FOLLOW-UP OF MECHANIZED AGRICULTURE GRADUATES AT TEXAS A&M UNIVERSITY

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FOLLOW-UP OF MECHANIZED AGRICULTURE GRADUATES

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PREFACE

This study was concerned with a follow-up of graduates from the Mechanized Agriculture program at Texas A&M University. The population involved was the total number of graduates of the program since its beginning in 1969, through the spring semester, 1978. The primary objective was to evaluate the Mechanized Agriculture program and curriculum to the end that adjustments might be made to improve the quality of the program and to better prepare graduates for occupational entry.

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CHAPTER I

THE RESEARCH PROBLEM

Agriculture in the United States has undergone dramatic changes in the past forty years. American agricultural trends have emerged and have been identified. For example, the number of small specialized farms are growing in number. This means that to be able to expand to larger farms, the demand for labor must increase to keep up with production. However, studies show that the actual farm population is decreasing. In point of fact, Bohlen (1) states that nationally, farm population dropped from 32 million in 1910 to about 9.3 million in 1974. Also the average farm size increased from 170 acres in 1940 to 385 acres in 1974. These changes were brought about because farmers found they could handle more acreage with new technology. They bought land from neighbors which led to some farmers moving off the farm.

These figures indicate: (1) less people on the farm, and (2) farms are becoming larger. Where then comes the labor force for farm production? The answer lies in mechanization. To handle larger acreages and operations with less people requires intensive mechanization procedures. Mechanization in American agriculture is proceding by leaps and bounds. This fact is illustrated well by Bohlen (1) when he stated it in this fashion:

> A farmer hand picking corn with a team and wagon in the early 1930's could pick 80 bushels a day. With an average 20-day picking season, he could pick 1,600 bushels. With 40-bushel per acre corn yields, one man could handle 40 acres of corn. Then came the one-row mechanical picker, then the two-row, and then the four-row combine and now larger units. With the four-row combine in the 1960's, one man could pick 1,200 bushels a day, or 24,000 bushels in 20 days. At 80 bushels per acre, that meant one man could handle 300 acres of corn (p. 59).

Along with these statistics have come other realities: (1) more and more farm hand labor is being replaced by machines, (2) these machines are requiring more and more technical knowledge, not only for operation, but also for service, (3) machinery is becoming more and more specialized, (4) machinery service and sales is requiring a higher degree of technical knowledge and skills, (5) machinery management is becoming increasingly important, and (6) machinery selection is more critical.

With the emergence of this highly mechanized agriculture, there has also emerged a need for knowledgeable people to work in this occupational field. The trend to a more highly mechanized agriculture will likely continue as will the ever existant need for technicians and professionals to work in this area.

To help meet the manpower needs of agriculture, our post-secondary educational institutions have increased their programs in the area of Mechanized Agriculture. The Mechanized Agriculture (Agricultural Mechanics), programs across the U.S. at the post-secondary level have been growing at a tremendous rate. Existing programs are experiencing expanded enrollment, and new programs are emerging. As is true with all educational programs and curriculums, there is a need for continual evaluation of these programs and curriculums to

insure that they meet program objectives and the needs of both the program graduates and those who might employ these graduates.

Problem Statement

Educational institutions are charged with preparing their students to enter the work force at an acceptable knowledge and skill level. It is also the duty of that institution to evaluate it's program to insure the relevancy of program objectives and curriculum. These must be continuously evaluated and adjusted, if necessary, to best serve the students and potential employers.

Need for the Study

In all endeavers of education, educators, administrators, and others involved with education, have questions arise as to the relevancy and the quality of the total program. All those involved in a given program, and particularly those involved in vocational education, continually seek ways to change and/or update techniques, methodology, or procedures which will better prepare their product to achieve his/her occupational goal. This means that the graduates of a program must be prepared as completely and to the highest degree of competency possible.

A second reason for evaluation of programs is brought about by the very nature of agriculture. With the ever increasing shift to mechanization of all crops and the many facets of agriculture striving for change to increase production and income, educational programs to prepare individuals for occupations in agriculture may

well become antiquated over a short period of time without evaluation and change when necessary.

By using an on-going evaluation of the Mechanized Agriculture programs, educators can have some assurance that they can continue to supply to students in their program, a program curriculum which will prepare these students to assume occupational and leadership roles in Mechanized Agriculture and related fields.

Purpose

The purpose of this study was to ascertain from former students and their employers, information regarding (1) former student perceptions of preparation received from the Mechanized Agriculture program, (2) adequacy of preparation of graduates as viewed by themselves and their employers, (3) ways which the program and/or curriculum might be strenghthened as viewed by former students and those who employed these former students, and (4) selected occupational characteristics of the graduates. To achieve this purpose, a questionnaire was selected to be mailed to the former students and their employers, if applicable, to gather information concerning 10 identified skill areas in which program graduates should possess some level of competence.

To serve as guidelines for the study, the following research questions were formulated:

1. What are the perceptions of the former students in respect to the importance of the 10 skill areas?

2. What are the perceptions of the employers in respect to

the importance of the ten skill areas?

3. How do the perceptions of the former students compare to those of their employers on the importance of the 10 skill areas?

4. What are the perceptions of the former students in regard to a need for further instruction in the 10 skill areas?

5. What are the perceptions of the employers in regard to a need for further instruction in the 10 skill areas?

6. How do the perceptions of the former students and their employers compare on the need for further instruction in the 10 skill areas?

7. How do the perceptions of the former students' evaluation of themselves in the 10 skill areas compare to their employers' evaluation of the former students' skill in the same areas?

8. Is there a difference between self-employed former students and those employed by others in their perceptions of the importance of the 10 skill areas?

9. Is there a difference between self-employed former students and those employed by others in their perceptions of a need for further instruction in the 10 skill areas?

10. Is there a difference in perceptions of graduates concerning their preparation received from the Mechanized Agriculture Program related to the number of years since graduation?

11. To what degree of adequacy do the former students perceive their training in the Mechanized Agriculture Program for meeting their occupational needs?

Scope

This study included the total 116 graduates from the Mechanized Agriculture program at Texas A&M University. Those students enrolled in Mechanized Agriculture courses but not designated as Mechanized Agriculture majors were not considered.

Limitations

Limitations may occur from the study as only graduates of the program at Texas A&M University will be included. Therefore, generalizations to other programs will be limited. However, the investigator feels that much useful information may be implied to other institutions having similar programs.

There will be no geographical limitations other than the one mentioned previously, as all students from the program will be included in the follow-up regardless of where they may be located geographically.

Definition of Terms

Power Mechanics Skills -- refers to those skills necessary for the operation, maintenance, repair, and major overhaul of tractors and machinery.

Machinery and Construction Skills -- refers to those skills necessary to build and repair machinery and farm buildings.

Business Skills -- refers to skill at keeping records, making out reports, and includes accounting and finance.

Communication Skills -- refers to skill in using both verbal and written communication.

Related Mechanics -- refers to job skills in related areas that help on the job (surveying, soils, irrigation, crops, etc.)

Job Practical Knowledge -- refers to practical, everyday knowledge of work processes, methods, and procedures.

Job Theoretical Knowledge -- refers to knowledge of basic principles and concepts underlying the practical trade work.

Personnel Relations Skills -- refers to skill at dealing with people, such as customers, co-workers, and other tradespeople.

Mathematical Skills -- refers to the ability to use arithmetic or higher mathematics to solve work problems.

Supervisory or Management Skills -- refers to skill supervising others and managing operations, e.g., instruction, directing, evaluating, planning, and organizing.

Perception -- an awareness on the part of the individual of his/her attitude toward a condition, event, a training activity,

or person.

Agricultural Mechanics -- an occupation or occupational training which is involved with the sales, service, construction, repair, or operation of agricultural machinery and related equipment.

CHAPTER II

REVIEW OF LITERATURE

The review of literature for this study will be directed toward the following four specific areas:

1. The role of the four year educational institution in vocational education.

2. Follow-up as a method of program and curriculum evaluation.

3. Need for program evaluation.

4. Similar studies in post secondary education.

The Four Year Institutions

Early in our country's history, colleges and universities directed their programs toward a broad range of study which included the arts, humanities, and other areas considered to have utensile in the broadening of an individual's total self. This education was for the purpose of preparing students to understand life and the finer things accompanying it. Education directed toward preparing an individual for an occupation or vocation was something left to other facets of education such as industry or the private sector. Vocational education was present even before most of these universities began to function, but this type of training was believed by many in those early days to have no place in the function of higher education.

As time passed however, philosophies began to change concerning vocational or occupational education. There arose in this country a great need for persons trained in the professions and as skilled laborers. Higher education began in the "professions" early in such areas as law and medicine, and many colleges and universities have since their beginning offered types of vocational training. As was stated by Venn (2), only a handful of colleges today do not offer occupationally oriented courses at the baccalaureate level.

Beginning in the 1930's, drastic changes began to arise in the world of work. These changes were due primarily to advancements in technology in all of industry and agriculture. This technology brought with it an increased need for professionals in the skill and technical areas of labor. To meet this need, education began gearing up for the training of this needed labor force. Technology continued to grow through the 1950's and into the 60's at such a rapid rate, that education was having difficulty in meeting the labor force requirements.

During this period, government and public thinking was also changing about the role and integrity of work itself. The public began to place more esteem on the skilled and trade occupations which brought more demand on our educational system to train and prepare individuals for these work roles. Labor demands began growing faster than our educational system could prepare people to fill skilled and technical occupations. In an effort to meet these needs, higher education began to expand its role in techni-

cal occupations. In an effort to meet these needs, higher education began to expand its role in technical training by offering two year non-degree programs, and four year baccalaureate degrees, particularly in areas needing workers trained for technical occupations.

One program which came about at both the two year and four year institutions is the engineering technology program. These curriculums are two or four years in duration and are designed to produce professionals trained in their selected field of technology for both job entry preparation, and management level proficiency.

In many ways these programs represent more freedom in selection of training than, for instance, an engineering program. A study done by Defore (3) to determine trends and to predict future supply and demand, compared the baccalaureate engineering technology programs with both the two year and four year engineering programs. The findings indicated that the baccalaureate engineering technology programs are more flexible in meeting individual student needs.

Mechanized agriculture is yet another program at four year institutions which has grown out of the need for trained technologists and professionals. This program which began officially in the late 1960's was set up to provide educational experiences for those students who wanted to pursue careers in technical operations and management in the agriculture industry.

In the case of Mechanized Agriculture, Agricultural Engineer-

ing departments at the colleges and universities assumed the responsibility for administration and control. Presently in the American Society of Agricultural Engineering Constitution, there are guide lines which were developed by the Engineering Council for Professional Development for the evaluation and accreditation of the four year programs in Engineering Technology (Mechanized Agriculture).

In summary, many educators feel that all of education and particularly post secondary, must assume responsibility for preparing men and women for the changing world of work (2). Post secondary education, because of its diversity, is probably in the best position for offering vocational education to individuals. This thinking was stated by Johnson (4).

> The community and the senior college or university clearly have an advantage over the vocational school or technical institute insofar as providing general education is concerned, for general or liberal education are established elements in college programs (p. 377).

Since the early beginning of our four year institutions, many changes have occured in the role assumed by colleges and universities. Higher education has now taken an active part in the preparation of individuals for the world of work, and this role in the years to come will most likely be continued and expanded.

One could sum up the responsibility and the trend in higher education in the words of Cossand (5).

> Four year institutions because of their diversity and heterogeneity of their students should naturally require a greater diversity of course offerings. We are thus in the midst of a revolution in higher education where the boundary lines have been greatly expanded by concern for occupational and career

education throughout all of post secondary education (p. 3).

Follow-up

Follow-up studies have long been used to evaluate occupational programs and curriculums because they lend themselves very well to the occupational set up. Follow-up studies as an evaluative tool in occupational education began shortly after the Smith Hughes Act of 1917. These studies of graduates supply information about former students such as job status, how well their program prepared them for their occupation, career interests, and serve as a basis for evaluating occupational programs for improvement purposes aimed at bettering the program to meet student needs.

Since the enactment of the Smith Hughes Act, follow-up studies of graduates have been growing in popularity due to (1) a greater number of students in occupational education programs, and (2) vocational legislation such as the Vocational Education Amendments of 1968. This legislation recommended that follow-up studies should be used intensively as a method of assessment of occupational programs. The following year, 1969, the National Advisory Council for Vocational Education (NACVE) issued a statement urging schools and colleges offering occupational programs to consider their obligation to students as extending beyond the point of graduation (6). The report by NACVE stated that "placing the student on the job and following up his success and failures provides the best possible information to the school on its own strengths and weaknesses" (7, p. 3). This same council in 1970 further re-

commended that job placement and follow-up services should be included as an integral part of a school's guidance and counseling program (8).

Most authorities on follow-up studies agree that these studies are easily related to the quality of a particular program, and information on many areas of importance to program evaluation and improvement is provided. "Perceptions of past training, success in subsequent employment, and further education are examples of information pertinent to the maintenance and improvement of the programs" (9, p. 124).

Gilli (10), a recognized authority in conducting follow-up studies, identified the following areas in which studies could supply assessment and decision making data.

1. Curriculum relevancy as assessed by former students, at the time they are placed on their first jobs and several years later.
2. Overall value (both immediate and long term) of the program of former students.
3. Quality of training and education, as assessed by employers in terms of their employee's performance on the job.
4. Determination of job characteristics (particularly in terms of activities oriented to people, data, and things.)
5. Job satisfaction of former students and graduates.
6. Determination of the mobility characteristics of former students and graduates, with respect to both job mobility and geographic mobility.
7. Characteristics of former students and graduates with respect to continuing education.
8. Determination of other demographic data needed for long term decision making (10, p. 25).

In addition to the above areas, graduates may also benefit from follow-up studies. According to Brantner (11), students graduating from vocational and occupational programs need continu-

ing support from the institutions from which they graduated. This continued contact of training institutions with their former students may be accomplished by using follow-up studies which serve to keep communication lines open.

Educational evaluation is becoming more and more important. There are many reasons for this. Legislation has dictated in many cases of public education, that evaluation must be carried on. State governments have come under more pressure to show accountability of their public educational programs. The tax paying public is also questioning the relevance and general worth of occupational programs. Evaluation using follow-up studies can assure all interested parties that the programs are producing the best qualified trainee at the least possible cost.

Need for Evaluation

Vocational education programs are faced with the tremendous responsibility of preparing individuals to enter the dynamic world of work. Agriculture, perhaps more than any other discipline, has the need to continually test the pulse of the agricultural industry for the purpose of staying in pace with existing needs.

> In spite of the extensive amount of research in agricultural occupations the point has not been reached where those planning agricultural education programs have the data needed for adapting programs to occupational needs of clientele (12, p. 10).

The trend in agriculture for many years has been for more off-farm occupations. The on-farm jobs have been decreasing as a result of labor costs and mechanization. However, the support of

off-farm occupations has increased at a rapid rate. Hodges (13) stated that as agriculture becomes more technological, the ever expanding need for people with a background in agricultural mechanics will become more apparent.

Related Studies

In reviewing the literature, studies that have been done on follow-up of university program graduates were relatively scarce. However, several studies have been completed that have dealt with post secondary education. A study by Hodges (13) was done involving the assessment of the effectiveness of training received in the Agricultural Mechanics program at Modesto Junior College in California. The study was done to gain information about the program hoping to give direction to curriculum developement and/or revision. This involved the mailed questionnaire to all students who were agricultural mechanics majors from 1965 through 1972. An employer questionnaire was also developed and mailed to those individuals who employed one of these majors. By using these responses on returned questionnaires and pertinent statistical procedures, conclusions and recommendations were offered on program improvement and also reinforcement of areas that indicated strengths in the program.

This study was based on nine skill areas considered to be representative of skills in which graduates from Modesto Junior College should have a high level of competence. Responses from the former students and their employers indicated that (1) the rank

order of the nine skill areas in importance was perceived by both to be the same, significant at the .10 level, (2) there was a high degree of correlation of former students and their employers in their view of the importance of the nine skill areas, significant at the .05 level, and (3) with a significance level of .05 using the Pearson Product Moment correlation, both the former students and their employers perceived the former students' competence in the nine skill areas essentially in the same manner. One exception to the latter was that in the area of power mechanics skills there was disagreement between the two groups indicating that agreement or disagreement could have occured by chance.

Perhaps the most important findings related to program improvement were indicated by the former students in response to an open ended question. The comments on areas where improvement was suggested by more than one student were as follows:

1. Articulation with four-year institutions
2. A need for more training in the supervisory and management skill area
3. A need for more training in personnel relations
4. A need for more training in diesel mechanics
5. A need for a closer relationship between agricultural mechanics instructors and the industry to improve work experience opportunities for students (13, p. 76).

The recommendations presented by Hodges in his study included a re-evaluation of emphasis of the nine skill areas along with suggestions for implementation of additional activities. These activities included such things as more diesel instruction, an improved articulation program with four year institutions, improved relationships of staff with industry, and orientaion materials to

students to stress the importance of some skill areas to the agricultural mechanics program.

Another study was completed in 1972 by Vicars (14) whose study involved follow-up of 1970-71 graduates of the Texas State Technical Institute in Waco, Texas. Two questionnaires were again utilized containing basically the same nine skill areas as was used by Hodges. A questionnaire was sent to each graduate, and for those indicating a current employer, an employer questionnaire was sent to their employer. Statistical procedures involved the frequency distributions, percentages, Pearson Product Moment correlation, and Kendall's Coefficient of Concordance.

This study was designed to answer four research questions formulated to provide information which might help, if needed, in program re-evaluation and improvement. The questions were formulated as follows:

1. How do graduates perceive the importance of the nine skill areas to their job and do they perceive a need for further training?
2. How do employers perceive the importance of the nine skill areas to the job held by their employee and do they perceive a need for further training for that employee?
3. How do employer and employee perceptions of the importance of the nine skill areas to the job compare?
4. How do employer and employee perceptions regarding the need for further training for the employee compare (14, p. 3)?

After analyzing the data received, strengths and weaknesses in the program were identified within the limitations of the study. This led to the following recommendations by Vicars(14) based on data obtained during the study.

1. The Texas State Technology Institute should take steps to

insure the establishment of an effective continuing follow-up system.
2. Consideration should be given to the inclusion of more hands-on time in one and two year programs.
3. Consideration should be given to placing additional emphasis in the areas of Job Practical Knowledge and Manual Job Skills for one and two-year programs.
4. Consideration should be givan to developing orientation materials to acquaint the students with the importance of developing Personnel Relation Skills, Supervisory Skills, and Communication Skills for their utility in providing the skills necessary for advancement on the job (p. 68).

Summary

In summary, post secondary education, including the colleges and universities, have a role in preparing individuals for placement in agricultural occupations. To achieve the best programs possible and to insure the relevance of those programs, evaluation should be a part of any vocational endeavor.

Similar studies have indicated that the follow-up method is successful in vocational education product evaluation. As was stated best by Vicars (15):

> Vocational instructors must go beyond the final examination to the ultimate consumer of our educational product, the public--as represented by the employer. This is necessary if vocational educators are to keep current and effective (p. 15).

Post secondary and other vocational education institutions have a responsibility to society to prepare quality individuals for occupations in agriculture. But they also have the responsibility of continual evaluation of changing trends and needs in the industry, and reflecting these needs by changing program objectives and curricula when necessary to stay abreast of both student and industry needs.

Chapter III

Methodology

The overall goal of this study was to ascertain from former students and their employers, information regarding (1) former student perceptions of preparation received from the Mechanized Agriculture program, (2) adequacy of preparation of graduates as viewed by themselves and their employers, (3) ways which the program and/or curriculum might be strengthened as viewed by former students and those who employed these former students, and (4) selected occupational characteristics of the graduates.

For the purpose of comparison, the former students will be divided into two groups: those self-employed and those employed by others. The two groups of former students will be compared in the following areas in which responses were retrieved on the questionnaire: (1) how important are the 10 skill areas to your present job, (2) how do you rate the adequacy of training received at Texas A&M University, and (3) do you feel there is a need for further instruction in any of the 10 skill areas.

Former student and employer responses will also be compared where there are matched pairs. Former students' and their employers' responses will be compared to test for differences in perceptions of (1) the importance of the skill to the former students'

present job, (2) the former student's evaluation of himself in each of the skill areas compared to his employer's evaluation of the former student in the same areas, and (3) the perceptions of both groups as to the need for more instruction in the skill areas.

Taking into consideration the various methods of gathering data for the study, this investigator felt that the mailed questionnaire would best suit his needs. This method was chosen primarily because of the distance of the population from the investigator.

Population

To achieve the goals set forth in this study, it was thought necessary by the investigator to use the total population. This population will include all graduates from Texas A&M University whose major field of study was Mechanized Agriculture. This will include all graduates from the school year 1968 through the spring of 1979.

The Questionnaire

The instrument chosen for use in this study was basically one used by both Vicars (14) and Hodges (13) who did studies similar to this one being undertaken. The instrument was adapted originally from a larger one used by Project Able conducted in Quincy, Massachusetts (15). The instrument was re-evaluated for usefulness in this study by the investigator's advisory committee and the department and program heads at Texas A&M University responsible for the Mechanized Agriculture program.

The questionnaire contains responses in the following 10 skill areas which were felt to be representative of skills desirable in the program graduates.

1. Power mechanics skills
2. Machinery and construction skills
3. Related mechanics skills
4. Job practical knowledge
5. Job theoretical knowledge
6. Clerical skills
7. Personnel relations skills
8. Mathematical skills
9. Supervisory and management skills
10. Other skills

Each of the above skills will receive responses on three separate five point Likert type scales. The three scales for the former students will seek responses for these questions: (1) how important is this skill for your present job, (2) how do you evaluate yourself on this skill, and (3) how do you rate the adequacy of training received at Texas A & M University in the 10 skill areas? Also included with the Likert scales will be a fourth response as to whether they felt that there was a need for more instruction or training in each of the 10 skill areas.

An additional part of the questionnaire will ask for opinions of various aspects of the Mechanized Agriculture program to determine the perceptions of the graduates in this area. The questionnaire will ask for (1) poor, (2) fair, (3) satisfactory, (4) ex-

cellent, or (5) outstanding ratings for each of the following items:

1. Quality of instruction from Mechanized Agriculture instructors
2. Quality of shop facilities and equipment
3. Condition of shop facilities and equipment
4. Adequacy of shop facilities and equipment
5. General physical condition of Mechanized Agriculture Department
6. Counseling given to students by the Mechanized Agriculture/Agricultural Engineering Department
7. Counseling given to students by the university
8. Help given students to find jobs
9. Opportunity for extra-curricular activities
10. Interest shown by instructors in students
11. Reputation of the Mechanized Agriculture Department
12. Efforts of the Mechanized Agriculture Department to stay current

Other information will be retrieved on the respondents relating to their personal characteristics and employment status. This data will not be reported in the findings but will be used by the Mechanized Agriculture Department at Texas A&M University for student placement files and follow-up information in the students' personal file.

The questionnaire to be used for the employers will be the same basic questionnaire to be used for the former students. The

10 skill areas will be identical but the three rating scales will change somewhat to include: (1) how important is this skill to his/her present job, (2) how would you evaluate him/her on this skill, (3) how does he/she compare with other entry workers who have had other training, and (4) do you feel there is a need for further training in the ten skill areas? The component on the former students' questionnaire concerning various aspects of the program will naturally be deleted from the employers' questionnaire.

On both the former student and the employer questionnaires, an effort will be made to solicit comments concerning changes they feel might be made. On the former student questionnaire, the comments will be directed toward the Mechanized Agriculture program at Texas A&M University. The employers will be asked to comment on changes or improvements they feel might better prepare our students for entry level jobs in agriculture or related industries.

Procedure

Due to the possibility of poor returns on the mailed questionnaire, precautions were taken in the procedures for gathering the data. Because of the relatively small population and since all graduates were familiar with the present program head, it was felt that a cover letter endorsed by him should be included along with the investigator's cover letter in the initial mailing to help secure a higher return.

The cover letter endorsed by the program head was felt to be

an important component of this initial contact. The first mailing, therefore, included two cover letters stressing the importance of the returned questionnaire, a questionnaire for the former student and an additional packet for the former student's employer. The additional packet included the two cover letters identical to the former student's and an employer questionnaire to be filled out by the former student's employer. A note was included in the initial mailing to ask the former student to hand carry the employer packet to that individual responsible for his/her evaluation. It was stressed in the cover letters to both the former student and to the employer that all results that would indicate names or endanger positions or social status, would be kept in the strictest of confidence. Finally, self addressed stamped envelopes were included for both respondents.

After a three week time period, a second mailing was initiated for the individuals who had not responded to the first questionnaire. A second cover letter was sent again stressing the importance of response to the study. This letter was tactfully written to imply that should the first mailing have been misplaced, then this second one could be used. A second employer packet of material like the first accompanied the second mailing.

Three weeks after the second mailing, personal contact by phone was utilized. It was hoped by the telephone follow-up that returns of approaching ninety percent or better could be achieved.

Statistical Procedures

All responses gathered were analyzed using frequency distributions and number and percentage figures. Other descriptive statistics such as the mean, median, and range were also used to describe the data where these served a purpose. Where added clearness and simplicity could be obtained, charts and graphs were used.

For the most part the above mentioned descriptive statistics were the most helpful in identifying trends and for use by the Mechanized Agriculture Department at Texas A&M University for identifying both strong and weak points in the program.

In addition to the descriptive statistics mentioned previously, further analysis of the data was desired. This analysis was done through the use of the t-test, Pearson Product Moment Correlation, and chi-square.

Research question number three is the comparison of perceptions of the 10 skill areas involving matched pairs of former students and their employers. Research question number eight is also a similar comparison on the importance of the 10 skill areas, but deals only with the former students as to their employment status: i.e. self-employed or employed by others. For these two questions the t-test was utilized to test the significance of difference between the group means.

It was decided by the investigator that the responses met the following assumptions to allow the use of the t-test:

1. The responses were expressed as interval data

2. The observations were independent

3. The variances were equal or nearly equal

Since research question number three involved matched pairs, the t-test formula for related samples was used. Research question number eight did not involve related data, therefore, the appropriate test of significance in this case involved the use of the pooled variance formula. However, before using either formula for the t-test, homogeneity of variances was checked using the following formula given by Best (16).

$$F = \frac{S_2}{S_2} \qquad \begin{matrix} \text{(larger variance)} \\ \text{(smaller variance)} \end{matrix}$$

Once the homogeneity of variances were confirmed, the following formulas given by Best (16) was used to calculate t values for question three and eight.

Related data formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{S_1^2}{N_1} + \frac{S_2^2}{N_2} - 2r\left[\frac{S_1}{\sqrt{N_1}}\right]\left[\frac{S_2}{\sqrt{N_2}}\right]}}$$

Pooled variance formula:

$$t = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{(N-1)\,S_1^2 + (N-1)\,S_2^2}{N_1 + N_2 - 2}\left[\frac{1}{N_1} + \frac{1}{N_2}\right]}}$$

The null hypothesis was that there is no significant difference between $\bar{X}_1$ and $\bar{X}_2$. The critical value for rejection for the null hypothesis was found for N + N - 2 degrees of freedom using the t-distribution table. The level of significance was set at the .05 level.

Chi-square was used for questions six and nine. In both these instances the responses are binomial and lent well to the chi-square comparison. These questions compare two groups of former students in one case and in the other, former student responses were compared to their employer's responses. Research question nine compared the two categories of students, and question six compared students with their employers. The responses in both instances were either a "yes" or a "no". By using the frequency distribution of the responses, chi-square fit well in both instances.

The null hypothesis used for the chi-square comparisons was that there is no significant difference in perceptions of the two groups in each question. The significance level was set at the .05 level.

Question ten tested for differences in perceptions of graduates concerning their preparation received from the Mechanized Agriculture program related to the number of years since graduation. For this question chi-square was also used with the former students being divided into three categories. These categories included those former students who have been out of the school program less than two years, two to four years, and greater

than four years.

The formula used to compute chi-square was given by Popham as follows (17):

$$\chi^2 = \sum \frac{(\text{observer frequency} - \text{expected frequency})^2}{\text{expected frequency}}$$

Due to the relatively small population of this study, the danger does exist that the number of responses in the Chi-square table may not be large enough to use the above formula. In the event that at least five responses (frequencies) do not occur in each cell of the Chi-square table, the Yates correction formula for small samples will be utilized. In this event, the formula used would be:

$$\chi^2 = \sum \frac{(/\text{observed frequency} - \text{expected frequency}/ - N/2)^2}{\text{expected frequency}}$$

In addressing question number seven on how the perceptions of the former students and their employers compare on the students' competence in the skill areas, the Pearson Product Moment Correlation coefficient was used. This correlation analysis indicated if the employee and his/her employer agreed on the employee competency level in each skill area.

The computational formula was:

$$r_{xy} = \frac{\Sigma xy - \frac{(\Sigma x)(\Sigma y)}{N}}{\sqrt{\left[\Sigma x^2 - \frac{(\Sigma x)^2}{N}\right]\left[\Sigma y^2 - \frac{(\Sigma y)^2}{N}\right]}}$$

The remaining questions not specifically mentioned were

dealt with statistically using the various descriptive methods discussed earlier.

CHAPTER IV

PRESENTATION AND ANALYSIS OF DATA

Purpose and Explanation of Statistical Procedures

The purpose of this chapter is to present and analyze the data received from the questionnaires returned by graduates of the Mechanized Agriculture program at Texas A&M University. To assist in analyzing the data, and to achieve the purpose of the study, various statistical procedures were selected. These procedures were chosen to best serve the basic purpose of evaluating selected aspects of the Mechanized Agriculture program, and specifically for answering the research questions formulated for the study.

Of the eleven research questions, five asked only for the perceptions of the former students or the employers on selected aspects of the Mechanized Agriculture program involving the 10 skill areas used in the study. For these five questions, descriptive statistics involving number, percentage, and means will be used for the description of the data.

The remaining six questions deal with comparisons of the various groups identified by the study. Question number three compares the responses of the former students and their employers as to the importance of the 10 skill areas. For this question, the t-test of significance between means was used. After checking for

homogeneity of variances in each of the ten skill areas, all variances were found to be equal and the formula using the pooled variance given in the methodology section was used.

Questions numbered six, nine, and ten were also concerned with comparing differences between several groups. These differences were tested using the formula given for chi-square in the methodology section.

Research question number seven compares the former students' evaluation of themselves in the 10 skill areas with how their employers rated them in the same areas. For this question, the Pearson Product Moment Correlation was used to determine if this relationship was positive or negative and to what degree.

In dealing with research question number eight, comparing the self employed former students with those employed by others in their perception of the importance of the 10 skill areas, the t-test of significance between means was again used. However, after the test for homogeneity of variances was calculated, it was found for three of the 10 skill areas, the pooled variance formula for the t-test was not the appropriate one to use. Therefore, for these three skill areas (business skills, power mechanics skills, and mathematical skills), the separate variance formula was used:

$$t = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{s_1^2}{n_1} + \frac{s_2^2}{n_2}}}$$

This addition constitutes the only change in statistical procedures from those given by the methodology chapter of this study.

Description of Population and Returns

The population for this study included the total number of graduates from the Mechanized Agriculture program at Texas A&M University from December, 1971 through May, 1978. This number represents 116 total graduates during this time frame.

Of the 116 total graduates, 82 responded with returned questionnaires representing a 70.7 percent response ratio. Twenty of these were self employed primarily in farming and various service related occupations. The remaining 62 respondents were employed by others.

Employer response was much lower than the former students. Sixty-two former students were employed by others, and of this number, 30 responses were received from employers constituting a slightly better than 48 percent employer response.

The mailing of questionnaires began the first week in August, 1979. This initial mailing was sent to approximately 60 percent of the total graduates. The completed first mailing was ended the third week of August, 1979. From the first mailing, approximately 50 questionnaires were returned.

Beginning the third week of October, a second mailing was sent to those who had not responded to the first mailing. From the second mailing an additional 25 responses were illicited bringing the total to approximately 75 returns. The time between the sec-

ond mailing and the third week of December was a waiting period to allow for response.

A telephone canvassing began in the third week of December to try for more responses. This telephone contact produced four additional responses. By the last of December, the total of 82 responses had been received and it was felt by the investigator that this was adequate time for returns and that no further response was forthcoming.

Due to the extremely slow response rate of the respondents, the investigator extended the original response time from the originally planned nine week period, to the fifteen week period described above.

Research Question Number One

Research question number one was included to get the perceptions of the former students as to the importance they placed on each of the ten skill areas as it applied to their present job. The amount of importance was rated on a scale from one to five, with one being of no real importance to five representing critical importance.

The number of responses and percentage response, rated on the one to five scale in each of the ten skill areas, are reported in Table I. This table represents the total responses (82), and also includes the number of non-responses in each skill area. In addition, the mean score response is shown.

The averages in the skill areas ranged from a low of 2.99 for

TABLE I

PERCEPTIONS OF FORMER STUDENTS
AS TO THE IMPORTANCE OF
THE TEN SKILL AREAS

Skill area	1 No importance		2 Some importance		3 Considerable importance		4 Major importance		5 Critical importance		No response		Mean Response
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Power mechanics	10	12.2	18	21.9	11	13.4	22	26.8	18	21.9	3	3.7	3.25
Machinery & construction	15	18.3	20	24.4	11	13.4	19	23.2	14	17.1	3	3.7	2.96
Business	7	8.5	9	11.0	13	15.9	23	28.0	26	31.7	4	4.9	3.67
Communication	2	2.4	7	8.5	18	22.0	23	28.0	28	34.2	4	4.9	3.87
Related mechanics	23	28.0	21	25.6	8	9.8	15	18.3	11	13.4	4	4.9	2.62
Job practical knowledge	2	2.4	5	6.1	13	15.9	34	41.5	25	30.5	3	3.7	3.95
Job theoretical knowledge	8	9.8	13	15.9	15	18.3	35	42.7	8	9.8	3	3.7	3.28
Personnel relations	1	1.2	4	4.9	5	6.1	28	34.2	41	50.0	3	3.7	4.32
Mathematical	12	14.6	19	23.2	16	19.5	22	26.8	10	12.2	3	3.7	2.99
Supervisory-management	3	3.7	8	9.8	19	23.2	21	25.6	28	34.2	3	3.7	3.67

N = 82

the mathematical skills area, to a high of 4.32 in personnel relations skills. As might be expected by the service occupations of a majority of the former students, those areas involving business, communication, personnel relations, and supervisory-management skills ranked the highest in mean response among the skill areas. A mean response of 2.99 was recorded for the mathematical skill area indicating mathematical skills were considered as having the least importance of the 10.

Research Question Number Two

Research question number two illicited a response from those employers who responded to the questionnaire on the importance of the 10 skill areas. These responses were felt necessary to find out how those individuals who employed graduates of the Mechanized Agriculture program perceived the importance of the 10 skill areas for their employees.

Related mechanics skills were rated lowest by the employers with a mean score of 2.32. A mean score of 4.47 was the response for personnel relations skills. This skill area was rated highest by the employers and also by the former students. This was indicated by the results from question number one. Employers felt much the same as the former students did concerning the importance of the 10 skill areas, as business, communication, job practical knowledge, personnel relations, and supervisory-management skills were rated as the top five areas.

Table II illustrates the complete results of research question

TABLE II

EMPLOYER PERCEPTIONS CONCERNING
THE IMPORTANCE OF THE
TEN SKILL AREAS

Skill area	No importance 1		Some importance 2		Considerable importance 3		Major importance 4		Critical importance 5		Non-response		Mean Response
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Power mechanics	3	10.0	4	13.3	6	20.0	11	36.7	6	20.0	0	0.0	3.43
Machinery & construction	8	26.7	2	6.7	12	40.0	6	20.0	2	6.7	0	0.0	2.73
Business	0	0.0	2	6.7	10	33.3	10	33.3	8	26.7	0	0.0	3.80
Communication	0	0.0	0	0.0	6	20.0	11	36.7	13	43.3	0	0.0	4.23
Related mechanics	9	30.0	10	33.3	1	3.3	7	23.2	1	3.3	2	6.7	2.32
Job practical knowledge	0	0.0	0	0.0	4	13.3	16	53.3	10	33.3	0	0.0	4.20
Job theoretical knowledge	1	3.3	3	10.0	11	36.7	11	36.7	4	13.3	0	0.0	3.47
Personnel relations	0	0.0	0	0.0	3	10.0	10	33.3	17	56.7	0	0.0	4.47
Mathematical	0	0.0	5	16.7	9	30.0	9	30.0	6	20.0	1	3.3	3.55
Supervisory-management	0	0.0	2	6.7	6	20.0	12	40.0	9	30.0	1	3.3	3.97

N = 30

number two concerning employer perception of the importance of the 10 skill areas.

Research Question Number Three

Research question number three involved a comparison of former student and employer responses concerning the importance of the 10 skill areas. This comparison was designed to identify differences in perceptions of the two groups, and the degree of difference by comparing to a preset significance level.

The statistical procedure used for this comparison was the t-test for significant differences between means. The significance level chosen by the investigator was the .05 level. The computational formula used for this test was the one reported in the methodology section using the pooled variance. However, homogeneity of variances was first checked between groups, and the group means were found to be equal. This was done to insure that the pooled variance formula was the appropriate formula to use.

The critical table value for t using the .05 significance level was found to be 2.000 with N + N - 2 degrees of freedom.

A t-value was calculated for each of the 10 skill areas using group means from former students' and employers' responses to the importance of the 10 skill areas.

By referring to Table III, one can see clearly that calculated t-values in all skill areas were far below the table value. These results indicate that there was no significant difference between means in any skill area at the .05 level. From these comparisons,

one might assume that the former students and their employers viewed the importance of the skill areas in much the same manner.

Table III

MATCHED PAIRS COMPARISON OF FORMER STUDENTS' AND EMPLOYERS' RESPONSES ON THE IMPORTANCE OF THE TEN SKILL AREAS

	Group means		t-value
Skill area	Former students	Employers	
Power mechanics	3.40	3.43	0.093
Machinery and construction	2.73	2.73	0.000
Business	3.83	3.80	0.136
Communication	4.23	4.23	0.000
Related mechanics	2.77	2.32	1.730
Job practical knowledge	4.03	4.20	0.653
Job theoretical knowledge	3.50	3.47	0.120
Personnel relations	4.53	4.47	0.600
Mathematical	3.27	3.55	1.270
Supervisory-management	3.90	3.97	0.318

df = number of pairs - 1

Number of pairs = 30

Table value = 2.000

Significance level = .05

Research Question Number Four

The questionnaire used for this study asked the former students to indicate if they felt that there was a need for further instruction in any of the skill areas. It was hoped that this information would indicate if there was a need for further instruction by the Mechanized Agriculture curriculum. The student responses were either a "yes" or a "no" to indicate this perception.

Research question four dealt with this question and the results are reported in Table IV. The number of "no response" was quite high for this question and one could only speculate as to the reason for this. The investigator felt, however, that it was likely due to the position of the response location on the questionnaire and cosmetic reasons.

Of those former students responding, 46.3 percent was the highest "yes" rating and this came in the area of supervisory and management skills. Other high "yes" ratings were in the business skills with 41.5 percent, and personnel relations skills with 36.6 percent. These areas are higher than their numbers represent if they are compared to the percentage of "no" responses. This is due to the large number of "no responses" mentioned earlier.

The highest ratings given in the "no" category, indicating that no more instruction was needed, were in the area of mathematical skills. The "no" response was 37.8 percent compared to 14.6 percent "yes". Approximately 48 percent did not respond in this area.

TABLE IV

FORMER STUDENT PERCEPTIONS ON THE NEED FOR FURTHER INSTRUCTION IN THE TEN SKILL AREAS

	YES		NO		NO RESPONSE	
Skill area	No.	%	No.	%	No.	%
Power mechanics	19	23.2	27	32.9	36	43.9
Machinery & construction	17	20.7	28	34.1	37	45.1
Business	34	41.5	11	13.4	37	45.1
Communication	26	31.7	19	23.2	27	32.9
Related mechanics	19	23.2	24	29.3	39	47.6
Job practical knowledge	23	28.0	22	26.8	37	45.1
Job theoretical knowledge	25	30.5	19	23.2	38	46.3
Personnel relations	30	36.6	13	15.9	39	47.6
Mathematical	12	14.6	31	37.8	39	47.6
Supervisory-management	38	46.3	7	8.5	37	45.1

n = 2

Research Question Number Five

Research question number five concerned the perceptions of former student's employers as to the need for further instruction needed in each of the skill areas. These employers were asked to respond using either "yes" or "no" indicating whether they felt there was a need for further instruction, or instruction was ade-

quate for the 10 skill areas. These perceptions would be based on the importance they placed on the various skill areas, and also how well they felt Mechanized Agriculture graduates were prepared for these skills.

Table V reports the responses received concerning the need for further instruction. Those areas rated highest in perception by the employers as needing no further instruction were: mathematical, 63.3 percent responding "no" compared to 20 percent responding "yes"; related mechanics, 53.3 percent to 16.7 percent; and machinery and construction, 60 percent compared to 20 percent reporting "yes".

Those areas perceived by the employers as needing further instruction included communication, personnel relations, and the supervisory-management skill areas.

Research Question Number Six

The purpose of research question six was to compare the responses of former students and their employers on the need for further instruction in the skill areas. This question compared only those matched pairs of former students and their employers, not the total former student response.

Chi-square was used to determine if a significant difference existed between these two groups. Due to the relatively small number of responses (30 in each group), and the number of nonresponses, the Yates Correction formula for chi-square was utilized.

As can be seen by referring to Table VI, only one area was

found to show a significant difference between the perceptions of the two groups. Job theoretical knowledge had a calculated chi-square value of 4.695 compared to the table value of 3.841. Of those former students responding, 10 (62.5 percent) felt there was a need for further instruction in this area compared to 19 (76 percent) of the employers who felt there was not a need for further instruction. This indicates that the former students felt a greater need in this area than did their employers.

TABLE V

EMPLOYER PERCEPTIONS ON THE NEED FOR FURTHER INSTRUCTION IN THE TEN SKILL AREAS

	YES		NO		NO RESPONSE	
Skill area	No.	%	No.	%	No.	%
Power mechanics	12	40.0	15	50.0	3	10.0
Machinery & construction	6	20.0	18	60.0	6	20.0
Business	13	43.3	13	43.3	4	13.3
Communication	15	50.0	11	36.7	4	13.3
Related mechanics	5	16.7	16	53.3	9	30.0
Job practical knowledge	11	36.7	14	46.7	5	16.7
Job theoretical knowledge	6	20.0	19	63.3	5	16.7
Personnel relations	15	50.0	11	36.7	4	13.3
Mathematical	6	20.0	19	63.3	5	16.7
Supervisory-management	16	53.3	9	30.0	5	16.7

n = 30

TABLE VI

COMPARISON OF FORMER STUDENTS AND THEIR EMPLOYERS CONCERNING THE NEED FOR FURTHER INSTRUCTION IN THE TEN SKILL AREAS

	Former students			Employers			χ^2
Skill area	Yes	No	Non-Response	Yes	No	Non-Response	
Power mechanics	5	12	13	12	15	3	0.490
Machinery & construction	4	12	14	6	18	6	0.139
Business	13	4	13	13	13	4	1.970
Communication	11	6	13	15	11	4	0.016
Related mechanics	5	11	14	5	16	9	0.020
Job practical knowledge	9	8	13	11	14	5	0.060
Job theoretical knowledge	10	6	14	6	19	5	*4.695
Personnel relations	12	5	13	15	11	4	0.267
Mathematical	4	12	14	6	19	5	0.090
Supervisory-management	15	2	13	16	9	5	2.040

* significant at the .05 level

The remaining skill areas showed no significant difference in the perceptions of the two groups, indicating both groups perceived the need for further instruction in these areas in much the same manner.

Research Question Number Seven

Question seven sought to determine the relationship of how the students perceived their own competence in the 10 skill areas, compared to their employers' perception of their competence in those same areas. This comparison was designed to give a better estimate of former student preparation and competence than the former student responses alone. This would tend to equalize any tendency of the former students to either overrate or underrate themselves.

The Pearson Product Moment Correlation was chosen to determine this relationship. These r-values in each skill area are reported in Table VII and show a positive correlation in all areas. The lowest r-values were .02 and .06 for job theoretical knowledge and job practical knowledge respectively, showing only slight positive correlation. These figures indicate that there is some relationship between the former students' and their employers' responses toward the positive, meaning more confidence may be placed on the responses concerning preparation and competence of former students in the 10 skill areas.

Research Question Number Eight

The design of this study separated the respondents into various groups for study purposes. Two of these groups were self-

employed former students and those who were employed by others. Research question number eight is a comparison of these two groups to determine if one group perceived the importance of the 10 skill areas differently from the other. It was hoped that this would indicate if some skill areas were more important to those who were self-employed or employed by others.

TABLE VII

RELATIONSHIP OF PERCEPTIONS OF FORMER STUDENT SELF-EVALUATION AND THEIR EMPLOYERS' EVALUATION OF THEIR COMPETENCE IN THE TEN SKILL AREAS

Skill area	Group means		Correlation coefficient-r
	Former students	Employers	
Power mechanics	3.40	3.43	.32
Machinery & construction	2.73	2.73	.66
Business	3.83	3.80	.32
Communication	4.23	4.23	.48
Related mechanics	2.77	2.32	.43
Job practical knowledge	4.03	4.20	.06
Job theoretical knowledge	3.50	3.47	.02
Personnel relations	4.53	4.47	.38
Mathematical	3.27	3.55	.49
Supervisory-management	3.90	3.97	.31

Note: larger r-values indicate greater magnitude of agreement between former students and their employers.

To achieve this comparison, responses were tabulated for each group and group means were calculated. These group means were then compared using the t-test of significance between means. The significance level was set at the .05 level for $N_1 + N_2 - 2$ degrees of freedom.

Five of the 10 skill areas indicated a significant difference between the two groups in the importance of the skill areas. Those skill areas which show this difference were (1) power mechanics, (2) machinery and construction, (3) business, (4) communication, and (5) related mechanics. The self-employed students ranked these areas higher than those former students employed by others. These differences between the group means are not surprising. Those self-employed individuals were primarily involved in production farming and the service skills such as welding and machinery repair. For this reason, this group probably was more closely involved in some areas mentioned than those who were employed by others. Those employed by others were predominantly sales and service oriented and were not as closely involved with the areas of power mechanics, machinery and construction, business, and related mechanics. Those employed by others, however, rated the area of communication higher than did the self-employed group.

Table VIII illustrates the results of the t-test concerning the comparison of self-employed students and those employed by others as to their perceptions of the importance of the skill areas.

TABLE VIII

COMPARISON OF SELF-EMPLOYED FORMER STUDENTS AND THOSE EMPLOYED BY OTHERS IN THEIR PERCEPTIONS OF THE IMPORTANCE OF THE TEN SKILL AREAS

Skill area	Group means		t-value
	Employed by others	Self-employed	
Power mechanics	2.97	4.10	3.92*
Machinery & construction	2.61	4.00	4.11*
Business	3.52	4.10	2.06*
Communication	4.05	3.35	2.56*
Related mechanics	2.41	3.26	2.64*
Job practical knowledge	3.98	3.85	0.51
Job theoretical knowledge	3.29	3.25	0.13
Personnel relations	4.42	4.00	1.83
Mathematical	3.02	2.90	0.43
Supervisory-management	3.80	3.80	0.00

* denotes significant difference at the .05 level

Research Question Number Nine

Research question number nine was a comparison of the self-employed former students and those employed by others concerning their perceptions of the need for further instruction in the skill areas.

The null hypothesis for this comparison was that there was no

significant difference between the perceptions of the two groups concerning the need for further instruction. The significance level was set at the .05 level.

As can be seen by referring to Table IX, the chi-square comparison failed to show a significant difference in the perceptions of the two groups. The area of power mechanics skills showed the highest chi-square value at 3.04. This value, however, was still below the rejection value of 3.841 from the chi-square table. Therefore, the null hypothesis was accepted and it was concluded that both groups viewed the need for further instruction in the same manner.

Research Question Number Ten

One objective of this study was to determine from the former students how well they felt they were prepared by their program at Texas A&M University in the skill areas involved in the study. It was also felt that possibly those former students who had been working in their occupations for longer periods of time might have different perceptions of their needs and their preparation. Research question number ten deals with how the former students' perceptions compared on the adequacy of preparation related to the number of years since their graduation. The comparison involved three groups: (1) less than two years since graduation, (2) from two to four years since graduation, and (3) greater than four years since graduation.

Chi-square was used to compare these three groups. A signifi-

cance level of .05 was used with a null hypothesis claiming no significant difference between the groups.

TABLE IX

COMPARISON OF SELF-EMPLOYED FORMER STUDENTS AND THOSE EMPLOYED BY OTHERS ON THE NEED FOR FURTHER INSTRUCTION IN THE TEN SKILL AREAS

	Former students			Employers			χ^2
Skill area	Yes	No	Non-Response	Yes	No	Non-Response	
Power mechanics	12	24	26	7	3	10	3.04
Machinery & construction	12	23	27	5	5	10	.35
Business	25	10	27	9	1	10	.58
Communication	20	16	26	6	3	11	.05
Related mechanics	16	19	27	3	5	12	0.00
Job practical knowledge	16	19	27	7	3	10	1.01
Job theoretical knowledge	21	14	27	4	5	11	.20
Personnel relations	25	9	28	5	4	11	.40
Mathematical	11	24	27	1	7	12	.38
Supervisory-management	31	6	26	7	2	11	.01

Critical value = 3.841 for .05 level of significance

Table X shows the results of the Chi-square comparison. As can be seen, only one area, business, indicated a significant difference. This tends to support the idea that those former students who have been working for the longest period have found a greater need for business type skills. This might also mean that preparation in the business skills by the mechanized agriculture curriculum may have improved since the earlier graduates were in the program. All other skill areas failed to show any significant difference in the mean responses.

Research Question Number Eleven

Research question number eleven was designed to provide information to the Mechanized Agriculture Department as to how well former students felt their program prepared them in the 10 skill areas. It was felt that this information would give an overall indication of the effectiveness of the program in preparing students for these skills.

Table XI shows the results of the responses received concerning the adequacy of training received at Texas A&M University. By referring to Table XI, it can be seen that all skill areas were rated satisfactory, illustrated by the mean response in each skill area. However, no skill area showed a mean response of 4.0, indicating excellence of training. The highest ratings were recorded in power mechanics (3.7), machinery and construction (3.6), and related mechanics with a 3.6 mean response. This indicates possi-

bly that better preparation and more emphasis was placed in these practical skill areas than the remaining skill areas.

TABLE X

COMPARISON OF THE PERCEPTIONS OF FORMER STUDENTS CONCERNING THE ADEQUACY OF PREPARATION RELATED TO THE NUMBER OF YEARS SINCE GRADUATION

	Group means			χ^2
	Years since graduation			
Skill area	<2	2-4	>4	
Power mechanics	3.66	3.67	3.70	.06
Machinery & construction	3.71	3.37	3.73	.42
Business	3.16	3.08	2.96	9.08
Communication	3.28	3.38	2.77	.004
Related mechanics	3.58	3.62	3.45	1.51
Job practical knowledge	3.55	3.30	3.13	1.03
Job theoretical knowledge	3.50	3.26	3.00	1.43
Personnel relations	3.31	2.67	2.91	1.60
Mathematical	3.47	3.30	3.30	1.42
Supervisory-management	3.25	3.04	3.04	4.89

Critical value = 5.991 at the .05 significance level

* denotes significant difference

TABLE XI

FORMER STUDENT PERCEPTIONS ON THE ADEQUACY OF TRAINING RECEIVED AT TEXAS A&M UNIVERSITY

Skill area	1 Poor		2 Fair		3 Satis-factory		4 Excel-lent		5 Out-standing				Mean Response
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Power mechanics	1	1.2	3	3.7	26	31.7	44	53.7	8	9.8	0	0.0	3.7
Machinery & construction	0	0.0	3	3.8	33	41.2	36	45.0	8	10.0	2	2.5	3.6
Business	2	2.4	14	17.1	43	52.4	18	21.9	3	3.7	0	0.0	3.0
Communication	1	1.2	14	17.5	39	48.8	21	26.2	5	6.2	2	2.5	3.2
Related mechanics	1	1.3	5	6.3	30	38.0	35	44.3	8	10.1	3	3.8	3.6
Job practical knowledge	1	1.2	9	11.1	40	49.4	23	28.4	8	9.9	1	1.2	3.3
Job theoretical knowledge	2	2.5	10	12.3	38	46.9	25	30.9	6	7.3	1	1.2	3.3
Personnel relations	6	7.3	18	21.9	35	42.7	17	20.7	6	7.3	0	0.0	3.0
Mathematical	3	3.8	5	6.2	38	47.5	29	36.2	5	6.3	2	2.5	3.4
Supervisory-management	4	4.9	15	18.3	34	41.5	27	32.9	2	2.4	0	0.0	3.1

N = 82

Departmental Ratings

All former student questionnaires included a group of questions designed to determine perceptions on specific areas of the Mechanized Agriculture department at Texas A&M University. This section was composed of 12 questions and asked for ratings of specific areas such as the quality of instruction, vocational counseling, and condition and adequacy of department facilities and equipment, etc. Each question was rated by the respondents using a five point scale with 1 being poor, 2 = fair, 3 = satisfactory, 4 = excellent, and 5 = outstanding.

These responses to the 12 questions concerning the Mechanized Agriculture department were considered to be extremely important particularly for departmental evaluation.

Table XII shows the results of the responses received on the 12 questions. The mean response is given to illustrate the degree of satisfaction to each question as perceived by the former students. The highest mean responses were on the questions of the quality of Mechanized Agriculture instructors and the reputation of the Mechanized Agriculture department with mean scores of 4.03 and 4.04 respectively. Other questions indicating relatively high satisfaction by the respondents were the condition of shop facilities and equipment, 3.97; the general physical condition of the Mechanized Agriculture department, 3.99; the efforts of the Mechanized Agriculture department to stay current, 3.96; and the interest shown by teachers in student problems, 3.81.

TABLE XII

FORMER STUDENT PERCEPTIONS OF SELECTED ASPECTS OF THE MECHANIZED AGRICULTURE DEPARTMENT

Item	Mean Response
Quality of instruction from Mech. Ag. instructors	4.03
Quality of instruction from other Ag. instructors	3.61
Condition of shop facilities and equipment	3.97
Adequacy of shop facilities and equipment	3.74
General physical condition of Mech. Ag. department	3.99
Vocational counseling given to students by Mech. Ag./ Ag. Eng. department	3.37
Vocational counseling given to students by the university	2.77
Help given to students to find jobs	3.07
Opportunity for extra curricular activities	3.57
Interest shown by teachers in student problems	3.81
Reputation of Mech. Ag. department	4.04
Efforts of Mech. Ag. department to stay current	3.96

Note: Means were calculated using a five point scale: 1 = poor, 2 = fair, 3 = satisfactory, 4 = excellent, 5 = outstanding.

The lowest rating was given to the adequacy of vocational counseling given by the university showing a mean response of 2.77. Help given students to find jobs was also rated relatively

low at a mean score of 3.07.

The results showed that in most of the areas listed, the former students perceived the department to be doing a better than satisfactory job. However, a few areas such as those mentioned earlier, were marginal if a satisfactory rating is considered the minimal satisfaction level.

Double Sampling

The total population of this study involved 116 former students who had graduated from the Mechanized Agriculture program at Texas A&M University. Of these 116 total graduates, 82 responses were received from the first and second questionnaire mailings and the telephone contacts. This left a total of 34 individuals classified as non-respondents. It was decided that a second sampling should be made of those 34 non-respondents to see if there might be a difference between those individuals who responded and those who did not.

The double sampling involved 10 percent of those non-respondents which constituted four additional returns. This sampling was done by choosing four individuals at random and contacting them by telephone. Upon contact, the same questionnaire utilized in the mail survey was used and completed over the phone with the assistance of the investigator.

After tabulation of the double sampling responses, mean scores were calculated and then compared to the mean scores of the original 82 responses which were received. The t-test was utilized to

compare the mean responses of the two groups using the .05 level of significance.

There were a total of 30 comparisons made between the initial respondents and the double sampling. Three questions were asked concerning each of the 10 skill areas on the questionnaire: (1) how important is this skill to your present job, (2) how do you evaluate yourself on this skill, and (3) how do you rate the adequacy of training received at TAMU. Table XIII shows the results of the double sampling comparison.

As can be seen in Table XIII, the question concerning the importance of each skill to the present job indicates two areas where there is a significant difference between the group mean responses. Both the power mechanics and the supervisory-management t-values exceeded the table value at the .05 level of significance. These differences however may be somewhat attributable to the characteristics of the double sampling. The double sampling respondents included three individuals whose job was connected to a tractor dealership. Of these three, one was self-employed in a tractor mechanics shop, and two were working as mechanics and serving as shop foreman. The fourth respondent was involved in tractor and machinery sales and service. These job descriptions would naturally tend to have a high rating of both the power mechanics and supervisory and management skill areas.

The question concerning self-evaluation in the skill areas produced only one significant difference. This difference came in the area of personnel relations. The double sampling produced a

TABLE XIII

COMPARISON OF DOUBLE SAMPLING RESPONSES
WITH INITIAL RESPONDENTS

Skill area	How important is this skill to your present job? Mean Response: Initial Respondents N = 82	Double Sampling N = 4	t	How would you evaluate yourself on this skill? Mean Response: Initial Respondents N = 82	Double Sampling N = 4	t	How do you rate the adequacy of training you received at TAMU? Mean Response: Initial Respondents N = 82	Double Sampling N = 4	t
Power mechanics	3.25	4.50	*1.79	4.00	4.25	1.10	3.67	3.75	0.21
Machinery & construction	2.94	3.00	0.08	3.82	3.25	1.58	3.61	4.50	*2.40
Business	3.71	4.75	1.60	3.29	3.75	1.15	3.07	3.75	1.66
Communication	3.87	4.75	1.63	3.43	3.75	0.64	3.19	3.50	0.72
Related mechanics	2.61	2.50	0.30	3.29	3.50	0.52	3.56	4.25	*1.68
Job practical knowledge	3.95	4.00	0.09	3.73	4.00	0.79	3.35	3.00	0.79
Job theoretical knowledge	3.28	4.25	0.43	3.52	3.75	0.57	3.28	3.50	0.50
Personnel relations	4.32	4.75	0.96	3.67	4.50	2.24	2.99	2.75	0.50
Mathematical	2.98	3.50	1.00	3.56	3.75	0.45	3.35	3.75	0.95
Supervisory-management	3.80	5.00	*3.64	3.62	3.75	0.38	3.09	3.00	0.19

* Denotes significant difference at the .05 level

Table value of t = 1.684

higher mean response than the initial responses did. Again, the job characteristics of the respondents in the double sampling may have affected this difference somewhat.

The third question asked the respondents to rate the adequacy of training received at TAMU in each of the skill areas. Two of the 10 comparisons produced a significant difference. These were in the areas of machinery and construction skills and related mechanics skills. In both instances, the double sampling rated the adequacy of training higher than the initial group of respondents.

It is evident from the results of the double sampling that some differences do exist between the group responding to the questionnaire and the telephone double sampling group. However, because of the sampling procedure of the double sampling, and considering the job description characteristics of this group, the investigator feels that the validity of the comparison involving the double sampling might be somewhat questionable. Although the differences in the double sampling may imply difficulty in generalizability of the study results to other populations, it does not detract from the validity of the original 82 respondents involved in this study.

Summary of Former Student's Comments

The questionnaire asked four additional responses from the respondents in addition to those rankings of the 10 skill areas. One statement asked the respondents to make any comment they would like concerning changes they would like to see made in the Mech-

anized Agriculture program at Texas A&M University. The following is a summary of these former students'comments:

I think an advanced engines course would be helpful.

There is a need for more instruction in hydraulics, diesel, and electrical systems.

The facilities and equipment need enlarging and updating.

There is a need for a closer relationship with Agricultural Engineering.

Graduate students should be allowed to teach only in the laboratory.

More emphasis is needed in the business and mechanics courses.

I feel that my training at A&M and the Mechanized Agriculture department was excellent.

I feel that I received an excellent education at A&M.

I would like to see some processing and materials handling offered.

I believe that the Mechanized Agriculture program has done well in keeping up with new practices and new machinery.

A course on overhaul and maintenance of power transmission systems would be helpful.

I would like to see more instruction on agriculture machinery.

The program needs to teach methods and procedures of setting up a small business.

I think the Mechanized Agriculture program is too general; it needs to prepare individuals for specific functions.

I feel that I got a well-rounded degree and, most important to me, personalized instruction and counseling.

I think there is a need for improvement in the communication and instructional skills.

More emphasis on business skills and basic math is needed.

I think there is a need for more diesel and hydraulics training.

I feel a course in sales would be helpful to me.

My experience at Texas A&M was both satisfying and gratifying.

I would like to see more design and basic engineering included.

The facilities and equipment need updating.

Expand the faculty with qualified and competent instructors to keep up with the enrollment. This would prevent using graduate students as instructors.

The program needs more challenging course work.

There should be more counseling on career goals.

I hope the program will stay practically oriented.

More emphasis should be placed on practical business courses such as accounting and management.

There is a need for more vocational counseling for students.

I think more business training and accounting is needed.

There needs to be more emphasis on marketing agriculture products.

Tell the students to learn to deal with people.

More emphasis should be placed on business skills.

There is a need for more instruction oriented toward diesel and hydraulics.

More bookkeeping and accounting would be helpful.

I could have used more technical writing and machinery management.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The overall purpose of this study was to evaluate selected aspects of the Mechanized Agriculture program at Texas A&M University. To achieve this purpose, a follow-up of program graduates involving both perceptions of the former students and their employers was felt would supply the needed information about the program. This information could then be analyzed to draw conclusions on the effectiveness of the program and to spot deficiences where these occured. With this information it was felt that changes might be made in the Mechanized Agriculture curriculum and total program to better suit the needs of graduates, and those employing the graduates.

The study was conducted by using a mailed questionnaire sent to all graduates of the program who had graduated prior to the fall semester, 1978, and also the employers of those graduates. The data base was built on 10 different skill areas about which responses were solicited. The skill areas were identified as being those areas in which program graduates should possess some level of competence to meet the occupational requirements of those occupations in which mechanized agriculture graduates commonly

were employed. The identified skill areas were as follows:

1. Power mechanics skills -- refers to those skills necessary for the proper operation, maintenance, repair, and major overhaul of tractors and machinery.

2. Machinery and construction skills -- refers to those skills necessary to build and repair machinery and farm buildings (welding, electricity, etc.).

3. Business skills -- refers to skill at keeping records, making out reports, and includes accounting and finance.

4. Communication skills -- refers to skill in using both verbal and written communication.

5. Related mechanics -- refers to job skills in related areas that help on the job (surveying, soils, irrigation, crops, etc.).

6. Job practical knowledge -- refers to practical, everyday knowledge of work processes, methods, procedures, etc.

7. Job theoretical knowledge -- refers to knowledge of basic principles and concepts underlying the practical trade work.

8. Personnel relations skills -- refers to skill at dealing with people, such as customers, co-workers, other trades, etc.

9. Mathematical skills -- refers to ability to use arithmetic or higher mathematics to solve work problems.

10. Supervisory or management skills -- refers to skill at supervising others, and managing operations, e.g. instructing, directing, planning, etc.

For each of the above skill areas, four questions were asked

of the former studetns. These were: (1) how important is this skill to your present job, (2) how do you evaluate yourself on this skill, (3) how do you rate the adequacy of training received at TAMU, and (4) do you feel there is a need for further instruction in this area?

Four questions were also asked of the former student's employers concerning the same 10 skill areas. The questions were changed somewhat from the four used for the former student questionnaire, but were basically the same questions: (1) how important is this skill to his present job, (2) how would you evaluate him on this skill, (3) how does he compare to other entry workers who have had other training?

The response rating used for the first three questions was a five point scale using one through five, with one indicating the lowest rating and five the highest. On the question concerning further instruction, both former students and employers responded with either a "yes" or a "no".

After identification of the skill areas to be used, eleven research questions were formulated to serve as a guide for the study. It was hoped that these research questions would supply adequate information and data upon which program evaluation could be based. These questions are listed below:

1. What are the perceptions of the former students in respect to the importance of the 10 skill areas?

2. What are the perceptions of the employers in respect to the importance of the 10 skill areas?

3. How do the perceptions of the former students compare to those of their employers on the importance of the 10 skill areas?

4. What are the perceptions of the former students in regard to a need for further instruction in the 10 skill areas?

5. What are the perceptions of the employers in regard to a need for further instruction in the 10 skill areas?

6. How do the perceptions of the former students and their employers compare on the need for further instruction in the 10 skill areas?

7. How do the perceptions of the former students' evaluation of themselves in the 10 skill areas compare to their employers' evaluation of the former students' skill in the same area?

8. Is there a difference between self-employed former students and those employed by others in their perceptions of the importance of the 10 skill areas?

9. Is there a difference between self-employed former students and those employed by others in their perceptions of a need for further instruction in the 10 skill areas?

10. Is there a difference in perceptions of graduates concerning the preparation received from the Mechanized Agriculture program related to the number of years since graduation?

11. To what degree of adequacy do the former students perceive their training in the Mechanized Agriculture program for meeting their occupational needs?

Summary of Findings

The following is a listing of the major findings resulting from the study:

1. The highest average responses, based on the five point scale, showed that the skill areas involving personnel relations, supervisory and management, communication, and business skills were rated the highest in respect to the importance of those skill areas by former students.

2. The employers of former students responded in much the same manner as the former students did concerning the importance of the skill areas. The employers also felt the areas of highest importance were those of personnel relations, supervisory and management, communication, and business.

3. Former students felt that more instruction was needed in the areas of business, personnel relations, and supervisory and management skills.

4. Employers felt that there was a need for further instruction in the areas of supervisory and management, communication, and personnel relations.

5. Self-employed former students differed from those former students employed by others in their perceptions of the importance of the 10 skill areas. The self-employed former students placed more importance on the areas of power mechanics, machinery and construction, and business skills, while those employed by others placed more emphasis on communication skills.

6. Former students felt that their training in all skill areas was satisfactory with power mechanics, machinery and construction, and related mechanics getting the highest ratings.

7. There seemed to be no difference in the perceptions of former students on the adequacy of preparation when grouped and compared according to the number of years since graduation with one exception. This came in the area of business skills where the group with the longest time since graduation rated their preparation lower than the other groups.

8. The results from the double sampling indicated that there may exist a difference in perceptions between the non-respondents and the group who responded to the questionnaire.

9. Employers compared Mechanized Agriculture graduates with other entry level workers having had other training. These responses indicate that in the area of power mechanics, machinery and construction, and mathematical skills, these graduates were rated in the upper 20 percent. Ratings in all other skill areas were above average.

10. The ratings of former students concerning the Mechanized Agriculture department were relatively high for most areas with the quality of instructors receiving the highest mean score. The former student responses to the departmental questions also indicated that vocational counseling given by the department and the university needed improvement.

Conclusions

The skill areas of personnel relations, supervisory and management, communications, and business skills are of critical importance to both the former students and their employers. Further instruction is shown to be needed in these areas: (1) business skills, (2) supervisory and management skills, (3) personnel relations skills, and (4) communication skills.

Self-employed former students have different needs in the skill areas than those employed by others.

Former students felt that their training by the Mechanized Agriculture department in the skill areas was adequate.

Excluding the area of business skills, the length of time since graduation made little difference in the perceptions of former students as to the adequacy of their preparation.

The group of non-respondents may in fact represent a portion of the population which is dissimilar to the respondents of this study.

Graduates of the Mechanized Agriculture program compare favorably to other individuals having different training.

With the exception of vocational counseling, former students were generally pleased with the Mechanized Agriculture Department.

Recommendations

The Mechanized Agriculture curriculum should strive to maintain and possibly increase the emphasis placed on instruction in-

volving student preparation for the skill areas of (1) business, (2) personnel relations, (3) supervisory and management, and (4) communications.

Since self-employed former students have shown needs that are different from other former student occupational needs, consideration should be given to provide study options within the Mechanized Agriculture curriculum. These options would better prepare individuals for entry and success in more specific selected occupational areas. A study group comprised of former students, industry representatives, and department personnel might well suggest what options would be beneficial to the program.

There seems to be a need for further instruction in the practical mechanics areas of diesel fuel systems, hydraulics, electrical systems, and power transmission systems. Therefore, more emphasis should be placed in these areas in existing courses involved, and additional course offerings in these areas should be considered.

Vocational counseling and guidance of students by the Agricultural Engineering Department should be accelerated and more organized.

Program facilities and equipment should be reviewed by faculty to insure a current and adequate instructional media.

An additional study similar to this one should be run to include the more recent graduates and add to the present data base.

Since Mechanized Agriculture majors represent only a portion of the students taking courses through the Agricultural Engineering department, other studies should also be done to look at spe-

cific parts of the program. For example, Agricultural Education students comprise a large percentage of the total students taking these courses including those involved in Farm Power and General Agriculture Mechanics certification programs. A study of those individuals trained in the department may also produce valuable information for program and course evaluation purposes.

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APPENDIXES

APPENDIX A

QUESTIONNAIRES

ALL INFORMATION ON THIS QUESTIONNAIRE WILL BE HELD IN STRICT CONFIDENCE AND USED FOR EDUCATIONAL PURPOSES ONLY

Company or Firm_____ Date_____

Address_____

Department or Shop_____

Rating Supervisor_____

Name of Employee_____

Job Title_____

EMPLOYER'S QUESTIONNAIRE

Please give approximate starting salary

Monthly_____

Hourly_____

For each of the skill areas listed below, answer the questions at the right.

Indicate your answers by marking the appropriate boxes:

	How important is this skill to his present job?					How would you evaluate him on this skill?					How does he compare with other entry workers who have had other training?					Do you feel that he needs more instruction or training in this area?	
	1. Of no real importance	2. Of some importance	3. Of considerable importance	4. Of major importance	5. Of critical importance	1. Needs much improvement	2. Generally below average	3. Average	4. Generally above average	5. Outstanding	1. Falls in the lower 5%	2. Falls in the lower 20%	3. Falls in the middle 50%	4. Falls in the upper 20%	5. Falls in the upper 5%	YES	NO
POWER MECHANICS SKILLS - Refers to those skills necessary for the operation, maintenance, repair, and major overhaul of tractors and machinery.																	
MACHINERY & CONSTRUCTION SKILLS - Refers to those skills necessary to build and repair machinery and farm buildings (welding, electricity, etc.)																	
BUSINESS SKILLS - Refers to skill at keeping records, making out reports, and includes accounting and finance.																	
COMMUNICATION SKILLS - Refers to skill in using both verbal and written communication.																	
RELATED MECHANICS SKILLS - Refers to job skills in related areas that help on the job (surveying, soils, irrigation, crops, etc.)																	
JOB PRACTICAL KNOWLEDGE - Refers to practical, everyday, knowledge of work processes, methods, procedures, etc.																	
JOB THEORETICAL KNOWLEDGE - Refers to knowledge of basic principles and concepts underlying the practical trade work.																	
PERSONNEL RELATIONS SKILLS - Refers to skill at dealing with people, such as customers, co-workers, other trades, etc.																	
MATHEMATICAL SKILLS - Refers to ability to use arithmetic or higher mathematics to solve work problems.																	
SUPERVISORY OR MANAGEMENT SKILLS - Refers to skill at supervising others, and managing operations, e.g. instructing, directing, planning, etc.																	
OTHER SKILLS - Add what you feel applies to his job and is not covered above: _____																	

Please make any comments you wish on the reverse side of this questionnaire concerning changes or improvements that you feel would better prepare our students for entry level jobs in Mechanized Agriculture.

ALL INFORMATION ON THIS QUESTIONNAIRE WILL BE HELD IN STRICT CONFIDENCE AND USED FOR EDUCATIONAL PURPOSES ONLY

Name _____ Date _____
Last First Middle

Name of Employer _____

Address of Employer _____
Street City State Zip Code

Job Title _____

Name of Immediate Supervisor _____

Please indicate if Self Employed _____

If not employed please indicate status below: (Circle One)

1. Continuing Education
2. Military Service
3. Unemployed
4. Employed part-time only
5. Seeking employment

For each of the skill areas listed below, answer the questions at the right.

Indicate your answers by marking the appropriate boxes:

	How important is this skill to your present job?					How would you evaluate yourself on this skill?					How do you rate the adequacy of training received at TAMU?					Do you feel that you need more instruction or training in this area?	
	1. Of no real importance	2. Of some importance	3. Of considerable importance	4. Of major importance	5. Of critical importance	1. Needs much improvement	2. Generally below average	3. Average	4. Generally above average	5. Outstanding	1. Poor	2. Fair	3. Satisfactory	4. Excellent	5. Outstanding	YES	NO
POWER MECHANICS SKILLS - Refers to those skills necessary for the operation, maintenance, repair, and major overhaul of tractors and machinery.																	
MACHINERY & CONSTRUCTION SKILLS - Refers to those skills necessary to build and repair machinery and farm buildings (welding, electricity, etc.)																	
BUSINESS SKILLS - Refers to skill at keeping records, making out reports, and includes accounting and finance.																	
COMMUNICATION SKILLS - Refers to skill in using both verbal and written communication.																	
RELATED MECHANICS SKILLS - Refers to job skills in related areas that help on the job (surveying, soils, irrigation, crops, etc.)																	
JOB PRACTICAL KNOWLEDGE - Refers to practical, everyday, knowledge of work processes, methods, procedures, etc.																	
JOB THEORETICAL KNOWLEDGE - Refers to knowledge of basic principles and concepts underlying the practical trade work.																	
PERSONNEL RELATIONS SKILLS - Refers to skill at dealing with people, such as customers, co-workers, other trades, etc.																	
MATHEMATICAL SKILLS - Refers to ability to use arithmetic or higher mathematics to solve work problems.																	
SUPERVISORY OR MANAGEMENT SKILLS - Refers to skill at supervising others, and managing operations, e.g. instructing, directing, planning, etc.																	
OTHER SKILLS - Add what you feel applies to his job and is not covered above: _____																	

Please give your frank opinion about the following items concerning you in mech. ag at TAMU.

	Poor	Fair	Satisfactory	Excellent	Outstanding
1. Quality of instruction from Mech. Ag. instructors.					
2. Quality of instruction from other Ag. instructors.					
3. Condition of shop facilities and equipment.					
4. Adequacy of shop facilities and equipment.					
5. General physical condition of Mech. Ag. Dept.					
6. Vocational counseling given to students by Mech. Ag./Ag. Sn. Dept.					
7. Vocational counseling given to students by university.					
8. Help given students to find jobs.					
9. Opportunity for extra-curricular activities.					
10. Interest shown by teachers in student problems					
11. Reputation of Mech. Ag. Dept.					
12. Efforts of Ag Dept. to stay current (up to date).					

Please make any comments you wish on the reverse side of this questionnaire concerning changes or improvements you would like to see made in the Mechanized Agriculture program at TAMU.

APPENDIX B

LETTERS OF TRANSMITTAL

TEXAS A&M UNIVERSITY
DEPARTMENT OF AGRICULTURAL ENGINEERING
COLLEGE STATION, TEXAS 77843
AC 713-845-3931

June 27, 1979

Dear

We contacted you last year in an attempt to locate and gather information of Mechanized Agriculture graduates from Texas A&M University. This information was very useful to us in the Mech. Ag. department in updating our files on our former graduates. By now you should have received a copy of the results of that survey.

Mr. Chester Darcey of our department is now gathering information toward a more intensive study of our degree program. He is utilizing a follow-up study of our graduates and their employers as part of his doctoral study at Oklahoma State University. It is hoped that this information can be used in giving direction to curriculum development and revision.

The intent of this study is not only to make a contribution to Mechanized Agriculture in general but particularly to the extent that it enhances the effectiveness of the Mechanized Agriculture program at Texas A&M University.

Since we expect this study to be of major importance in helping to establish any changes of direction in our Mech. Ag. program, it is my hope that you will participate in this study by completing the enclosed questionnaire. Your judgement and recommendations will be of significant help to this department.

Yours truly,

Lambert H. Wilkes

Lambert H. Wilkes
Professor

LHWvk

enclosure

TEXAS A&M UNIVERSITY
DEPARTMENT OF AGRICULTURAL ENGINEERING
COLLEGE STATION, TEXAS 77843
AC 713-845-3931

Dear

You may be aware that I am now attending Oklahoma State University and in the process of completing my doctoral degree. I have been here since December and plan to return to A&M in September to continue work in the Mechanized Agriculture department.

As you know from your experience, all organizations should periodically evaluate themselves to continually strive to update and improve. In education, and particularly education in agriculture where changes occur almost daily, it is even more important that we try to maintain relevance and excellence in our programs. It is my hope to receive enough information, from you and other former Mech. Ag. students and their employers, to give us some guidelines with which to evaluate phases of our Mech. Ag. program to the end and that necessary revisions might be implemented if needed.

Your cooperation in the endeavor is of extreme importance to the success of the study. It would be greatly appreciated if you would answer the questionnaire, see that your employer or immediate supervisor answer theirs, and then insure their return to me as soon as possible. Because of the relatively small size in the number of our graduates, it is imperative that we hear from all graduates to keep from biasing the validity of the study.

I have attempted to make the questionnaire consume as little of your and your employer's time as possible. Please take time now to complete and return the questionnaire to me in return mail. It would help, I am sure, if you would take the questionnaire to your employer and encourage him to complete it.

I hope that this is not too much of an inconvenience for you, but I hope you realize too, the importance of it to me. I appreciate your help and hope that I can return the favor.

Sincerely,

Chester L. Darcey

P.S. If you are self-employed, indicate this on your questionnaire and discount the employer's questionnaire.

CLDvk

TEXAS A&M UNIVERSITY
DEPARTMENT OF AGRICULTURAL ENGINEERING
COLLEGE STATION, TEXAS 77843
AC 713-845-3931

Dear

Recently I mailed you some questionnaires concerning the Mechanized Agriculture department and your training at Texas A&M University. The information from you and your employer (if applicable) is desparately needed to complete and make this study valid.

As you know, this study is the basis for my dissertation and a requirement for successful completion of my doctoral program. Furthermore, we at Texas A&M in the Mechanized Agriculture department need this information, that only you can supply us, to look critically at our program for evaluation and revision purposes.

Possibly you have misplaced the information from the first mailing. For this reason, I have included another packet for your convenience.

Please take a few minutes to help us with this study by completing your questionnaire and by asking your employer or supervisor to do likewise.

Thank you for your cooperation and effort in this matter. Your help is deeply appreciated.

Yours truly,

Chester L. Darcey

VITA 2

Chester L. Darcey

Candidate for the Degree of

Doctor of Education

Thesis: FOLLOW-UP OF MECHANIZED AGRICULTURE GRADUATES AT TEXAS A&M UNIVERSITY

Major Field: Agricultural Education

Biographical:

Personal data: Born in Dallas, Texas, March 26, 1945, the son of Mr. and Mrs. C. F. Darcey.

Education: Graduated from John Tyler High School, Tyler, Texas, in May, 1963; received Associate of Arts degree from Tyler Junior College, in 1972; received Bachelor of Science degree in Agricultural Education from Texas A&M University in 1973; received Master of Education from Texas A&M University in 1974; enrolled in doctoral program at Oklahoma State University, 1978-79; completed requirements for the Doctor of Education degree at Oklahoma State University in May, 1980.

Professional Experience: Production worker, Kelly Springfield Tire Company, 1963-1972; graduate research assistant, Agricultural Education Department, Texas A&M University, 1974; instructor in Mechanized Agriculture at Texas A&M University, 1974-1978; research associate, Home Economics Department, Oklahoma State University, 1979; lecturer, Agricultural Engineering Department, Texas A&M University, 1979-1980.