

DOCUMENT RESUME

ED 084 416

CE 000 589

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TITLE An Assessment of Selected Aspects of the  
Pre-Employment Program in Farm Machinery Service and  
Repair.  
INSTITUTION Texas A and M Univ., College Station. Texas  
Agricultural Experiment Station.  
PUB DATE Aug 70  
NOTE 16p.  
EDRS PRICE MF-\$0.65 HC-\$3.29  
DESCRIPTORS \*Agricultural Education; Agricultural Engineering;  
\*Agricultural Machinery; Agricultural Machinery  
Occupations; \*Farm Mechanics (Occupation); Machine  
Repairmen; \*Program Evaluation; Questionnaires;  
Vocational Agriculture; \*Vocational Education  
Teachers

ABSTRACT

In an effort to evaluate certain aspects of the pre-employment program in farm machinery service and repair, questionnaires were sent to 39 Texas teachers of the programs. Based on 30 responses (76.92%), the major conclusions were: a majority of the teachers felt they did not have adequate training in farm machinery mechanics; no uniform selection of students for enrollment existed and no aptitude tests were given; the teachers felt the students possessed mechanical aptitude but the most of them were not planning on becoming mechanics. It was also found that close to 30% of the students completing the pre-employment laboratory program were employed as farm machinery mechanics or in closely related occupations. Suggestions were made by the teachers for improving the program by increasing class time, space, tools and equipment, and instructional materials. Support from local implement dealers was judged to be adequate. Five recommendations are made by the author on the basis of the information compiled. The report is intended to inform teachers, teacher educators, and Texas State Department of Education personnel of some of the experiences gained by the program teachers. (AG)

ED 084416

AN ASSESSMENT OF SELECTED ASPECTS OF THE  
PRE-EMPLOYMENT PROGRAM IN FARM  
MACHINERY SERVICE AND REPAIR

by

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Texas Agricultural Experiment Station  
Texas A&M University  
H. O. Kunkel, Acting Director

August, 1970

Departmental Information Report

70-1

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## FOREWORD

The purpose of this publication is to inform teachers, teacher educators and State Department of Education personnel of some of the experiences gained by those conducting the pre-employment laboratory program in farm machinery service and repair. As in the initiation of any new program, all problems to be encountered cannot be anticipated in advance. It is therefore necessary to make periodic status assessments to the end that adjustments may be made in policies and procedures for the operation of the program.

The major portion of the research for this publication was conducted by Robert F. Kruse while he served as research assistant in the Department of Agricultural Education. Mr. Kruse is employed as an instructor of agricultural mechanics at East Texas State University, Commerce.

Earl S. Webb, Professor  
Agricultural Education  
August, 1970

AN ASSESSMENT OF SELECTED ASPECTS OF THE  
PRE-EMPLOYMENT PROGRAM IN FARM  
MACHINERY SERVICE AND REPAIR

The Purpose

The purpose of this investigation was to determine if problems exist in teaching and administering the pre-employment laboratory program in farm machinery service and repair. To be more specific the following questions served as guidelines in conducting the investigation:

1. Did teachers feel that pre-service and in-service training were adequate to qualify them to teach the program?
2. Were problems being encountered in the selection, teaching, and placement of students who enroll in the pre-employment laboratory program?
3. Did teachers feel they had adequate physical facilities to train students for entry into the field of farm machinery mechanics?
4. Based upon an analysis of questions 1, 2, and 3, what recommendations should be made to improve the program?

Procedure

A questionnaire was constructed which related to teacher qualifications, physical facilities, and students. Items included were determined by interviews with teacher trainers and a limited number of teachers of the pre-employment laboratory program.

Questionnaires were mailed to thirty-nine teachers. A cover letter was included. Responses were received from thirty, 76.92 percent of the teachers conducting pre-employment laboratory programs in Texas.

### Analysis of Data

The following analysis of data was based on the responses received from the 30 teachers of the pre-employment laboratory program in farm machinery service and repair who responded to the questionnaire. All data presented are related to one of the three areas: teacher training, students, or physical facilities.

### Training

When asked whether or not the individuals teaching the pre-employment laboratory programs felt they had adequate training to teach the course, eleven or 36.67 percent, as shown in Table 1, responded that they did. However,

Table 1. Do you feel you have adequate training to teach this course?

| Responses | Number of Teachers | Percent |
|-----------|--------------------|---------|
| Yes       | 11                 | 36.67   |
| No        | 17                 | 56.67   |
| Undecided | 2                  | 6.66    |
| Total     | 30                 | 100.00  |

seventeen, or 56.67 percent felt they did not have adequate training and two were undecided. Among those that thought their training was inadequate, hydraulics, electrical systems, and diesel engines were most frequently mentioned.

#### Selection of Students

There was no definite pattern for the selection of students to be trained in the program. The following sample of quotations taken from the responses gives an indication of the diverse means used to select students for enrollment in the pre-employment laboratory program in farm machinery service and repair:

By free choice and being senior students.

They select the course through the aid of a counselor.

Take the students we can get.

Placed according to need and interest.

Picked by principal--too many misfits.

Those who wish to learn a trade and are not planning to attend a college.

I have personal interviews with each student.

If no other teacher can put up with the student, they come to my class.

Teacher conference--seniors only.

Seniors who have completed three years of vocational agriculture.

The ones who don't want to study or can't make it elsewhere.

### Mechanical Aptitude Tests

As shown in Table 2, aptitude tests were not given to any students entering the pre-employment laboratory program.

Table 2. Do students take a mechanical aptitude test before entering your class?

| Responses | Number of Teachers | Percent |
|-----------|--------------------|---------|
| Yes       | 0                  | 00.00   |
| No        | 30                 | 100.00  |
| Total     | 30                 | 100.00  |

### Aptitude of the Students

When asked if a majority of their students seemed to have the mechanical aptitude necessary to become mechanics, twenty-three, or 76.67 percent of the

Table 3. Do a majority of your students seem to have the aptitude necessary to become mechanics?

| Responses | Number of Teachers | Percent |
|-----------|--------------------|---------|
| Yes       | 23                 | 76.67   |
| No        | 3                  | 10.00   |
| Undecided | 4                  | 13.33   |
| Total     | 30                 | 100.00  |

respondents, as shown in Table 3, answered yes. Ten percent said their students did not have the necessary aptitude and 13.33 percent were undecided.

#### Students Planning to be Mechanics

Twenty percent of the respondents, as shown in Table 4, thought that the majority of their students plan to be mechanics. But it was the opinion of 33.33 percent that the majority of their students were not planning to be mechanics and 46.67 percent of the respondents were undecided.

Table 4. Do the majority of your students plan to be mechanics?

| Responses | Number of Teachers | Percent |
|-----------|--------------------|---------|
| Yes       | 6                  | 20.00   |
| No        | 10                 | 33.33   |
| Undecided | 14                 | 46.67   |
| Total     | 30                 | 100.00  |

#### Occupations of Students that have Completed the Program

In Table 5, it is shown that 9.76 percent of the students that have completed the program are now working in the farm machinery service and repair field. It may be observed, however, that slightly more than 28.00 percent were in the occupation of farm machinery service and repair or in closely

related occupations. Slightly more than 39.00 percent of those completing the program were in college.

Table 5. In what occupational fields are your former students now employed?

| Occupational Field   | Number of Students | Percent |
|--|--------------------|---------|
| Farm machinery service and repair                          | 32                 | 9.76    |
| Occupations related to farm machinery service and repair   | 60                 | 18.29   |
| Occupations unrelated to farm machinery service and repair | 88                 | 26.83   |
| College  | 130                | 39.63   |
| Armed Services   | 17                 | 5.18    |
| Trade Schools  | 1                  | 0.31    |
| Total  | 328                | 100.00  |

#### Number of Students per Class

At the time of the investigation, the actual number of students enrolled in each class ranged from three to twenty with a mean of 11.72. The optimum number of students, as perceived by respondents, ranged from eight to twenty per class with a mean of 12.30. It is evident that some teachers felt they could teach more students than were enrolled in their classes while others thought they had too many.

### Number of Classes per Day

The actual number of pre-employment laboratory classes being taught per day in the schools at the time of the investigation ranged from one to two with a mean of 1.16 classes per day throughout the state. The number of pre-employment laboratory classes considered to be optimum by the teachers also ranged from one to two, with a mean of 1.33. In view of the difference between the two means, it appears that some teachers felt they could teach more classes per day than they were teaching.

### Number of Hours per Class

Throughout the state, the actual number of hours of time used to teach classes in the pre-employment laboratory program was two. The number of hours the teachers considered to be optimum, however, ranged from two to four, with a mean of 2.6 hours per class each day. Evidently, many teachers felt they needed more time for teaching the course than the minimum two-hour period in effect at the time of the study.

### Additional Classes Taught

The number of respondents teaching courses in addition to the one in the pre-employment laboratory program was twenty-nine, or 96.67 percent, as may be seen in Table 6. The number of additional classes taught ranged from one to four classes in vocational agriculture, with one person teaching a class of

Table 6. Do you teach classes in addition to the pre-employment laboratory class?

| Responses | Number of Teachers | Percent |
|-----------|--------------------|---------|
| Yes       | 29                 | 96.67   |
| No        | 1                  | 3.33    |
| Total     | 30                 | 100.00  |

physical science. Only one teacher was not teaching a class in addition to the pre-employment program.

#### Laboratory Space

The amount of laboratory floor space available for programs in the various schools represented in the study ranged from 900 square feet to 6,000, with a mean of 2,209.14. When asked the optimum number of square feet needed, responses ranged from 1,200 square feet to 6,000, with a mean of 3,998.21. It appears that most teachers felt they needed more laboratory space than was available.

#### Adequate Tools and Equipment

In response to the question as to whether they had adequate tools and equipment, nineteen or 63.34 percent of the respondents indicated that their laboratories contained adequate tools and equipment, as shown in Table 7.

Table 7. Does your laboratory contain adequate tools and equipment?

| Responses | Number of Teachers | Percent |
|-----------|--------------------|---------|
| Yes       | 19                 | 63.34   |
| No        | 10                 | 33.33   |
| Undecided | 1                  | 3.33    |
| Total     | 30                 | 100.00  |

There were ten negative responses and one undecided. When those with inadequate equipment were asked what additional equipment was needed to equip their laboratories, testing equipment, air compressors, valve grinders, and engine mounts were the tools and equipment most frequently mentioned.

#### Course of Study

In response to the question about courses of study, twenty or 66.67 percent of the respondents indicated they had a satisfactory course of study, as

Table 8. Do you have a satisfactory course of study?

| Responses | Number of Teachers | Percent |
|-----------|--------------------|---------|
| Yes       | 20                 | 66.67   |
| No        | 6                  | 26.67   |
| Undecided | 2                  | 6.66    |
| Total     | 30                 | 100.00  |

seen in Table 8. Of the remaining responses, eight, or 26.67 percent were not satisfied and two were undecided.

### Text Book

When asked if students had adequate text books for the course, 14 or 46.67 percent answered yes, while 53.33 percent answered no. Of the 14 that responded yes, one indicated satisfaction with the text while four were not satisfied and nine were undecided.

### Reference Materials

As shown in Table 9, 53.33 percent of the respondents had an adequate supply of service manuals, while 46.67 percent did not have. Also, 66.67 percent of the respondents had an adequate supply of technical bulletins, while 33.33 percent said they had an inadequate supply. Forty percent thought their supply of reference texts to be adequate, but sixty percent of the respondents thought their supply was inadequate.

Table 9. Do you have an adequate supply of the following reference materials?

| References          | Responses          |         |                    |         |
|---------------------|--------------------|---------|--------------------|---------|
|                     | Yes                |         | No                 |         |
|                     | Number of Teachers | Percent | Number of Teachers | Percent |
| Service manuals     | 16                 | 53.33   | 14                 | 46.67   |
| Technical bulletins | 20                 | 66.67   | 10                 | 33.33   |
| Reference texts     | 12                 | 40.00   | 18                 | 60.00   |

Support of Implement Dealers

In response to the question concerning support of implement dealers, 28 or 93.33 percent indicated that they did receive support while only two or 6.67 percent indicated that they received no support from local implement dealers, as shown in Table 10. When those that received support were asked in what way local dealers supported their program, the most frequently mentioned assistance was that of serving on advisory committees, giving demonstrations for classes and providing tractors for laboratory work.

Table 10. Do the implement dealers in your area support your program?

| Responses | Number of Teachers | Percent |
|-----------|--------------------|---------|
| Yes       | 28                 | 93.33   |
| No        | 2                  | 6.67    |
| Total     | 30                 | 100.00  |

### Summary

The major findings of this study were:

1. A majority of the teachers felt they did not have adequate training in farm machinery mechanics to teach the pre-employment laboratory class. Deficiencies were noted in the areas of hydraulics, electrical systems, and diesel engines.
2. There was no uniform procedure for selecting students for enrollment in the pre-employment laboratory program.
3. Mechanical aptitude tests were not given to any student entering the pre-employment laboratory program among the schools in the investigation.
4. The majority of students in the pre-employment program seem to have the aptitude necessary to become mechanics, according to the opinion of their teachers.
5. It was the opinion of respondents that a majority of their students enrolled in the pre-employment laboratory program in farm machinery service and repair were not planning to become mechanics.
6. Slightly less than 10 percent of the students completing the pre-employment laboratory program were employed as farm machinery mechanics. Almost 19 percent, however, were employed in closely related occupations.
7. A few teachers felt they could teach more than one class of the pre-employment laboratory program.

8. Many teachers felt they needed more than a two-hour class session for teaching a class of the pre-employment laboratory program.
9. Most respondents were teaching courses in addition to the pre-employment laboratory program. The most common addition was one or more classes of production vocational agriculture.
10. A vast majority of the teachers felt they needed more laboratory space than is presently available. The mean square feet available was approximately 2,200; the square feet considered to be optimum, however, was almost 4,000.
11. There were a few pre-employment laboratory programs which did not have adequate tools and equipment. The most common deficiencies were testing equipment, air compressors, valve grinders, and engine mounts.
12. Most of the teachers felt they had an adequate course of study.
13. Only about one-half of the respondents indicated that they had adequate text books, technical bulletins, and service manuals. Only one respondent expressed complete satisfaction with the text book. All others were either not satisfied or undecided.
14. Most of the pre-employment laboratory programs received support from the local implement dealers. The most common assistance was in furnishing tractors, serving on advisory committees, and providing demonstrations.

### Recommendations

The following recommendations were developed from the analysis of data:

1. Efforts should be made to allow teachers to acquire skills and knowledge needed to teach all aspects of the farm machinery mechanics trade. In addition, means should be provided for teachers to keep abreast of changes as they develop in the farm machinery field.
2. Vocational guidance services need to be utilized in the selection and placement of students trained to be mechanics through the pre-employment laboratory program.
3. Serious consideration should be given to increasing the time for class sessions.
4. A study should be initiated to determine the minimum amount of floor space needed for an effective training program.
5. Standard text books and reference materials should be adopted on a state-wide basis for the pre-employment laboratory program in farm machinery service and repair.