisfaction with program graduates as employees, their willingness to employ additional graduates, their willingness to provide assistance for the conduct of these programs and the overall need for training programs of the "Pre-Lab" type?

### Definition of Terms

Certain words and terms used in this study need to be defined in

accordance with the way they were used.

Beginning Mechanic: A person who has had basic training in mechanics at high school before he is employed. He may be known in the trade as a mechanic's helper.

Formal Preparation: The training the instructor received at the college level.

Informal Preparation: The training the instructor received other than at the college level.

Knowledge: An understanding of the function of mechanical unit and its relationship to the functioning of other units.

Manager: The person responsible for the service and repair shop in a farm machinery company. He may also be known as the head mechanic, lead mechanic, or shop foreman.

Successful Employment: The graduate has remained with the same firm for a period of six months or longer and is performing suitable to please the employer.

Unsuccessful Employment: The graduate has been released from a firm before he had established tenure of six months. His competencies were insufficient to meet the employer's needs.



## CHAPTER TWO

### REVIEW OF LITERATURE

The purpose of this chapter is to present some of the recent research related to the programs offering training in farm machinery mechanics. It is meant to present a practical review of related materials. This review was conducted to provide a basis for conclusions regarding what has been done in the field and to obtain an over-all view of the need for agricultural machinery service and repair mechanics on the national scene. This chapter is divided into sub-topics of related subject matter.

#### Related Studies and Investigations

Since this is a relatively new training program, very little literature exists on the subject, a conclusion which was drawn after a thorough search of the existing literature. Most of the useful material reported herein appeared in articles in the Agricultural Education Magazine.

#### Establishing Curriculum Content

To establish a program in farm machinery service and repair, a new curriculum had to be developed. To develop new curriculum content, such questions as the following had to be given serious thought. What should be included in a curriculum for students

preparing for work in agricultural dealerships? Should the curriculum be developed for specific job titles or are there compatible job titles which can be clustered into one curriculum? What are the most important abilities and understandings needed for the various jobs in agricultural equipment dealerships?

Traditionally, the answer to the questions have been determined by using facts secured from school communities. This remains a favored policy by practicing administrators, but with extensive mobility of the labor force, it seems critical to review employment needs and desired curriculum content on a basis more extensive than a school district or county.

A study was conducted in Arkansas by Denver Hutson (9) to determine if the training students received in farm mechanics was useful in their present occupations. The study was conducted on graduates who entered non-farming occupations. The findings revealed that 82 percent of the former students who entered non-farming occupations indicated that the skills they acquired in agricultural mechanics in high school were useful in the occupations in which they were engaged.

#### Curriculum Specialization or Generalization

How are students helped to select an area of agricultural specialization? Is there an objective method available to aid the students in their assessments? Such an important decision should be given serious consideration. It seems reasonable that educators should know what kind of questions to ask if they are to initiate meaningful change. (7) Interest inventories, test results, and

other information are widely used in similar guidance situations to initiate and inaugurate change. (6) The problem exists that most of the widely-used interest inventories deal with agriculture as a single field rather than as a series of specialized fields with differences in qualifications and in interest patterns of the people successfully employed in each of these fields.

### Curriculum Content

The tripartition of agriculture education, the local school, the vocational agricultural division of the state education agency, and departments of agricultural education in approved institutions all have a responsibility for stimulating, coordinating, and disseminating innovations in agricultural education. (7) Since the program of farm mechanics is an integral part of the total agricultural education program, then the same applies to agricultural mechanics.

The state departments, or agencies of education, are a significant source of influence. If one acknowledges that most conferences and meetings attended by teachers of agriculture are initiated by the state departments, the state department's leadership role in influencing change is very significant.

Implement dealers indicated that important activities of employees were meeting people, selling, estimating costs, reading technical reports, service manuals and parts lists, planning production or service of the firm, keeping records, handling money, promoting the services of the firm, and writing business letters. (14)

High school instruction in agricultural mechanics should prove a very effective media for discovering the mechanical aptitude of

the student. It has never been the objective of the high school program to prepare a person to go into an agricultural implement dealership as a competent mechanic.

It has been well established that to properly train a mechanic it is first necessary to provide adequate instruction and practice in a shop (15). To do so requires shop space for numerous pieces of farm machinery and equipment. In addition to the large amount of space required for this instruction, the shop must be well equipped. It has been established that departments with larger shops, more than one teacher, two class periods for farm mechanics, and the greatest number of tools and supplies are teaching farm machinery a greater number of hours (3).

A study conducted in Alabama by Baker (1) provided a descriptive appraisal of mechanical and managerial activities being performed on farms as a basis for program planning in farm power and machinery for secondary school departments of vocational agriculture. The conclusions of the study were based on 29 selected mechanical and managerial activities being performed in farm power and machinery on 228 progressive Alabama farms and the opinions of 228 farm operators, 92 teachers of vocational agriculture, 7 teacher educators, and 12 commercial educational representatives in Alabama as to the relative value of farm acquisition and use of the selected activities in farm power and machinery to farm operators.

The conclusion of the study were:

- 1) Teachers should consider farmers' opinions in their school service area pertaining to the importance and appropriateness of farm power and machinery activities to be included in the curriculum.
- 2) Teachers of vocational agriculture should consider the

personal characteristics and economic conditions of the farm population in the school service area when planning educational programs in farm power and machinery.

- 3) Considerable emphasis should be placed on developing abilities and understanding in farm power and machinery with emphasis on maintenance, service, and adjustments.
- 4) Considerable emphasis should be placed on the teaching of mechanical theory along with perfection of manipulative skills.
- 5) Considerable emphasis should be placed on the aspects of farm power and machinery management.
- 6) The mechanical and managerial activities being performed by farmers along with the opinions of teachers of vocational agriculture, commercial people, and specialists should be used by teachers of vocational agriculture to establish a priority classification for the instruction to be included in the curriculum.

Farm implement dealers indicated that employees needed knowledge and skills in the area of production, products, materials, and service pertaining to the farm machinery industry.

Wood (14) pointed out that in areas of mechanics and engineering, it is essential that employees have technical instruction in:

- 1) basic mechanical skills
- 2) farm machinery
- 3) internal combustion engines
- 4) tractors

On the basis of this review of literature and observations by the investigator and others the conclusion was reached that farm implement dealers were interested in working with teachers in developing educational programs designed to prepare students for entry into occupations in farm machinery industry. Employers were willing to permit high school students to visit and observe operations of their firms. Many dealers would provide seasonable employment for students and would release their employees to aid teachers in providing

instruction. Managers were aware that problems involving liability insurance, the time involved in training and supervising student employees, and the attitude of the students would be encountered in developing and conducting a cooperative educational program involving both the school and farm machinery firms.

#### Need for Farm Implement Mechanics

In order to plan and recommend an agricultural mechanics program that will meet the needs of students preparing for both production and off-farm agricultural occupations, it is necessary to ascertain to what extent mechanical competencies are needed by farmers. In general, previous research has shown that the competencies needed by off-farm agricultural employees were somewhat similar to those needed by farmers.

Wood (14) established a definite need for employees who have received training in farm power and machinery. Owner-managers and managers of farm machinery businesses reported difficulties in finding qualified employees.

Engelking (5) conducted a study in Canton, Illinois, in 1965 to determine the need for farm implement mechanics. The study indicated that almost every implement dealer in the Canton area needed at least one additional mechanic. Approximately five hundred implement mechanics were needed in the state of Illinois at the time of his study. It was established that fifteen thousand were needed nation-wide. Engelking found that the average age of the farm implement mechanic in the labor force was forty-nine years of age.

Weston (13) commented that he has had frequent inquiries for

mechanics with competencies to overhaul a diesel tractor. The potential employers were seeking people with a master's degree, with four or five years of successful teaching experience and some practical experience working in industry. These inquiries came from universities, colleges, junior colleges, technical schools, area vocational schools, and high schools. Weston realized many groups place different values upon educational backgrounds. He felt that it was as important for a person to know how to run a valve grinding machine as it was to be able to figure Chi-square or how to use a t-test. Weston contended that a person who investigated and then evaluated an engine analysis machine test had as much "on the ball" as a person who wrote a research proposal. He felt this training should be recognized as equivalent to other professional training.

Huber (18), Dean of Vocational-Technical Education, Spoon River College, Canton, Illinois, reported that in 1963 the average age of farm equipment dealership personnel was approximately fifty-five years of age. He reported another national survey showed there was an immediate need for at least 20,000 farm implement mechanics.

Webb (12) found at the time his study was made in 1966 that a need existed in Texas for approximately 2,000 additional mechanics. He also determined that an additional 1,568 would be needed within the next twelve months and an additional 3,866 would be needed within the next five years for the state of Texas alone.

#### The Texas Pre-Employment Laboratory Training Program

The main objective of the course in agricultural machinery mechanics was to prepare persons for gainful employment in the field

of agricultural machinery. Instruction was directed primarily to students who desired employment in farm equipment dealerships as a mechanic, a parts clerk, or a salesman of farm equipment.

Theory was presented by lecture and demonstrations using mock-ups and cut-aways, diagrams, charts, and other visual aids. In the laboratory, engines and tractors, including complete sets of tools and test equipment were used to instruct students in the application of theory. A "live work" program in which tractors and other agricultural machinery were repaired by students was also included in the program. This equipment--tractors and machinery for repair--was provided by students, farmers, and equipment dealers.

Instruction was aimed primarily at mechanics; however, opportunities to progress to the ultimate goal of becoming a manager or an owner was stressed. Instruction in marketing was given and it was adapted to the farm machinery industry including topics such as attitudes, marketing and management, selling, advertising, buying, consumer credit and financing, and distribution. The students were taught to develop a spirit of cooperation with fellow workers and a sense of responsibility toward their employer and jobs. Attention was given to topics and items such as safe work habits, neatness, and cleanliness of the work area.

Two questions were facing the Department of Vocational Agriculture at Dimmit, Texas, (4) in regard to farm power and machinery. These questions were 1) what do you do when you live in a community where the farmer can't get his tractor repaired as quickly as needed because the implement dealer can't hire enough good mechanics? and 2) are the schools really meeting the needs of the students?



The Dimmit vocational agriculture teachers responded and initiated the new program of Pre-Employment Laboratory Training in Farm Power and Machinery. The program was developed in the following manner:

- 1) An occupational survey of the community's immediate and projected needs for farm machinery mechanics was made.
- 2) A study of the school was made to identify the resources available for a new program.
- 3) A request was made for the assistance of the State Director of Agricultural Education for the approval of a new program termed Pre-Employment Laboratory Training in Farm Power and Machinery.

The orientation, instructions, and recommendations for teaching the course were as follows:

- 1) Orientation on how the program in Pre-Employment Laboratory Training in Farm Power and Machinery was organized and operated.
- 2) Each student was taught the fundamentals of engine operations and overhaul.
- 3) Stress was placed on safety and the proper use of tools.
- 4) Units of history of engines, shop safety, and tools and equipment to be used were taught at the beginning of the school year.
- 5) Demonstrations on the fundamentals of engine overhaul were used.
- 6) Small gasoline engines were used early in the program because the basic theory is the same as in larger engines.
- 7) Each student overhauled a small gasoline engine.
- 8) The class as a group overhauled an engine under the supervision of the teacher.
- 9) There was and should be one engine for two students to work on. These were supplied by students, farmers, and implement dealers with the agreement that the owner would pay for the parts needed.

- 10) The teacher worked with the students on an individual basis providing demonstrations and assistance as necessary.
- 11) Groups of students should be called together for special demonstrations and instruction when unusual and interesting situations are found.
- 12) Each tractor or piece of equipment should be completely reconditioned and painted before leaving the shop.

From the beginning, the program has been under the administration of the Texas Education Agency. It was conducted by a contract arrangement with the Agricultural Education and Agricultural Engineering Departments of Texas A & M University, College Station, Texas. The Texas Education Agency sets minimum standards for the program. These standards are set for tools, equipment, and space. Teachers must hold a valid teaching certificate for vocational agriculture.

To be eligible for enrollment in the program, students must be sixteen years of age, be in grades eleven or twelve, and have an occupational objective in the area of farm power and machinery. Students must spend a minimum of two hours per day in the shop.

Methodology, needs, and background all have a part to play in the training of enrollees (10). It would seem that the rapid innovation of mechanical change in farm machinery would be an indication of things to come.

## CHAPTER III

### DESIGN AND CONDUCT OF THE STUDY

The purpose of this chapter is to describe the methods and procedures used in conducting this study. These were dictated by the central purpose of the study which was to obtain follow-up data on graduates of the Texas Pre-Employment Laboratory Training Program in Farm Machinery Service and Repair and to identify and describe selected variables associated with these programs. Specific objectives of the study also provided guidance for the design and conduct of the investigation. These objectives were:

- 1) To describe selected components of the "Pre-Lab" training program.
- 2) To describe selected characteristics of students who had completed the programs relative to their school activities and certain personal data.
- 3) To determine if the "Pre-Lab" training programs were meeting the manpower needs of the farm machinery industry in terms of producing sufficient numbers of graduates who were capable of suitable on-the-job performance.

A set of research questions were also formulated to contribute to the attainment of the purpose and objectives of the study. Answers to the following questions were sought:

- 1) What is the nature of selected components of the "Pre-Lab" training programs such as: (1) teacher preparation for this type instruction, (2) facilities and equipment available for the programs, (3) assistance and/or cooperation available to

- the programs from various sources and (4) perceptions of the programs by various groups?
- 2) What are the characteristics of students who have completed these programs regarding (1) grades earned in "Pre-Lab" training, (2) grades earned in all high school work, (3) nature of participation in FFA activities, (4) nature of participation in school activities other than FFA, (5) FFA degrees earned, (6) current status, and (7) personal and socio-economic backgrounds?
  - 3) How do the farm machinery personnel who have employed program graduates feel about the adequacy of knowledge and skills possessed by these new employees? How do employers rate the graduates in terms of selected personal traits? What general observations do employers have regarding their satisfaction with program graduates as employees, their willingness to employ additional graduates, their willingness to provide assistance for the conduct of these programs and the over-all need for training programs of the "Pre-Lab" type?

In order to collect and analyze data pertaining to the purpose, objectives, and research questions developed for guidance of the study effort, it was necessary to accomplish the following tasks:

- 1) Determine the study population
- 2) Develop instruments for data collection
- 3) Develop a procedure for data collection
- 4) Select methods of data analysis

#### The Study Population and Sample

To promote understanding of the setting and population for the study, the investigator considered it appropriate to provide a brief overview of the administrative structure of the Texas Vocational Agriculture Program. Since the investigator taught for some years in this program, much of the information was drawn from his knowledge of the system.

## Structure of Vocational Agriculture in Texas

Vocational agriculture is an integral part of the Texas Education Agency. The organization has a state director and an assistant director with offices in the Texas Education Agency Building, Austin, Texas. These two directors are a part of the Vocational Education Department. The agency is further broken down into ten areas, identified as Area I, II, etc., with supervisors assigned to given areas of the state to assist and supervise those schools offering vocational agriculture as a part of their curriculum.

Texas has 1094 departments of vocational agriculture at the secondary level which are categorized into ten supervisory areas, each of which is sub-divided into districts. Normally, three or four districts comprise an area. Each supervisor has an office and is housed within his respective area. Many of the schools have multi-teacher departments within which both production agriculture and specialized programs such as the "Pre-Lab" type are offered.

Because the study was concerned with the "Pre-Lab" programs specifically, the population actually consisted of all such programs in the state. However, for purposes of convenience and efficiency, only a sample of this population was studied.

## The Study Sample

The study was restricted to a portion of the state of Texas. All of the "Pre-Lab" programs in Areas V and VIII and a portion of those in Areas III were included in the study for various reasons. First, it was concluded that programs in this portion of the state would be typical of the entire state and inferences could be made from the

findings about these programs. Also, the selected schools were among those which had begun offering the training program when it was first authorized. This was a relatively new training program and only a limited number of schools offered training in the "Pre-Lab" programs. Each year new schools have been added to the program; but in order to follow-up the graduates, it was necessary to study the schools that had offered the program over a relatively longer period of time.

Geographically, schools included in the study were situated in a section of eastern Texas. The southern limit of this section was roughly a line from Austin to Houston; however, the southernmost school included La Grange, which was one of the earlier schools to instigate the "Pre-Lab" program. The northern boundary was the Red River. The western boundary of the geographic area was designated by a line extending roughly from the Red River through Paris to Houston. All "Pre-Lab" programs situated within this area were included in the sample. A map depicting the geographic region and the location of study schools within the region may be found in Appendix D.

Area V, in the northern section of the study region included three schools: Bonham, Ladonia, and Farmersville. Thirty-one students had received training in farm machinery service and repair in these schools. Of this number, three were trained at Bonham, eight were trained at Ladonia, and the remaining twenty received their training in the program at Farmersville.

Area VIII was in the middle portion of the geographic region and contained four schools that offered training in the "Pre-Lab" programs. These schools were Itasca, Hubbard, Brownsboro, and

Palestine, which, collectively, had graduated twenty-eight students from their programs in 1968. Itasca had eleven graduates, Hubbard had four; eight had received training at Brownsboro and five at Palestine.

Area III, in the southern section, included the schools of Thorndale, Lexington, Somerville, Navasota, Waller, and La Grange. These six schools had graduated forty students. Thorndale trained two; Lexington trained thirteen; Somerville trained five; Navasota trained six; Waller had ten; and La Grange trained the remaining four.

Thus, the study sample was composed of thirteen schools with active "Pre-Lab" programs and from which a total of ninety-nine students had graduated in 1968.

#### Development of the Instruments

A total of three instruments were designed by the investigator to secure information needed for the study. These consisted of a questionnaire mailed to the "Pre-Lab" teachers, an interview schedule administered to these teachers and selected personnel in each school and an interview schedule administered to farm machinery dealers who had employed graduates of the programs. A draft of each of these instruments was developed by the investigator on the basis of his personal experiences with the "Pre-Lab" program and upon the basis of information secured from a review of related literature. These drafts were submitted to fellow graduate students, the staff of the Agricultural Education Department at Oklahoma State University and selected staff of the Oklahoma State Department for Vocational and

Technical Education. Revisions and refinements suggested by these reviewers were utilized in developing the final drafts of the instruments.

### The Mailed Questionnaire

The first instrument, a questionnaire mailed to the "Pre-Lab" teachers, was intended to collect follow-up data on 1968 graduates of the program including their name, tenure in the program, patterns of employment and/or continuing education, or other status.

By utilizing a comprehensive list developed by the investigator, each teacher was also queried about facilities and equipment available in his department for the program. For each item on the list, the teachers were asked to indicate whether it was 1) sufficient for all jobs, 2) sufficient for most jobs, 3) insufficient, or 4) not available.

In addition, teachers were called upon to rate the degree of assistance and/or cooperation extended to their programs by various groups. The degree of cooperation and/or assistance was estimated as being either 1) excellent, 2) good, 3) fair, 4) poor, or 5) none.

Another portion of the teacher questionnaire sought to determine how the programs were perceived by selected groups of people in each community. Teachers were asked to estimate the degree of favorability toward the programs exhibited by administrators, guidance counselors, fellow teachers, school patrons, the over-all student body and those students enrolled in the program. These estimates were made by using a scale containing the categories: highly favorable, favorable, somewhat favorable and unfavorable.



A complete copy of the mailed questionnaire is included in Appendix A.

#### The School Personnel Interview Schedule

The investigator personally interviewed the "Pre-Lab" teacher, school administrators and the guidance counselors in each school in an effort to describe selected characteristics of students who had graduated from the programs. The schedules were developed by the investigator to secure data related to students' grades in the "Pre-Lab" program, over-all grade point averages, participation in FFA activities, participation in school activities other than in FFA, personal traits, and socio-economic background. Assistance in refining and clarifying these interview schedules was obtained from the same groups described previously. Appendix B contains a copy of this instrument.

#### The Employer Interview Schedule

A third instrument was developed by the investigator for the purpose of determining the adequacy of knowledge and skills possessed by these program graduates who had secured full-time employment in the farm machinery industry. This instrument was completed by means of a personal interview of these graduates' employers during the investigator's visit to the respective businesses.

The categories of knowledge and skills included in the instrument were derived from a list which had been developed by Webb (12) as a result of his study to determine the basis and content for the "Pre-Lab" program. Suggestions from those previewing the instrument

prompted the investigator to revise Webb's list slightly for inclusion in this instrument.

The schedule was designed to determine whether each category of knowledge or skill was required of new employees and if so, whether he was capable of performing each at a level adjudged to be 1) highly satisfactory, 2) satisfactory or 3) unsatisfactory by the employer. This was selected as a realistic means of getting at the quality of the preparatory programs.

In an effort to determine 1) selected non-skill-related characteristics of on-the-job graduates and 2) employers' general observations about the "Pre-Lab" programs, two additional sections were included in the employer interview schedule. With reference to the former, it was decided to ask employers to indicate their degree of satisfaction with each employee's general personal habits and human relations abilities as they related to the work situation. To arrive at the latter, a group of general questions which related to employers' willingness to hire additional graduates and to assist in the conduct of training programs and to whether they felt there was an overall need for the program were included in this instrument. Appendix C contains a complete copy of the employer interview schedule.

#### Collection of the Data

Two techniques of data collection, the mailed questionnaire and the personal interview, were selected for this study. The investigator felt that the use of the mailed questionnaires would not only provide an efficient means of securing a complete list of program graduates and data related to each, but also would facilitate the

development of an itinerary for the completion of the personal interviews schedule.

Questionnaires were mailed to each of the thirteen "Pre-Lab" teachers late in February, 1970. These were accompanied by a cover letter explaining the purpose of the study and providing instructions for completing the instruments. The respondents were asked to phone or write the investigator in the event they were unable to complete portions of the survey. Also, from a list of dates proposed by the investigator, the teachers were asked to arrange a convenient date for holding personal interviews with school personnel and employers of program graduates. Subsequently, responses were received from the entire group of teachers and an itinerary was established for the investigator's visit to each school.

In March, 1970, the investigator visited each of the "Pre-Lab" programs and conducted personal interviews with those previously designated. Since it was found that only two of the program graduates were employed in farm machinery businesses, interviews with employers were conducted in but two businesses--one in Ladonia, Texas, and the other in Waller, Texas.

#### Analysis of the Data

Following receipt of the mailed questionnaires and completion of the personal interviews, the data were compiled and tabulated in a manner designed to fulfill the purpose and objectives of the study. Since this research effort was primarily of a descriptive nature, statistics such as arithmetic averages and percentages were selected as appropriate means of describing the findings. Chapter IV, which

follows, provides specific information relative to analysis and presentation of the findings.

## CHAPTER IV

### PRESENTATION AND ANALYSIS OF DATA

Data presented in this chapter were obtained from thirteen selected schools who offered training in Pre-Employment Laboratory Training in Farm Machinery Service and Repair. This sample was chosen from selected high schools in Texas. (See Chapter III for sample procedures.) Two farm implement dealers were surveyed who had employed graduates of the above programs.

After data were collected through the previously outlined procedures and techniques, they were tabulated and analyzed by appropriate techniques to describe the findings. Since this was an evaluative or follow-up study, only descriptive statistics were applied to the findings. The information was summarized in a tabular form of presentation.

#### "Pre-Lab" Training Programs

The goal of the "Pre-Lab" training programs was to prepare young mechanics to enter the labor force as farm machinery mechanics. This study was designed to measure how successful the program had been in training young men as farm machinery mechanics. Since the farm implement dealers had previously been involved in the development of the curriculum, it appeared to be realistic to ask them to evaluate the training based on their knowledge of the graduates whom

they had employed from the program. If changes, or shifts in emphasis, have occurred since the original survey to determine curriculum content, these changes should be incorporated into the curriculum. Also it was felt that a determination of selected components of the "Pre-Lab" training programs including teacher preparation, facilities and equipment, assistance and/or cooperation available to the programs, selected student characteristics and the manner in which people perceived the programs would contribute to increased knowledge relative to program effectiveness. The following sections of this chapter were designed to present a summary and analysis of the findings.

#### Selected Components of the "Pre-Lab" Training Programs

##### Teacher Preparation

One of the objectives of the study was to identify the components of an effective training program. It is apparent that various components would affect a training program. One of the most important of these would seem to be the teacher's preparation for this type of program. Since the program was rather new, many teachers were faced with a situation for which they had received very little, if any, training. It can be observed from Table I that approximately 93 percent of the teachers had received less than ten hours of instruction in farm machinery service and repair prior to their assignment of teaching the course. Five (38.47 percent) of these teachers had received no formal undergraduate training in this area and only one teacher in the group had received 21 hours or more of preparatory course work. It is interesting to note that the latter teacher had

received a Master's Degree in Agricultural Engineering. These findings reflect that in the past there had been little need for the inclusion of this type of training in the undergraduate teacher education curriculum.

TABLE I  
FORMAL UNDERGRADUATE TRAINING RECEIVED BY TEACHERS

Hours of Training	Number	Percent
None	5	38.46
1 - 10 hours	7	53.85
11 - 20 hours	-	-
21 hours or more	1	7.69
Total	13	100.00

Table II is a summary of teacher preparation at the graduate level. Only one teacher had received more than ten hours of formal graduate instruction in farm machinery repair and service. As noted previously, this was a teacher who had a Master's Degree in Agricultural Engineering.

A noteworthy finding reported in Table II was that more than three-fourths of the teachers had received no formal graduate preparation for teaching these programs. The remainder of the group had received only the traditional amounts of training normally offered for teachers of vocational agriculture.

A summary of teacher preparation by means of non-credit short

courses is presented in Table III. The teachers of "Pre-Lab" programs are required to attend non-credit summer workshops to further their knowledge and understanding of farm machinery service and repair. These teachers receive reimbursement from the state to attend these sessions.

TABLE II  
FORMAL GRADUATE TRAINING RECEIVED BY TEACHERS  
IN FARM MACHINERY SERVICE AND REPAIR

Hours of Training	Number	Percent
None	10	76.93
1 - 10 hours	2	15.38
11 - 20 hours	-	- -
21 hours or more	1	7.69
Total	13	100.00

The data presented in Table III indicated that one teacher had not attended any summer non-credit short courses. It should be pointed out that this was a beginning teacher and plans were forthcoming for him to attend a short course the summer following the survey.

The short courses were held annually at Texas A & M University under the direction of Mr. Paul Chilen, Associate Professor of Agricultural Engineering and Agricultural Education. State staff personnel assisted with the planning and coordinating of the program.



Implement branch houses furnished expert personnel in selected areas of study. For example, Ford Tractor Company, John Deere, and other manufacturers provided specialists in such areas as hydraulics, machinery, and electronics. Tool manufacturers also sent representatives to the short courses to assist with the demonstrations and use of their tools and machines.

TABLE III

NON-CREDIT WORKSHOPS ATTENDED BY TEACHERS  
IN FARM MACHINERY SERVICE AND REPAIR

Weeks of Workshop	Number	Percent
None	1	7.69
Less than three weeks	3	23.08
Four to seven weeks	6	46.15
Eight weeks or more	3	23.08
Total	13	100.00

Teachers received balanced portions of their training in theory and in laboratory exercises. Pairs of teachers were assigned a tractor and worked as a team to overhaul and rebuild the tractor during their training period. The mornings were devoted to class and theory, while the afternoons and evenings were devoted to related laboratory training exercises.

Table IV details other types of informal training and/or related experiences of teachers. All but one of the teachers had previous experiences related to farm machinery repair and service. Although

this may be viewed as valuable experience, many faults may be also found in such training. Much of such training may be inadequate for the modern technical motors and machinery of today.

TABLE IV  
INFORMAL TRAINING RECEIVED BY TEACHERS IN  
FARM MACHINERY SERVICE AND REPAIR

Type of Training	Number	Percent
On-farm experiences with machinery service and repair	12	92.31
Experience in agricultural machinery service and repair businesses	5	38.46
Experience in automotive service and repair, (i.e., hobby, service stations, dealers)	7	53.85
Others	2	15.38

Of the teachers studied, 53.84 percent had received training in some phase of automotive repair. Since this is closely related in terms of general principles and concepts, it seems reasonable to assume that one should be able to transfer such learning experiences from automotive mechanics to tractor mechanics with little difficulty.

Two of the teachers reported having received training and experiences other than those listed on the questionnaire. This training had been received in military service. Both men had been assigned to some phase of flight mechanics while in the Air Force. These two men were in the older group of teachers in the study.

Facilities and Equipment

Tools, equipment, and facilities were selected as probable influencing factors upon the effectiveness of "Pre-Lab" training programs. The data presented in Table V indicated the teachers' ratings of their tools, equipment, and facilities with respect to the degree of sufficiency for carrying out necessary functions of the program.

TABLE V  
TEACHER RATINGS OF TOOLS, EQUIPMENT, AND FACILITIES

Item	Sufficient		Insufficient		None	
	No.	%	No.	%	No.	%
Small Hand Tools	13	100.00				
Socket Sets	13	100.00				
Small Power Tools	13	100.00				
General Tools	13	100.00				
Motor Analyzer (Scope)	7	53.85			6	46.15
Valve Grinding Equipment	11	84.62			2	15.38
Steam Cleaner	10	76.92	1	7.69	2	15.38
Parts Cleaner Stand	6	46.15			7	53.85
P.T.O. Dynamometer	4	30.76			9	69.24
Connecting Rod Alignment Tester	5	38.47	2	15.38	6	46.15
Micrometers	11	84.62	1	7.69	1	7.69
Jacks and Hoists	10	76.93	1	7.69	2	15.38
Motor and Support Stands	5	38.47	8	61.53		
Battery Charger	11	84.62			2	15.38
Spray Paint Gun	13	100.00				
Classroom Space	12	92.31			1	7.69
Work Area	9	69.24	4	30.76		
Tool Area	10	76.93	3	23.07		
Paint Room	4	30.76			9	69.24

It will be noticed from the data in Table V that only seven (53.85 percent) of the teachers cooperating in the study had a motor analyzer, or "scope" as labeled by many mechanics. This piece of equipment is expensive, but almost essential in analyzing motor troubles and therefore would appear to be a most effective teaching instrument. This item of equipment would allow a teacher to challenge a group of students in training to analyze and detect many mechanical failures prior to actual repair or overhaul. Once a motor has been repaired or overhauled, this machine provides data which reveals the motor's performance. Therefore, the motor analyzer removes all guesses and presents the actual situation and/or performance.

Only two (15.38 percent) of the training programs did not have valve grinding equipment. These two teachers were operating on a very limited budget. They were sending their valve work out to local repair shops for these services.

Steam cleaners were present in eleven (84.62 percent) of the training stations. These are also regarded as near necessities in teaching the mechanical programs. Not only do they make for cleaner equipment to work on, but they also stress the need for cleanliness to the students. All people who are knowledgeable of mechanics know the importance of cleanliness, especially with diesel equipment. In addition, tractors and other equipment usually were painted as a part of the repair program which requires some type of effective cleaning to remove old grease, dirt, and grime that has collected on farm equipment over a given time.

Power-take-off dynameters were present in only four (30.76 percent) of the training programs. This tool is also an expensive but

a very effective teaching tool. It not only presents the data on how a tractor performs, but it also is a very effective tool to "break-in" a newly conditioned engine. It is closely related to the motor analyzer when considered as a teaching tool. It also removes all guesses, doubts, and assumptions about the performance of a unit. One can measure and record the performance of a unit with this tool. Once this data is obtained, comparisons with given specifications for any given unit can be made.

A large number of the training stations were operating with what appeared to be insufficient motor or tractor support stands. The data revealed that eight (61.53 percent) of the schools were in this situation. Proper stands make working conditions more desirable, but even more important is the safety provided when the motors or tractors are properly secured on stands designed for such uses.

Painting is usually the final job performed on a tractor, or piece of farm machinery. All schools had painting equipment; yet nine (69.24 percent) were working without a paint room. The desirability of providing a painting room is supported by a number of factors. One of the principal factors is that paints and supplies used with paints are often highly inflammable. These supplies and materials should be removed from the main building. Additionally, painting in a separate room usually offers safety factors to the painter including proper lighting and ventilation. Painting in a separate room also prevents paint spray and dust from settling on the shop area and the working areas.

#### Assistance and/or Cooperation Available to the Program

The amount of assistance and/or cooperation the mechanics

teacher received from various groups was considered another possible component of a successful training program. Assistance and/or cooperation from the state office personnel was rated as excellent by eight (61.54 percent) of the cooperating teachers in the study. The others rated such assistance either good or fair. This seems to indicate that the majority of the teachers were satisfied with the assistance and/or cooperation they were receiving from this group of people.

TABLE VI  
TEACHER RATINGS OF ASSISTANCE AND/OR  
COOPERATION FROM VARIOUS GROUPS

GROUPS	Responses									
	Excellent		Good		Fair		Poor		None	
	No.	%	No.	%	No.	%	No.	%	No.	%
State Office Personnel	8	61.54	2	15.38	3	23.08	-	-	-	-
Area Supervisor	6	46.15	3	23.08	4	30.77	-	-	-	-
College Personnel	9	69.23	0		3	23.08	1	7.69	-	-
Implement Manufacturers	5	38.46	5	38.46	2	15.38	1	7.69	-	-
Branch Houses	3	23.08	5	38.46	3	23.08	1	7.69	1	7.69
Implement Dealers	6	46.15	4	30.77	3	23.08	-	-	-	-
Texas Hardware & Implement Dealers Assoc.	1	7.69	1	7.69	3	23.08	2	15.38	6	46.15

Cooperation and/or assistance provided by the area supervisors was rated excellent by six (46.15 percent) of the respondents and good by three (23.08 percent). A rating of fair was indicated by four (30.77 percent) of the teachers. Those teachers who rated the

quality of assistance and/or cooperation from area supervisors as fair were those located the greatest distance from the supervisors' headquarters.

The assistance and/or cooperation of the college personnel was rated excellent by nine (69.23 percent) of the teachers, while three (23.08 percent) of the teachers rated their assistance and/or cooperation as fair. Only one teacher rated assistance and/or cooperation as fair. Only one teacher rated assistance and/or cooperation from college personnel as poor.

The assistance and/or cooperation received from the implement dealers and manufacturers was rated as either good or excellent by ten (67.92 percent) of the cooperating teachers. Two teachers (15.38 percent) and one teacher (7.69 percent) rated this source as fair and poor respectively. This seems to support earlier thoughts that implement dealers and manufacturers are eager to help promote a program that will train potential mechanics for employment.

The assistance and/or cooperation from the Texas Hardware and Implement Dealers Association received a low rating. Seven (69.23 percent) rated this group fair or lower, with six (46.15 percent) of the teachers indicating they provided no assistance and/or cooperation. It was discovered in visiting with the teachers that they had not requested the assistance and/or cooperation of this group. The investigator has personal knowledge of this group and its willingness to assist with the training program.

#### Perceptions Toward the Programs

The perception of the administration toward any program is one

of the most important components of a successful program. Another important component would be the teachers' competencies. However, the most competent teacher cannot conduct a satisfactory program without the assistance of the administration. According to the views prevalent among teachers who were interviewed, most school administrators had desirable perceptions regarding their "Pre-Lab" programs as substantiated by the fact that ten (76.93 percent) of the teachers rated cooperation and support from the total administration as highly favorable. The remaining three (23.07 percent) gave the administration a rating of favorable. During the conduct of the survey this attitude of the administration, although not recorded, was easily detected by the investigator. Many were either at the agriculture building awaiting the investigator's visit, or came soon after his arrival. These superintendents were very courteous and showed much interest and concern in the investigator's visit to their school. The investigator views this as a vital part in any successful program.

Since the "Pre-Lab" programs were rather new, many school counselors, in visiting with the investigator, indicated various philosophies in regard to enrolling students in the mechanics program. Some were enrolling only the high achieving students, while others enrolled only the low achievers. One had enrolled twenty students in the program the previous year; of these, sixteen had enrolled in colleges and universities at the time of this study. Another school had seventeen graduates who were all enrolled in colleges and universities at the time of this study.

Only one school's counselor was rated by the mechanics teacher



as being somewhat favorable toward the "Pre-Lab" training program. This school was located in a rural area, in a low income area with a high percentage of Negro population. After visiting with both the agricultural mechanics teacher and the counselor, the investigator was of the opinion that a problem existed between these two teachers and was not a result of the counselor's view toward the program itself.

TABLE VII  
TEACHER RATINGS OF PERCEPTION OF THE PROGRAM  
BY MEMBERS OF THE COMMUNITY

Groups	Highly Favorable		Favorable		Somewhat Favorable		Unfavorable	
	No.	%	No.	%	No.	%	No.	%
Administration	10	76.93	3	23.07	--	--		
Counselors <sup>a/</sup>	4	40.00	5	50.00	1	10.00		
Fellow Teachers	6	46.15	6	46.15	1	7.69		
Overall Student Body	5	38.46	5	38.47	3	23.07		
School Patrons	7	53.85	5	38.47	1	7.69		
Students Enrolled in the programs	10	76.93	3	23.07				

<sup>a/</sup> Three schools did not have a counselor. The percentage was calculated on ten schools rather than the total N of thirteen.

Of the thirteen teachers reporting, six (46.15 percent) felt that fellow teachers' perceptions were highly favorable and six (46.15 percent) rated them as favorable. Only one teacher (7.69 percent) rated fellow teachers' perceptions as being somewhat favorable. While in these departments, the investigator found many

teachers visiting the program during their off periods. Another large group were having, or had previously had, work done for them by the students of the "Pre-Lab" programs. The perception of the programs by school patrons was very high with twelve (92.31 percent) of the teachers reporting that patrons had favorable or highly favorable perceptions. Many of them had received services from this program, while others were either receiving services or waiting for services. Each school had a waiting list of people desiring work. This work was not restricted to tractor mechanics. Much work was being completed on lawn mowers, lawn and garden tractors, air-cooled engines of various types, and other farm and garden equipment. Again, the investigator considers this type of cooperation and support as a vital part of the total program. This support is almost essential in order to continue a good training program. Without the support of the community patrons, equipment to work on would immediately become a problem.

#### Characteristics of Students Who Had Graduated From the "Pre-Lab" Programs

Another objective of this study was concerned with selected characteristics of students who had completed the "Pre-Lab" training programs. The following findings include the total population and no single school was treated separately.

#### Student Grade Averages

The data presented in Table VIII indicate that fifty (50.51 percent) of the students received a grade of "A" in the "Pre-Lab" programs. At this point, it is worthy to note that of the 99 students

who had completed the program, 94 had received only one year of training. The average grade of "A" was received by those students who achieved at a 93 percent level for that given course. The grade of "B" was received by those who achieved at a level ranging from 85 to 92 percent for that given course. The "C" grades included an achievement level ranging from 75 to 84 percent for the course in which the students were measured.

TABLE VIII

STUDENT GRADES IN PRE-EMPLOYMENT LABORATORY TRAINING  
PROGRAMS IN FARM MACHINERY SERVICE AND REPAIR

Grade	Number	Percent
A	50	50.51
B	39	39.39
C	10	10.10
D	---	---
Total	99	100.00

These data revealed that more than 90 percent of the students enrolled in the "Pre-Lab" programs received a grade of "B" or better. By utilizing a numerical scale where A=4, B=3, and C=2; the average grade received by students in the programs was found to be 3.4--almost a B+ for the entire group.

The results of studying students' total overall grade point averages for four years in high school are reported in Table IX. It was discovered that only twelve (12.12 percent) of the students had

received an overall average of "A". Thirty-six students (36.36 percent) earned an overall grade point average of "B". The bulk of the students, 46 (41.47 percent) accumulated an overall grade point average of "C", while five (5.05 percent) had overall averages of "D" in all high school course work completed. By averaging the overall grade point averages according to the scale described previously, the high school grade point average for the entire group was calculated to be a 2.55, or slightly above the C+ level.

TABLE IX  
STUDENT OVER-ALL GRADE AVERAGES FOR  
HIGH SCHOOL COURSE WORK

Grade	Number	Percent
A	12	12.12
B	36	36.36
C	46	46.47
D	5	5.05
Total	99	100.00

Compared to grade averages received in the "Pre-Lab" program, overall high school grades for the group averaged nearly a full grade point lower. Perhaps a portion of this difference may be explained by the nature of the course offerings and the fact that students elected to enroll in the special program because of personal interests and/or career objectives.

Participation in FFA

Many of the "Pre-Lab" programs were composed of former members of the Future Farmers of America organization. The data in Table X reveal that ninety (90.90 percent) of the graduates had been members of the FFA. Since many were former members, one could expect the participation to be high in the activities related to the FFA organization. These activities ranged from the local to the state levels. Many activities such as shows, fairs, and/or contests, conventions, and radio and/or T.V. programs occurred at the state level. The remaining activities were restricted to the local and district levels.

TABLE X  
STUDENT PARTICIPATION IN FUTURE FARMERS  
OF AMERICA ACTIVITIES

Activities	Number of Students N = 99	Percent
F. F. A. Member	90	90.90
F. F. A. Officer	45	45.45
Committee Chairman	66	66.66
Awards Banquets	66	66.66
Conventions	39	39.39
Community Service Clubs	23	23.23
School Assemblies	34	34.34
Radio and/or T. V. Programs	10	10.10
Shows, Fairs, and/or Contests	56	56.56
Leadership Training Schools	50	50.50

A large number of the graduates had been former officers in the FFA. This group contained 45 (45.45 percent) of the total student

population under study. One of the graduates had been an officer on the district level in the state organization.

A majority of the graduates had served as chairmen of one or more of the major committees or divisions of the local program of activities. This group was composed of 66 (66.66 percent) of the graduates studied. A large percentage of the boys were active in the annual awards banquets. The survey revealed that 66 (66.66 percent) had participated in these activities. Less than half of the students had actively participated in FFA conventions as revealed by the finding that only 39 (39.39 percent) had engaged in these activities, many of which were at the state level. Some of the students had attended as official delegates representing their local FFA chapter, while other students had attended as observers.

Local service clubs have long been willing to work with the local FFA. The FFA members often present some type of program to these groups via talks, films, or demonstrations. The survey revealed that 23 (23.23 percent) of the "Pre-Lab" students had been engaged in such types of programs.

Another aspect of the FFA training program is promotion of the FFA. The third week of February each year is designated as National Future Farmers of America Week. During this time many chapters have school assemblies to acquaint the student body with the activities of the FFA. A total of thirty-four (34.34 percent) of the "Pre-Lab" students had been involved in such activities.

Radio and television programs have been long recognized as an excellent means of public relations for FFA chapters. Only ten (10.10 percent) of the students had appeared on either radio or

television programs to promote FFA activities. Some of these "Pre-Lab" students have appeared on television programs to show slides and give presentations and/or demonstrations in relation to the "Pre-Lab" training programs. Some schools have used this media to inform the public about their programs. Slides often are made as a tractor enters the shop, and additional slides are made at various stages of the repair work and later of the finished tractor. Then, these slides are often shown on television with a narration by one or more of the students.

The area of shows, fairs, and/or contents has been an integral part of the FFA program since its early inception. It was found that 56 (56.56 percent) of the students had participated in one or more of these events during their enrollment in vocational agriculture and the "Pre-Lab" training programs.

Leadership is one of the foundations upon which the FFA was organized. Most of the schools stressed leadership and its related activities to a high degree. The study revealed that 50 (50.50 percent) of the "Pre-Lab" students had been in leadership activities of a scope and nature ranging up to the area level.

The data in Table XI presents the highest degree of membership obtained by the "Pre-Lab" students as members of the FFA organization. Previous data showed that 90 (90.90 percent) of the students enrolled were members of the FFA. Of this number, five (5.05 percent) had attained the Degree of Greenhand; 82 (82.83 percent) had reached Chapter Farmer; three (3.03 percent) had been chosen State Farmers; and nine (9.09 percent) of the students had not received an FFA degree of any type.

TABLE XI  
HIGHEST F.F.A. DEGREES ATTAINED BY "PRE-LAB" STUDENTS

Degree	Number	Percent
Greenhand	5	5.05
Chapter Farmer	82	82.83
State Farmer	3	3.03
No Degree	9	9.09
Total	99	100.00

Participation in Other School Activities

As indicated by the data in Table XII, many of the students had participated in school activities other than those related to FFA. A total of 51 students (51.51 percent) had been class officers and 49 (49.49 percent) were members of various school clubs. Athletics drew the attention and participation of 61 (61.63 percent) of the graduates.

TABLE XII  
STUDENT PARTICIPATION IN SCHOOL ACTIVITIES OTHER THAN  
THOSE RELATED TO THE FUTURE FARMERS OF AMERICA

Activity	Participants	Percent
Class Officer	51	51.51
School Clubs	47	47.47
Athletics	61	61.62
Honor Society	11	11.11
Others	6	6.06



A few of the students surveyed, eleven (11.11 percent) had superior grades and, thus, were members of an honor society. Another six (6.06 percent) of the students surveyed had participated in activities other than those listed on the instrument. For example, two of the students had been valedictorians of their graduating classes.

### Current Status

Data found in Table XIII reveals that 52 (52.52 percent) of the graduates were continuing in some type of higher education program at various types of institutions. Another 28 (28.28 percent) of the graduates had entered the labor force. A current tour of duty in military service accounted for 16 (16.16 percent) of the graduates. By visiting in the various schools, the investigator learned that this group was composed largely of the slower achievers as revealed by various scholastic tests.

TABLE XIII

PRESENT STATUS OF THE NINETY-NINE GRADUATES  
OF THE "PRE-LAB" PROGRAMS

Status	Number	Percent
College Student	52	52.52
Employed	28	28.28
Military Service	16	16.16
Unemployed	2	2.02
Deceased	1	1.01
Total	99	100.00

Of the students who had received the training only two (2.02 percent) were unemployed. Both of these students were from a rural setting and low-income homes. One student was deceased, having been electrocuted accidentally. Inspection of grades and various records in his home school indicated that he was a very promising senior student.

Continuing Education. Table XIV depicts the types of higher education institutions in which students who were continuing their formal education were enrolled. The investigation revealed that 29 (55.77 percent) of this group were enrolled in junior colleges and, as an aside to this, it was indicated that family income and location of these institutions were factors influencing junior college attendance. Various scholastic records were available on many of the graduates, but no attempt was made to correlate grades and attendance at selected types of colleges because schools used various kinds and types of tests.

TABLE XIV

## TYPES OF ENROLLMENT BY GRADUATES IN CONTINUING EDUCATION

Type of College	Number	Percent
Junior College	29	55.77
Four-Year College or University	21	40.38
Others	2	3.85
Total	52	100.00

The second largest group was those enrolled in the four-year

colleges or universitites. This troupe accounted for 21 (40.38 percent) of the graduates who were in continuing education. Only two (3.85 percent) of those in continuing education were enrolled in schools other than the types previously discussed. One student had entered an art academy, and another had entered a trade school in Kansas City, Missouri. This student was pursuing a program in diesel mechanics.

To illustrate the major areas of study selected by those in continuing education, Table XV was developed. Data in this table reveal that 34 (65.38 percent) of those in higher education were pursuing some area of agriculture. The remaining eighteen (34.62 percent) were majoring in areas other than agriculture. Many of this latter group were enrolled in some phase of business. A few of this group were enrolled in private church-related colleges and planned to enter seminaries later.

TABLE XV

MAJOR FIELDS OF STUDY BY GRADUATES  
IN CONTINUING EDUCATION

Major	Number	Percent
Agricultural Related	34	65.38
Non-Agricultural Related	18	34.62
Total	52	100.00

It was interesting to find one of the non-agriculture majors,

a law student at the University of Texas, was a member of a rather prominent family with extensive financial interests in Dallas. Personnel in his home high school related that this student was interested in agriculture but that he had elected to study law in order that he might be able to manage his future finances more efficiently.

Employment Patterns. An inspection of the data presented in Table XVI indicates that only two (7.14 percent) of the graduates of the "Pre-Lab" programs immediately entered the labor force in an occupation directly related to their training. Another 13 (46.43 percent) were occupied in areas related to mechanics, but not farm machinery mechanics specifically. Some of these were employed as auto mechanics; others were on maintenance forces in industry.

TABLE XVI  
OCCUPATIONS SELECTED BY GRADUATES WHO  
HAD ENTERED THE LABOR FORCE

Occupation	Number	Percent
Farm Machinery Service and Repair	2	7.14
Occupations Related to Mechanics	13	46.43
Occupations Unrelated to Mechanics	13	46.43
Total	28	100.00

Thirteen (46.43 percent) of those employed were in areas not related directly to mechanics. However, some of this group were employed in appliance businesses which could be somewhat related,

especially for those who were employed in the service departments. Information was not available to determine their exact duties; therefore, they were listed among those occupations described as unrelated to mechanics. Thus, 28 graduates (26.28 percent) of the programs were in some type of full-time employment at the time of the investigation.

#### Personal and Socio-economic Background

The survey revealed that the majority of the students in the study were considered to be both reliable and dependable. As reported in Table XVII, teachers indicated that 55 (55.55 percent) of the graduates were highly favorable with respect to these traits. Another 36 (36.35 percent) of the graduates were rated as favorable in this respect. Eight (8.88 percent) of the graduates were rated by the teachers as being somewhat favorable with regard to their reliability and dependability. Only one student in the population of ninety-nine was rated as unfavorable in terms of his reliability and dependability. This particular student was caught stealing tools. He remained in the program after the incident, but he was under strict observation and supervision.

The appearance of the students was also rated quite high by teachers. The personal appearance of 58 students (58.58 percent) was rated as highly favorable while 32 (32.32 percent) received a rating of favorable. Only 8 students (8.08 percent) were marked as somewhat favorable for this characteristic. Interviews with school personnel indicated that this might be related to those students' home and family situations.

TABLE XVII

TEACHER RATINGS OF SELECTED CHARACTERISTICS OF  
THE NINE-NINE PROGRAM GRADUATES

Characteristic	Condition							
	Highly Favorable		Favorable		Somewhat Favorable		Unfavorable	
	No.	%	No.	%	No.	%	No.	%
Reliability/dependability	55	55.55	35	35.35	8	8.08	1	1.01
Appearance	58	58.58	32	32.32	8	8.08	--	--
Sensitivity toward others	55	55.55	33	33.33	10	10.10	1	1.01
Pride in achievement	55	55.55	38	38.38	4	4.04	2	2.02
Home life	44	44.44	33	33.33	13	13.13	9	9.09
General attitude	52	52.52	36	36.36	8	8.08	3	3.03

The study revealed that teachers felt most of the students were sensitive toward and care about others. Only ten students (10.10 percent) received a rating of somewhat favorable, and only one was marked as unfavorable with respect to this feature.

Students' pride in achievement was scored high by their teachers. A total of 93 students (93.93 percent) received ratings of favorable or highly favorable. The investigator was impressed with the students and the pride they exhibited in their work as the various schools were visited for purposes of data collection.

Teachers reported that the students' home life characteristics were more diverse than any other characteristics. The data revealed that 77 (77.77 percent) of the students had come from favorable or highly favorable home situations, that thirteen (13.13 percent) were from homes classified as somewhat favorable. A total of nine (9.09

percent) of the students enrolled in the "Pre-Lab" training programs were from unfavorable home situations according to teachers. This group was composed almost entirely of rural, low income, Negro students as determined by informal visits with the teachers.

The general attitude of a vast majority of the students was considered favorable or better. Only eight (8.08 percent) of the students surveyed were reported to be somewhat unfavorable with respect to their general attitudes. Only three students (3.03 percent) were felt to have unfavorable general attitudes. The investigator noted that in most cases when the home life was less desirable, the attitude was rated lower.

#### Residential Background

The largest percentage of students who had graduated from the program were reared on a farm as summarized in Table XVIII. The data presented in Table XVIII shows that eleven (11.11 percent) of the students were reared in town, yet they had on-farm experiences. A total of 29 (29.29 percent) of the students were reared in town and had no farming experiences. Fifty-nine graduates (59.60 percent) had been reared on farms.

TABLE XVIII

HOME BACKGROUND OF STUDENTS ENROLLED IN THE  
"PRE-LAB" TRAINING PROGRAMS

Situation	Number	Percent
Reared on a farm	59	59.60
Reared in town, no on-farm experience	29	29.29
Reared in town, on-farm experience	11	11.11
Total	99	100.00

Family Financial Status

Data presented in Table XIX revealed that the annual family income of the largest single group of "Pre-Lab" program graduates was determined to be in the \$5,000-\$10,000 range. The study revealed that the family income of 46 (46.47 percent) of the students was in this bracket. The second largest group was found to have come from families with an income of \$5,000 or less per year. A total of 35 members (35.35 percent) of the population were found in this income range. Only eight (8.08 percent) of the students had come from families whose income was greater than \$15,000 per year.

TABLE XIX  
FAMILY INCOME LEVEL OF STUDENTS ENROLLED IN  
THE "PRE-LAB" TRAINING PROGRAMS

Parents' Income Range	Number	Percent
Over \$15,000 per year	8	8.08
\$10,000 - \$14,999 per year	10	10.10
\$5,000 - \$9,999 per year	46	46.47
Less than \$5,000 per year	35	35.35
Total	99	100.00

Employer Evaluation of On-the-job Graduates  
And the "Pre-Lab" Programs

Since only two graduates of the program were employed in agricultural machinery businesses, the investigator felt that tabular comparisons of findings relative to this small number of graduates



would not be beneficial. Therefore, a decision was made to summarize the findings in a narrative manner by the specific areas investigated. The following is intended to serve this purpose.

#### Suitability of Knowledge and Skills

General Shop Skills. The employers reported they were satisfied with the graduates' performances in the area of general shop skills. These skills were listed as: 1) general shop safety, 2) ability to use tools correctly, 3) ability to assemble new farm equipment, 4) ability to adjust new farm equipment, 5) the ability to balance between functional understanding of mechanical units and the ability to service and repair units, and 6) knowledge to use cleaning materials safely and various methods employed in cleaning body parts for reconditioning.

Electrical systems and instruments. The employers rated graduates' performances as suitable in all areas but one. They both agreed that knowledge and skills related to the function of voltage, amperes, ammeter, volt meters, solenoids, and relays in an electrical system were technical and therefore would require on-the-job training in order for employees to reach desired levels of competence. They also agreed that employees did not have a need for supplemental training currently, but that they would need to attend special service training schools to keep abreast on the new equipment.

Lubrication and fuel systems. Employers indicated the graduates were performing at a suitable level in the portions of their work dealing with these two systems; however, the employers reported that the areas of advanced carburetion and diesel systems would require

additional and concurrent training to keep up with the new technology related to these areas. This was especially true in the diesel repair and maintenance.

Power trains. The graduates were considered capable in understanding and demonstrating skills related to transmissions, drive lines, clutches and gears. According to their employers, they were able to enter the labor force and perform these skills without additional training.

Hydraulics. The interviews revealed that the training the graduates had received in the "Pre-Lab" programs was broad enough to provide them with an understanding of the principles of hydraulics and power steering units. The employers agreed that if a mechanic wanted to specialize in only hydraulics, he would be required to secure additional training. However, as they pointed out, much of this training could be given at the service training centers of various manufacturers.

Cooling systems. The employers emphasized their graduates abilities were adequate to perform service work on any segment of the cooling system. These new employees had not only demonstrated superior skills in repairs of the cooling system, but they were knowledgeable of many of the causes of such failures. They were trained to the extent that they could also perform many preventive measures on the equipment to avoid later problems of a more serious nature.

Principles of internal engines. The "Pre-Lab" programs have produced graduates who are capable of performing repairs on internal engines according to information obtained from the employers of two such graduates. The students were trained to the extent so they

could apparently enter the shops and immediately become productive members of the labor force. The employers were impressed with their ability to read technical manuals, to keep things neat, clean, and in order, and to make precise measurements.

#### Selected Graduate Characteristics

The graduates were rated as highly satisfactory by their employers on the selected personal characteristics studied. For the most part, the employers rated both graduates as highly satisfactory with respect to neatness in dress, their work, and their work areas. The same held true for their ambitions, promptness, dependability, efficiency, and ability to get along with others. The employers agreed that an employee's ability to meet customers was as important as any of the traits studied. In fact, one dealer stressed this as an essential characteristic for his employees. It was his contention that the graduate could be trained on-the-job in many mechanical skills, but they first had to have the ability to meet, greet, and care for customers.

#### Employers Support of Programs

The two employers of program graduates appeared eager to assist with the "Pre-Lab" programs. Interviews revealed that the implement dealers were: 1) satisfied with the performance of the graduates who had completed the training programs, 2) willing to hire additional graduates of the programs, 3) willing to assist in the operation of the training programs by providing employees as resource people, loaning special tools, equipment, etc., and 4) convinced of the need

to continue the type of training being offered through the "Pre-Lab" programs. The dealer support for these programs is best emphasized by one of the employer's unsolicited remarks to the investigator as follows:

The training offered to these young potential mechanics in the Pre-Employment Laboratory Training in Farm Machinery Service and Repair is some of the best training these young men can get. The training is very valuable, especially to those who do not continue their education but choose instead to establish a career in agriculturally-related occupations.

Employers willing to support these programs were not confined only to those who had hired graduates. The investigator visited casually with several other farm machinery dealers and without exception, these employers expressed the same willingness to support programs and agreed with the need for continuation of the programs.

## CHAPTER V

### SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

The central purpose of this study was to obtain follow-up data on graduates of the Pre-Employment Laboratory Training in Farm Machinery Service and Repair and to identify and describe selected variables associated with these programs. Completion of the study involved collection and analysis of data regarding the following specific objectives which were formulated to guide the research effort:

- 1) To describe selected components of the "Pre-Lab" training programs.
- 2) To describe selected characteristics of students who had completed the programs relative to their school activities and certain personal data.
- 3) To determine if the "Pre-Lab" programs were meeting the manpower needs of the farm machinery industry in terms of producing sufficient numbers of graduates who were capable of suitable on-the-job performance.

The purpose of the present chapter is to offer a summary of the study findings related to the purpose and objectives, to present the investigator's conclusions derived from the findings, and finally, to propose specific recommendations which the investigator felt were warranted as a result of conducting the study.

Data for the study were collected by means of mailed questionnaires and interviews completed in 13 selected schools in Texas offering training programs in the area of Pre-Employment Laboratory Training in Farm Machinery Service and Repair. The questionnaires were

mailed to the teachers of agriculture at each selected school. The completed questionnaires were returned to the investigator. All data were carefully analyzed and evaluated and assembled into tabular form for presentation and discussion.

### Summary of the Findings

#### Selected Components of the "Pre-Lab" Training Programs

Teacher preparation. The data presented in Chapter IV revealed that the majority of teachers of the "Pre-Lab" programs had received ten hours or less of formal undergraduate training in farm machinery service and repair. Only one teacher had received ten hours or more of formal graduate training in this area. Except for a single new teacher, all had attended one or more non-credit summer workshops. However, the new teacher disclosed plans for attending the summer workshop in the summer following the time of this study.

All but one of the mechanics teachers had received informal training via on-farm experiences with machinery service and repair. All of the teachers reported some type of informal training in farm machinery service and repair.

Facilities and equipment. Small hand tools, such as sockets, small power tools, and general shop tools were adequate in all of the schools surveyed. The larger and more expensive tools such as motor analyzers and dynamometers were found in a relatively small number of schools. Seven schools owned a motor analyzer, while only four schools had a dynamometer.

The classroom space was reported as being sufficient by all but one of the teachers. The work areas were reported as being sufficient

by nine teachers, while four reported their work areas were insufficient. The tool areas were considered as sufficient by ten teachers, but three rated their tool space as being insufficient. Only four departments had sufficient painting facilities, while nine reported no painting facilities were available.

Assistance and/or cooperation. Eight of the teachers reported assistance and/or cooperation from the state office personnel as excellent. Two others rated their assistance and/or cooperation from this same group as good, while three teachers rated such assistance and/or cooperation as fair.

The area supervisors assistance and/or cooperation was rated excellent by six of the mechanics teachers; three rated them as good, and the remaining four rated this group fair.

The assistance and/or cooperation from college and/or university personnel was rated excellent by nine teachers. Three rated them as fair and one rated them as poor sources of assistance and/or cooperation.

The assistance and/or cooperation provided by implement manufacturers and dealers were rated as either good or excellent by all but one of the teachers included in the study.

The Texas Hardware and Implement Dealers Association was rated excellent only by one of the teachers. One teacher rated them as good, three rated them fair, two rated them poor, while six reported they had received no assistance and/or cooperation from this group.

Perception toward the program. Teachers rated the administrator's perception of the "Pre-Lab" programs as either highly favorable, or favorable. Teachers felt guidance counselors had various views of

the programs. Four teachers reported the perception of the counselors to be highly favorable. Five of the teachers rated their perceptions as favorable. Only one teacher scored the counselors as being somewhat favorable toward their "Pre-Lab" programs.

The perception of the "Pre-Lab" programs by total student bodies in each school was lowest among the groups considered. Five teachers indicated the total student body was highly favorable toward the programs. Five others felt this group perceived the programs in a favorable manner, while three teachers felt the student body was somewhat favorable in their perceptions.

School patrons were rated as having a highly favorable perception by seven of the teachers. Five teachers rated this group as favorable while one teacher rated the perception of his program by this group as somewhat favorable.

The students enrolled in "Pre-Lab" programs had a good perception of the program. Ten reported their enrollees to be highly favorable toward the programs and the remaining three reported favorable perceptions by students enrolled.

#### Selected Student Characteristics

Student grades. More than one-half of the graduates surveyed had received a grade of "A" in the "Pre-Lab" course, 39 had earned a "B" and 10 had received a "C". The average grade for all students in this course was a "B".

Relative to grade averages for all high school courses completed, 12 students maintained an "A" average, 26 attained an average of "B", 46 had earned a "C" average and five had overall averages of "D".



The overall high school grade point average for the group was slightly above the "C+" level.

Participation in FFA activities. Ninety of the program graduates had participated in some of the activities of their local chapters. Other than membership in the organization, committee chairmanships and participation in award banquets were the most popular activities, with 66 of the graduates having served in each activity. Many had been active in shows, fairs, and contests, while others had been very active in leadership training schools. The remaining activities engaged in were conventions, speaking at community service clubs, presenting school assemblies, and participation in radio and/or television programs.

FFA Degrees. Eighty-two of the graduates had advanced to the Degree of Chapter Farmer, but only three had been awarded the State Farmer Degree. Just five members of the group had not advanced beyond the Greenhand Degree. Nine graduates had not been members of the FFA organization.

Participation in other school activities. Participation in athletics was very popular among the graduates surveyed, with 61 indicating they had engaged in some type of athletics. The second largest group, 51 graduates, had served as class officers. Various school clubs had attracted many of the students. Eleven of graduates had been members of an honor society.

Current status. More than one-half of the graduates were in some type of higher education. Of this group, 29 had entered the junior college, 21 were in four year colleges and universities other than those previously listed. Thirty-four members of the group

who had entered colleges and universities were pursuing agriculturally related fields of study. The remaining 18 were in study areas other than agriculture. Twenty-eight of the graduates had entered the labor force upon graduation from the "Pre-Lab" programs, but only two of these were employed in farm machinery service and repair occupations. Thirteen others were in occupations related to mechanics. The remaining 13 employed graduates were in occupations not directly related to mechanics.

Sixteen of the graduates had entered military services upon graduation from the "Pre-Lab" programs. Two others were unemployed at the time of the study and one student was deceased.

Personal and socio-economic background. Findings indicated that the "Pre-Lab" program graduates were rather stable, dependable, and reliable individuals. Teachers rated 90 of the graduates as favorable or highly favorable relative to traits such as personal appearance and pride in achievement. With regard to the traits of sensitivity and feelings toward others, home life, and general attitude, teachers rated the graduates at a slightly lower level. It appeared that when student's home life was rated lower, the graduate's general attitude rating would be lower.

Almost three-fourths of the graduates were either reared on a farm, or had secured some type of on-farm experiences. About one-third of the graduates had been reared in town and had obtained no on-farm experiences.

Thirty-five graduates were from families with an income of less than \$5,000 per year. Nearly one-half of the graduates were from families with annual incomes ranging from \$5,000 to \$10,000.

Eighteen graduates were from families with incomes in excess of \$10,000 annually.

Employers' Evaluations of on-the-job Graduates and the "Pre-Lab" Programs

Suitable knowledge and skills. Data revealed that only two of the 99 graduates who had received the "Pre-Lab" training had entered the labor force as farm machinery mechanics. The two reporting employers who had hired these graduates were, for the most part, satisfied with the knowledge and skills their employees had received in the programs. Both agreed that the programs were producing men who could enter the labor force as productive mechanics in the farm machinery industry. However, the reporting employers listed the following areas and specific skills in which they felt graduates would need additional training before they could perform at optimum levels in their positions: 1) functions of voltage, amperes, ammeters, volt meters, solenoids, and relays in an electrical system, 2) principles of carburetion, 3) ability to remove and replace diesel fuel filters, 4) purge fuel lines, 5) time injection pumps, and 6) special areas of hydraulics.

Selected graduate characteristics. Both employers of program graduates felt that the job-related personal characteristics of these employees were highly satisfactory. Those pertained to the traits of neatness, ambition, promptness, dependability, efficiency, and human relations abilities.

Employer support of program. Personal interviews with the two aforementioned employers disclosed that they were generally satisfied

with their employees who had completed the "Pre-Lab" program and were willing to hire additional graduates. They also felt there was a need to continue such programs and declared they would provide various types of aid for the conduct of same.

### Conclusions

This study was conducted under the guidance of a given set of objectives and research questions. Based upon analysis of the study findings relative to the objectives and research questions, the investigator arrived at certain conclusions. The following sections detail these conclusions.

#### Selected Components of the "Pre-Lab" Training Programs

Teacher preparation. Regarding teacher preparation, the investigator concluded:

- 1) That formal teacher preparation for teaching in farm machinery mechanics had been inadequate at both the undergraduate and graduate levels.
- 2) That non-credit summer workshops in farm machinery service and repair had served as a major source for up-dating teachers in the area.
- 3) That the informal training received by teachers in farm machinery service and repair had constituted very useful experiences for their current teaching assignments.
- 4) That the summer workshops were an expensive means of training teachers. These teachers were required to be out of their communities for a three week period. It is obvious that this type of training represents a major expense of time and effort on the part of the teacher. It seems reasonable to conclude that these absences could curtail the effectiveness of their production agriculture programs due to less time being available for supervised training programs, visitations, and curriculum planning and development.

Facilities and equipment. Findings regarding this program component prompted the investigator to conclude:

- 1) That small hand tools, socket sets, small power tools and general tools were adequate in the "Pre-Lab" training programs.
- 2) That larger, more expensive and valuable training devices such as motor analyzers, dynamometers, and steam cleaners were not available in several of the training programs.
- 3) That painting equipment was adequate in all of the training programs.
- 4) That classroom facilities were adequate in the schools to provide and maintain a good teaching environment.
- 5) That the work area (shop floor space) needed to be improved in most of the schools surveyed.
- 6) That tool areas were adequate in the majority of the schools offering the mechanics program. However, a few schools needed to improve their tool areas. This could be accomplished by employing better tool management, tool arrangement, and tool storage.
- 7) That facilities provided for painting were inadequate and even unsafe at some of the schools surveyed. Most painting situations needed extensive improvement.

Assistance and/or cooperation. Regarding this program component, the investigator concludes:

- 1) That, in general, the assistance and/or cooperation available to the programs was good.
- 2) That the state office personnel were doing an effective job in this area.
- 3) That, for the most part, the assistance and/or cooperation offered by area supervisors was sufficient.
- 4) That college and/or university personnel had provided satisfactory assistance and/or cooperation.
- 5) That implement manufacturers and dealers had been very good in assisting and/or cooperating with the mechanics programs.
- 6) That assistance and/or cooperation from the manufacturer's branch houses needed improving.

- 7) That the Texas Hardware and Implement Dealers Association had not been as active in assisting and/or cooperating with the programs as might be desired.

Perception toward the program. After in-depth discussion with teachers regarding the perceptions of selected groups toward the programs, it was concluded:

- 1) That the perception of school administrators was favorable toward the "Pre-Lab" programs.
- 2) That the over-all view of school counselors toward the programs was favorable. However, some individuals needed to be better informed about the program, its purpose, and its potential.
- 3) That fellow teachers' perceptions of the "Pre-Lab" training programs were favorable.
- 4) That in all schools the total student bodies, school patrons, and students enrolled in the "Pre-Lab" programs perceived the programs favorably.

Student grades. Analysis of findings on student grades provided basis for concluding:

- 1) That students earned a higher grade average in the mechanics course than in other courses, due perhaps to their interest, aptitude, and motivation in the mechanics courses as compared to required high school courses.

Selected student characteristics. Findings relative to this variable led to the following conclusion:

- 1) That the vast majority of program graduates had been members of the FFA, been very active in its functions, and had attained the Degree of Chapter Farmer.

Current status. Regarding the findings relative to the current status of students, the following conclusions were drawn:

- 1) That many of the graduates who had entered higher education had done so at the junior college level. It was concluded by the writer that the location of the college and family background were the primary factors influencing the type of college and/or university entered. Previous grades of the students were examined, but it was felt that grades

were not a major element in the decision of the colleges and/or universities entered.

- 2) That the majority of the college students from the "Pre-Lab" programs were studying in agriculturally-related subject areas. It was felt this could be due to the influence of the "Pre-Lab" programs and the production agriculture programs in their local schools.

Employment patterns. Findings on the graduates' employment patterns led to the following conclusions:

- 1) That the vast majority of graduates who had accepted employment upon completion of the program did not seek to enter the cluster of occupations for which they had been trained. Instead, they chose non-agricultural occupations requiring mechanical knowledge and skills or non-agricultural and non-mechanical types of occupations.
- 2) That graduates' employment patterns indicated the programs actually provided preparation for a wider range of occupations than the program title implies.

Personal and socio-economic background. With regard to these student traits the following conclusions were drawn:

- 1) That students enrolled in the "Pre-Lab" programs were generally reliable, dependable, desirable in appearance, proud of their achievements, reasonably sensitive toward others, and were average or above in terms of their home life and general attitude.
- 2) That the "Pre-Lab" programs attracted students who had been reared on farms or had on-farm experiences and who came from what might be termed "low-middle" income families.

Employers' Evaluation of On-the-job Graduates and the "Pre-Lab" Programs

Since only two graduates were employed in agricultural machinery occupations, the investigator felt that any conclusions derived from such a small sample of employers would not be fitting and could possibly lead to improper generalizations as to the effectiveness of the program. However, it would seem appropriate to point out that the

two employers surveyed were generally pleased with their employees who had completed the programs and with the programs themselves.

General conclusions. Aside from conclusions relating specifically to the purpose and objectives of the study, the investigator felt certain general conclusions were warranted. These include the following:

- 1) That, contrary to prevailing opinion, programs of this type attract average or above high school students both in terms of academic ability and involvement in various school activities.
- 2) That the "Pre-Lab" programs were influential on the decisions of many students to enter higher education and to pursue majors in agriculture or agriculturally-related subject areas.
- 3) That insufficient time had elapsed to obtain a thorough follow-up of graduates and evaluation of the "Pre-Lab" programs. This was concluded because of the relatively short period of time the programs had been in existence and also because fulfillment of military service commitments had, or would, alter the occupational plans of many graduates. The same held true for those graduates who had entered higher education and had not attempted to secure employment.
- 4) That, on the basis of all the investigative procedures and findings, both formal and informal, the "Pre-Lab" programs were generally effective and were valuable supplements to traditional vocational agriculture programs.

#### Recommendations

Certain specific recommendations, based upon the study findings, many interviews, literature reviewed, and the investigator's personal knowledge of the "Pre-Lab" programs were formulated. These recommendations, categorized by specific objectives of the investigation, are presented in this section.

Teacher preparation. With reference to teacher preparation, it is recommended:



- 1) That, in the future, teachers of these programs should be afforded more extensive formal preparation at both the undergraduate and graduate levels.
- 2) That teacher-training institutions should expand their curriculum offerings to provide laboratory training in tractor overhaul, repair, and maintenance, and farm machinery service and repair. Also, that such offerings should have a proper balance of theory and laboratory time to promote full development of technical knowledge and of the teacher's ability to perform related skills.

Facilities and equipment. Regarding this aspect of the programs, it is recommended:

- 1) That all programs, both present and future, follow the tool guide in Suggested Basic Course Outline for Agricultural Machinery Service and Repair. This guide was developed as a result of surveys conducted among numerous agricultural machinery personnel and was published in 1966 by the Vocational Division of the Texas Education Agency. Copies of this guide may be obtained by writing the Agency, Austin, Texas.
- 2) That the larger, more expensive tools and equipment, such as motor analyzers, valve grinding equipment, steam cleaners, dynamometers, should be a part of the training stations. These items would seem to be essential to facilitate development of effective training programs.
- 3) That separate painting facilities would be safer and in many instances healthier. Separate facilities would prevent dust and paint spray from settling on tools and equipment in the work area. These should contain adequate lighting and ventilation and should not be used for storage of flammable materials.

Assistance and/or cooperation. To improve assistance and/or cooperation available to programs, it is recommended:

- 1) That all educational personnel involved with the programs make a concerted and continuing effort to seek the assistance and/or cooperation of all groups, organizations, and individuals who are concerned with or affected by the programs.

Perceptions toward the programs. To maintain favorable perceptions toward the programs by all groups, it is recommended:

- 1) That all personnel involved with the "Pre-Lab" programs

should continually cultivate good rapport with all industrial and community groups concerned with the outcome of the mechanics programs.

- 2) That programs should be publicized frequently and in a variety of ways in order to keep a variety of persons well informed of the purposes, potential, and outcomes of the program.

Student selection. Because a great deal of the potential success of programs is dependent upon the quality of students enrolled, it is recommended:

- 1) That the appropriate local school personnel (administrators, "Pre-Lab" teachers, counselors, etc.) should be involved in selection of students for these programs.
- 2) That only those students who have the interest, aptitude, ability, and career objectives in the area of agricultural machinery service and repair be permitted to enroll in such programs. Further, it is suggested that all students selected should have a reasonable opportunity for successful employment upon completing the program, or could utilize the instruction as a basis for advanced training leading to technical and/or professional levels of employment in agriculture.
- 3) That students selected to receive this training should possess desirable and acceptable personality and human relations traits which will contribute to successful entry into and maintenance of full-time employment and also to their becoming productive members of society.

The program in general. With regard to certain general aspects of the program, it is recommended:

- 1) That the course content should continue to be patterned after the guidelines published by the Texas Education Agency.
- 2) That training in farm machinery mechanics at the secondary school level should continue as an integral part of vocational agriculture programs.
- 3) That the training should be broad enough to allow a graduate to enter a variety of occupations with an entry-level, marketable skill in farm machinery service and repair.

- 4) That highly technical areas of instruction, such as advanced electronics, diesel operation, and hydraulics be offered at post-secondary institutions and/or in the implement dealers' service schools.

Future programs. With regard to new programs, it is recommended:

- 1) That the basic programs continue under the present plan with improvements being made in student selection, student placement, and other components that will affect the outcome of the program's success.
- 2) That a few pilot schools offer the "Pre-Lab" training on the cooperative education basis. The students would need to be placed in an agricultural machinery business to receive on-the-job training for part of each day.
- 3) That the use of an advisory committee be given careful consideration by the schools offering the "Pre-Lab" training programs.

Additional Research. The investigator felt this research effort disclosed additional concerns or areas which should be studied.

Therefore, it is recommended:

- 1) That this study should be replicated after sufficient time has elapsed for greater numbers of program graduates to become employed, especially those who were in military service or higher education programs.
- 2) That an effort should be made to determine how employers, other than those in agricultural machinery businesses, who have hired program graduates would evaluate these on-the-job graduates and their preparation.
- 3) That a longitudinal research effort be initiated to establish employment patterns and the degree of success that graduates have in employment situations.

It is the sincere desire of the investigator that those responsible for the leadership and development of present and future programs in "Pre-Lab" training could make use of the findings and recommendations presented in this study as additional guidelines for establishing and operating programs. Also, it is hoped that the study might disclose to college and university personnel any areas

in which their teacher-training programs in farm machinery and power might need improvement or expansion or provide assistance for the development or expansion or provide assistance for the development and construction of future curricula in this area.

Today, all types of farm tractors and equipment have evolved into technical, complicated machines. Therefore, all educators must make the necessary changes demanded by advanced automation in order to produce students who are knowledgeable of the basic fundamentals of mechanics as they relate to present day agricultural machines.

A SELECTED BIBLIOGRAPHY

- (1) Baker, Richard A. "Curriculum Construction and Course Planning Planning in Farm Power and Machinery." Agricultural Education. Vol. 38, No. 6, (December, 1965), pp. 136-137.
- (2) Basamworth, E. L. "Change the Name--Name the Change." Agricultural Education, Vol. 1, No. 9, (March, 1967), p. 216.
- (3) Bear, W. Forrest, and Travis Nelson. "How Much Instruction in Farm Machinery?" Agricultural Education, Vol. 40, No. 3, (September, 1967), pp. 56-57.
- (4) Cepica, Marvin, and Elroy Otte. "Pre-Employment Laboratory Training in Farm Power and Machinery." Agricultural Education, Vol. 41, No. 11, (May, 1969), p. 26.
- (5) Engelking, Harold F. "The Birth of a Program." Agricultural Education, Vol. 38, No. 9, (March, 1966), pp. 198-199.
- (6) Hamilton, William H. "How Do Your Students Select an Agricultural Specialty?" Agricultural Education, Vol. 41, (July, 1968), p. 22.
- (7) Hannemann, James, and Edwin W. St. John. "Change in Agricultural Education." Agricultural Education, Vol. 40, No. 10, (April, 1968), pp. 219-220.
- (8) Huber, Harold D. "A Post-Secondary Program in Farm Machinery Technology." Agricultural Education, Vol. 42, No. 3, (September, 1969), pp. 64-65.
- (9) Hutson, Denver B. "Agricultural Mechanics for Students Who Enter Non-Farming Occupations." Agricultural Education, Vol. 39, No. 9, (March, 1967), pp. 203-209.
- (10) Kabler, Donald. "Agricultural Mechanics in 1967--An Opinion." Agricultural Education, Vol. 39, No. 9, (March, 1967), p. 196.
- (11) Scarborough, Cayce. "Learning Lab or Project Production." Agricultural Education, Vol. 39, No. 9, (March, 1967), p. 195.

- (12) Webb, Earl S. Opportunities and Requirements for Entry into the Agricultural Machinery Mechanics Trade, Texas A & M University, Departmental Information Report 69-1, 1969.
- (13) Weston, Curtis R. "Where Can We Find..?" Agricultural Education, Vol. 42, No. 3, (September, 1969), p. 55.
- (14) Wood, Jay. "Instruction for Farm Machinery Occupations." Agricultural Education, Vol. 40, No. 7, (January, 1968), p. 151.
- (15) Zipplin, James. "Post-High School Instruction in Agricultural Mechanics." Agricultural Education, Vol. 40, No. 8, (February, 1968), pp. 186-187.

## APPENDIXES

APPENDIX A---Data on student employment, college selection, Armed Services, and other occupations or conditions.

APPENDIX B---Selected characteristics of students completing the "Pre-Lab" training programs in farm machinery service and repair.

APPENDIX C---Employer's rating of graduates of the "Pre-Lab" training programs in farm machinery service and repair.

APPENDIX D---Location of high schools participating in the 1968-69 "Pre-Lab" training programs in farm machinery service and repair.

APPENDIX A





## PART II

DIRECTIONS: Please check the most appropriate answer that best describes your preparation for teaching farm machinery repair and service.

A. Formal Preparation

1. Semester hours of undergraduate instruction in farm machinery repair and service:

- 1. None
- 2. 1-10 hours
- 3. 11-20 hours
- 4. 21 hours or more (Please specify \_\_\_\_\_)

2. Semester hours of graduate instruction in farm machinery repair and service:

- 1. None
- 2. 1-10 hours
- 3. 11-20 hours
- 4. 21 hours or more (Please specify \_\_\_\_\_)

3. Non-credit summer workshops:

- 1. None
- 2. Less than three weeks
- 3. Four to seven weeks
- 4. Eight weeks or more (Please specify \_\_\_\_\_)

B. Informal Preparation

1. Related work experiences:

- 1. On-farm experience with machinery repair and service
- 2. Experience in agricultural machinery repair and service businesses
- 3. Experience in automotive repair and service (i.e., hobby, service station, dealerships, etc.)
- 4. Others (Please specify \_\_\_\_\_)

## PART III

**DIRECTIONS:** Please check the appropriate space that best describes your situation on tools and facilities.

**TERMS****DEFINED:**1. Sufficient for all jobs:

All the desired and necessary tools to do all of the repair work and be able to use each tool for its correct purpose.

2. Sufficient for most jobs:

Enough tools to do most of the jobs. Sometimes tools may have to be substituted for the proper tools designed for the specific purpose.

3. Insufficient:

Too few tools to do the job satisfactorily. Often have to borrow or use the improper tool for the specific need.

## FACILITY AND EQUIPMENT INVENTORY

TOOLS, EQUIPMENT, FACILITIES	Sufficient for all Jobs	Sufficient for most jobs	Insuffi- cient	None
A. SMALL HAND TOOLS:				
1. open end wrenches				
2. box end wrenches				
3. combination open and box end wrenches				
B. SOCKET SETS:				
1. 3/8" drive or smaller				
2. 1/2" drive set				
3. 3/4" drive set or larger				
C. SMALL POWER TOOLS:				
1. electric drills				
2. electric sanders				
3. portable electric grinders				
4. hones				
5. right angle combination grinder and buffer				

TOOLS, EQUIPMENT, FACILITIES	Sufficient for all Jobs	Sufficient for most Jobs	Insuffi- cient	None
D. SPECIALIZED TOOLS/MACHINES:				
1. motor analyzer				
2. valve grinding equipment				
3. steam cleaner				
4. battery charger				
5. power-take-off dynamometer				
6. compression gauges				
7. various presses (hand, hydraulic)				
8. gear pullers				
9. valve spring tester				
10. oxy-acetylene torch				
11. electric arc welder				
12. spray paint gun				
13. torque wrench				
14. regulator/generator tester				
15. starter/battery tester				
16. connection rod alignment tester				
17. screw plate sets (tap and dies)				
18. screw and bolt extractors				
19. cylinder ring compressor				
20. cylinder ring expander				
21. sleeve puller				
22. valve spring compressor				
23. micrometer				
24. ignition wrenches				
25. allen (hex-head) wrench				
26. Ridge reamer (cylinder)				
27. bearing leak tester				
E. GENERAL TOOLS:				
1. metal vices				
2. anvils				
3. grinders:				
a. table				
b. pedestal				
c. tool				
4. drill press				
5. twist drill bits				
6. metal cutting saws				
7. shop hammers				
8. screwdrivers				
9. punches				
10. cold chisels				
11. pliers				
12. clamps				

TOOLS, EQUIPMENT, FACILITIES	Sufficient for all Jobs	Sufficient for most Jobs	Insuffi- cient	None
13. creepers				
14. wash pan for parts				
15. storage pan for parts				
16. feeler gauges				
17. various stands (to support tractor, etc.)				
18. chain hoist				
19. hydraulic jacks				
20. air compressor				
F. FACILITIES:				
1. departmental floor space				
a. classroom				
b. tool area				
c. work area				
2. paint room				
3. separate cleaning area for parts				
4. storage room				

## PART IV

DIRECTIONS: Please place a check in the appropriate space that best describes the degree of assistance and/or cooperation you receive in connection with your program.

Note: You may be assured this information is requested only to facilitate the study. No school will be identified. It is hypothesized that assistance and/or supervision may be a variable, characteristic, or component that is associated with the successful training program in the pre-employment training program.

THE DEGREE OF ASSISTANCE AND/OR COOPERATION  
OF THE PROGRAM BY VARIOUS GROUPS

GROUPS	Excellent	Good	Fair	Poor	None
1. State-university personnel					
a. state office personnel					
b. area supervisor					
c. college personnel					
2. Implement manufacturers					
3. Branch houses of implement manufacturers					
4. Implement dealers					
5. Texas Hardware & Implement Dealers Association					

## PART V

**DIRECTIONS:** Please place a check mark in the allotted space that best describes the attitude you as the teacher view others take toward your program.

**TERMS****DEFINED:**

1. Highly favorable:  
People view the program as an asset to the school and community and are willing to help promote the program.
2. Favorable:  
People view the program as an asset to the school and community but are slow to assist with the promotion of the program.
3. Somewhat favorable:  
People are neither highly favorable, favorable, or unfavorable toward the existing program. They are somewhat neutral.
4. Unfavorable:  
People express opinions and act unfavorable toward the program.

## PERCEPTIONS OF THE PROGRAM IN THE COMMUNITY

GROUPS	Highly Favorable	Favorable	Somewhat Favorable	Unfavorable
Administration				
Guidance and counselors				
Fellow teachers				
School patrons				
Overall student body				
Students enrolled in program				

**Note:** Again, you may be assured this information is requested only to facilitate the study. No school will be identified in the study. The investigator is only trying to secure variables, characteristics, or components that are associated with the successful training programs in pre-employment training programs.

APPENDIX B

**CHARACTERISTICS OF STUDENTS COMPLETING THE PRE-EMPLOYMENT  
LABORATORY TRAINING PROGRAMS IN FARM  
MACHINERY SERVICE AND REPAIR**

**Objective:** To describe selected characteristics of students completing the Pre-Employment Laboratory Training Programs in Farm Machinery Service and Repair as determined by previous grades, overall grade point averages, leadership activities, personal and socio-economic factors.

**Directions:** Please indicate the situation that best describes the student's performance and/or characteristics.

1. Student's grade in the Pre-Employment Training Program: A\_\_\_\_, B\_\_\_\_, C\_\_\_\_, D\_\_\_\_, F\_\_\_\_ or W\_\_\_\_.
2. Student's overall high school grade point average: A\_\_\_\_, B\_\_\_\_, C\_\_\_\_, D\_\_\_\_, F\_\_\_\_, or W\_\_\_\_.
3. Student's FFA Activities:

Activities	Level				
	Local	District	Area	State	National
1. F.F.A. Member					
2. Officer					
3. Committee Chairman					
4. Shows, Fairs, & Contests					
5. Participation in Leadership Schools					
6. Awards Banquets					
7. Conventions					
8. Community Service Clubs					
9. School Assemblies					
10. Radio, and/or TV Programs					
11. Others (Please specify)					

4. Highest F. F. A. Degree Held:
  - \_\_\_\_\_ Greenhand
  - \_\_\_\_\_ Chapter Farmer
  - \_\_\_\_\_ Lone Star Farmer
  - \_\_\_\_\_ American Farmer



## 5. Student's leadership other than F. F. A.:

- Class officer  
 School clubs  
 Athletics  
 Honor society  
 Others (Please specify)

## 6. Student's personal and socio-economic background:

Characteristic	Condition			
	Highly Favorable	Favorable	Somewhat Favorable	Unfavorable
Reliability/dependability				
Appearance				
Sensitivity and feelings toward others				
Student's pride in achievement				
Home life				
General attitude				

## 7. Student's home background:

- Reared on a farm  
 Reared in town, but worked on a farm  
 Reared in town

## 8. Student's socio-economic condition (parent's income):

- Over \$15,000 per year  
 \$10,000 - \$15,000 per year  
 \$5,000 - \$10,000 per year  
 Less than \$5,000 per year

## 9. Student's scores on various tests (I.Q., etc.):

Name of Test                      Score

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APPENDIX G

EMPLOYER'S RATING OF GRADUATES OF THE PRE-EMPLOYMENT  
LABORATORY TRAINING PROGRAM IN FARM  
MACHINERY SERVICE AND REPAIR

A study was conducted in 1966 to determine the basic knowledge and skills that farm implement dealers desired in future employees. The result of this study provided the basis and content for a new educational program entitled "Pre-Employment Laboratory Training in Farm Machinery Service and Repair."

Now, four years later, the current study is being conducted to evaluate the training received by young men in the Pre-Employment Laboratory Training Programs. It is being conducted to see how well the graduates are performing in regard to meeting the needs of farm implement dealers. Because it is felt that employers are best qualified to assess the employee's performance on the job, you are being asked to provide an estimate of the capabilities and aptitude of the employee (s) you have hired from these programs.

For each of the following types of knowledge and skills, will you please check the space that best describes the employee's performance. Use the prescribed code to guide your estimates.

Your cooperation will be appreciated and may be very helpful in deciding on curriculum content for student training programs.

Directions. Please check the appropriate space that best expresses your feelings toward the training that the student has received in the Pre-Employment Laboratory Training Program.

Code: 1 - Employee performs at a highly satisfactory level.

2 - Employee performs at a satisfactory level

3 - Employee performs at an unsatisfactory level

Job Title of Employee \_\_\_\_\_

Name of Employee \_\_\_\_\_

Tenure of Employee on the Job \_\_\_\_\_

PART A -- KNOWLEDGE AND SKILLS

Knowledge and Skills	Not Required for this Employee	Training Evaluation (Check One)		
		1	2	3
1. General Shop Skills				
a. General Shop Safety				
b. Ability to use tools correctly				
c. Ability to assemble new farm equipment				
d. Ability to adjust new farm equipment				
e. Ability to balance between functional understanding of mechanical units and the ability to service and repair units				
f. Proper use of cleaning materials and various methods employed in cleaning body parts for reconditioning				
2. Electrical systems and instruments				
a. Theory of ignition				
b. Function of voltage, amperes, ammeters, volt meters, solenoids and relays in an electrical system.				
c. Causes of detonation and preignition				
d. Principles of generator operation and parts of a generator				

## PART A -- KNOWLEDGE AND SKILLS (Continued)

Knowledge and Skills	Not Required for this Employee	Training Evaluation (Check One)		
		1	2	3
e. Purpose and types of batteries				
f. Knowledge of starting motors and purposes of brushes				
g. How to service, test, and charge batteries				
3. Lubrication and fuel systems				
a. Principles of carburetion				
b. Function and maintenance of fuel air cleaners				
c. Understand LP gas liquid and vapor systems				
d. Need for cleanliness, nature of fuel warning devices, function of injection pumps, types of air systems, and types of starting aids related to diesel systems				
e. Ability to remove and replace diesel fuel filters, purge diesel fuel lines, and time injection pumps				
f. Drain and refill transmissions				
4. Power Trains				
a. Principles of power transmission and function of clutches				
b. Function of gears and the causes of wear on gears				
c. Function of clutches and the causes of clutch troubles				
5. Hydraulics				
a. Principles of hydraulics				
b. Principles of the integral lift systems				
c. Understanding basic parts of various types of hydraulic systems				
d. Principles of power steering and the different types of power steering				
e. Understand brake action and nature of both mechanical and				

## PART A -- KNOWLEDGE AND SKILLS (Continued)

Knowledge and Skills	Not Required for this Employee	Training Evaluation (Check One)		
		1	2	3
hydraulic brake systems				
6. Cooling system				
a. Function of each part of engine cooling system				
b. Nature of temperature gauges				
c. Ability to check antifreeze solution				
d. Ability to remove, replace and adjust fan belts				
7. Principles of internal combus- tion as it applies to all types of engines				
a. Function of governors and be able to adjust governors				
b. Function of bearings, different types and uses of bearings, and causes of bearing failures				

Directions: Use the scale as before to evaluate the employee.

## PART B -- OTHER ASPECTS OF THE EMPLOYEE

Characteristics	Rating (Check One)		
	1	2	3
1. Neatness			
2. Ability to get along with others			
3. Ambition			
4. Attitude			
5. Promptness			
6. Dependability			
7. Ability to meet customers			
8. Efficiency			
9. Appearance of work area			
10. Pride in work			

## PART C -- GENERAL QUESTIONS

1. Are you satisfied with the performance of your employee(s) who have completed the Pre-Employment Laboratory Training Programs?  
\_\_\_\_\_Yes \_\_\_\_\_No
2. Would you hire additional employees who have received the Pre-Employment Laboratory Training? \_\_\_\_\_Yes \_\_\_\_\_No
3. Would you be willing to assist in the operation of training programs by providing employees as resource people, loaning special tools, equipment, etc.? \_\_\_\_\_Yes \_\_\_\_\_No
4. Do you agree with the overall need for a training program in the area of farm machinery service and repair? \_\_\_\_\_Yes  
\_\_\_\_\_No
5. Do you have any general comments about the Pre-Employment Training Program?  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

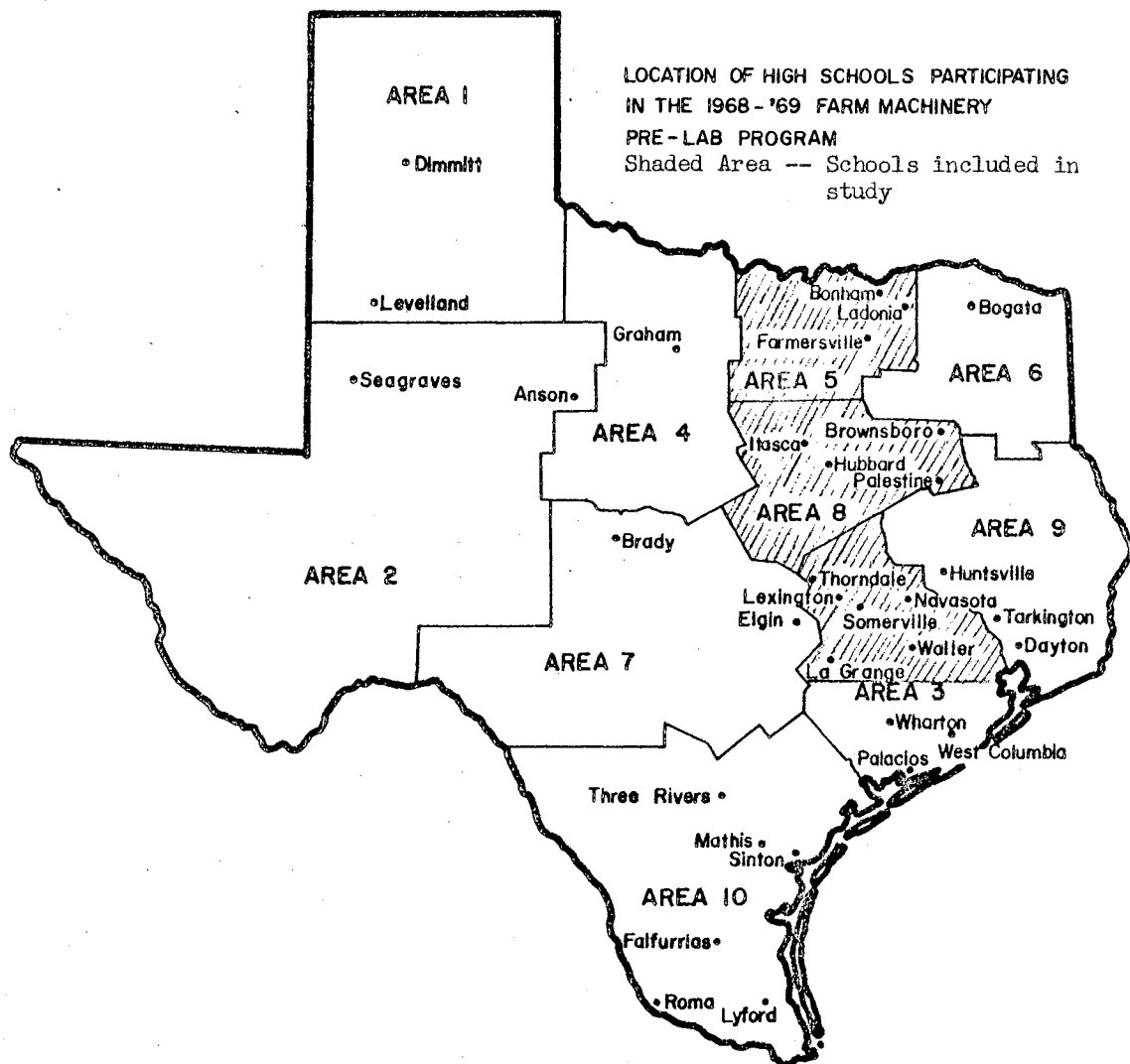
Name of Company \_\_\_\_\_

Name of Person Interviewed \_\_\_\_\_

Position of Person Interviewed \_\_\_\_\_

APPENDIX D





VITA

Charley Joe Jones

Candidate for the Degree of

Doctor of Education

Dissertation: AN EVALUATION OF THE EFFECTIVENESS OF PRE-EMPLOYMENT LABORATORY TRAINING IN MEETING THE MANPOWER NEEDS OF FARM IMPLEMENT DEALERS FOR FARM MACHINERY SERVICE AND REPAIR OCCUPATIONS

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Biographical:

Personal Data: Born in Clarksville, Texas, on November 24, 1935, the son of Raymond Jones and the late Cecile Williams Jones.

Education: Graduated from Annona Elementary School, Annona, Texas, in May, 1950; graduated from Annona High School in May, 1954; attended The University of Houston in 1954 and 1955; received the Bachelor of Science Degree from East Texas State University, Commerce, Texas, in 1958 with a major in Agricultural Education; received the Master of Science Degree in General-Technical Agriculture with a minor in Agricultural Education and General Biology from East Texas State University, Commerce, Texas, in August, 1959.

Professional Experience: Graduate Assistant in the Agricultural Department, East Texas State University, 1958-59; vocational agriculture teacher, Scurry-Rosser High School, Scurry, Texas, 1959-61; vocational agriculture teacher, Annona High School, 1961-65; vocational agriculture teacher, Clarksville High School, Clarksville, Texas, 1965-68; graduate assistant in Agricultural Education, Oklahoma State University, 1968-69; graduate assistant in Agricultural Engineering, Oklahoma State University, 1969-70.

Professional Memberships: Former member of the Texas State Teachers Association, Texas Vocational Agriculture Teachers Association, America Vocational Association, National Vocational Agriculture Teachers Association, Member of Educational Honor Society, Phi Delta Kappa, Oklahoma State University Chapter.

Professional Offices: Regional Educational Chairman, Vice President, and President of the Texas State Teachers Association; Vice President and President of the Ex-Aggie Association, East Texas State University, Commerce, Texas; Officer in the Collegiate Future Farmers of America; co-advisor of the Collegiate Future Farmers of America Chapter, Oklahoma State University, Stillwater, Oklahoma.