DETERMINING COMPETENCIES FOR INITIAL EMPLOYMENT IN THE DAIRY FARM EQUIPMEMT BUSINESS

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ABSTRACT

DETERMINING COMPETENCIES FOR INITIAL EMPLOYMENT IN THE DAIRY FARM EQUIPMENT BUSINESS

by Harrison Gardner

Purpose.--The purpose of this study was to demonstrate a method of identifying certain competencies and related information essential to the success of persons who seek employment in non-farm occupations that provide the farmer with direct-contact services. This information should provide a basis for the development of effective training programs.

Method.--The method utilized to gather occupational information and translate the information into vocational programs was developed in the perspective of a larger, more inclusive framework. To demonstrate this method, data were secured relevant to one phase of the non-farm agricultural industry, the dairy farm equipment business. From a review of occupational literature and materials provided by members of national and state associations of businessmen and farm equipment companies in the United States, a list of 129 worker competencies was prepared in the form of a questionnaire. This survey instrument was designed to obtain information considered important for the preparation of workers who, during initial employment, sell, install, or maintain

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bulk milk tanks or milking systems. The questionnaire was completed by a panel of 11 persons considered to be authorities within or associated with the dairy industry, and a group of 88 Michigan teachers of vocational agriculture. The panel members indicated the value and importance of each competency for entrance workers. The teachers indicated which of the competencies had been taught in All-Day, Young Farmer, or Adult Farmer classes during the past year. The responses of the panel members and teachers were tabulated and compiled into tables. These tables summarize the percentages of responses by both the panel members and the teachers to each of the items in the questionnaire.

Findings and interpretations.--Responses of panel members indicated that the method demonstrated in this study was effective in obtaining important information for workers who seek employment in certain non-farm agricultural occupations. These occupations provide the farmer with direct-contact services through the sale, installation, and maintenance of bulk milk tanks or milking systems. The method as demonstrated was effective in providing information that can be used as a basis for developing training programs.

The responses of the panel members provided consistent clusters of competencies around which educational programs can be organized to prepare workers for specific occupations. Clusters of cognitive and manipulative competencies were identified in the areas of farming, human

relations, salesmanship, and mechanics that are important for employees who during initial employment sell, install, or maintain bulk milk tanks or milking systems.

Nearly three-fourths of the 129 competencies were rated by over 60 per cent of the panel members as having considerable value for these workers. Over 60 per cent of the panel members indicated that: (1) slightly over one-half of the competencies were important for workers who during initial employment only sell or sell and maintain the prescribed dairy equipment; (2) slightly less than one-fourth of the competencies were important for workers who install, maintain, or install and maintain equipment. The clusters of competencies should provide a basis for the development of operationally-defined objectives. Instructional programs based on these objectives should contribute to the preparation of workers for initial employment.

Responses of teachers indicated that few of the competencies identified by the panel members as those needed by workers who sell, install, or maintain bulk milk tanks or milking systems were being taught as a part of local programs of vocational agriculture in Michigan. If persons are to be prepared for initial employment in these occupations through programs of vocational agriculture, extensive modification of programs must be made.

DETERMINING COMPETENCIES FOR INITIAL EMPLOYMENT IN THE DAIRY FARM EQUIPMENT BUSINESS

By

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TABLE OF CONTENTS

LIST OF TABLES

LIST OF APPENDICES

Appendix
Table

CHAPTER I

INTRODUCTION

We are living in a dynamic and revolutionary age. The changes which are occurring have been classified as social, political, economic, philosophical, and technical. Classification in itself is not significant; however, the societal effects of these changes in patterns of living and thinking are crucial. Today's educator must provide leadership in accepting the challenge of social dynamism by planning and implementing programs which will help prepare man to participate actively and effectively in a rapidly changing society.

These social and technical changes have greatly affected agriculture and related educational programs. The history of American agriculture shows that it has undergone tremendous changes. It has expanded from self-sufficient farming to a multi-billion dollar industry which includes farming, the provision of supplies and technical services to the farmer, and the processing and marketing of farm products. Modern agriculture is characterized by complex machinery, equipment and technology.

Many of the functions once performed by the farmer are provided now as services to the farmer by non-farm

agricultural workers, many of whom require specialized education. Educational programs have been developed to meet the vocational education needs of farmers. These programs must be modified or new programs established to meet the needs of farmers and this new group of agricultural workers.

It is the purpose of this chapter to present a statement of: (1) the problem; (2) the need for the study; (3) the plan of the study; (4) the basic assumptions which underlie the study; (5) the limitations of the study; and (6) the definition of terms used in the study.

Statement of the Problem

It is the purpose of this study to demonstrate a method of identifying certain competencies that are essential to the success of persons who seek employment in non-farm agricultural occupations that provide the farmer with direct-contact services. These competencies should serve as a basis for the establishment or modification of effective vocational programs to prepare workers for these occupations.

Persons who are employed in non-farm agricultural occupations must be sufficiently competent to perform the required functions of that occupation at a prescribed level. These required competencies must be identified to serve as a basis for organizing vocational programs of instruction for the preparation of potential employees. Pertinent occupational data must be secured from the agricultural industry and translated into vocational courses of instruction.

In a democratic society, the development of an effective method of determining the employment needs of individuals includes more than the establishment of a procedure for securing occupational information and translating the information into effective vocational education programs. The procedure utilized and the resultant vocational education programs should be put in perspective with a larger, more extensive frame of reference within which these programs are developed: the values and purposes to which a democratic society is committed. Such a method will (1) insure the continuous improvement of vocational education programs to meet the needs of individuals and industry under new conditions in an ever-changing society, and (2) provide a justification of the method and of the educational programs.

Need for the Study

Many changes have occurred in agriculture in the United States since its inception, especially during the last two decades. The size of the average farm has doubled while the number of farm operators has decreased considerably. The percentage of the labor force employed on farms decreased from 11.9 per cent in 1947[1] to 9.0 per cent in November, 1957.[2]

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[1]Department of Labor, Monthly Labor Review, LXVI, number 1 (January, 1948), p. 81.

[2]Department of Labor, Monthly Labor Review, LXXXI, number 1 (January, 1958), p. 83.

From 1944 to 1959 specialization, technology, and mechanization have resulted in the following changes: (1) farm output in terms of production per man hour has more than doubled;[3] (2) the total man hours of labor used for all farm work has been reduced by over 50 per cent; (3) the number of milk cows on farms decreased from well over 25 million to slightly more than 19 million,[4] and during the same period the average production per milk cow increased from 4,787 to 6,438 pounds;[5] and (4) the value of farm machines and equipment shipped for use in the United States increased from slightly over 549 million dollars to over 1,700 million dollars.[6]

These developments have been accompanied by the rise of a new group of agricultural businesses. These businesses employ specialized workers who perform many of the tasks formerly done by the farmer. The specialists develop, distribute, and disseminate information with regard to new machinery, improved seed, and better feeds. They also sell, install, and maintain complex farm equipment. The farmer has

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[3]United States Department of Agriculture, Agricultural Statistics, 1960 (Washington, D. C.: Superintendent of Documents, United States Government Printing Office, 1961), p. 465.

[4]Ibid., p. 493.

[5]Ibid., p. 388.

[6]Ibid., p. 451.

become increasingly dependent upon these specialists for high quality services. The success or failure of his farm enterprise can be largely attributed to his managerial ability and to the competence of these workers.

By the fifth decade of the twentieth century, a significant percentage of the labor force in the United States was employed in agriculture. In a recent paper, one agricultural economist stated that 37 per cent of the total labor force of 64.5 million workers were employed in agricultural occupations. Of these 23.9 million workers, approximately one-third were farmers; 25 per cent were engaged in providing feed, seed, machinery, and equipment to the farmer; and 42 per cent were engaged in the processing and distribution of farm products.[7] These data clearly point up the fact that by 1954 two-thirds of the workers engaged in agriculture were employed in non-farm agricultural occupations. Six million were engaged in providing materials and equipment to the farmer. This is three-fourths the number who were engaged in farming.

In spite of the increased number of workers employed in non-farm agricultural occupations, only minor changes have been made in established vocational agriculture education

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[7]Richard G. Ford, "Agriculture and Its Relationship to Other Segments of the Economy" (report of a seminar paper; Washington, D. C.: Federal Extension Service, United States Department of Agriculture, 1958), p. 10.

programs. These programs continue to provide experiences for youth and adults to enter and advance in farming, but place little emphasis on preparing persons to enter other agricultural occupations.

The necessity for determining the educational needs of these persons has been cited in several recent studies. Royster implied that an examination must be made of all agricultural occupations to determine the ". . . common needs for which training might be incorporated into the program of vocational agriculture."[8] The study by Tom, Hill, and Greene[9] also emphasized the necessity for determining the common needs of workers in agricultural occupations through studies of these areas. In a comprehensive study of former secondary vocational agriculture students, Sanders[10] reported that one out of five who completed one or more courses of vocational agriculture entered farming; and six out of 100 entered a

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[8]Ralph R. Royster, "Analysis of Non-Farming Agricultural Occupations of Boys Having Training in Vocational Agriculture From Selected Counties in Indiana" (unpublished Doctor's dissertation, The University of Missouri, Columbia, 1959), p. 15.

[9]Frederick K. T. Tom, Charles W. Hill, and Kingsley L. Greene, Employment Opportunities in Certain Occupations Related to Farming in the Syracuse Economic Area, New York (report of a study; Ithaca, New York: Agricultural Education Division, Rural Education Department, Cornell University, 1961).

[10]W. H. Sanders, "Follow-up of Students of Vocational Agriculture in South Carolina, 1955-1960" (report of a study; Blacksburg, Virginia: Department of Agricultural Education, Virginia Polytechnic Institute, 1955). (Mimeographed.)

farm-related occupation. Another recent study[11] indicated that of 4,826 individuals who had studied vocational agriculture in high school, 17 per cent were in full-time farming, 15 per cent were farming part-time, and 10 per cent were employed in non-farm agricultural occupations in 1960.

Finally, Sutherland and Thompson,[12] in a survey of 327 agricultural businesses in California, reported that one out of five persons employed needed agricultural training. They recommended that further studies of these businesses be made.

These studies clearly support the necessity for determining the educational needs of persons who seek employment in non-farm agricultural occupations.

Traditionally, vocational education programs in agriculture have been based on a survey of the leading farming businesses in a community. New programs were established or existing programs were modified to meet the needs of the farming business or the individuals employed by farmers. But is this the best procedure?

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[11]Mississippi State Board for Vocational Education, Occupational Status of Former Students of Vocational Agriculture in Mississippi in 1960 (report of a study; Jackson, Mississippi: Vocational Agricultural Education, 1961), p. 8.

[12]S. S. Sutherland and O. E. Thompson, The Training Required by Workers in Agricultural Business and Industry in California (report of a study; Sacramento, California: California State Department of Education, 1957), p. 8.

Some educators feel that established vocational agriculture programs should be held strictly to preparation for farming. Others believe that these programs in the local public schools should be modified to include instruction to prepare persons for employment in agricultural businesses, including farming. In support of this belief, Wiegers,[13] in a recent study, concluded,

> It seems that vocational education in agriculture below college grade must begin playing a new and greater role by providing instruction in agriculture which will have wide application not only in the farming occupations, but in the non-farm agricultural occupations.[14]

He also developed a series of questions and issues which should be resolved through research and discussion. One question as stated was, "Upon what foundations should the program of instruction be built?"[15] Other writers have asked this and similar questions. Should the educational needs of employees be determined by surveying local business establishments or the leaders in the industry? Should researchers continusously examine business, industry and established educational programs, and recommend modification of these programs?

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[13] George W. Wiegers, "Our New Role in Vocational Agriculture" (a report to the Tennessee Vocational Agriculture Teachers at the Joint Conference of Teachers of Vocational Education, University of Tennessee, Knoxville, June 5, 1962).

[14] Ibid., p. 21.

[15] Ibid., p. 22.

These questions must be given careful consideration. It is necessary to devise a satisfactory method of determining and meeting the occupational needs of individuals. This method, when adapted to vocational agriculture programs, must be placed in perspective within the larger framework of democracy.

Such a framework will provide the limitations within which key issues and questions can be discussed. It will also provide a rationale for (1) a continuous examination of changes which have occurred and which are occurring in agriculture, as they affect the educational needs of potential workers in agricultural occupations; (2) the method used to determine these educational needs; (3) the existence of public vocational education programs in agriculture; and (4) implementing changes in these public educational programs.

Plan of the Study

The first part of this study is concerned with the establishment of a broad framework of democracy and a method of determining the educational needs of individuals for employment in non-farm agricultural occupations. The second part is concerned with a survey to demonstrate the method within the established framework.

Establishing the framework for the study.--In Chapter II, a broad framework is established to provide a justification for the establishment and modification of vocational

programs in agriculture, and to provide a method of determining the vocational needs of individuals. To establish this framework several tenets of American democracy are discussed to provide a frame of reference within which a method can be justified for determining the educational needs of workers who seek employment in certain non-farm agricultural occupations. This framework also provides a rationale for modifying and establishing vocational agriculture programs.

Secondly, the development of the American secondary school is briefly outlined to illustrate how a democratic society expands its social institutions and modifies its programs to meet the challenge of changing conditions. This discussion is included to further clarify and establish the framework which is developed.

A description of federally subsidized education programs in vocational agriculture that were established in the American public schools during the early part of the twentieth century will be briefly discussed. The purpose of this section is to demonstrate that these programs were aimed primarily at meeting the needs of workers in one segment of the agricultural work force, viz., present and prospective farmers.

Following this description, a brief history of American agriculture is developed to point out the vast and significant changes which have occurred, especially during the past forty years. Of particular note is the rise of large

non-farm agricultural businesses employing persons who serve the farmer. This discussion points up the need (within the democratic rationale which is established) for modification of established programs of vocational agriculture and the development of new vocational agriculture programs.

Thereafter, a review of significant studies designed to determine the educational needs of non-farm agricultural workers is presented. Also in Chapter II, a method is described for determining the vocational education needs of individuals who wish to prepare for entering certain non-farm agricultural occupations.

Method and procedure.--Chapter III describes the method and procedure used to secure data relevant to one phase of the non-farm agricultural industry. The sources of data and the procedure utilized to secure the data will demonstrate a method of identifying competencies that are essential to the success of persons who seek employment in certain non-farm agricultural occupations. These competencies should serve as a basis for organizing effective vocational programs to prepare workers for these occupations. In demonstrating this method, survey instruments were developed, and specific data were secured to identify the competencies which should be possessed by persons for initial employment in selected occupations which provide direct-contact services to the dairy farmer. These services include the sale, installation, or maintenance of bulk milk tanks or milking systems.

The data for the study were secured by surveying authorities associated with the American dairy industry. Data were also secured to determine which of the identified worker competencies were currently taught by a selected group of Michigan teachers of vocational agriculture. This procedure provided a basis for suggesting modification of local programs of vocational agriculture education to meet the needs of these workers.

Chapter IV provides a summary of the findings. The data are organized into tables showing the percentages of responses to items in the survey questionnaire. These data will provide a basis for the development of instruction to meet the vocational needs of entry workers who sell, install, or maintain bulk milk tanks or milking systems on the farm. It should also offer evidence which would support or refute the method utilized.

Finally, in Chapter V, a summary of the study is reported, together with conclusions and recommendations.

Basic Assumptions

The following assumptions are recognized as basic to this study:

1. Public educational institutions were established in the United States to provide educational experiences which would benefit the individual and society. Work is a socially acceptable activity

which is vital to a democratic society. Therefore, public educational systems should provide instructional programs which include the preparation of persons for successful employment.

2. Professional educators are responsible for studying the principal problem areas in contemporary society and correctly assessing social demands for changes in educational programs.
3. Social problems and demands must be evaluated in terms of democracy. Judgments must be made concerning values, policies, and programs which should be conserved or changed.
4. Changing social conditions and the subsequent new knowledge which has not yet been fully applied in professional thinking must be utilized in solving current social problems and in meeting social demands for change.

Limitations of the Study

The scope of this study is limited by the following:

1. The study is concerned with demonstrating a method of determining certain competencies that should be possessed by workers, for initial employment, in certain non-farm agricultural occupations. The study is based on a selected list

of mechanical, sales, human relations, and farming competencies that are considered to be essential to the success of employees who during initial employment sell, install, or maintain bulk milk tanks or milking systems.

2. The competencies that are identified in this study are based on the judgments of persons who are authorities regarding the American dairy industry. These competencies should be applicable to personnel in the United States who are employed in occupations that sell, install, or maintain the above-mentioned dairy equipment.
3. The extent to which the identified competencies are taught in public educational institutions is determined by surveying a selected group of Michigan teachers of vocational agriculture.

Definition of Terms

The following are definitions of terms which are basic to this study:

Farming.--The phase of agriculture concerned with production through the management of, or labor on, a farm.[16]

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[16] Sutherland and Thompson, op. cit., pp. ii-iii.

Occupation.--A job occurring in a number of firms or establishments, or a group of jobs sufficiently similar in functions, responsibilities, and working conditions to warrant similar treatment in personnel processes.[17]

Agricultural Occupations.--Occupations in the following three categories: (1) agricultural production: these include the actual on-farm production of food and fiber, i.e., farming; (2) agricultural business and industry, e.g., the sales and service of farm equipment and machinery; and (3) agricultural professions, e.g., forestry, veterinary medicine, and extension service.[18] This study is primarily concerned with occupations in the second category for which a college degree is not normally required.[19] Some knowledge of farming, however, is required in these occupations.[20]

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[17]William H. Stead and W. Earl Masincup, The Occupational Research Program of the United States Employment Service (Chicago: Public Administration Service, 1943), p. 62.

[18]Harold M. Byram, Guidance in Agricultural Education (Danville, Illinois: The Interstate Printers and Publishers, Inc., 1959), p. 65.

[19]Norman K. Hoover, Handbook of Agricultural Occupations (Danville, Illinois: The Interstate Printers and Publishers, Inc., 1963), p. 5.

[20]William Henry Kennedy, "A Clarification of Relationships Between Farming and Certain Other Agricultural Occupations with Implications for Guidance and Curriculum Development" (unpublished Ed.D. dissertation, Michigan State University, East Lansing, 1958), p. 398.

High Echelon Position.--A position in the upper portion of the hierarchy of authority within an industry, a business, an agency, or an educational institution. A person occupying this position is cognizant of the strategic aims of the business or industry; he is actively concerned with external relations and internal processes of the business.[21]

Manipulative Competence.--The operational skills leading to relatively immediate and concrete observable results.

Cognitive Competence.--The knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made.

Summary

In this chapter, a statement of the problem, the need for, and the scope and limitations of the study were presented, together with the basic underlying assumptions and definitions of terms.

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[21]Burleigh B. Gardner and David G. Moore, Human Relations in Industry (Homewood, Illinois: Richard D. Irwin, Inc., 1955), p. 16.

CHAPTER II

A FRAMEWORK FOR THE ESTABLISHMENT OF VOCATIONAL EDUCATION PROGRAMS

The purpose of this chapter is to (1) develop a concept of democracy which provides a basis for the establishment and modification of vocational programs in agriculture and a method of determining the vocational education needs of individuals; (2) briefly trace the development of the American secondary school to illustrate how a society expands its social institutions and modifies its program to meet the challenge of democracy; (3) describe the federally subsidized education programs in vocational agriculture that were established in the American public schools during the early part of the twentieth century; (4) discuss the important changes which have occurred in American agriculture that demand modification of established vocational agriculture programs; (5) review studies designed to determine the educational needs of non-farm agricultural workers; and (6) describe a method of obtaining information important to individuals who wish to prepare for entering certain non-farm agricultural occupations.

The Ideals of American Democracy

In this section the ideals of democracy which have contributed to the development of effective, free public education programs in America are outlined. These basic tenets serve as a broad social framework. The procedure used to identify worker competencies leading to the modification of public voctional education programs should be established within this frame of reference.

Democracy has a commitment to an open society.--There is an inherent conviction in a democracy that men can improve their society if they are provided the facts and are free ". . . to compare things as they are with their vision of things as they ought to be."[1] The existing order of things must be open to continuous examination. Nothing within a democratic society is exempt from criticism. Within this commitment all human arrangements are subject to error. However, democracy provides for a process of continuous evaluation of all institutions programs, and human needs, through which errors can be corrected.[2]

This process is the source of authority in a democracy. In clarifying this concept, Sayers and Madden stated that:

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[1]The Rockefeller Panel Report, The Power of the Democratic Idea, Special Studies Project Report VI (Garden City: Doubleday and Company, Inc., 1960), p. 5.

[2]Ibid., p. 5.

> The people of a democracy cooperatively create and, as they learn from inquiry, recreate the sources of their authority in the form of such processes. Upon these methods and procedures they depend for the determination of policies and programs of action.[3]

This asserts that democratic citizens rely on intelligent inquiry as a source of ideas for the changes which need to be made in the interest of order and stability.

Democracy has a commitment to equal membership in the moral community.--This belief in a process of continuous examination suggests another fundamental democratic tenet. Every man is endowed with equal rights to the full development of his capacity. A true democrat respects every individual for his integrity, not for his membership in a given group. He is vitally concerned with human welfare. He actively seeks the improvement of the material state of man; the development of each as an independent individual; and his entrance as a full participant into the enterprises of his community. For "To believe in democracy is to wish to help individuals by giving them the tools to help themselves."[4]

Democracy has a commitment to respect individual diversity and privacy.--This belief that all men are endowed

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[3]Ephraim V. Sayers and Ward Madden, Education and the Democratic Faith (New York: Appleton-Century-Crofts, Inc., 1959), p. 95.

[4]The Rockefeller Panel Report, op. cit., p. 6.

with equal rights in the moral community alludes to another democratic ideal. To be concerned with democracy is to be concerned with human beings, not in totality, but one by one. Each individual must exercise his own judgment and choose his own basic beliefs. Each must also be just as concerned for the freedom of others and the right of others to think differently.[5] Such a commitment demands faith in the efficacy of human intelligence and good will. Continuous self-discipline and rational behavior are mandatory. Behavior cannot be predicated upon impulse in response to an indeterminate situation. It must result from reflective thinking, respect for others, and suspended judgment.

These tenets of democracy imply that the conditions of occupations and public educational programs should be continuously evaluated. Knowledgeable representatives of business and industry should be queried to determine the competencies needed by individuals seeking employment. Once this has been accomplished, educational personnel should indicate which of these competencies are currently included as a part of the vocational curriculum. The curriculum should be modified to provide the desired instruction. If public educational institutions cannot provide suitable instruction, other agencies must accept this responsibility.

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[5] Ibid., p. 7.

This process is dependent upon the ability of individuals to scientifically and judiciously determine the employment needs of persons.

Democracy has a commitment to government by consent.--A society that is committed to the tenets which have been set forth must provide opportunities for the development of individual purposes and abilities. Such a society will be characterized by mobility, not a fixed uniform social order. Necessarily, as individuals strive to enhance their interests, unanimity of agreement regarding the development and implementation of public policy will not be possible. In fact, a lack of complete harmony is expected. A system of government must be utilized which will settle disagreements and disputes in a peaceful and harmonious manner. Government by consent, the political ideal of democracy, fulfills this need.[6]

As a political system, democracy demands that conflicts and issues must be brought out in the open and viewed within a social and legal framework. All public policies and programs must be subject to public discussion. This system rests upon responsibility and accountability.

Any scientific method that is utilized to obtain occupational information which will serve as a basis for organizing public educational programs should be developed

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[6] Ibid., p. 8.

and justified within an acceptable social framework. This will result in the development of a method that is consistent with the best current data and also with the best experience drawn from the past.

Democracy rests upon an assumption of faith.--The democratic ideals which have been described manifest an assumption of faith. "The conviction is that the value of all human arrangements must be measured by what they do to enhance the life of the individual--to help him grow in knowledge, sensitivity, and the mastery of himself and his destiny."[7]

The members of a democracy are committed to providing each with the basic constructs of economic security that are essential to the good life. Such a society ". . . cannot be indifferent to the conditions of its economy, the development of its technology, or the material possessions in the hands of its people."[8] For these important concerns are not ends, but means to an end--the development of the individual. All must strive to establish social conditions in which the individual can utilize his unique interests and abilities more extensively through his contributions to that society. A democracy, therefore, judges itself by

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[7] Ibid., p. 11.

[8] Ibid., p. 12.

the character of its members, and by the quality of their lives.[9]

Democracy is a system which must continuously develop.--American democracy is a testing ground for democratic ideals. The test is in the power of these ideals to generate faith, expand social institutions, and modify policies and programs to achieve greater human progress. As Dr. Gordon Lee so aptly stated:

> Democracy, dedicated as we have seen to the improvement of the conditions of human life and the enhancement of individual happiness, is never content with the status quo; it is constantly and inherently dissatisfied with conditions as they are. . . . Democracy must advance or ceases to be a democracy.[10]

American democracy has continuously expanded its social institutions, and modified programs and policies in the interest of the development of individual capacities; it must continue to do so to insure the highest quality of associated living.

The Function of Education in a Democracy

How can a democratic society be assured that human reason is equal to its charge? How can its citizens be prepared to discharge their duties and accept their responsibilities and obligations?

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[9] Ibid.

[10] Gordon C. Lee, An Introduction to Education in Modern America (rev.; New York: Holt, Rinehart and Winston, Inc., 1957), p. 44.

Social institutions must be established and developed to meet this charge. If the human individual is the principal point of concern, ". . . all the institutions in a democratic society exist for the purpose of promoting his growth."[11] That is, his growth is promoted through his contributions to society.

The free public school is one of the institutions in America which was designed to prepare an intelligent citizenry. The American people have become aware that ". . . in a nation where all citizens have civic responsibilities, it is necessary for all of the people to have an education for intelligent citizenship."[12] In summing up the responsibility of the school, Bode said ". . . the school is peculiarly the institution in which democracy becomes conscious of itself."[13]

Extensive educational programs must be developed which will provide opportunity for each individual to examine problems, programs, and policies through cooperative inquiry. Through this process, each will develop an understanding of how decisions by individuals in small groups

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[11]Sayers and Madden, op. cit., p. 429.

[12]John F. Cramer and George Stephenson Browne, Contemporary Education: A Comparative Study of National Systems (New York: Harcourt, Brace and Co., 1956), p. 27.

[13]Boyd H. Bode, Democracy as a Way of Life (New York: Macmillan Company, 1950), p. 95.

affect the welfare of others, whereby controversial issues are settled by intelligent inquiry and each will synthesize a system of beliefs and values compatible with the American democratic ideal. Educational programs will also enhance the development of the individual's interests and capacities, including occupational competence, in socially acceptable ways.

The tenets of democracy which are outlined above clearly provide a justification for the establishment and modification of public education programs. They also assert that these organized instructional programs should be open to continuous evaluation to determine their effectiveness in meeting the needs of individuals and society. In fact, within a developing and changing democracy, program and policy changes should be expected. Further, the method used to determine these needs must be based on rational and intelligent inquiry by those concerned.

Programs of vocational agriculture are an integral part of the public school curriculum. They, too, must be open to continuous examination. They should be based upon the occupational requirements of agricultural business and industry to fulfill the interests, capacities, and needs of the potential agricultural employee and to further agriculture. These occupational requirements must be determined by a careful study of the conditions and demands of the agricultural occupations that serve American society. Those

persons associated with an industry who have the greatest knowledge about and concern for the occupational needs of potential workers should provide information to help workers function more effectively during initial employment.

The basic ideals of democracy and their implications for education have been discussed and a framework for the development of public educational programs has been established. A primary concern of this study is to develop a method of determining the vocational education needs of individuals through a continuous examination of industry and public educational programs. A second concern is to justify the need for modifying these educational programs within the demands of a developing and changing democratic society.

Changes in the goods and services provided by an industry effects changes in the competencies that must be possessed by employees who provide them. Vocational education programs, then, should be established or modified to provide potential employees with the desired competencies.

In the next part of this chapter a brief description of the development of the American secondary public school will be given to illustrate how institutions and programs in a democracy demand modification to meet individual and societal needs. This illustration has implications for the modification of vocational agriculture courses within a changing agricultural industry.

The Development of the American Public Secondary School

It was stated earlier that "American Democracy is a testing ground for democratic ideals. The test is in the power of these ideals to generate faith, expand social institutions, and modify policies and programs to achieve greater human progress."[14] The challenge of democracy is clearly exemplified in the development of the secondary school in America.

The Latin Grammar School.--The development of American secondary education is the story of gradual change from church domination to state control.[15] During the Colonial Period the church was the center of educational interests. Democratic concerns were focused largely on freedom of worship and provision for well-prepared community leaders.[16] The Latin Grammar School was established to prepare a select number of boys for entrance to college. The experiences, such as mastery of Latin and Greek, provided by the Latin Grammar School and the college prepared the clergy for their

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[14] Cf., p. 23.

[15] Ellwood P. Cubberley, Public Education in the United States (Cambridge, Massachusetts: Houghton Mifflin Co., 1947), p. 12.

[16] R. Freeman Butts, A Cultural History of Western Education (New York: McGraw-Hill Book Co., Inc., 1955), p. 443.

roles as church-state leaders.

The Academy.--The opening of the frontier broke down the crystallized colonial way of life, i.e., it became less parochial and more secular. Frontier life was marked by the need to obtain useful and practical knowledge for survival.[17] Scientific thought and method were utilized as tools to improve man's social and economic conditions.[18] It became obvious, then, that the Latin Grammar School with its limited curriculum and exclusive college-preparatory aims was inadequate for the needs of American youth. There was a demand for a more practical institution, less exclusive and less aristocratic in character, and better adapted in its instruction to the needs of a frontier society.[19]

The Academy was established as the social institution to satisy these demands. Preparation for improved social life was accomplished by a curriculum offering courses such as agricultural chemistry, mathematics, bookkeeping, English, and physics.[20]

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[17]Frederich J. Turner, The Frontier in American History (New York: Henry Holt and Co., Inc., 1920). This publication presents an excellent account of this point.

[18]William E. Drake, The American School in Transition (Englewood Cliffs, New Jersey: Prentice-Hall, Inc., 1955), p. 108.

[19]Cubberley, op. cit., p. 112.

[20]Ibid., p. 250.

The American High School.--The Industrial Revolution during the nineteenth century had a greater impact on the total mode of living than any other single event in American history. The patterns of educational development followed closely the development of industrialization and urbanization.[21] Industrial development increased the productive capacity of man and his potential standard of living. Education was given renewed priority as a means by which man could acquire greater skill and attain a higher standard of living. Three influential groups--business, organized labor, and national political and educational leaders--who supported secondary public schools were instrumental in achieving curriculum modifications to meet emerging human and democratic needs. Curricular emphasis was placed upon economic well-being, improved occupational skills, and understanding the functioning of sound government. The focus of attention moved from fundamental mathematics to algebra and geometry; from astronomy to physics, chemistry and biological sciences; from rhetoric to literature and modern languages; from ancient history to civics and economics. Subject areas which were added by the end of the nineteenth century included manual training, physical education, home economics, and agriculture.[22]

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[21]Drake, op. cit., p. 187.

[22]Ibid., p. 361.

The early twentieth century was characterized by the business and industrial corporation, a rapidly growing technology, heavy concentration of populace in urban areas, increased social and geographic mobility, emphasis on skilled labor, power, speed, and rapid change.

Since 1900, the outstanding tendency at the secondary level has been that of attempting to provide curricular experiences which are more compatible with the modern needs of every individual of high school age: experiences which provide the tools necessary to analyze present and future situations and to develop the unique interests and capacities of each individual. To accomplish this, a variety of elective subject areas, including programs of vocational education were offered.

Vocational education as a part of the curriculum.--A brief discussion of the aims of vocational education programs within the democratic framework which was established earlier will provide a rationale for including these programs in the public school curriculum.

The aim of vocational education is preparation for socially useful work. The justification for establishing vocational education programs as stated earlier in this chapter is ". . . the members of a democracy are committed to providing each with the basic constructs of economic security that are essential for the good life."[23] Further,

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[23] Cf., p. 22.

it was stated that a democracy will ". . . strive to establish social conditions in which the individual can utilize his unique interests and abilities more extensively through his contributions to that society."[24] In short, work in a democratic society is a socially acceptable activity which provides each individual with the basic conditions of economic security, and with the opportunity to develop his special interests and capacities. Vocational education programs were established to assist individuals to achieve these goals.

It should be pointed out that the conditions of economic security and well-being are not ends in themselves; neither should the aims of vocational education be limited to these ends. To assure this, vocational education programs should be established as an integral part of the total education program. These programs should be designed to develop the competence needed by individuals to enter and make progress in an occupation on a useful and productive basis, and to contribute ". . . toward the development of good citizens by developing their physical, social, civic, cultural, and economic competencies."[25] Hence, effective vocational instruction contributes to the development of proficient workers who are good citizens.

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[24] Cf., p. 22.

[25] American Vocational Association, Definitions of Terms in Vocational and Practical Arts Education (Washington, D. C.: Committee on Research and Publications, 1954), p. 27.

Of particular significance and relevance to this study was the emergence of vocational programs offered by the public high school and designed to meet the needs of potential agricultural workers and to improve agriculture. Since only a fraction of the vocational programs in agriculture were established without the aid of federal funds, only the federally subsidized programs will be described.

The Establishment of Programs of Vocational Agriculture

Federally subsidized programs of vocational education were authorized by the Vocational Act of 1917. As was stated earlier, the conditions of industrialization, diversification, and urbanization led to the establishment of vocational subjects in the high school curriculum to provide needed occupational competencies. With the rise of the factory, large industries and diversified farming, varying levels of skill were needed by different industries and different levels were required within an industry. An increasing number of workers needed a high degree of skill. There was also an increased compulsory attendance in school of large numbers of pupils who were in need of a breadth of experience, including preparation for employment. Also, there was a growing concern for the full utilization of resources, both natural and human.[26]

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[26]William P. Sears, Jr., The Roots of Vocational Education (New York: John Wiley and Sons, Inc., 1931), p. 279.

These demands were so great that in 1914 Congress authorized the President to appoint a Congressional Commission to consider national aid for vocational education. Prosser and Allen, in commenting upon the Commission's Report, stated: "The two great assets of a nation which enters into the production of wealth, whether agricultural or industrial, are natural resources and human labor. The conservation and full utilization of both of these depend upon vocational training."[27]

The report of the Commission led to the passage of the Vocational Act of 1917, commonly known as the Smith-Hughes Act. This Act provided funds for paying the salaries of teachers, supervisors, or directors of agricultural, trade, home economics, and industrial subjects.[28] Under this Act, policies were established within which local federally subsidized programs of vocational agriculture could be developed. The basic policy statement, as outlined in the Second Annual Report of the Federal Board for Vocational Education states:

> . . . that the controlling purpose of such education shall be to fit for useful employment; that such education shall be of less than college grade and be designed to meet the needs of persons over

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[27]Charles A. Prosser and Charles R. Allen, Vocational Education in a Democracy (New York: Appleton-Century-Crofts, Inc., 1925), p. 424.

[28]Sears, op. cit., pp. 200-01.

> 14 years of age who have entered upon or are preparing to enter upon the work or the farm or of the farm home.[29]

In 1918, 15,453 students were enrolled in these programs.[30] Instruction was provided through All-Day classes for youth enrolled in public high schools; through Young Farmer classes for out-of-school youth who were establishing themselves in farming; and through Adult Farmer classes for those who were improving their proficiency in farming.[31]

By 1950, the aim of vocational education in agriculture was defined as "To train present and prospective farmers for proficiency in farming. . . ."[32] The major objectives include the development of the ability to:

1. Make a beginning and advance in farming.
2. Produce farm commodities efficiently.
3. Market farm products advantageously.

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[29]Smith-Hughes Act (Public Law No. 347, Section 10, 64th Congress, approved February 23, 1917) in Second Annual Report of the Federal Board for Vocational Education (Federal Board for Vocational Education, Washington, D. C.: Superintendent of Documents, United States Government Printing Office, 1918), p. 118.

[30]Department of Health, Education, and Welfare, Digest of Annual Reports of State Boards for Vocational Education (for fiscal year ended June 30, 1962; Bulletin Number OE-80008-62; Washington, D. C.: Superintendent of Documents, United States Government Printing Office, 1963), p. 22.

[31]Department of Health, Education, and Welfare, Administration of Vocational Education, op. cit., p. 13.

[32]Department of Health, Education, and Welfare, Educational Objectives in Vocational Agriculture (Monograph Number 21; Vocational Division, Office of Education; Washington, D. C.: Superintendent of Documents, United States Government Printing Office, 1955), p. 3.

4. Conserve soil and other natural resources.
5. Manage a farm business effectively.
6. Maintain a favorable environment.
7. Participate in rural leadership activities.[33]

A review of these objectives clearly indicates that vocational education programs in agriculture were designed primarily to meet the needs of those individuals who wish to prepare for or advance in one phase of agriculture, i.e., farming.

Extensive programs of systematic instruction designed to achieve these objectives have been established. A variety of activities have been developed. Classroom activities provide opportunities for All-Day, Young Farmer, or Adult Farmer students to discuss farm-related problems. Classes may be held in the classroom, on a farm, at a place of business, or in any locality within the community that will enhance effective instruction. The basis for instruction is the farming programs of the students. These programs are under the close guidance and supervision of the vocational agriculture teacher.

Farm mechanics activities are an important part of the instructional program. They include areas, such as farm shop work, farm power and machinery, farm building construction and maintenance, rural electrification, and water

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[33] Ibid., p. 4.

management.[34]

In the All-Day program all of the above activities are organized with a school-sponsored organization, the Future Farmers of America, as an integral part of the total vocational agriculture program. The Future Farmers of America is a national organization designed to develop agricultural leadership, citizenship, and cooperation. A major goal is to provide an organization within which rural youth can discuss and define common problems, goals, and needs.[35]

Since 1918, an ever-increasing number of students have enrolled in vocational agriculture classes provided through the local public schools. In that year 15,453 students were enrolled; by 1961, this number had increased to 805,322 students who were enrolled in All-Day, Young Farmer, and Adult Farmer classes.[36]

These programs have served thousands of farm youth and adults who were preparing to enter and advance in farming, one phase of agriculture. However, agriculture has

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[34]Lloyd J. Phipps, Handbook on Teaching Vocational Agriculture (6th ed. rev.; Danville, Illinois: Interstate Printing Co., 1952), pp. 15-20.

[35]Ralph E. Bender, Raymond M. Clark, and Robert E. Taylor, The FFA and You: Your Guide to Learning (Danville, Illinois: The Interstate Printers and Publishers, Inc., 1962), pp. 1-2.

[36]Department of Health, Education, and Welfare, Digest of Annual Reports of State Boards for Vocational Education, op. cit., p. 22.

changed considerably, especially since the federally subsidized programs of vocational agriculture were first established. Thousands of persons are now entering non-farm agricultural occupations. To be consistent with the democratic framework, their educational needs must be determined in terms of new developments in agriculture to adequately prepare them for these occupations.

A review of the significant changes which have occurred in American agriculture will establish the following: (1) the farmer today is far more dependent on non-farm agricultural businesses which provide him with goods and services that are vital to agricultural production; and (2) our concept of agriculture is no longer synonymous with, nor limited to, farming.

The Development of American Agriculture

From the time of America's first white settlement through the Colonial Period, agriculture was highly primitive. It was limited almost exclusively to self-sufficient farming. Agrarian life was characterized by independent isolationism.[37]

From 1780 to 1900, four primary developments occurred which resulted in dynamic changes in American agriculture.

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[37]Max Lerner, America as a Civilization: Life and Thought in the United States Today (New York: Simon and Schuster, 1957), p. 147.

These developments were: (1) the mechanization of farming; (2) the expansion of farming into the Mississippi Valley and Great Plains areas; (3) the rapid development of agricultural specialization; and (4) the beginning of scientific agriculture.[38] Crude wooden tools were replaced by the iron plowshare, steel-surfaced tilling implements, and horse-drawn planters and reapers. These enabled the farmer to produce crops on a large-scale with fewer man hours of labor. The region between the Ohio River and the Great Lakes, westward into the prairies, was endowed with a warm climate and adequate rainfall, as well as fine, fertile soil which was easy to clear and cultivate. These conditions enhanced the establishment of large, permanent farms.

During this era of mechanization and westward expansion, agriculture drifted toward specialization of enterprise and the dependence on off-farm services, and away from the vestiges of self-sufficient farming. The degree of specialization was not nearly so great as now, but a trend in this direction was evident. This trend was sustained by the stimulus of business enterprise, the pressure of competition, and the production of farm machinery. Economic limitations of self-sufficiency and an ever-increasing demand

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[38] Harold U. Faulkner, American Economic History (5th ed. rev.; New York: Harper and Brothers Publishers, 1943), p. 225.

for material betterment ushered in a new era of science which contributed to the development of a capitalistic society. The city and European markets, together with the abundance of fertile river bottom lands, began to provide the rural family with a degree of prosperity and the means to purchase materials and products other than the bare necessities of food and shelter.

The overall effect of these changes was an expansion of agriculture beyond the limits of farming to include the non-farm agricultural industry. Financial gains through the sale of farm products were sufficient to purchase needed farm machinery, equipment, and supplies. Business establishments sprang up off the farm, in the cities, to supply the farmer with many goods and services. Thus, agriculture was extended to include phases other than production.

Industrial and agricultural mechanization sparked a steady growth in the volume and speed of mass production. The machine age also generated new modes of living, thinking, and cultural expression.[39] Nowhere were these changes more striking than in agriculture.

By the fifth decade of the twentieth century, the nature and scope of farming had been altered considerably.

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[39]Robin M. Williams, Jr., American Society (New York: Alfred A. Knopf, 1957), pp. 542-43.

Labor-saving devices had become as prevalent in the farm business as in the large industrial centers of the United States.[40] Farm production per acre and per animal unit increased tremendously, necessitated by bristling appetitive competition for a world market. Farms increased in size, many to the magnitude of the corporation. The high cost of production, together with sagging farm prices received by the farmers, demanded that those who were to survive must produce at an unparalleled rate of efficiency.

The modern dairy farm exemplifies the complexities of the farm business. Cows are milked in milking parlors as sanitary as the operating room in a modern hospital. The milk is carried through a glass or stainless steel pipeline directly to a bulk tank cooler. The temperature is automatically kept at a constant level through the use of sensitive electronic devices. Later, the milk is pumped out of the cooler into a refrigerated tank-type truck for delivery to a milk processing plant. The bulk tank milk cooler and pipelines are then automatically washed and sterilized.

Utilizing the example of the modern dairy farm, it becomes apparent that the farmer can no longer be perceived as an ultra-conservative "backwoodsman" with a nominal education who earns only a meager income. The successful

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[40]Charles A. Beard, Rise of American Civilization (New York: The Macmillan Co., 1930), pp. 714-15.

farmer is a highly intelligent and perceptive businessman who is capable of managing a corporate-sized business: a critical individual who must possess a number of mechanical, bookkeeping, and managerial abilities. His welfare and prosperity are highly dependent upon consumer demand for his products, governmental regulations, efficient utilization of his equipment, and his awareness of the role of modern technology and science in his farm enterprise.

Due to the complexity of the machinery, equipment, and technology demanded by the intricacies of modern farming, many of the functions once performed by farmers are now provided by non-farm workers who have had training in a specialized technical area. There is a great need for such non-farm agricultural specialists. It is necessary to train personnel to sell, install, and maintain equipment and machinery; to analyze soils and recommend types and rates of commercial fertilizers; to consider farm management problems and outline procedures and approved practices which will increase production per animal unit and per acre; and to aid the farmer in analyzing problem situations, developing long and short-term plans, and implementing efficient and effective business programs.

The technical specialist who provides the farmer with goods and services must be very proficient in the selling, installing, and servicing of the commodity. He must be as skilled and effective as representatives who deal with

large non-agricultural industries.

In brief, American agriculture has expanded from self-sufficient farming to a multi-billion dollar industry which includes ". . . plant science, soils and conservation, animal husbandry, insects, machines and equipment, processing and utilizing farm products, economics, the dissemination of information, and homes."[41]

A review of traditional vocational programs in agriculture, together with the significant changes which have occurred in American agriculture, point up a lag in the development of effective educational programs to meet the needs of present and prospective farmers, i.e., those who seek employment in the production phase. However, modern agriculture embodies much more than farming; it includes such areas as provision of supplies and technical services to those who produce farm commodities, as well as the processing and marketing of these commodities.

The farm populace relies more and more on off-the-farm agricultural industry for technical supplies and complex machinery and equipment. "In order for these to be efficiently introduced, used, and maintained on farms . . . increased numbers of trained agricultural business and industry workers

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[41]United States Department of Agriculture, "After a Hundred Years," The 1962 Yearbook of Agriculture (Washington, D. C.: Superintendent of Documents, United States Government Printing Office, 1962), p. x.

will be required."[42]

Efforts have been made to meet these training needs, especially during the past ten years. A review of some of these studies will provide a basis for, and direction to, this study.

A Review of Related Studies

The purpose of this section of Chapter II is to review selected occupational studies that deal with the determiniation of the educational needs of persons employed in, as well as those seeking employment in, non-farm agricultural occupations. Such a review will reflect the methods which have been utilized to determine these needs.

Survey of leaders in local businesses.--A review of pertinent literature indicates that three general approaches have been utilized to gain insight into these vocational needs. One method, reported by Clark,[43] Horner,[44] and others was designed to survey persons employed in local business

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[42]J. R. Warmbrod (ed.), New Dimensions in Public School Education in Agriculture (a report of a conference of national significance; University of Illinois, Urbana, Illinois; June 19-22, 1962; Danville, Illinois: The Interstate Printers and Publishers, Inc., 1962), p. 19.

[43]Raymond M. Clark, "Need for Training for Non-Farm Agricultural Business" (East Lansing, Michigan: Department of Teacher Education, College of Education, Michigan State University, 1959). (Mimeographed.)

[44]James T. Horner, "Responsibility of Teacher Educators to Youth Entering Non-Farm Agricultural Occupations," The Journal of the American Association of Teacher Educators in Agriculture, II (July, 1962), pp. 15-19.

establishments within a given geographical area to determine the skills, abilities and understandings that should be possessed by present and potential non-farm employees. Training program for specific industries or businesses could be developed, based on the identified abilities required within a business.

Clark[45] demonstrated a very practical method of identifying the training needs of workers in non-farm agricultural business in the local community. Data were obtained in forty-five Michigan communities through the cooperation of local teachers of vocational agriculture and students enrolled in their advanced high school classes. The students utilized a prepared instrument as a guide to interview managers and workers employed in all of the non-farm agricultural businesses indentified in the community.

The purpose of this study was to identify the skills, abilities and understandings which must be possessed by persons engaged in these occupations, both agricultural and non-agricultural, and to determine what experiences could be offered by the public schools to assist in initial employment and advancement in the businesses. The data collected could serve as a basis for establishing programs to train persons for specific jobs and job levels. For example, needed

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[45] Clark, op. cit.

educational experiences could be provided persons who seek employment in such non-farm agricultural occupations as bookkeeper or salesman.

Clark summarized the following conclusions that are relevant to this study:

1. Managers and workers in these businesses need both manipulative skills and management abilities in agriculture.
2. More of them need skills and abilities in areas of Public Relations and Customer Relations than in Farming and use of Hand Tools.
3. Managers and workers in non-farm agricultural business need training for initial employment and for advancement in business.
4. There is need for training at both the high school and at the adult levels.[46]

Clark also pointed out that the needed training for employees entering non-farm agricultural occupations ". . . cuts across many of the subject matter areas we commonly label as 'General' and 'Vocational.'"[47] He suggested that programs should be established including areas such as agriculture, business, shop, mathematics, and others in one course of instruction adapted to the needs of prospective workers. He also listed explicit recommendations for further study of non-farm agricultural occupations to determine what training prospective workers will need for initial employment in these occupations.[48]

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[46] Ibid., p. 13.

[47] Ibid.

[48] Ibid., pp. 14-15.

Tom, Hill, and Greene[49] utilized a similar method in New York in 1961. They conducted a study to determine whether New York secondary schools should establish vocational training programs for youth interested in preparing for occupations related to farming. They were concerned with (1) determining the number of employment opportunities in certain occupations related to farming; and (2) determining the general nature, level, and scope of pre-employment training needed by prospective employees.[50]

All non-farm agricultural businesses, exclusive of those not regularly employing new personnel and those hiring only college graduates, were surveyed in five contiguous central New York counties. The owners or managers of each firm were mailed a questionnaire to obtain the desired data; those who did not respond were interviewed.

Unlike Clark's, this study was concerned with determining the general nature, level, and scope of pre-employment training needed; not specific abilities for specific levels and job classifications. The following pertinent conclusions were drawn from this study:

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[49]Frederick K. T. Tom, Charles W. Hill, and Kingsley L. Greene, Employment Opportunities in Certain Occupations Related to Farming in the Syracuse Economic Area, New York (report of a study; Ithaca, New York: Agricultural Education Division, Rural Education Department, Cornell University, 1961).

[50]Ibid., p. 3.

1. In none of the seventeen occupations studied were employment opportunities sufficiently large to warrant the establishment of specific vocational training programs by a local school district designed to develop the special skills needed by employees in the given occupation.
2. A person interested in employment in the related occupations should have at least a high school education.[51]

Other findings of this study also showed that the employment opportunities were sufficiently large to warrant the establishment of special vocational programs when the potential of the five areas studied was combined.

Other studies by Horner,[52] Sutherland and Thompson,[53] Harris, Tigner, and Hansen,[54] and the Staff of the State Board of Vocational Education of the state of Washington[55] utilized a similar method of obtaining data and reached conclusions which support the development of special vocational training programs for persons employed in non-farm occupations.

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[51] Ibid., pp. 19-20.

[52] Horner, op. cit., pp. 15-19.

[53] S. S. Sutherland and O. E. Thompson, The Training Required by Workers in Agricultural Business and Industry in California (report of a study; Sacramento, California: California State Department of Education, 1957).

[54] Norman C. Harris, Richard Tigner, and Holger Hansen, Business Jobs in Agriculture (a survey report; Bakersfield, California: Vocational-Technical Education, Bakersfield College, 1958).

[55] Washington State Board for Vocational Education, Training Needs of Workers in Business Associated with Agriculture (report of a study; Olympia, Washington: Vocational Agricultural Education, 1959).

Horner provided a summary of the responses of 800 employers of 22,000 persons working in non-farm agricultural jobs in 62 towns throughout Nebraska. His findings, related to employment, indicated that most farm-related businesses engaged in sales or service activity dealt with implements, supplies, and feed, and most of the jobs were of the skilled or semi-skilled type.[56] He found that areas in which employees were deficient included business knowledge, mathematical ability, salesmanship, and oral communication. Further, his findings indicated that most of the employers believed that the secondary schools should ". . . provide training in such areas as occupational safety and health, worker relationships, understanding business opportunities, and typical business organizations. . . ."[57]

Horner listed the following conclusions:

> (1) Employers in farm related occupations are not assuming the responsibility of educating their employees; (2) the proportion of workers able to secure unskilled employment is decreasing; (3) the numbers of skilled, technical, clerical, managerial, and sales jobs are increasing, (4) many rural youth will inevitably enter non-farming agricultural jobs and (5) although their farm backgrounds and experiences are valuable, they will require considerable education to qualify for and advance in satisfactory employment.[58]

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[56] Horner, op. cit., p. 16.

[57] Ibid., p. 18.

[58] Ibid., p. 18.

Sutherland and Thompson[59] reported a study of 327 agricultural businesses employing 24,305 persons in six major types of farming areas in California. Findings relevant to this study include the following: (1) The most common types of businesses employing persons who had had training in agriculture were those providing sales and service of agricultural products; (2) the demand for agriculturally trained business employees is comparable to the demand for agriculturally trained farm workers;[60] and (3) high school agriculture appeared to meet the needs of the skilled and semi-skilled employees of non-farm agricultural businesses, and junior college or a four-year college degree for sales personnel.[61]

The Bakersfield Study[62] utilized the same method of determining the vocational education needs of non-farm employees. However, the data were secured to provide a basis for curriculum development at the junior college, rather than at the high school level.

The findings of the study showed that (1) most of the firms that participated in the study were engaged in the

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[59]Sutherland and Thompson, op. cit.

[60]Ibid., p. 8.

[61]Ibid., pp. 31-32.

[62]Harris, Tigner, and Hansen, op. cit.

sales and service of farm supplies and equipment;[63] (2) technical assistance on farm problems is a service rendered by most of these firms; (3) there is an increasing need for more specialized training in the scientific phases of agriculture and agricultural services; (4) "The traditional agriculture education programs in high schools and junior colleges should be revised and broadened. . . ."[64] to include marketing and distribution on a business basis; and (5) ". . . most people engaged in the business activities of the agriculture industry are more effective in their jobs if they have had a background of education in agriculture, . . ."[65] and specific skills, abilities, and understandings directly related to their business activities.[66]

The staff of the State Board for Vocational Education of Washington State[67] developed a study very similar to Sutherland and Thompson's.[68] The findings of the study showed that educational experiences at the high school level provide adequate preparation only for the unskilled,

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[63] Ibid., p. 8.

[64] Ibid., p. 12.

[65] Ibid., p. 14.

[66] Ibid., p. 17.

[67] Washington State Board for Vocational Education, op. cit.

[68] Sutherland and Thompson, op. cit.

semi-skilled, and skilled levels of employment in agricultural occupations. Only 39.6 per cent of those interviewed believed that high school prepared employees for sales work; over one-fourth of the sales personnel were considered as having had inadequate preparation.[69]

The results of this study also indicated that the areas of business education most needed by employees at all levels of employment were salesmanship, customer relations and principles of business operation.[70]

Several conclusions were stated which are especially pertinent to this study: (1) Vocational agriculture has a major responsibility in the training for non-farm agricultural occupations, especially for most of the unskilled, semi-skilled, and skilled jobs, and for over two-thirds of the sales group; (2) "Vocational Agriculture should widen its base . . ."[71] to include students who are planning to enter branches of agriculture other than farming; (3) "Agricultural education at all levels should be concerned with constructing programs to train for positions in agricultural business; . . ."[72] and (4) Sales training, business education,

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[69]Washington State Board, op. cit., pp. 16-17.

[70]Ibid., p. 20.

[71]Ibid., p. 24.

[72]Ibid., pp. 24-25.

agricultural training and farm experience were rated more highly by employers than mathematics, science, literature, and foreign languages as needed by business employees.[73]

Survey of local businesses within an industry.--A second method of determining the vocational education needs of persons who are employed in, or seek employment in, non-farm agricultural occupations is to survey the owners or operators of local businesses representing a total industry, such as the dairy farm equipment industry. Thompson's[74] procedure clearly illustrates this method. He made a study of 286 nurseries (approximately a 10 per cent sample) in California by interviewing managers, owners, or operators of these businesses. This method was designed to secure data that would serve as a basis for planning training programs for current and potential workers employed in occupations within the nursery industry.

The results of the study indicated that most of the nurserymen (1) were dissatisfied with the formal educational level of their employees;[75] (2) recommended a minimum of high school graduation for all employees except common

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[73] Ibid., p. 25.

[74] O. E. Thompson, Training Requirements of Workers in the Production and Distribution of Nursery Products (report of a study; Sacramento, California: California State Department of Education, 1957).

[75] Ibid., p. 19.

laborers; and (3) recommended junior college graduation or a four-year college degree for the supervisor-manager.[76] Also, high school graduation was considered adequate for up to 50 per cent of the skilled employees.[77] Training in special business education courses was recommended for nursery employees, especially in the areas of salesmanship and merchandising.[78] The respondents also indicated a desire to assist in the development of courses of instruction for potential employees.[79]

Studies to identify non-farm agricultural occupations.--A third general method which has been used to gain insight into the vocational education needs of agricultural workers was that of surveying former vocational agriculture students who are employed by non-farm agricultural businesses and industries to determine the extent to which high school programs of vocational agriculture are meeting the needs of these employees; or by studying the nature of occupations to clarify their relationship to farming to identify those that may be further studied as non-farm agricultural occupations.

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[76] Ibid., pp. 19-20.

[77] Ibid., p. 19.

[78] Ibid., p. 21.

[79] Ibid., p. 23.

Studies by Royster,[80] Blackmon and Dawson,[81] and Kennedy[82] illustrate this general method. Royster[83] made a study of 1,635 former students of vocational agriculture from twenty-four Indiana high schools. The major purpose of the study was to determine the basic agricultural skills needed by students who were enrolled in vocational agriculture and later entered non-farm agricultural occupations.

The graduates engaged in these occupations were interviewed to determine the qualifications needed by beginning employees, suggestions for modifications in high school vocational programs to prepare the graduates for entering non-farm agricultural occupations, and the type and amount of training that is provided by the business firms.[84]

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[80]Ralph R. Royster, "Analysis of Non-Farming Agricultural Occupations in Indiana," The University of Missouri Bulletin (Columbia, Missouri: Education Series 1960, Vol. 61, Number 79, 1960).

[81]John H. Blackmon and Cleburn G. Dawson, Need for Training for Non-Farming Agricultural Occupations (report of a study; Raleigh, N. Carolina: North Carolina Department of Public Instruction, 1961).

[82]William Henry Kennedy, "A Clarification of Relationships Between Farming and Certain Other Agricultural Occupations with Implications for Guidance and Curriculum Development" (unpublished Ed. D. dissertation, Michigan State University, East Lansing, 1958).

[83]Royster, op. cit.

[84]Ibid., p. 4.

Stated conclusions relevant to this study include the following:

1. Generally, it seems that the training in vocational agriculture is inadequate to prepare students completely for non-farming occupations.
2. It would appear impractical for schools to train students completely for skills in specific non-farming agricultural occupations.
3. Employers in non-farming agricultural concerns prefer employees who have been reared on the farm and who have had training in vocational agriculture.[85]

One of the implications for further research stated that, "There needs to be a study of all agricultural occupations to find out common needs for which training might be incorporated in the program of vocational agriculture."[86]

Blackmon and Dawson[87] reported a study in North Carolina which included a survey of rural senior high school male students and former vocational agriculture students. This phase of the study was designed to provide information concerning occupational choices and training, of persons seeking employment in non-farm agricultural occupations. The purpose was to secure evidence concerning the nature and extent of the need for providing vocational education for these individuals.[88]

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[85] Ibid., p. 15.

[86] Royster, op. cit., p. 15.

[87] Blackmon and Dawson, op. cit.

[88] Ibid., p. 6.

To secure this data, seventy-six agriculture teachers in a nine county area administered a questionnaire to the graduating senior boys in vocational agriculture classes. They also furnished a list of former vocational agriculture students who had either graduated during the previous two years or would have geaduated if they had not dropped out of high school. The latter students were sent questionnaires by mail to be completed and returned.[89]

As an additional part of this study, these vocational agriculture teachers administered a questionnaire to agricultural industry and business firms to determine the need for a training program in agricultural technology.

General conclusions and recommendations pertinent to this study include the following: (1) Many agricultural business and industry firms have employees who need additional technical training, and many of the firms had no training program; (2) Technical training should be provided for persons who wish to be employed by agricultural industry and business firms; (3) Technical training programs for present and prospective employees of non-farm agricultural occupations should be established; (4) Pre-employment training should be designed to prepare individuals for one or more jobs, including farm equipment salesman, farm equipment dealer, farm equipment repair mechanic, diesel tractor mechanic,

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[89] Ibid., p. 7.

regular tractor mechanic, custom machine operator and implement manufacturer; and (5) "Maximum flexibility should be maintained in such matters as employment of instructors, student entrance criteria, and use of facilities . . ."[90] to provide a variety of educational opportunities to meet the needs of individuals.

Kennedy[91] studied the relationships between farming and other agricultural occupations for the purpose of guiding the development of desirable curricula for training workers for these occupations.[92]

The study was designed to develop from a review of literature a list of occupations with agricultural connotations. This list was submitted to a jury of experts concerned with agricultural education for their opinion as to whether or not workers in these occupations need a knowledge of farming. A sample of occupations for further study was drawn from this list.[93]

Twenty-five of these occupations were then studied in sixty-three communities in Michigan by interviewing employers and workers of businesses. The interviewees were asked to

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[90] Ibid., p. 11.

[91] Kennedy, op. cit.

[92] Ibid., pp. 1-2.

[93] Ibid., pp. 385-86.

indicate the degree to which persons employed in these occupations require a knowledge of farming. On this basis, these occupations were classified as agricultural or non-agricultural.[94]

Some of the relevant findings were, (1) The effect of agricultural training on the employability or success of workers was different for different occupations;[95] (2) Many occupations previously regarded by some writers to be related to agriculture, require relatively little knowledge of farming; and (3) "The rapidly changing nature of the agricultural economy demands that continued study be made to establish trends in the requirements of occupations so that some predictions into the future may be made."[96]

Studies of this type are designed to establish criteria as a basis for classifying agricultural occupations. They help the researcher to identify non-farm agricultural workers.

Summary.--Three general methods of gaining insight into the vocational education needs of present and prospective employees of non-farm agricultural occupations, together with significant and representative studies were

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[94] Ibid., p. 156.

[95] Ibid., p. 391.

[96] Ibid., p. 40.

reviewed. Included were those designed to survey several businesses in local communities, those designed to survey a sample of businesses within a given industry, and those concerned with the identification of non-farm agricultural occupations for further study.

A Method of Determining Occupational Competencies

Studies concerned with determining the vocational education needs of current and prospective employees of non-farm agricultural occupations have been reviewed. The purpose of this section of the chapter is to describe the method used in this study to determine certain competencies that should be possessed by non-farm agricultural workers who provide the farmer with direct-contact services.

The justification for establishing vocational education courses of instruction within a democracy was discussed earlier in this chapter.[97] Both the public secondary schools and many institutions of higher learning now include vocational courses as a part of their total curricular offerings. The justification for including vocational preparation courses becomes clearer by relating the need for occupational competence to an acceptable definition of curriculum.

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[97] *Cf.*, p. 31.

Phenix stated that:

> The curriculum is a schedule of proposed instruction embodying the preferred direction of student development. It rests upon and manifests a certain system of values. These values constitute the aims, objectives or purposes of education, and the curriculum is the means by which the aims are achieved, the objectives realized and the purposes fulfilled.98

In a democracy the development of suitable occupational competence by each individual is valued highly; is an integral part of the "the preferred direction of student development." If the curriculum is the means by which the aims of a society are to be achieved, then it ought to include experiences which provide the individual with the competence necessary for successful employment in an occupation.

Since a prime need of an increasing number of persons is the development of occupational competence necessary to enter non-farm agricultural occupations, and since this competence is a part of the preferred direction of student development, the curriculum of public educational institutions ought to include instruction, the goals of which are to prepare the individual to enter these occupations. But if these aims receive little priority by an institution in relationship to other social goals, then, other social institutions and agencies must accept responsibility for them, i.e., must

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98 Phillip Phenix, Philosophy of Education (New York: Holt, Rinehart and Winston, Inc., 1958), p. 59.

provide individuals with the needed competence. If the needed competencies are too technical or abstract for students enrolled in high school or evening courses to understand and develop, these competencies should be taught at the junior college or university level. In short, a democratic society is committed to meeting the occupational needs of present and prospective workers.[99]

Educational institutions which accept the responsibility for aiding the student to gain occupational competence must organize courses of instruction, based upon needed and attainable objectives. To be effective, these objectives should be operationally defined and stated in terms of desirable behavior.[100]

One method of determining the objectives of a vocational program, such as non-farm agriculture, is to survey the leaders who are knowledgeable about the occupation. To accomplish this, a survey instrument may be used which will determine the occupational needs of workers in terms that can be translated into operationally-defined objectives.

An acceptable survey instrument for this study was designed to secure this information regarding the manipulative and cognitive competencies which should be possessed

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[99] Cf., p. 31.

[100] Lee J. Cronbach, Educational Psychology (2d. ed. rev.; New York: Harcourt, Brace and World, Inc., 1962), pp. 52-55.

by persons who are to be employed in non-farm agricultural occupations. Each item (competency) in the survey questionnaire was stated in a form that could easily be reduced to behavioristic terms and defined operationally.

In completing the questionnaires, the leaders in the occupation indicated the competencies that they considered important to the worker for occupational success. These competencies should provide a basis for the development of operationally-defined objectives around which instructional programs can be organized.

A questionnaire was also submitted to vocational teachers. It was composed of competencies identical to those listed in the questionnaire that was submitted to the occupational authorities. The teachers were asked to determine the degree to which the desired competencies were currently being taught. Discrepencies between desired competencies and competencies that are currently being taught were expected to provide a basis for modifying local programs of vocational agriculture.

Traditionally, vocational agriculture programs have been based upon the needs of the farming industry as determined by a survey of the leaders in successful farming enterprises of the community. In light of the changes which have occurred in agriculture and the speed at which they are occurring, this procedure must be modified to determine the potential employee's needs. Today many of the non-farm

agricultural specialists are not employed by local establishments. Many are employed by huge industries and businesses which continuously develop and sell, install, and service new equipment and machinery on the farm. Thus, the size and scope of the community serviced by a firm has increased tremendously. Each enterprise must also conduct an intensive program of basic and applied research in an effort to develop new technology. These technological changes result in numerous modifications in equipment and services provided.

Earlier it was stated that within a democracy the citizens are responsible for the continuous evaluation of all programs, policies, and human needs. It was also stated that this process must rest upon intelligent, rational inquiry as a source of ideas for changes which should be made.

Due to the size and scope of the area served, and complexity of the non-farm agricultural business, the authorities in successful enterprises are not located in local establishments. They occupy, instead, high echelon positions within, or closely associated with an industry, e.g., the dairy industry. They are in a position to determine worker competencies through intelligent, rational inquiry in view of the growing community size, changing technology, and the evolving changes in machinery and equipment. Vocational education programs which are based upon the judgment of the leaders of an industry probably will reflect the needs of both current and future employees. Hence,

instructional programs that are designed to meet these needs will not soon become antiquated.

In summary, public educational institutions were established in America to achieve a system of values developed by a democratic society. Curricular experiences are provided to assist each individual to develop desirable behavior. The development of a level of competence for successful employment in a socially useful occupation is desirable behavior which each should manifest.

An increasing number of persons are seeking employment in non-farm agricultural occupations. Public educational institutions should provide vocational instruction based upon operationally-defined objectives.

The course objectives can be determined by asking authorities to indicate competencies which are important to the worker for occupational success in a business. The identified competencies should be stated in a form that can easily be restated in terms of behavioral objectives. These objectives probably can be selected and grouped to provide the potential employee with effective systematized instruction in a logical sequence. Public educational institutions should also be surveyed to determine if existing vocational education programs provide a part or all of the needed instruction.

To demonstrate the method outlined above and to secure specific occupational data, a study was made of

non-farm agricultural occupations that employ persons who sell, install, and maintain bulk milk tanks or milking systems. These persons provide direct-contact services to the dairy farmer.

A panel of experts who occupy high echelon positions and work closely with the dairy equipment industry were surveyed to identify competencies that should be possessed by persons for initial employment in these occupations. Selected Michigan teachers of vocational agriculture were also surveyed to determine which of the identified competencies were currently taught in local vocational agriculture programs.

The competencies rated as of great value to the worker could serve as course objectives. These objectives would be the core of instruction for persons who seek employment in the prescribed occupations.

This method can be justified in terms of a democratic framework and can greatly facilitate the development of effective vocational programs to prepare potential workers for these non-farm agricultural occupations.

CHAPTER III

SOURCE OF DATA AND METHODS OF PROCEDURE

This chapter presents the sources of data and the methods of procedure utilized in the study to secure the data. Included is a description of the (1) method of securing the data; (2) development of the list of competencies; (3) preparation of the questionnaires; (4) selection of the panel members; (5) selection of the vocational agriculture teachers; and (6) return of the questionnaires.

Sources of Data

The data provided by this study consisted, in part, of responses to questionnaires which were mailed to a selected sample of personnel in high echelon positions in dairy businesses and associations, and Michigan institutions of higher learning.

Additional data were provided through the responses to questionnaires sent to selected Michigan vocational agriculture teachers.

Procedure

Methods of securing the data.--A panel composed of qualified persons who occupied positions of leadership in the American dairy industry and institutions of higher

learning were selected. They were asked to indicate the value of each of a selected list of competencies in aiding workers during initial employment to successfully fulfill the required functions of certain occupations which provide direct-contact services to the dairy farmer. These services include the sale, installation, and maintenance of milking systems or bulk milk tanks. The panel members were also to determine the importance of each competency for workers who perform these functions.

In addition, each member was to provide the following: (1) a brief description and title of the entry jobs for employees who sell, install, and maintain this dairy equipment; (2) the type and amount of formal education these entry workers should receive prior to initial employment; and (3) the extent that these workers should perform the required functions during the first six months of employment without assistance.

For clarification, "formal education" as used in this study refers to the general level and type of formal instruction that a person has received, i.e., high school, junior college, or four-year college. Within this general type, vocational agriculture or business courses at the high school or post high school level would be included.

A group of Michigan secondary teachers of vocational agriculture was also selected for the study. They were asked to indicate whether or not each of the competencies

on the specified list had been taught in their All-Day, Young Farmer, or Adult Farmer classes during the past year.

The authenticity of this method of securing valid opinions has been noted by Hillway:

> . . . there are times when opinion may be the best evidence available. In such cases, care is exercised to make sure the opinion is qualified and authoritative. Ordinarily, this means the opinion of one who is an expert with regard to the matter under consideration.[1]

In discussing the utilization of opinion, Good and Scates relate:

> Some types of questionnaires (for example, the depth questionnaire) go beyond statistical data and factual material into the area of attitudes, and hidden motivations. If opinion is recognized as such and the results are carefully interpreted, this is a legitimate field of investigation for the questionnaire, by way of securing a cross section of thought or attitude.[2]

Several methods of securing the data were considered. However, Barr, Davis, and Johnson stated, "The questionnaire makes possible contact with a large number of persons and also with many who could not otherwise be reached."[3] In as much as this study was designed to survey a relatively large number of teachers of vocational agriculture from a

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[1]Tyrus Hillway, Introduction to Research (Boston: Houghton Mifflin Company, 1956), p. 271.

[2]Carter Good and Douglas Scates, Methods of Research (New York: Appleton-Crofts, Inc., 1954), p. 613.

[3]Arvil S. Barr, Robert A. Davis and Palmer Johnson, Educational Research and Appraisal (New York: J. B. Lippincott Co., 1953), p. 66.

rather large geographical area, as well as to survey a panel of personnel who held positions in organizations of national scope, the questionnaire was selected as the most efficient and valid method.

Development of the list of competencies.--The first step in gathering the data for this study was to develop a list of competencies for the questionnaires. Worker competencies to be included in the questionnaire were those that could be classified as "Mechanical," "Selling," "Human Relations," and "Farming." Both cognitive and manipulative competencies were listed under each of these four areas.

This list was compiled by reviewing occupational literature, including books, periodicals, pamphlets, resource files, job descriptions and specifications, and training manuals. A survey letter (see Appendix A) was composed to secure resource materials for review. The letter specifically requested that the recipient provide job descriptions, job specifications, and training manuals and materials which describe competencies of workers directly contacting the farmer through the sale, installation, and service of dairy appliances and equipment. The letter also requested that the recipient provide the name and addresses of personnel concerned with the dairy industry who might assist with this study by providing resource materials or counsel. This letter was mailed to the president or executive secretary of 123 state and national associations of businessmen and

farm equipment companies in the United States. The names and addresses of the associations and personnel were obtained from the Directory of National Associations of Businessmen, 1960.[4] This directory lists associations by products and service fields.

Additional names and addresses of farm equipment firms were gleaned from reputable agricultural periodicals and lists supplied by Michigan dairy extension specialists employed by Michigan State University.

Seventy-three of the recipients responded to the survey letter. Much of the material which was included with their correspondence was invaluable to the study. Only a few businesses had developed apparently adequate job descriptions, specifications, or lists of competencies needed by persons for initial employment in dairy equipment and service occupations which provide the farmer with direct-contact services. Some of the farm equipment firms requested the results of the study to supplement their incomplete training manuals and programs. Every respondent expressed interest and a willingness to participate in the study.

A list of 129 competencies was developed and categorized under of the following eight sections:

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[4]Jay Judkins (ed.), Directory of National Associations of Businessmen, 1960 (Washington, D. C.: Superintendent of Documents, United States Government Printing Office, 1960).

Section I: Mechanical Competencies (Manipulative)

Section II: Mechanical Competencies (Cognitive)

Section III: Selling Competencies (Manipulative)

Section IV: Selling Competencies (Cognitive)

Section V: Competencies in Human Relations (Manipulative)

Section VI: Competencies in Human Relations (Cognitive)

Section VII: Farming Competencies (Manipulative)

Section VIII: Farming competencies (cognitive)

In compiling the list, some selection of competencies was made by excluding those which, in the opinion and experience of the investigator, were merely repetitive of others which had already been listed. The competencies were stated in a manner which permitted their reduction to behavioristic terms; i.e., easily expressed as operationally defined objectives.

Preparation of the questionnaire.--A questionnaire was prepared to gather data from the panel members and Michigan teachers of vocational agriculture. The questionnaire which was submitted to the panel members was divided into two parts. In Part One, the 129 competencies were classified and organized into the eight sections described above in the form of a Check List (see Appendix B).

The panel members were to indicate initially on the

Check List whether each competency should be required of employees whose function it is to sell or install or maintain milking systems or bulk milk tanks or who perform any combination of these worker functions.

Secondly, they were asked to indicate whether each competency was "Very Valuable," "Valuable," of "Little Value," or of "No Value" in aiding the worker during initial employment to successfully fulfill the required functions of the occupation. Space was provided for the respondents to list additional competencies at the end of each of the eight sections in Part One of the questionnaire.

In Part Two of the questionnaire, each panel member was asked to provide the following information: (1) his position and employing firm; (2) a brief description of the entry jobs for workers who sell, install, and maintain dairy equipment; (3) the type and amount of formal education which these entry workers should receive prior to initial employment; and (4) the extent to which these workers should sell, install, and maintain equipment during the first six months without assistance (See Appendix B).

The questionnaire was reviewed by personnel in the Office of Research and Publications, College of Education, Michigan State University, East Lansing, Michigan. A copy was also submitted to six persons in Michigan who were employed by businesses which sold large quantities of milking systems and bulk milk tanks or agencies concerned with

personnel who provide direct-contact services to the dairy farmer. (See Appendix C.) As a result of their suggestions, the questionnaire was revised and duplicated for submission to the selected panel members.

The questionnaire which was submitted to the selected group of Michigan teachers of vocational agriculture contained the same Check List of competencies as was listed in Part One of the questionnaire submitted to the panel members. The teachers were asked to indicate whether or not each competency had been taught as a part of the All-Day or Young Farmer or Adult Farmer classes during the past year. (See Appendix B.)

Selection of the panel members.--A panel of qualified personnel was selected to whom the questionnaire was submitted. (See Appendix C.) The general qualifications for a panel member were that he (1) hold a high echelon position in a business organization or institution of higher learning; (2) have an understanding of dairy farming and direct-contact services provided the dairy farmer by non-farm businesses; and (3) have a concern for the educational needs of workers in agricultural occupations.

Each selected panel member was invited by letter to assist in the study. (See Appendix A.) The letter was followed by a personal telephone call. All of the panel members expressed their willingness to participate in the study.

The qualifications of the panel members to respond to the questionnaires sent them are given in Appendix D. One of the men directed research for the Farm Equipment Institute in Chicago, Illinois; three were national regional sales representatives of reputable dairy equipment companies; two were presidents of dairy equipment companies which serve the farmers geographically located in the lower two-thirds of Michigan; two were dairy extension specialists serving the State of Michigan; one was a farm equipment extension specialist; and two were in agricultural education teacher preparation and as such were known to have farm experience, agricultural training, and close contact with agricultural occupations.

As indicated in Appendix D, six of the men held high echelon positions in a business or institute, five in institutions of higher learning; four were directly concerned with training workers for non-farm agricultural occupations; eight worked directly or indirectly with workers who provide the dairy farmer with direct-contact services; and six had done extensive writing and research in the field of agricultural occupations or equipment. All of the panel members were qualified in at least two of these categories; six of the eleven were qualified in at least three categories.

Selection of the vocational agriculture teachers.--The selected teachers of vocational agriculture in Michigan who responded to a questionnaire in this study were employed

by public school systems serving counties having a large number of dairy farms. Michigan counties characterized by farming which was predominantly dairy in nature were selected inasmuch as this area was of the type, size and scope to (1) render certain that instruction concerned with the dairy enterprise should be offered as a part of local vocational agriculture programs; (2) demonstrate a method of determining the educational needs of certain non-farm workers; and (3) serve as a basis for modifying, or establishing educational programs to meet the needs of agricultural employees who sell, install, or maintain dairy equipment.

A clarification of "counties having a large number of dairy farms" is necessay. A Michigan county was classified as such, and included in this study, if (1) thirty per cent or more of the commercial farms in the county were classified as "dairy type" farms; (2) there were at least 400 dairy farms in the county; and (3) there were at least 10,000 milk cows on commercial farms in the county.

The United States Census of Agriculture: 1959[5] was used as the source of these data and definitions. It was also used to define "dairy type" farm as follows: A

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[5]United States Bureau of Census, United States Census of Agriculture: 1959, Volume I, Counties, Part 13, Michigan (Washington, D. C.: Superintendent of Documents, United States Government Printing Office, 1961), pp. 160-167; 182-186; 197-201.

dairy farm is one having ". . . a value of sales of dairy products amounting to 50 per cent or more of the total products sold, . . ." or,

> A farm having a value of sales of dairy products amounting to less than 50 percent of the total value of farm products sold was classified as a dairy farm if--
> (a) milk and cream sold accounted for more than 30 percent of the total value of products sold and--
> (b) milk cows represented 50 percent or more of total cows and--
> (c) the value of milk and cream sold plus the value of cattle and calves sold amounted to 50 percent or more of the total value of all farm products sold.[6]

Twenty-six counties satisfied the requirements outlined. (See Appendix D.)

Following the selection of these counties, a list of the names and addresses of all of the teachers of vocational agriculture within these areas was compiled.[7] A total of 130 teachers who were employed by public school systems within these twenty-six counties were listed. (See Appendix C.) They comprised the group that was surveyed.

Return of questionnaire.--Letters (see Appendix A) and questionnaires were mailed to the eleven panel members

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[6] Ibid., p. XXIV.

[7] This list was compiled from "Schools and Teachers of Vocational Agriculture in Michigan" (an official listing; Lansing, Michigan: Office of Vocational Education, Department of Public Instruction, 1961).

on April 11, 1962. All of the panel members completed and returned the questionnaire before August 1, 1962.

Letters (see Appendix A) and questionnaires were mailed to the 130 selected Michigan teachers of vocational agriculture on May 10, 1962. Of the 130 questionnaires mailed, 60 were returned by July 1, 1962. On July 5, 1962, a follow-up letter (see Appendix A) was mailed to those who had not returned the questionnaire; 10 additional questionnaires were returned by July 30, 1962. On July 31, 1962, those teachers who had not returned the questionnaires were contacted personally at the Annual Michigan Association of Teachers of Vocational Agriculture Conference at East Lansing, Michigan and encouraged to respond; 22 additional questionnaires were returned. Of the total replies, four were unuseable. In each case the teacher of vocational agriculture had left the school system and the superintendent returned the questionnaire form.

Of a total of 130 questionnaires sent to the teachers, 92, or 70.8 per cent, were returned; and 88, or 67.7 per cent, were useable.

Analysis of the Data

As each questionnaire was received from a respondent, it was coded for IBM key punch operators. When all of the respondents had returned their questionnaires, the data were tabulated in terms of the number and percentage of responses for each item within each of the sections in the questionnaire.

These data were then compiled into tables which provide a summary of the percentage of responses to each item in the questionnaire by the panel members and by the teachers of vocational agriculture. The percentages were computed by dividing the number of responses to an item by the total number of possible responses. For the panel members, n = 11; for the teachers, n = 88. Other types of statistical analyses were not utilized because of the small number of panel members in the group.

CHAPTER IV

REPORT OF FINDINGS

This chapter presents a report of the various competencies recommended by the panel members and taught by the teachers. It also includes a summary of other data submitted by the panel members.

The findings of this study are divided into nine parts. The first eight present the responses of panel members and teachers to the eight sections of the Check List, i.e., Part One of the questionnaire. The last section presents a summary of the responses of panel members to Part Two of the instrument.

In each of the first eight sections, a report of the findings has been summarized in terms of (1) the competencies that received a large percentage of high value ratings by the panel members; (2) the percentage of panel members indicating which type of workers should possess these highly rated competencies, i.e., those whose function it is to sell or install or maintain milking systems or bulk milk tanks, or any combination of these functions; (3) the percentage of Michigan vocational agriculture teachers who taught these competencies; and (4) the competencies that received a small percentage of high value ratings by the panel members.

The panel members were asked to indicate the value of each competency for workers during initial employment as: "Very Valuable"; "Valuable"; of "Little Value"; or of "No Value." In the remainder of this text the percentage of respondents indicating either "Very Valuable" or "Valuable" have been combined (VV+V) and will be referred to as "Highly Valuable."

Need for mechanical manipulative competencies.--Part One of the questionnaire was developed in the form of a Check List. Section I of the Check List was designed to determine the following: (1) the relative value of each of forty-three manipulative mechanical competencies for successful employment; (2) the personnel who should possess each; and (3) the percentage of teachers who taught each of these competencies.

For clarification, manipulative competence was defined as "The operational skills leading to relatively immediate and concrete observable results."[1] Each manipulative competency on the Check List was preceded by the introductory phrase, "During Initial Employment, the Workers Should be Able To:."

(1) Value rating of panel.--Thirty-eight of the competencies in Section I of the Check List were rated by

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[1] Cf. p. 16.

60 per cent or more of the panel members as "Highly Valuable" for workers who sell, install or maintain bulk milk tanks or milking systems. In Table 1, these competencies are listed in descending order of the value rating.

The entire panel (100 per cent) rated the first twenty-three of these competencies as "Highly Valuable" for entrance employees. Of the remaining fifteen competencies, thirteen were rated by over 80 per cent of the panel members as "Highly Valuable" for these workers.

Table 2 lists the five competencies which were rated as "Highly Valuable" by less than 60 per cent of the panel members. In the opinion of the panel members, these were of less value to workers than the other thirty-eight mechanical manipulative competencies.

The percentage of the panel members indicating which type of workers should possess the forty-three mechanical manipulative competencies, i.e., those whose function it is to sell or install or maintain milking systems or bulk milk tanks, or any combination of these functions, are listed in Appendix E, Table 22. Although there was considerable agreement among the panel members regarding the value rating of these competencies, there was less agreement in regard to the kind of personnel who should possess them.

(2) Competencies important for installation and maintenance personnel.--Twenty-seven of the competencies listed in Table 1 were checked by 60 per cent or more of

Table 1.--Mechanical manipulative competencies rated as "Highly Valuable" by 60 per cent or more of the panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As (VV+V)
1. Operate simple hand and machine tools and equipment	100
3. Make electrical connections and install electrical wiring	100
5. Dismantle, inspect, and clean electrical equipment	100
6. Check and replace electronic controls	100
9. Dismantle and service thermostatically-operated valves	100
12. Install equipment, and pipeline and wiring systems by interpreting sketches, prints, and verbal engineering instructions	100
13. Lay out a job from blueprint and select proper materials	100
16. Cut and thread pipe	100
17. Test vacuum and liquid pipeline for leaks	100
19. Measure, cut, and install cast iron, stainless steel, plastic and glass pipe	100
21. Install and service vacuum and liquid pumps, and filtering systems	100
23. Utilize the proper lubricants for pipe, valves, pumps, and milking equipment	100
24. Dismantle dairy equipment; clean, inspect, and replace worn parts	100
25. Locate, adjust, and replace faulty valves, pressure regulators, and controls	100
26. Determine the equipment required for the milking parlor	100
27. Determine the equipment required for the milk house	100
28. Assemble and install standard walk-through, tandem, and herringbone milking stalls	100
29. Install and service a pipeline milking system in a milking parlor or stanchion-type barn	100

Table 1.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As (VV+V)
30. Install pipeline milking system accessory equipment (wash tank, storage rack, etc.)	100
31. Assemble pipeline system milker units	100
32. Recommend the proper cleaning materials for the milking equipment	100
35. Install, operate, and service a bulk tank cooler	100
37. Conduct periodic maintenance inspections of electrical equipment and pipeline milker systems	100
2. Locate sources of failure; repair or replace defective parts and wiring	91
4. Install, align, and service electric motors	91
7. Cut, bend, and fit electrical conduit	91
8. Maintain and use electrical testing equipment	91
10. Install 115 and 230 volt electrical systems from the service entrance	91
18. Break and make pipe joints; clean and renew pipe gasket	91
22. Rebuild pumps	91
34. Milk a cow properly with a mechanical milker	91
39. Recognize the relationship between the cause of equipment malfunction and effective remedial action	91
14. Inspect, clean, and adjust circuit breakers	82
20. Find dimensions of various pipe sizes, types of fittings and number of threads on pipe	82
33. Sanitize milking equipment	82
36. Utilize a water hardness kit and an iron test kit	82
42. Measure the unit pressure of liquids	64
15. Install a building drain	63

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")

Table 2.--Mechanical manipulative competencies rated as "Highly Valuable" by less than 60 per cent of the panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As (VV+V)
11. Install three phase circuits	55
38. Solve problems using Newton's law of motion	36
40. Calculate the components of force	36
41. Solve problems through the application of principles of rotational motion	36
43. Calculate the pressure on immersed plane surfaces	27

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable").

the panel members as those which should be possessed by employees who provide the farmer with one, or with a combination of the following services: (1) installation; (2) maintenance; or (3) installation and maintenance of milking systems or bulk milk tanks. These items are listed in Table 3 in descending order of the percentage of panel members who indicated each as important for personnel who install or maintain or install and maintain this dairy equipment.

Referring to Table 3, it will be noted that the first ten of these items were rated by the entire panel as important for personnel who perform these functions (I+M+IM). The next twelve competencies, beginning with Item Number 2, were rated by 80 to 91 per cent of the panel members as

Table 3.--Mechanical manipulative competencies rated as "Highly Valuable" by 60 per cent or more of the panel members for installation or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (VV+V)	(I+M+IM)
3. Make electrical connections and install electrical wiring	100	100
4. Install, align, and service electric motors	91	100
5. Dismantle, inspect, and clean electrical equipment	100	100
6. Check and replace electronic controls	100	100
7. Cut, bend, and fit electrical conduit	91	100
9. Dismantle and service thermostatically-operated valves	100	100
18. Break and make pipe joints; clean and renew pipe gasket	91	100
19. Measure, cut, and install cast iron, stainless steel, plastic and glass pipe	100	100
22. Rebuild pumps	91	100
25. Locate, adjust, and replace faulty valves, pressure regulators, and controls	100	100
2. Locate sources of failure; repair or replace defective parts and wiring	91	91
10. Install 115 and 230 volt electrical systems from the service entrance	91	91
12. Install equipment, and pipeline and wiring systems by interpreting sketches, prints, and verbal engineering instructions	100	91
14. Inspect, clean, and adjust circuit breakers	82	91
15. Install a building drain	63	91
16. Cut and thread pipe	100	91

Table 3.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (VV+V)	(I+M+IM)
23. Utilize the proper lubricants for pipe, valves, pumps, and milking equipment	100	91
8. Maintain and use electrical testing equipment	91	82
21. Install and service vacuum and liquid pumps, and filtering systems	100	82
28. Assemble and install standard walk-through, tandem, and herringbone milking stalls	100	82
30. Install pipeline milking system accessory equipment (wash tank, storage rack, etc.)	100	82
35. Install, operate, and service a bulk tank cooler	100	82
20. Find dimensions of various pipe sizes, types of fittings and number of threads on pipe	82	73
24. Dismantle dairy equipment; clean; inspect, and replace worn parts	100	73
29. Install and service a pipeline milking parlor or stanchion-type barn	100	73
17. Test vacuum and liquid pipeline systems for leaks	100	64
37. Conduct periodic maintenance inspections of electrical equipment and pipeline milker systems	100	64

[a]This table should be read as follows: 91 per cent of the panel rated Item Number 4 as "Highly Valuable" ("Very Valuable" plus "Valuable," i.e., VV+V). This competency, "Install, align, and service electric motors," was rated by 100 per cent of the panel members as important for personnel who Install or Maintain or Install and Maintain (I+M+IM) bulk milk tanks or milking systems.

important to personnel who provide the farmer with these services. The last five competencies were rated by 60 to 79 per cent of the panel as important to these personnel.

(3) Competencies important for sales or maintenance personnel.--Four of the forty-three mechanical manipulative competencies listed in Table 1 were checked by 60 per cent or more of the panel members as those which are important for employees who sell or maintain or sell and maintain bulk milk tanks or milking systems, as shown in Table 4.

There were no logical patterns of grouping within the data provided by the respondents regarding the remaining seven competencies which were checked by over 60 per cent of them as "Highly Valuable" to employees. These competencies, listed in Appendix E, Table 23, apparently are believed to be of approximately equal value to employees who perform any one or a combination of the worker functions.

(4) Competencies that were taught.--A summary of the percentage of vocational agriculture teachers who taught the mechanical manipulative competencies that were rated as "Highly Valuable" by 60 per cent or more of the panel members is tabulated in Appendix E, Table 24, in descending order of the percentage of teachers who taught these in All-Day, Young Farmer, and/or Adult Farmer courses.

It is readily apparent that a very small percentage of the Michigan vocational agriculture teachers provided training in these mechanical manipulative competencies that

Table 4.--Mechanical manipulative competencies rated as "Highly Valuable" by 60 per cent or more of the panel members for sales or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As	
	(VV+V)	Important for Personnel Who: (S+M+SM)
26. Determine the equipment required for the milking parlor	100	64
27. Determine the equipment required for the milk house	100	73
33. Sanitize milking equipment	82	73
34. Milk a cow properly with a mechanical milker	91	73

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
(S+M+SM) = Important for Sales, Maintenance, or Sales and Maintenance personnel

were rated as of high value to employees who sell, install, or maintain dairy equipment. Of the thirty-eight competencies that were rated as "Highly Valuable" and important for workers during initial employment by 60 per cent or more of the panel members, only three were taught by 60 per cent or more of the eighty-eight teachers located in Michigan dairy counties. These three competencies included the following: Item Number 1, "Operate simple hand and machine tools and equipment"; Item Number 3, "Make electrical connections and install electrical wiring"; and Item Number 16, "Cut and thread pipe." The percentage of teachers reporting that they had taught these competencies was 82 per cent,

71 per cent, and 63 per cent, respectively.

Twenty-six of these thirty-eight mechanical manipulative competencies, approximately two-thirds, were reported as having been taught by less than one-third of the teachers.

Of the competencies taught by these teachers, only two were included as a part of the Young Farmer or Adult Farmer course of instruction by 10 per cent or more of the teachers. Item Number 1, "Operate simple hand and machine tools and equipment," and Item Number 33, "Sanitize milking equipment," were taught by 14 per cent and 10 per cent, respectively, of the teachers as a part of the Adult Farmer instruction. None of the competencies were reported as having been taught as a part of the Young Farmer program by more than 5 per cent of the teachers.

A tabulation of the twenty-seven mechanical manipulative competencies (listed in Table 3) that were rated by 60 per cent or more of the panel members as "Highly Valuable" for persons who (1) <u>install</u>; (2) <u>maintain</u>; or (3) <u>install and maintain</u> the described dairy equipment, and a comparison of the percentage of teachers who taught each competency is shown in Appendix E, Table 25. Only two of these competencies, Item 3 and 16, referred to above, were taught by 60 per cent or more of the teachers.

The percentage of teachers who taught the competencies rated by the panel members as highly important for employees

who (1) sell; (2) maintain; or (3) sell and maintain equipment is shown in Table 5. None of these four competencies was taught by a large percentage (60 per cent or more) of teachers.

Need for mechanical cognitive competencies.--Section II of the Check List was designed to determine the relative value of each of fourteen mechanical cognitive competencies for successful employment; the personnel who should possess each; and the percentage of teachers who taught each competency.

For clarification, cognitive competence was defined as, "The knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made."[2] Each cognitive competency in the Check List was preceded by the statement, "During Initial Employment the Worker Should Know:".

(1) Value rating of panel.--These fourteen competencies and their ratings by the panel members are itemized in Appendix E, Table 26. The first seven of these competencies were rated as "Highly Valuable" by 60 per cent or more of the panel members for entrance employees. They are listed in Table 6, in descending order of the percentage of panel members who rated each as "Highly Valuable" (VV+V).

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[2] Cf., p. 16.

Table 5.--Percentage of teachers who taught mechanical manipulative competencies rated as "Highly Valuable" by 60 per cent or more of the panel members for sales or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) as Important for Personnel Who: (S+M+SM)	Percentage of Teachers Who Taught (N=88)			
		All-Day	YF	Adult	Total
34. Milk a cow properly with a mechanical milker	73	40	3	8	51
33. Sanitize milking equipment	73	34	2	10	46
26. Determine the equipment required for the milking parlor	64	24	3	6	33
27. Determine the equipment required for the milk house	73	24	2	6	39

[a](S+M+SM) = Important for Sales, Maintenance, and Sales and Maintenance personnel
All-Day = Taught as a part of All-Day instruction
YF = Taught as a part of Young Farmer instruction
Adult = Taught as a part of Adult Farmer instruction
Total = Sum of percentages under All-Day, YF, and Adult for each competency

(2) Competencies important for sales or maintenance personnel.--The first six of the competencies listed in Table 6 were rated by 60 per cent or more of the panel members as important for personnel who during initial employment sell or sell and maintain bulk milk tanks or milking systems. These are summarized in Table 7.

Table 6.--Mechanical cognitive competencies rated as "Highly Valuable" by 60 per cent or more of the panel members for sales, installation or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As (VV+V)
3. The general sanitary requirements for the placement of drains in the milk house	100
2. Equipment requirements for standard milking parlor layouts	91
4. The air space and ventilation requirements for the milk house	91
1. Prescribed safety practices	91
14. The principles of electricity	91
11. The velocity and discharge in the flow of liquids	73
10. The physical properties of liquids	64

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable").

(3) Competencies that were taught.--The percentage of the Michigan vocational agriculture teachers who taught each of these six highly rated competencies is provided in Appendix E, Table 27. This data shows that with the exception of Item Number 1, ("During initial employment the worker should know:") "Prescribed safety practices," only a small percentage of teachers taught these competencies as a part of All-Day, Young Farmer, or Adult Farmer instruction. Sixty-one per cent of the teachers taught Item Number 1.

The remaining seven mechanical cognitive competencies were rated as "Highly Valuable" by less than 60 per cent

Table 7.--Mechanical cognitive competencies rated as "Highly Valuable" by 60 per cent or more of the panel members for sales or sales and maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (VV+V)	(S+SM)
3. The general sanitary requirements for the placement of drains in the milk house	100	82
2. Equipment requirements for standard milking parlor layouts	91	82
4. The air space and ventilation requirements for the milk house	91	73
1. Prescribed safety practices	91	73
14. The principles of electricity	91	64
11. The velocity and discharge in the flow of liquids	73	64

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable").
(S+SM) = Important for Sales and/or Sales and Maintenance personnel.

of the panel members for employees who sell, install and maintain bulk milk tanks or milking systems, as indicated in Table 8.

Need for manipulative competencies in the area of salesmanship.--Section III of the Check List was concerned with determining the value of fourteen manipulative competencies in the area of salesmanship to the success of certain employees, and the percentage of teachers who taught

Table 8.--Mechanical cognitive competencies rated as "Highly Valuable" by less than 60 per cent of the panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As (VV+V)
9. The machine elements of mechanics (lever, wheel and axle, etc.)	46
5. The kinds, forms, and physical properties of matter	36
6. The principles of velocity	36
12. The basic laws of equilibrium	36
13. The principles of impulse and momentum	36
7. The meaning, types and units of force	27
8. The principles of centrifugal force	27

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")

these competencies. These fourteen items and the ratings by the panel members are summarized in Appendix E, Table 28 in descending order of their value rating.

(1) Value rating of panel.--All of the competencies, except Item Number 11, "Operate a cash register," were rated as "Highly Valuable" by over 60 per cent of the panel members; seven received a high value rating by the entire panel. A further analysis of the responses to these items by the panel members points out that there is considerable agreement regarding the personnel who should possess these competencies.

(2) Competencies important for sales or maintenance personnel.--A compilation of these data, Table 9, indicates that over 60 per cent of the panel members recommended that each of these competencies should be possessed by workers who sell or sell and maintain bulk milk tanks or milking systems during initial employment.

(3) Competencies important for only sales personnel.--A close examination of Table 9 indicates that all of the competencies except Items 1 and 2 were recommended by over 60 per cent of the panel members as important only for sales personnel.

Only a small percentage of the panel recommended these competencies as those required by personnel who install equipment. This implies that these personnel have little need to interact directly with the farmer, nor do they have the responsibility of promoting the company's product.

(4) Competencies that were taught.--Table 10 provides a summary of the percentage of selected Michigan vocational agriculture teachers who taught each of the thirteen manipulative competencies in the area of salesmanship that were rated as "Highly Valuable" by over 60 per cent of the panel members. None of these competencies was taught by a large percentage of these teachers.

Need for cognitive competencies in the area of salesmanship.--Section IV of the Check List, in Part One of the questionnaire, was designed to determine the value of each

Table 9.--Manipulative competencies in the area of salesmanship rated as "Highly Valuable" by 60 per cent or more of the panel members for sales or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Imporrant for Personnel Who: (VV+V)	S	SM	(S+SM)
1. Continuously build company good-will	100	18	82	100
9. Resolve customer objections into purchases	100	100		100
10. Close out a sale	100	100		100
13. File reports of present and future sales conditions	82	91	9	100
3. Display and demonstrate a product	100	82	9	91
5. Locate and schedule visits with potential customers	100	91		91
6. Assume an outward appearance which is in accordance with the customer's expectation	91	64	27	91
7. Determine the customer's real wants and needs; appeal to his buying motives	100	91		91
14. Use sales engineering and training manuals as guides	82	73	18	91
2. Write up a bill of sale and a credit agreement	100	46	36	82
4. Utilize a "flip-flop" chart and other visual aids	91	73	9	82
8. Become persuasive	82	82		82
12. Fill out depreciation schedules for equipment	72	73	9	82

[a] (VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
SM = Important for Sales and Maintenance personnel
(S+SM) = Important for Sales and/or Sales and Maintenance personnel

Table 10.--Percentage of teachers who taught manipulative competencies in the area of salesmanship rated as "Highly Valuable" by 60 per cent or more of the panel members for sales or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) as Important for Personnel Who: (S+SM)	Percentage of Teachers Who Taught (N=88)			
		All-Day	YF	Adult	Total
1. Continuously build company good-will	100	11	2	8	21
2. Write up a bill of sale and a credit agreement	82	21	1	5	27
3. Display and demonstrate a product	91	22	1	3	26
5. Locate and schedule visits with potential customers	91	8	2	1	11
6. Assume an outward appearance which is in accordance with the customer's expectations	91	9	2	2	13
8. Become persuasive	82	13	2	2	17
10. Close out a sale	100	6	1	1	8
7. Determine the customer's real wants and needs; appeal to his buying motives	91	7	2	1	10
11. Use sales engineering and training manuals as guides	91	13	2	2	17
4. Utilize a "flip-flop" chart and other visual aids	82	17	1	3	21
9. Resolve customer objections into purchases	100	6	1	1	8
12. Fill out depreciation schedules for equipment	82	17	2	6	25
13. File reports of present and future sales conditions	100	7	1	1	9

Table 10.--Continued

[a](S+SM) = Important for Sales and Sales and Maintenance personnel
All-Day = Taught as a part of All-Day instruction
YF = Taught as a part of Young Farmer instruction
Adult = Taught as a part of Adult Farmer instruction
Total = Sum of percentages under All-Day, Young Farmer, and Adult for each competency

of eight cognitive competencies in the area of salesmanship for successful initial employment; the personnel who should possess each competency; and the percentage of the selected teachers who taught each competency. An itemized account of the responses of panel members to these competencies is shown in Table 11.

(1) Value rating of panel.--With the exception of Item Number 2, all of these competencies were rated as "Highly Valuable" for entrance workers by over 60 per cent of the panel members. Slightly over 50 per cent of the panel members inidicated that employees should understand Item Number 2, "The attributes of a salesman's personality."

(2) Competencies important for sales or maintenance personnel.--A review of the data in Table 11 clearly shows that in the opinion of the panel members, these competencies are important for sales, or sales and maintenance personnel. A more concise summary of this data, Table 12, further clarifies the importance of these cognitive competencies for workers who sell or sell and maintain dairy equipment during initial employment.

(3) Competencies important for only sales personnel.--Four of these competencies, Numbers 3, 6, 7, and 4 were rated by over 60 per cent of the panel members as important only for sales personnel.

(4) Competencies that were taught.--Of the seven competencies in Section IV which were rated by 60 per cent

Table 11.--Cognitive competencies in the area of salesmanship and their rating by the panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (VV+V)	S	SIM	SM	NC
1. The advantages of the firm's products and services	100	36	18	46	
3. Typical customer questions	100	73		18	9
5. Legal and ethical business conduct	100	55		45	
6. The basic principles of merchandising	100	100			
7. The types of retail credit that are utilized by business firms	100	100			
8. Federal, state, and local regulations affecting product installation and use	100	55		45	
4. The kind, quality, cost, and source of materials used in equipment which is sold	91	64		18	18
2. The attributes of a salesman's personality	55	82			

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
SIM = Important for Sales, Installation and Maintenance personnel
SM = Important for Sales and Maintenance personnel
NC = No choice was made

None of the competencies were rated as important for the following personnel:
I = Important for Installation personnel
M = Important for Maintenance personnel
SI = Important for Sales and Installation personnel
IM = Important for Installation and Maintenance personnel

Table 12.--Cognitive competencies in the area of salesmanship rated as "Highly Valuable" by 60 per cent or more of the panel members for sales or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As			
		Important for Personnel Who:		
	(VV+V)	S	SM	(S+SM)
1. The advantages of the firm's products and services	100	36	46	82
3. Typical customer questions	100	73	18	91
5. Legal and ethical business conduct	100	55	45	100
6. The basic principles of merchandising	100	100		100
7. The types of retail credit that are utilized by business firms	100	100		100
8. Federal, state, and local regulations affecting product installation and use	100	55	45	100
4. The kind, quality, cost, and source of materials used in equipment which is sold	91	64	18	82

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
SM = Important for Sales and Maintenance personnel
(S+SM) = Important for Sales and/or Sales and Maintenance personnel

or more of the panel members as important for employees during initial employment, none were taught by a large percentage of vocational agriculture teachers. This data is summarized in Table 13. Item Number 7, ("The Workers Should Understand:") "The types of retail credit that are utilized by business firms," was taught by the largest percentage of teachers, but, this was taught by only 20 per cent as part of the All-Day, Young Farmer, or Adult Farmer instruction.

Need for manipulative competencies relative to human relations.--Section V of the Check List was developed to determine the value of each of four manipulative competencies in the area of human relations for successful employment; the personnel who should possess each of these; and the percentage of teachers who taught each competency. The responses by the panel members to this part of the Check List are summarized in Table 14.

(1) Ratings by panel members in terms of value and importance for personnel.--Only two items in this section were rated as "Highly Valuable" by 60 per cent or more of the panel members. These competencies, Item Number 3, "Relate to fellow employees and employers satisfactorily," and Item Number 4, "Accept changes in business policy and procedure," were recommended as necessary for only Sales, or Sales and Maintenance personnel by 91 and 82 per cent, respectively, of the panel members.

Table 13.--Percentage of teachers who taught cognitive competencies in the area of salesmanship rated as "Highly Valuable" by 60 per cent or more of the panel members for Sales or Maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) as Important for Personnel Who: (S+SM)	Percentage of Teachers Who Taught (N=88) All-Day	YF	Adult	Total
5. Legal and ethical business conduct	100	9		2	11
6. The basic principles of merchandising	100	9		1	10
7. The types of retail credit that are utilized by business firms	100	14		6	20
8. Federal, state, and local regulations affecting product installation and use	100	6	1	3	10
3. Typical customer questions	91	7		2	9
1. The advantages of the firm's products and services	82	6	1	2	9
4. The kind, quality, cost, and source of materials used in equipment which is sold	82	7		1	8

[a](S+SM) = Important for Sales and/or Sales and Maintenance personnel
All-Day = Taught as a part of All-Day instruction
YF = Taught as a part of Young Farmer instruction
Adult = Taught as a part of Adult Farmer instruction
Total = Sum of percentage under All-Day, YF, and Adult for each competency

Table 14.--Manipulative competencies in the area of human relations and their rating by panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (VV+V)	S	SIM	SM	NC
4. Accept change in business policy and procedure	91	27		55	18
3. Relate to fellow employees and employers satisfactorily	82	27		64	9
2. Assume the role of the new employee in a business organization	54	27		55	18
1. Participate in a group to change business policy	36	36	9	36	19

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
SIM = Important for Sales, Installation and Maintenance personnel
SM = Important for Sales and Maintenance personnel
NC = No choice was made

None of the competencies were rated as important for the following personnel:

I = Important for Installation personnel
M = Important for Maintenance personnel
SI = Important for Sales and Installation personnel
IM = Important for Installation and Maintenance personnel

(2) Competencies that were taught.--A review of the responses of teachers to these competencies indicated that only 16 per cent taught Item Number 3, "Relate to fellow employees and employers satisfactorily"; 13 per cent taught Item Number 4, "Accept change in business policy and procedure"; 13 per cent Item Number 1, "Participate in a group to change business policy"; and 5 per cent taught Item Number 2, "Assume the role of the new employee in a business organization."

Need for cognitive competencies relative to human relations.--Section VI of the Check List was concerned with identifying the cognitive competencies in the area of human relations that should be possessed by workers who during initial employment, sell, install, and maintain bulk milk tanks or milking systems. The panel members and teachers were asked to respond to twenty-eight items in this section. The responses of the panel members are summarized in Appendix E, Table 29.

(1) Value rating of panel.--Each of the first sixteen items, Numbers 6 through 18, were rated as "Highly Valuable" by over 60 per cent of the panel members as competencies which should be possessed by these entry workers. The remaining twelve items were rated by less than 60 per cent of the panel group as "Highly Valuable" for entry employees, ranging from 18 to 55 per cent.

(2) Competencies important for sales or maintenance personnel.--A review of the personnel rating clearly indicates that in the opinion of the panel members, these human relations competencies are important for dairy equipment sales, or sales and maintenance personnel. The responses for the sixteen items rated as "Highly Valuable" by over 60 per cent of the panel are summarized in Table 15. Over 80 per cent of the panel checked each of these competencies as important for entry employees who sell, or sell and maintain the specified dairy equipment. A closer analysis of this data shows that over 60 per cent of the panel members rated all but three of these competencies as important for both sales and maintenance employees. Number 13, 18, and 23 were the exceptions rated as important to sales and maintenance personnel by only 27 per cent, 55 per cent, and 46 per cent, respectively, of the panel members. These data indicate that, in the opinion of the panel members, workers who provide the farmer with direct-contact services through the sales and maintenance of the specified dairy equipment should have an understanding of these sixteen items.

(3) Competencies that were taught.--A summary of the responses of teachers to these sixteen competencies is reported in Appendix E, Table 30. This data points out that slightly over one-third of the teachers taught Item Number 1, "The principles of good human relations." Each of the remaining competencies was taught by less than 25 per cent

Table 15.--Cognitive competencies in the area of human relations rated as "Highly Valuable" by 60 per cent or more of the panel members for sales or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (VV+V)	S	SM	(S+SM)
6. How to evaluate the results of action which has been taken and make effective adjustments	100	18	73	91
1. The principles of good human relations	91	9	91	100
2. How to recognize individual differences in people	91	36	64	100
13. Methods which are utilized to motivate people	91	73	27	100
25. What a fair days work and wages are	91	9	73	82
5. How to distinguish problems which should be referred to the supervisor	82	18	64	82
15. How to accept authority and the subsequent responsibility in a democratic business organization	82	27	64	91
19. The relationship between personality development and job success	82	27	64	91
21. Why company philosophy and policy should be adopted	82	27	64	91
23. Current business promotion policies	82	36	46	82
27. How to complete an application, and interview for a job	82		91	91
9. The causes of poor human relations	73	18	82	100
20. The need for mutual respect for the rights of managers, supervisors and employees	73	9	73	82
3. How to recognize types of relationships among employees as reflected in attitudes and patterns of behavior	64	27	64	91

Table 15.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (VV+V)	S	SM	(S+SM)
17. The types of relationship which should exist between a business firm and an employee	64	27	64	91
18. How to aid in establishing cooperative relations between employers and employees, as well as among employees	64	27	55	82

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
SM = Important for Sales and Maintenance personnel
(S+SM) = Important for Sales and/or Sales and Maintenance personnel

of the teachers as a part of the total program of vocational agriculture.

The twelve human relations competencies that were rated as "Highly Valuable" by less than 60 per cent of the panel members as important to entrance employees, and their total value ratings are itemized in Appendix E, Table 31. It is interesting to note that only 54 per cent of the panel members believed that beginning workers should know "How to solve problems scientifically" (Item Number 4). Also, every competency was checked as of "Little Value" and "No Value" by at least 9 per cent of the respondents.

Need for manipulative competencies in farming.--Section VII of the Check List was designed to determine which of certain manipulative farming competencies should be possessed by employees during initial employment; the value of each competency to employees; and the percentage of selected teachers in the local public schools who had taught them. The responses to these thirteen items by the panel members appear in Appendix E, Table 32.

(1) Rating by panel members in terms of value and importance for personnel.--All but one item, Number 13, "Suggest changes in the farm crop and soils program to improve the size and volume of a farm business," were rated as "Highly Valuable" by over 60 per cent of the panel members for entrance employees. The data in the table also indicates that over 60 per cent of the panel members considered these

twelve competencies important to only sales personnel. These twelve competencies and the Item Numbers are listed below:

1. Calculate milk production per cow, price per pound of milk, and labor requirement per cow.
2. Determine the net return per dairy cow, per year, to the farmer.
3. Plan an improvement program for the dairy herd.
4. Calculate the cost of installing and using a bulk milk tank.
5. Select the proper size bulk milk tank.
6. Recommend approved milk production practices.
7. Recommend dairy herd management practices to increase labor income.
8. Recommend management practices to control disease in the dairy herd.
9. Plan a barn layout and milking system to meet the needs of the farm.
10. Determine the strengths and weaknesses in a specific farm livestock program.
11. Plan changes in the dairy program to increase the efficiency of the farm business.
12. Suggest changes in the dairy enterprise to improve the size and volume of a farm business.

(2) Competencies that were taught.--The response of the vocational agriculture teachers to these items are summarized in Appendix E, Table 33. This compilation of data shows that six of the competencies, Numbers 1, 6, 2, 3, 12, and 8 were taught by 60 per cent or more of the vocational agriculture teachers in All-Day, Young Farmer, or Adult Farmer classes.

These competencies, rated by the panel members as important to sales personnel, are listed below:

1. Calculate milk production per cow, price per pound of milk, and labor requirement per cow.

6. Recommend approved milk production practices.

2. Determine the net return per dairy cow, per year, to the farmer.

3. Plan an improvement program for the dairy herd.

12. Suggest changes in the dairy enterprise to improve the size and volume of a farm business.

8. Recommend management practices to control disease in the dairy herd.

All of these items can be classified as those directly related to the management of the farm dairy enterprise. The two competencies that were taught by the smallest percentage of teachers, Items 4 and 5, appear to be important for present and prospective dairy farmers. However, Item Number 4, "Calculate the cost of installing and using a bulk milk tank," was taught by only 31 per cent of the teachers; Number 5, "Select the proper size bulk milk tank," by only 38 per cent. Item Number 9, "Plan a barn layout and milking system to meet the needs of a farm," is closely related to these two competencies, and was taught by one-half of the teachers.

The percentage of these manipulative competencies in farming taught in Young Farmer classes was almost negligible. None was reported as taught by over three per cent of the teachers in these classes. Also, none of these competencies was reported as taught by over 19 per cent of

the teachers in Adult Farmer classes.

Need for cognitive competencies in farming.--The last Section of the Check List (Part One of the questionnaire) was designed to determine the degree of value of each of five cognitive competencies in farming for initial employment; the personnel who should possess each; and the percentage of teachers who taught each of these competencies.

(1) Value rating by panel.--All five of these competencies were rated as "Highly Valuable" by 60 per cent or more of the panel members as important to entrance workers employed in occupations that sell, install, or maintain bulk milk tanks or milking systems. (See Appendix E, Table 34.) However, none was given this rating by over 82 per cent of the panel members.

(2) Competencies important for sales or maintenance personnel.--The personnel ratings by the panel members indicate that the first four competencies were recommended by over 60 per cent of the panel members for persons who only sell the specified dairy equipment. These items are listed below:

1. How to use records of production in the selection of breeding stock
2. The need for providing suitable housing and equipment for dairy cattle
4. The relationship between the size and volume of the farm business and farm income
5. The importance of well-kept farm buildings to the dairy farmer

Their ratings also indicate that the remaining competency, Item Number 3, "The general construction features of farm buildings," should be understood by employees who sell and maintain bulk milk tanks or milking systems.

(3) Competencies that were taught.--A summary of the response of the teachers to the competencies rated as important for sales personnel is shown in Table 16. Two of these competencies were taught by over 60 per cent of the teachers, Items 1 and 2. All of these items were taught as a part of the total vocational agriculture program by at least 50 per cent of the teachers. However, almost none of the teachers included these competencies in the Young Farmer instructional program, and only a small percentage included them as a part of the Adult Farmer program.

Summary of data in Part One of the questionnaire.--The responses of the panel members and teachers to the 129 items in Part One of the questionnaire (the Check List) are summarized in Table 17. Sixty per cent or more of the panel members indicated that 100 of the total number of competencies were "Highly Valuable" ("Very Valuable" or "Valuable") to personnel who, during initial employment, sell, install, or maintain bulk milk tanks or milking systems. Forty-three of these 100 competencies, were rated as "Highly Valuable" by the entire group. The percentage of the total number of items in each section that were rated "Highly Valuable" by 60 per cent or more of the panel members ranged from seven

Table 16.--Percentage of teachers who taught cognitive competencies in farming rated as "Highly Valuable" by 60 per cent or more of the panel members for sales personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) as Important for Personnel Who: (VV+V)	S	Percentage of Teachers Who Taught (N=88) All-Day	YF	Adult	Total
1. How to use records of production in the selection of breeding stock	82	91	50		13	63
2. The need for providing suitable housing and equipment for dairy cattle	82	73	43	1	19	63
4. The relationship between the size and volume of the farm business and farm income	82	91	42		15	57
5. The importance of well-kept farm buildings to the dairy farmer	73	64	39		11	50

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
All-Day = Taught as a part of All-Day instruction
YF = Taught as a part of Young Farmer instruction
Adult = Taught as a part of Adult Farmer instruction
Total = Sum of percentages under All-Day, YF, and Adult for each competency

Table 17.--Summary of responses to the Check List by panel members and teachers[a]

Sections	Total Items	No. of Items Checked by Panel Members (N=11): Value (VV+V): Over 60% of Panel	Value (VV+V): Entire Panel	Value (VV+V): Less than 60% of Panel	Personnel (over 60% of Panel): (S+SM)	Personnel (over 60% of Panel): S	Personnel (over 60% of Panel): SM	Personnel (over 60% of Panel): (I+M+IM)	No. of Items Checked by Over 60% of Teachers as Having Been Taught (N=88)
I: Mechanical, Manipulative	43	38	23	5	4			27	2
II: Mechanical, Cognitive	14	7	1	7	6				1
III: Selling, Manipulative	14	13	7	1	13	11	1		
IV: Selling, Cognitive	8	7	6	1	7	4			
V: Human Relations, Manipulative	4	2		2	2		1		
VI: Human Relations, Cognitive	28	16	1	12	16	1	14		
VII: Farming, Manipulative	13	12	5	1	12	12			6
VIII: Farming, Cognitive	5	5			5	4			2
Totals	129	100	43	29	65	32	16	27	11

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")

Table 17.--Continued

(S+SM) = Important for Sales and Sales and Maintenance personnel
S = Important for Sales personnel
SM = Important for Sales and Maintenance personnel
(I+M+IM) = Important for Installation, Maintenance, and Installation and Maintenance personnel

out of fourteen (50 per cent), in Section II, to five out of a possible five (100 per cent), in Section VIII of the Check List.

Sixty per cent or more of the panel members also indicated the following: (1) Sixty-five competencies were important to sales or sales and maintenance personnel; (2) Thirty-two competencies were important to only sales personnel; (3) Sixteen competencies were important to sales and maintenance personnel; and (4) Twenty-seven competencies were important to (1) installation or (2) maintenance or (3) installation and maintenance personnel during initial employment.

Fourteen of the sixteen items which are important for sales and maintenance personnel were cognitive competencies in the area of human relations. The only competencies checked as important for persons who install dairy equipment during initial employment were those listed in Section I ("Mechanical, Manipulative"). Twenty-seven of these forty-three competencies, 62.8 per cent, were rated as important to (1) installation or (2) maintenance or (3) installation and maintenance personnel.

Some competencies were checked in each section of the Check List by 60 per cent or more of the panel members as important to sales or sales and maintenance personnel.

None of the eighteen manipulative and cognitive competencies in farming, in Sections VII and VIII, were

checked by 60 per cent or more of the panel members as important for (1) installation, (2) maintenance, or (3) installation and maintenance personnel. However, sixteen of these eighteen competencies were indicated as important for only sales personnel by over 60 per cent of the panel members.

The last column in Table 17 shows that only a very small number of the competencies, eleven of 129, were taught by 60 per cent or more of the Michigan teachers of vocational agriculture; less than 10 per cent of the total number of competencies. Eight of the twelve items taught were farming competencies that are directly related to the farm dairy enterprise.

The results of this survey can be organized to facilitate the development of vocational education programs. Table 18 lists all of the competencies in the Check List which were rated by 60 per cent or more of the panel members as "Highly Valuable" ("Very Valuable" or "Valuable") and important for employees who only sell or sell and maintain bulk milk tanks or milking systems. Those competencies which were taught by 60 per cent or more of the Michigan teachers of vocational agriculture are preceded by the letter "b." These 65 items have been listed in numerical sequence by each section of the Check List. They are the competencies listed in the questionnaire which, in the opinion of the panel members, should be possessed by workers who during

Table 18.--Items in the Check List, by sections, rated as "Highly Valuable" by 60 per cent or more of the panel members for sales or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (S+SM)
I. MECHANICAL, MANIPULATIVE	
26. Determine the equipment required for the milking parlor	64
27. Determine the equipment required for the milk house	73
33. Sanitize milking equipment	73
34. Milk a cow properly with a mechanical milker	73
II: MECHANICAL, COGNITIVE	
1.[b] Prescribed safety practice	73
2. Equipment requirements for standard milking parlor layouts	82
3. The general sanitary requirements for the placement of drains in the milk house	82
4. The air space and ventilation requirements for the milk house	73
11. The velocity and discharge in the flow of liquids	64
14. The principles of electricity	64
III: SELLING, MANIPULATIVE	
1. Continuously build company good-will	100
2. Write up a bill of sale and a credit agreement	82
3. Display and demonstrate a product	91
4. Utilize a "flip-flop" chart and other visual aids	82
5. Locate and schedule visits with potential customers	91
6. Assume an outward appearance which is in accordance with the customer's expectation	91

Table 18.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (S+SM)
7. Determine the customer's real wants and needs; appeal to his buying motives	91
8. Become persuasive	82
9. Resolve customer objections into purchases	100
10. Close out a sale	100
12. Fill out depreciation schedules for equipment	82
13. File reports of present and future sales conditions	100
14. Use sales engineering and training manuals as guides	91
IV: SELLING COGNITIVE	
1. The advantages of the firm's products and services	82
3. Typical customer questions	91
4. The kind, quality, cost, and source of materials used in equipment which is sold	82
5. Legal and ethical business conduct	100
6. The basic principles of merchandising	100
7. The types of retail credit that are utilized by business firms	100
8. Federal, state, and local regulations affecting product installation and use	100
V: HUMAN RELATIONS, MANIPULATIVE	
3. Relate to fellow employees and employers satisfactorily	91
4. Accept change in business policy and procedure	82

Table 18.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (S+SM)
VI: HUMAN RELATIONS, COGNITIVE	
1. The principles of good human relations	100
2. How to recognize individual differences in people	100
3. How to recognize types of relationships among employees as reflected in attitudes and patterns of behavior	91
5. How to distinguish problems which should be referred to the supervisor	82
6. How to evaluate the results of action which has been taken and make effective adjustments	91
9. The causes of poor human relations	100
13. Methods which are utilized to motivate people	100
15. How to accept authority and the subsequent responsibility in a democratic business organization	91
17. The type of relationship which should exist between a business firm and an employee	91
18. How to aid in establishing cooperative relations between employers and employees, as well as among employees	82
19. The relationship between personality development and job success	91
20. The need for mutual respect for the rights of managers, supervisors, and employees	82
21. Why company philosophy and policy should be adopted	91
23. Current business promotion policies	82
25. What a fair days work and wages are	82
27. How to complete an application, and interview for a job	91

Table 18.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (S+SM)
VII: FARMING, MANIPULATIVE	
1.[b] Calculate milk production per cow, price per pound of milk, and labor requirements per cow	91
2.[b] Determine the net return per dairy cow, per year, to the farmer	73
3.[b] Plan an improvement program for the dairy herd	100
4. Calculate the cost of installing and using a milk bulk tank	64
5. Select the proper size bulk milk tank	100
6.[b] Recommend approved milk production practices	82
7. Recommend dairy herd management practices to increase labor income	82
8.[b] Recommend management practices to control disease in the dairy herd	64
9. Plan a barn layout and milking system to meet the needs of a farm	82
10. Determine the strengths and weaknesses in a specific farm livestock program	91
11. Plan changes in the dairy program to increase the efficiency of the farm business	82
12.[b] Suggest changes in the dairy enterprise to improve the size and volume of a farm business	82
VIII: FARMING, COGNITIVE	
1. How to use records of production in the selection of breeding stock	91
2. The need for providing suitable housing and equipment for dairy cattle	73
3. The general construction features of farm buildings	100

Table 18.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (S+SM)
4. The relationship between the size and volume of the farm business and farm income	91
5. The importance of well-kept farm buildings to the dairy farmer	100

[a](S+SM) = Important for Sales and Sales and Maintenance personnel

[b]Competencies taught by 60 per cent or more of the selected group of vocational agriculture teachers.

initial employment sell or sell and maintain bulk milk tanks or milking systems. These competencies, when translated into behavioral terms, could serve as objectives for vocational courses of instruction. Perhaps, courses based on these objectives could provide potential workers with competencies identified by the panel members as important for persons who sell and maintain bulk milk tanks or milking systems.

Table 19 lists all of the competencies in the Check List which were rated by 60 per cent or more of the panel members as "Highly Valuable" ("Very Valuable" or "Valuable") and important for employees who (1) install, (2) maintain, or (3) install and maintain the dairy equipment described above. All twenty-seven of these items are mechanical manipulative competencies. Only two were taught by 60 per cent or more of the teachers of vocational agriculture, Item Number 3, "Make electrical connections and install electrical wiring"; and Number 16, "Cut and thread pipe."

Perhaps, these competencies can be translated into behavioral objectives of instruction designed to prepare persons for initial employment in occupations that serve the farmer through the installation or maintenance of bulk milk tanks or milking systems.

Summary of responses to Part Two of the questionnaire.--In Part Two of the questionnaire, each panel member was asked to provide a brief description of the entry jobs for employees who sell, install, and maintain dairy equipment; the type

Table 19.--Items in the Check List, by sections, rated as "Highly Valuable" by 60 per cent or more of the panel members for installation or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: (I+M+IM)
I. MECHANICAL, MANIPULATIVE	
2. Locate sources of failure; repair or replace defective parts and wiring	91
3.[b] Make electrical connections and install electrical wiring	100
4. Install, align, and service electric motors	100
5. Dismantle, inspect, and clean electrical equipment	100
6. Check and replace electronic controls	100
7. Cut, bend, and fit electrical conduit	100
8. Maintain and use electrical testing equipment	82
9. Dismantle and service thermostatically-operated valves	100
10. Install 115 and 230 volt electrical systems from the service entrance	91
12. Install equipment, and pipeline and wiring systems by interpreting sketches, prints, and verbal engineering instructions	91
14. Inspect, clean, and adjust circuit breakers	91
15. Install a building drain	91
16.[b] Cut and thread pipe	91
17. Test vacuum and liquid pipeline systems for leaks	64
18. Break and make pipe joints; clean and renew pipe gasket	100
19. Measure, cut, and install cast iron, stainless steel, plastic and glass pipe	100
20. Find dimensions of various pipe sizes, types of fittings and number of threads on pipe	73

Table 19.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: (I+M+IM)
21. Install and service vacuum and liquid pumps, and filtering systems	82
22. Rebuild pumps	100
23. Utilize the proper lubricants for pipe, valves, pumps, and milking equipment	91
24. Dismantle dairy equipment; clean, inspect, and replace worn parts	73
25. Locate, adjust, and replace faulty valves, pressure regulators, and controls	100
28. Assemble and install standard walk-through, tandem, and herringbone milking stalls	82
29. Install and service a pipeline milking parlor or stanchion-type barn	73
30. Install pipeline milking system accessory equipment (wash tank, storage rack, etc.)	82
35. Install, operate, and service a bulk tank cooler	82
37. Conduct periodic maintenance inspections of electrical equipment and pipeline milker systems	64

[a](I+M+IM) = Important for Installation, Maintenance, or Installation and maintenance personnel

[b]Competencies taught by 60 per cent or more of the selected group of vocational agriculture teachers.

and amount of formal education (defined on p. 67) which these entry workers should receive prior to initial employment; and the extent that these workers should sell, install, and maintain equipment during the first six months without assistance.

Only three of the panel members provided a description of the entry jobs. They included the following: (1) "Stockroom or floor clerk; repair department; servicing or route man; book or record keeper; sales assistant"; (2) "Work with experienced men in a territory"; and (3) "Anywhere in the area of a graduate in the specific field to one who has natural talents."

Only one respondent offered a job classification; "Retail farm dairy equipment sales-installation-service-man."

Table 20 summarizes the responses of the panel members regarding the type of formal education entry workers should have. A majority recommended that entry workers complete high school and an apprentice type training course of instruction. Nearly one-half of the group recommended three or four years of All-Day vocational agriculture. The remaining types of educational experience were recommended by less than 30 per cent of the panel members.

In discussing the formal educational needs of employees, the panel members expressed the importance of high school experience and at least some post high school experience in a technical school or college. One respondent stated that,

Table 20.--The type of formal education recommended by the panel members for entry workers

Educational Experience	Response by Panel Members (N=11) Percentage
High school graduate	64
Vocational agriculture; 3-4 years during high school	45
Vocational business; 2-3 years during high school	27
Adult education course, business	18
Adult education course, agriculture	27
Apprentice type training course	55
Junior college; two-year technical course	27
College; four-year engineering course	18

"It would depend to a large degree on how technical the equipment was." Another respondent said, "High school with emphasis on disciplinary subjects. Technical training in agriculture: two years for salesmen. High school with some vocational agriculture: two years of technical training in engineering and shop for installation and maintenance men."

Table 21 provides a summary of responses regarding the extent that these employees should sell, install, and maintain dairy equipment during the first six months of employment without assistance.

This summary indicates that approximately one-half of the panel members believe that sales personnel can work without assistance during the first six months of employment;

Table 21.--The extent to which entry employees should work without assistance during the first six months of employment

Entry Employees	Response by Panel Members (N=11) (Percentage)			
	Often	Seldom	Never	No Choice
Sales personnel	45	36	9	9
Installation personnel	27	55	9	9
Maintenance personnel	27	64		9

over 50 per cent or more believe that installation and maintenance personnel should seldom or never work alone during this entry period.

In summarizing these data, no well-defined entry job classification was given for personnel who are employed in occupations that sell, install, and/or maintain dairy equipment. Also, in the opinion of the panel members, these employees should complete high school and some post high school training in vocational education courses in business or agriculture, apprentice type training, junior college, or a four-year college. And, during the first six months of employment, the employees should seldom or never work alone. This is especially true for installation and maintenance personnel.

The next chapter presents a summary of the design and important findings of the study. It also reports the conclusions of the investigation and recommendations for further study.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

This chapter summarizes the report of the study, presents the conclusions drawn from the findings as they relate to the purpose of the study, and sets forth recommendations for further study beyond the limits of this investigation.

Procedure

This study is designed to demonstrate a method of identifying certain competencies that are essential to the success of persons who seek employment in non-farm occupations that provide the farmer with direct-contact services. The identified competencies should serve as a basis for the establishment or modification of vocational education programs to prepare workers for these occupations.

The method utilized to gather occupational information and translate the information into vocational programs is developed in the perspective of a larger, more inclusive social framework.

Several tenets of democracy are discussed to establish a social framework within which a method of obtaining

occupational information important to employees can be developed.

A brief review of the development of the American secondary school illustrates how a society expands and modifies its social institutions and programs to meet the challenge of changing conditions in a democratic society. This illustration infers that any industry within the American society that is undergoing continuous change should be examined to determine the new conditions in the industry. These changes and new conditions should be reflected in the modification of vocational programs that are designed to prepare persons for employment in occupations within the industry.

A review of the history of the development of American agriculture points out vast and significant changes which have occurred within this segment of the American economy. Of particular note is the rise of large non-farm agricultural occupations employing persons who provide the farmer with direct-contact services. These occupations serve large geographical areas and are characterized by a developing and changing technology.

The changes that have occurred in agriculture should be reflected in public educational programs designed to prepare workers for employment in agricultural occupations. In 1917, federally subsidized programs in vocational agriculture were authorized in the American public schools to

accomplish this. However, a review of the purposes of these programs points out that they are aimed primarily at meeting the occupational needs of only one segment of the agricultural work force, i.e., present and prospective farmers.

Selected literature is cited to show the current methods being utilized to determine the vocational needs of non-farm agricultural employees. Three general methods of obtaining this information are apparent in the review of literature. Included are those designed to survey the leaders in several businesses within local communities; those designed to survey the leaders in a sample of local business establishments within a given industry; and those studies concerned with the identification of non-farm agricultural occupations for further study.

The method used in this study is developed to obtain occupational information consistent with the established social frame of reference. It is proposed that, due to the changes in technology and the size and scope of these occupations, authorities who hold high level positions within an agricultural industry or related agency are competent and willing to provide the desired occupational information. It is also proposed that competencies that are identified by these persons as important for the preparation of workers should be translated into operationally-defined objectives. These objectives should serve as the basis for the development of vocational education programs to prepare workers for

employment. Further, representatives of public educational institutions should be competent and willing to indicate which of the identified competencies are currently taught. This comparison provides a basis for modifying local vocational education programs.

The data provided by this study to demonstrate the method consists, in part, of responses to questionnaires by a panel of authorities within or associated with the dairy industry. The general qualifications for these panel members are that they (1) hold high echelon positions in a business organization or institution of higher learning; (2) have an understanding of dairy farming and direct-contact services provided the dairy farmer by non-farm businesses; and (3) have a concern for the educational needs of workers in agricultural occupations. Eleven members were selected to respond to a questionnaire.

This survey instrument completed by the panel members is designed to obtain information considered important for the preparation of workers who, during initial employment, sell, install, or maintain bulk milk tanks or milking systems. The data that have been collected include the following: (1) the value of certain cognitive and manipulative competencies in aiding workers to successfully fulfill the functions described above; (2) the importance of the competencies that receive a high value rating for workers who <u>sell</u> or <u>install</u> or <u>maintain</u> the prescribed dairy equipment,

or any combinations of these functions; (3) a brief description of the entry occupation for workers who sell, install, and maintain dairy equipment; (4) the occupational classification that should be assigned to persons in these occupations; (5) the amount of supervision these entry workers should receive during the first six months of employment; and (6) the type and amount of formal education they should receive prior to initial employment.

Additional data are provided through the responses to questionnaires by a selected group of Michigan vocational agriculture teachers. All of the Michigan teachers of vocational agriculture are included in the selected group if they are employed by public school systems serving counties having a large number of dairy farms. A Michigan county is classified as such, and included in the study, if (1) thirty per cent or more of the commercial farms in the county are classified as dairy type farms; (2) there are at least 400 dairy farms in the county; and (3) there are at least 10,000 milk cows on commercial farms in the county, as reported in the United States Census of Agriculture: 1959.[1] Twenty-six counties satisfy these criteria. These areas are served by 130 vocational agriculture teachers.

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[1] United States Bureau of Census, United States Census of Agriculture: 1959, Volume I, Counties, Part 13, Michigan (Washington, D. C.: Superintendent of Documents, United States Government Printing Office, 1961), p. xxiv.

The questionnaire that was completed by the teachers is designed to determine which of those competencies identified by the panel members as important to entry workers have been taught in All-Day, Young Farmer, or Adult Farmer classes during the past year.

The competencies which are organized into a Check List (Part I of the questionnaire) were compiled by reviewing occupational literature, including books, periodicals, pamphlets, resource files, job descriptions and specifications, and training manuals. These materials were supplied or recommended by personnel who hold positions of leadership in state and national associations of businessmen and farm equipment companies. A total of 129 competencies were compiled. They are stated in a manner which permits their reduction to behavioral terms, i.e., easily expressed as desired changes in the behavior of the student.

The data received from the panel members and the selected Michigan vocational agriculture teachers are tabulated and compiled into tables. These tables summarize the percentages of responses by both the panel members and the teachers to each of the items in the questionnaire.

Summary of Findings

The persons who qualified as panel members by the criteria listed in Chapter III provided information that is considered to be important for the preparation of entry

workers employed in occupations that sell, install, or maintain bulk milk tanks or milking systems.

Several cognitive and manipulative competencies are identified as having significant value for these workers, as evidenced by the following:

1. One-third of the 129 competencies on the Check List are rated by the entire panel as having considerable value for workers who during initial employment sell, install, and/or maintain bulk milk tanks and/or milking systems.
2. Approximately three-fourths of the competencies on the Check List are rated by over 60 per cent of the panel members as having considerable value for these workers during initial employment.

The panel members also identify specific cognitive and manipulative competencies as important to workers who during initial employment provide the farmer with the following direct-contact services: (1) the sales; (2) the installation; or (3) the maintenance of the prescribed dairy equipment; or (4) any combination of these services. This is supported by the following:

1. Slightly over one-half of the competencies are rated by over 60 per cent of the panel members as important for workers who during initial employment <u>only sell</u>, or <u>sell and maintain</u> bulk milk tanks and/or milking systems.

2. Slightly less than one-fourth of the competencies on the Check List are rated by over 60 per cent of the panel members as important for workers who only sell this equipment.
3. Approximately one-fifth of the competencies are rated by over 60 per cent of the panel members as having considerable value for workers who during initial employment install, maintain, or install and maintain the prescribed equipment. All of the competencies rated as important for these workers are classified as "Manipulative Mechanical."
4. The "Selling," "Human Relations," and "Farming" competencies on the Check List are indicated by the panel members as not important to persons who during initial employment install bulk milk tanks and/or milking systems.

Requisite information is provided by the panel members regarding the type and amount of formal education (as defined on page 67) these entry workers should receive prior to initial employment. In their opinion, persons who seek employment in non-farm agricultural occupations that sell, install, and maintain dairy equipment should complete high school and acquire some post high school formal education. Over 60 per cent of the panel members consider the completion of high school as important for these employees. There

is no consensus regarding the type of post high school experience necessary.

The panel members also provide information regarding the amount of supervision entry workers employed in these occupations should receive during their initial employment period. Over 60 per cent of the panel members indicate that persons who install or maintain the prescribed dairy equipment should seldom or never work without assistance during the first six months of employment. Forty-five per cent of the panel members indicate that sales personnel should often work without assistance during this period.

The panel members do not provide one segment of information considered to be important for the preparation of workers. Few of the panel members outline an occupational classification for persons who sell, install, and maintain dairy equipment. Neither do they provide a description of the entry occupation for these workers. Apparently, they do not have this information available.

The Michigan teachers clearly indicate which of the competencies on the Check List have been taught as a part of the local program of vocational agriculture. These competencies can then be compared with those which had been identified by the panel as of significant value and importance to employees. A summary of the comparison points out that only eleven of the identified competencies have been taught by 60 per cent or more of the teachers as a part of

the All-Day, Young Farmer, or Adult Farmer instruction.

Conclusions

The method demonstrated in this study is effective in obtaining important information for workers who seek employment in certain non-farm agricultural occupations. These occupations provide the farmer with direct-contact services through the sale, installation, and maintenance of bulk milk tanks or milking systems. The method as demonstrated is sound in providing information that can be used as a basis for training programs.

The ideal of American democracy used as a basic frame of reference demands that persons who are well informed and concerned about an occupation or occupational area should be competent and willing to provide important information needed by workers to fulfill the required functions of the occupation. Persons who work closely with public educational programs should be able to identify the competencies that are currently taught which are considered to be important to workers.

Further, the social framework that is established prescribes that under changing conditions, programs and practices must be continuously examined. This examination must be based upon intelligent inquiry. Such a process will lead to any necessary modifications of institutions, policies or programs, including educational programs.

Persons who occupy high echelon positions within the dairy industry, or in agencies closely related to the industry, should be and are willing and competent to identify specific competencies of significant value and importance to workers who provide the farmer with the above-mentioned services. They also provide information regarding the type and amount of formal education needed by these workers prior to initial employment, as well as the extent to which employees should work without supervision during the first six months of employment. Apparently these authorities do not have information regarding a title and description of the entry occupations for workers who are employed by these non-farm agricultural occupations.

The responses of the panel members provide consistent clusters of competencies around which educational programs may be organized to prepare workers for initial employment in specific occupations. Clusters of competencies are identified in the areas of farming, human relations, salesmanship, and mechanics that are important for employees who during initial employment sell; sell and/or maintain; or install and/or maintain bulk milk tanks or milking systems.

The clusters of cognitive and manipulative competencies that are identified as important for persons employed in specific occupations should provide a basis for the development of operationally-defined objectives. Instructional programs based on these objectives should contribute to the

preparation of workers for initial employment.

Persons employed by public educational institutions should be surveyed to determine which of the competencies are being taught as a part of the instructional program. In this study, a survey of teachers of vocational agriculture shows that few of the competencies identified by the panel members as those needed by workers who during initial employment sell, install, or maintain bulk milk tanks or milking systems are being taught as a part of the vocational agriculture program. Thus, if existing local programs of vocational agriculture are to prepare workers for initial employment, extensive modification of programs must be made. It is also evident that instruction in vocational agriculture provided by Michigan public secondary schools has not been of the type to meet the vocational needs of workers in certain non-farm agricultural occupations.

These results support the thesis that due to the changing conditions within certain non-farm agricultural occupations, these occupations should be continuously examined to determine the educational needs of workers who seek employment in them. Public educational institutions should also be continuously evaluated to determine the extent to which they are providing for these needs.

Recommendations

Several recommendations for further study beyond the limitations of this investigation are listed in the

following paragraphs.

1. The method of identifying worker competencies as a basis for the establishment of vocational programs that is demonstrated in this study should be utilized to investigate non-farm agricultural occupations that have the following characteristics: (1) serving large geographical areas; (2) providing the farmer with direct-contact services; and (3) manifesting a developing and changing technology. Moreover, the rapidly changing nature of agriculture demands that a continuous study be made to identify the vocational competencies needed by persons who are preparing to enter these occupations.
2. In developing curricula for training persons for certain non-farm agricultural occupations, recognition should be given to the specialized nature of these occupations and to the differences in vocational competencies needed. These differences imply that training programs should be carefully adapted to the specific requirements of each occupation or certain combinations of occupations.
3. If vocational agriculture curricula are to meet the educational needs of persons who seek employment in certain non-farm occupations, the

instruction should manifest the specialized characteristics of these occupations and should provide experiences that can be highly individualized.

4. It may not be feasible to establish or modify such vocational agriculture programs offered by local public schools in rural areas due to the specialized nature of the instruction, the diverse areas of competencies to be taught, and the small number who might seek employment in each non-farm agricultural occupation. Studies should be made to determine the need for area vocational schools to prepare persons for initial employment in these non-farm agricultural occupations.
5. Researchers who are responsible for modifying and establishing local programs of vocational agriculture should endeavor to integrate or synthesize data collected into educational programs according to some over-all order of unity or consistency. In other words, programs of vocational agriculture should be modified or established in reference to some comprehensive purpose of education, e.g., providing the kind of society in which man wants to live.
6. Clusters of cognitive and manipulative competencies are identified as important for workers who sell,

install, or maintain the prescribed dairy equipment. Other competencies may also be important to these workers; efforts should be made to identify others that could be added to these.

7. The only competencies identified for workers who install dairy equipment are in the area of "Mechanical Manipulative." Consequently, persons who occupy high echelon positions within the dairy industry, or in agencies and institutions closely associated with it, should be questioned further to identify competencies other than "Mechanical Manipulative" that should be possessed by persons who install dairy equipment during initial employment.
8. The results of this study point out that workers who sell, install, and maintain bulk milk tanks or milking systems should possess competencies in the field of farming, distribution, and trade and industry. Perhaps training could be provided in two or more of the following areas at the secondary or adult level: agricultural education, distributive education, and/or trade and industrial education. Studies should be made to determine the most effective method of providing vocational education at the secondary and adult levels for these non-farm and other agricultural occupations.

9. In this study, eleven of the competencies identified as important to workers are taught by secondary agricultural teachers. Teachers responsible for vocational programs in areas other than agriculture should be queried to determine whether or not any of the identified competencies are currently taught in these areas.
10. These worker competencies may also be included as a part of instruction in apprentice type training programs, or at the junior college level. Studies should be made to determine which of the identified competencies are currently taught.
11. Authorities in the dairy industry indicate that persons should complete high school and obtain some post high school education prior to initial employment. These leaders should be queried further to determine in greater detail the formal educational requirements of potential employees.
12. Studies should be made to determine a title for and description of the occupational classifications for entry workers who sell, install, or maintain dairy equipment.
13. The panel members recommend supervision of workers during the first six months of employment. An investigation should be made to determine whether or not systematized instruction should be integrated

with work experience during the first months of employment in these occupations.

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APPENDICES

APPENDIX A

Letter sent to secure resource materials
Letter sent to prospective panel members
Covering letter enclosed with the questionnaire sent to panel members
Covering letter enclosed with the questionnaire to teachers
Follow-up letter sent to teachers who had not returned the questionnaire

MICHIGAN STATE UNIVERSITY EAST LANSING

COLLEGE OF EDUCATION

July 12, 1961

I am currently engaged in research for my doctoral dissertation at Michigan State University. It is the purpose of this study to identify the educational needs of persons for entrance into selected non-farm commercial occupations directly contacting the farmer through the sale, installation, and service of dairy appliances and equipment. Will you please assist me by providing the following materials:

1. Job descriptions for workers employed in commercial occupations directly contacting the farmer through the sale, installation, and service of dairy appliances and equipment.

2. Job specifications for workers employed in commercial occupations directly contacting the farmer through the sale, installation, and service of dairy appliances and equipment.

3. Training materials or manuals which are used to train workers employed in commercial occupations directly contacting the farmer through the sale, installation, and service of dairy appliances and equipment.

4. The names and addresses of representatives of your organization serving Michigan agriculture who might assist me further by providing resource materials or counsel.

I would be most appreciative of any data which you could give me that would aid in completing this study.

Very truly yours,

Harrison Gardner
Assistant Instructor
Agricultural Education Services
336 College of Education

March 10, 1962

Dear Mr. _____:

I am currently engaged in research for my doctoral dissertation at Michigan State University. It is the purpose of this study to obtain information that is important to persons for entrance into selected non-farm commercial occupations. These occupations provide the farmer with direct-contact services through the sale, installation, and maintenance of bulk milk tanks and/or milking systems. A questionnaire in the form of a Check List has been developed to aid me in identifying certain competencies needed by the personnel described.

The study was designed to secure the opinions of a panel of knowledgeable personnel in leading dairy equipment institutes, associations, and companies in the United States, as well as dairy and farm equipment specialists at Michigan State University.

Several persons within the dairy industry have recommended you as one who is highly qualified to respond to the questionnaire. I would be most appreciative if you would aid me in completing this study by filling out a questionnaire. I will contact you on _____, April _____, 1962, regarding this matter.

Very truly yours,

Harrison Gardner, Instructor
College of Education

April 11, 1962

Dear Dr. _____:

Thank you again for consenting to act as a member of the panel for my study of non-farm agricultural occupations. The Check List is enclosed. I believe it is self-explanatory. When you have completed the instrument, please return it to me in the envelope provided.

It is the purpose of this study to obtain information that is important to persons for entrance into selected non-farm commercial occupations directly contacting the farmer through the sale, installation, and service of milking systems and bulk milk tanks. The data gathered will provide invaluable data which can be utilized as a basis for planning vocational education programs.

I will, of course, provide each panel member with a summary of the study.

Sincerely yours,

Harrison Gardner, Instructor
College of Education

May 10, 1962

Dear Mr. _____:

When I was teaching vocational agriculture in Marshall, I aided a number of people by completing questionnaires and check lists. However, until now, I had never fully realized the value of the service which teachers render to the teaching profession by cooperating in research studies. I must admit that I am depending upon you to assist me in completing a study.

I am currently engaged in research for my doctoral dissertation at Michigan State University. It is the purpose of this study to identify certain cognitive and manipulative competencies that are important to persons for entrance into selected non-farm commercial occupations. These occupations provide the farmer with direct-contact services through the sale, installation, and maintenance of bulk milk tanks and/or milking systems. A second purpose is to determine which of these identified competencies were taught by Michigan teachers of vocational agriculture during the past year.

As a teacher in the selected group, will you please assist me by filling out the enclosed Check List? It will require only a few minutes of your time. Your assistance will enable me to accomplish the second purpose mentioned above.

A self-addressed envelope is enclosed for your convenience in returning the questionnaire.

Very truly yours,

Harrison Gardner, Instructor
College of Education

July 5, 1962

Dear Mr. _____:

With all due apologies to a farm periodical, I would like to remind you of things to do during the month of July.

Now is the time to:

Hoe
Think
Vacation
Correspond
Dust office
Check records
Say Hi to wife
Make farm visits
Hold an FFA meeting
Build program of work
DO GARDNER'S CHECK LIST
Attend annual conference
Hold a Young Farmer meeting

I trust that the above gimmick will encourage you to complete the Check List which I mailed to you on May 10, 1962. Without your help, my study will be incomplete and inconclusive.

If you have misplaced the Check List, please inform me of such on the enclosed self-addressed postcard, and I will send you another copy.

Very truly yours,

Harrison Gardner, Instructor
College of Education

APPENDIX B

Questionnaire forms for panel members
Questionnaire forms for teachers

CHECK LIST

Part One:

A. This Check List was developed to determine the value of competencies which should be possessed by persons for initial employment in occupations which provide direct-contact services to the dairy farmer. These services include the sale, installation, and maintenance of milking systems and bulk milk tanks.

B. Instructions for Completing the Check List:

1. Please read each item carefully and determine whether or not each competency should be required of workers who, during initial employment, sell, install, or maintain milking systems and/or bulk milk tanks.
2. Place an "S" in the column labeled Worker's Function if the competency should be possessed by workers who SELL milking systems and/or bulk milk tanks.
3. Place an "I" in the column labeled Worker's Function if the competency should be possessed by workers who INSTALL milking systems and/or bulk milk tanks.
4. Place an "M" in the column labeled Worker's Function if the competency should be possessed by workers who MAINTAIN milking systems and/or bulk milk tanks.
5. If the item should be possessed by workers who perform two or three of the functions (Sell, Install, Maintain), place two or three appropriate letters in the column labeled Worker's Function.

6. Next, determine the value of each competency in aiding the worker during initial employment to successfully fulfill the required functions of the occupation. Place a check mark (✓) in one of the four columns to the right of each item:

   Check (Very Valuable) . . . if the item gives the the worker a decided advantage in fulfilling the requirements of the occupation.

   Check (Valuable) . . . . . if the item gives the worker some advantage in fulfilling the requirements of the occupation.

   Check (Little Value) . . . if the item gives the worker little advantage in fulfilling the requirements of the occupation.

   Check (No Value) . . . . . if the item may be a definite asset, but the worker may not need this particular item in fulfilling the requirements of the occupation.

7. Additional competencies which you believe should be included in the study may be listed in the blank spaces at the end of each section of the Check List.

C. Definition of Terms:

1. Manipulative Competence: The operational skills leading to relatively immediate and concrete observable results.

2. Cognitive Competence: The knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made.

D. Examples:

COMPETENCIES

If you can not make a choice, circle the question number.	WORKER'S FUNCTION		VALUE			
Manipulative Competence: The operational skills leading to relatively immediate and concrete observable results.	S-SALES I-INSTALLATION M-MAINTENANCE		VERY VALUABLE	VALUABLE	LITTLE VALUE	NO VALUE
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:						
1. Operate a cash register	S			✓		
2. Install a bulk tank cooler	I		✓			
3. Service electric motors	IM		✓			
4. Milk a cow with a mechanical milker	SIM			✓		
(5) Install three-phase circuits						
	S. I. M.		V.V.	V.	L.V.	N.V.

COMPETENCIES If you can not make a choice, circle the question number. Section I: Mechanical Competencies (Manipulative) Manipulative Competence: the operational skills leading to relatively immediate and concrete observable results.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE			VALUE VERY VALUABLE VALUABLE LITTLE VALUE NO VALUE			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:							
1. Operate simple hand and machine tools and equipment							
2. Locate sources of failure; repair or replace defective parts and wiring							
3. Make electrical connections and install electrical wiring							
4. Install, align and service electric motors							
5. Dismantle, inspect, and clean electrical equipment							
6. Check and replace electronic controls							
7. Cut, bend, and fit electrical conduit							
8. Maintain and use electrical testing equipment							
9. Dismantle and service thermostatically operated valves							
10. Install 115 and 230 volt electrical systems from the service entrance							
	S.	I.	M.	V.V.	V.	L.V.	N.V.

COMPETENCIES If you can not make a choice, circle the question number.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE	VALUE VERY VALUABLE	VALUABLE	LITTLE VALUE	NO VALUE
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:					
11. Install three phase circuits					
12. Install equipment, and pipeline and wiring systems by interpreting sketches, prints, and verbal engineering instructions					
13. Lay out a job from blueprint and select proper materials					
14. Inspect, clean, and adjust circuit breakers					
15. Install a building drain					
16. Cut and thread pipe					
17. Test vacuum and liquid pipeline systems for leaks					
18. Break and make pipe joints; clean and renew pipe gaskets					
19. Measure, cut, and install cast iron, stainless steel, plastic and glass pipe					

S. I. M.

V.V. V. L.V. N.V.

COMPETENCIES If you can not make a choice, circle the question number	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE		VALUE VERY VALUABLE VALUABLE LITTLE VALUE NO VALUE			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:						
20. Find dimensions of various pipe sizes, types of fittings, and number of threads on pipe						
21. Install and service vacuum and liquid pumps, and filtering systems						
22. Rebuild pumps						
23. Utilize the proper lubricants for pipe, valves, pumps, and milking equipment						
24. Dismantle dairy equipment; clean, inspect and replace worn parts						
25. Locate, adjust, and replace faulty valves pressure regulators, and controls						
26. Determine the equipment required for the milking parlor						
27. Determine the equipment required for the milk house						
28. Assemble and install standard walk-through, tandem, and herringbone milking stalls						
	S. I. M.		V.V.	V.	L.V.	N.V.

COMPETENCIES If you can not make a choice, circle the question number.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE		VALUE VERY VALUABLE	VALUABLE	LITTLE VALUE	NO VALUE
DURING INITIAL EMPLOYMENT THE WORKER SHOULD BE ABLE TO:						
29. Install and service a pipeline milking system in a milking parlor or stanchion-type barn						
30. Install pipeline milking system accessory equipment (wash tank, storage rack, etc.)						
31. Assemble pipeline system milker units						
32. Recommend the proper cleaning materials for the milking equipment						
33. Sanitize milking equipment						
34. Milk a cow properly with a mechanical milker						
35. Install, operate, and service a bulk tank cooler						
36. Utilize a water hardness test kit and an iron test kit						
37. Conduct periodic maintenance inspections of electrical equipment and pipeline milker systems						
	S. I. M.		V.V.	V.	L.V.	N.V.

COMPETENCIES If you can not make a choice, circle the question number.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE	VALUE VERY VALUABLE VALUABLE LITTLE VALUE NO VALUE
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:		
38. Solve problems using Newton's laws of motion		
39. Recognize the relationship between the cause of equipment malfunction and effective remedial action		
40. Calculate the components of force		
41. Solve problems through the application of principles of rotational motion		
42. Measure the unit pressure of liquids		
43. Calculate the pressure on immersed plane surfaces		
OTHER: (Please list and rate each competency.)		
44.		
45.		
46.	S. I. M.	V.V. V. L.V. N.V.

COMPETENCIES	WORKER'S FUNCTION			VALUE			
If you can not make a choice, circle the question number. SECTION II: Mechanical Comptencies (Cognitive) Cognitive Competence: the knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made.	S-SALES	I-INSTALLATION	M-MAINTENANCE	VERY VALUABLE	VALUABLE	LITTLE VALUE	NO VALUE
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:							
1. Prescribed safety practices							
2. Equipment requirements for standard milking parlor layouts							
3. The general sanitary requirements for the placement of drains in the milk house							
4. The air space and ventilation requirements for the milk house							
5. The kinds, forms, and physical properties of matter							
6. The principles of velocity							
7. The meaning, types and units of force							
8. The principles of centrifugal force							
9. The machine elements of mechanics (lever, wheel and axle, etc.)							
10. The physical properties of liquids							
11. The velocity and discharge in the flow of liquids							
	S.	I.	M.	V.V.	V.	L.V.	N.V.

COMPETENCIES If you can not make a choice, circle the question number.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE		VALUE VERY VALUABLE	 VALUABLE	 LITTLE VALUE	 NO VALUE
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:						
12. The basic laws of equilibrium						
13. The principles of impulse and momentum						
14. The principles of electricity						
OTHER: (Please list and rate each competency)						
15.						
16.						
17.						
Section III: Selling Competencies (Manipulative)						
Manipulative Competence: the operational skills leading to relatively immediate and concrete observable results.						
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:						
1. Continuously build company good-will						
2. Write up a bill of sale and a credit agreement						
3. Display and demonstrate a product						
4. Utilize a "flip-flop" chart and other visual aids						
	S. I. M.		V.V.	V.	L.V.	N.V.

-11-

COMPETENCIES If you can not make a choice, circle the question number.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE			VALUE VERY VALUABLE VALUABLE LITTLE VALUE NO VALUE			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:							
5. Locate and schedule visits with potential customers							
6. Assume an outward appearance which is in accordance with the customer's expectations							
7. Determine the customer's real wants and needs; appeal to his buying motives							
8. Become persuasive							
9. Resolve customer objections into purchases							
10. Close out a sale							
11. Operate a cash register							
12. Fill out depreciation schedules for equipment							
13. File reports of present and future sales conditions							
14. Use sales engineering and training manuals as guides							
OTHER: (Please list and rate each competency) 15.							
16.							
17.							
	S.	I.	M.	V.V.	V.	L.V.	N.V.

COMPETENCIES If you can not make a choice, circle the question number.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE			VALUE VERY VALUABLE	VALUABLE	LITTLE VALUE	NO VALUE
Section IV: Selling Competencies (Cognitive)							
Cognitive Competence: the knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made.							
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:							
1. The advantages of the firm's products and services							
2. The attributes of a salesman's personality							
3. Typical customer questions							
4. The kind, quality, cost, and source of materials used in equipment which is sold							
5. Legal and ethical business conduct							
6. The basic principles of merchandising							
7. The types of retail credit that are utilized by business firms							
8. Federal, state, and local regulations affecting product installation and use							
OTHER: (Please list and rate each competency)							
9.							
10.							
11.							
	S.	I.	M.	V.V.	V.	L.V.	N.V.

COMPETENCIES	WORKER'S FUNCTION			VALUE			
If you can not make a choice, circle the question number. Section V: Competencies in Human Relations (Manipulative) Manipulative Competence: the operational skill leading to relatively immediate and concrete observable results.	S-SALES	I-INSTALLATION	M-MAINTENANCE	VERY VALUABLE	VALUABLE	LITTLE VALUE	NO VALUE
DURING THE INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:							
1. Participate in a group to change business policy							
2. Assume the role of the new employee in a business organization							
3. Relate to fellow employees and employers satisfactorily							
4. Accept changes in business policy and procedure							
OTHER: (Please list and rate each competency)							
5.							
6.							
7.							
	S.	I.	M.	V.V.	V.	L.V.	N.V.

COMPETENCIES	WORKER'S FUNCTION			VALUE			
If you can not make a choice, circle the question number.	S-SALES	I-INSTALLATION	M-MAINTENANCE	VERY VALUABLE	VALUABLE	LITTLE VALUE	NO VALUE
Section VI: Competencies in Human Relations (Cognitive)							
Cognitive Competence: the knowledge and understanding of which responsible judgments concerning the manipulative aspects of competence can be made.							
DURING INITIAL EMPLOYMENT THE WORKER SHOULD KNOW:							
1. The principles of good human relations							
2. How to recognize individual differences in people							
3. How to recognize types of relationships among employees as reflected in attitudes and patterns of behavior							
4. How to solve problems scientifically							
5. How to distinguish problems which should be referred to the supervisor							
6. How to evaluate the results of action which has been taken and make effective adjustments							
7. The rights and responsibilities of employees and employers in collective bargaining							
8. The characteristics of democratic and autocratic supervision							
	S.	I.	M.	V.V.	V.	L.V.	N.V.

COMPETENCIES If you can not make a choice, circle the question number.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE			VALUE VERY VALUABLE	VALUABLE	LITTLE VALUE	NO VALUE
DURING THE INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:							
9. The causes of poor human relations							
10. How to analyze an individual's behavior in terms of his own frame of reference							
11. The effect of frustration on attitudes and behavior							
12. The social dynamics of a work group							
13. Methods which are utilized to motivate people							
14. The causes of fatigue and boredom							
15. How to accept authority and the subsequent responsibility in a democratic business organization							
16. How to evaluate worker competence							
17. The type of relationship which should exist between a business firm and an employee							
18. How to aid in establishing cooperative relations between employers and employees, as well as among employees							
19. The relationship between personality development and job success							
	S.	I.	M.	V.V.	V.	L.V.	N.V.

COMPETENCIES If you can not make a choice, circle the question number.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE			VALUE VERY VALUABLE		LITTLE VALUE	NO VALUE
	S.	I.	M.	V.V.	V.	L.V.	N.V.
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:							
20. The need for mutual respect for the rights of managers, supervisors, and employees							
21. Why company philosophy and policy should be adopted							
22. The characteristics and function of the power structure within a business organization							
23. Current business promotion policies							
24. The various types of business organizations							
25. What a fair days work and wages are							
26. How to evaluate employment and unemployment benefits							
27. How to complete an application, and interview for a job							
28. How to read and interpret the Dictionary of Occupational Titles							
OTHER: (Please list and rate each competency)							
29.							
30.							
31.							

COMPETENCIES	WORKER'S FUNCTION			VALUE			
If you can not make a choice, circle the question number.	S-SALES	I-INSTALLATION	M-MAINTENANCE	VERY VALUABLE	VALUABLE	LITTLE VALUE	NO VALUE
Section VII: Farming Competencies (Manipulative)							
Manipulative Competence: the operational skill leading to relatively immediate and concrete observable results							
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:							
1. Calculate milk production per cow, price per pound of milk, and labor requirements per cow							
2. Determine the net return per dairy cow, per year, to the farmer							
3. Plan an improvement program for the dairy herd							
4. Calculate the cost of installing and using a bulk milk tank							
5. Select the proper size bulk milk tank							
6. Recommend approved milk production practices							
7. Recommend dairy herd management practices to increase labor income							
8. Recommend management practices to control disease in the dairy herd							
9. Plan a barn layout and milking system to meet the needs of a farm							
10. Determine the strengths and weaknesses in a specific farm livestock program							
	S.	I.	M.	V.V.	V.	L.V.	N.V.

COMPETENCIES If you can not make a choice, circle the question number.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE			VALUE VERY VALUABLE VALUABLE LITTLE VALUE NO VALUE			
	S.	I.	M.	V.V.	V.	L.V.	N.V.
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:							
11. Plan changes in the dairy program to increase the efficiency of the farm business.							
12. Suggest changes in the dairy enterprise to improve the size and volume of a farm business							
13. Suggest changes in the farm crop and soils program to improve the size and volume of a farm business							
OTHER: (Please list and rate each competency)							
14.							
15.							
16.							

COMPETENCIES If you can not make a choice, circle the question number. Section VIII: Farming Competencies (Cognitive) Cognitive Competence: the knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made.	WORKER'S FUNCTION S-SALES I-INSTALLATION M-MAINTENANCE	VALUE VERY VALUABLE VALUABLE LITTLE VALUE NO VALUE
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:		
1. How to use records of production in the selection of breeding stock		
2. The need for providing suitable housing and equipment for dairy cattle		
3. The general construction features of farm buildings		
4. The relationship between the size and volume of the farm business and farm income		
5. The importance of well-kept farm buildings to the dairy farmer		
OTHER: (Please list and rate each competency)		
6.		
7.		
8.		
	S. I. M.	V.V. V. L.V. N.V.

PART TWO: GENERAL INFORMATION

A. Your name (if you wish to state it) _____

B. Name of your employing firm, institution, or association _____

C. Your position or job title _____

D. Give a brief description of the entry occupations for workers who sell, install, or maintain dairy equipment

_____

_____

E. What occupational classification should be assigned to persons in these entry occupations? _____

F. How often should a worker who is initially employed in a firm which sells, installs, or maintains dairy equipment perform the following functions alone during the first six months of his employment? (check below)

Sell equipment	Often ___	Seldom ___	Never ___
Install equipment	Often ___	Seldom ___	Never ___
Maintain equipment	Often ___	Seldom ___	Never ___

G. What type of formal education should an employee have to fulfill the requirements of an entry occupation in performing the above functions?

_____

_____

H. What type of formal education should a worker who is initially employed in a firm which sells, installs, or maintains dairy equipment have? (check below)

( ) High school graduate

( ) Vocational agriculture; 3-4 years during high school

( ) Vocational business; 2-3 years during high school

( ) Adult education course, business

( ) Adult education course, agriculture

( ) Apprentice type training course

( ) Junior college; two year technical course

( ) College; four year engineering course

( ) Other _____

_____

CHECK LIST

A. This Check List was developed to determine which of certain worker competencies were taught by Michigan teachers of vocational agriculture during the past year. These competencies may be important for workers who during initial employment sell, install, or maintain bulk milk tanks and milking systems.

B. Instructions for Completing the Check List:

1. Please read each item carefully and place a check mark (✓) in any one or any combination of the three columns on the Check List indicating that the competency was taught during the past year.
   a. Check the column labeled All-Day if the competency was taught as a part of the All-Day vocational agriculture program.
   b. Check the column labeled Young Farmer if the competency was taught as a part of the Young Farmer program.
   c. Check the column labeled Adult Farmer if the competency was taught as a part of the Adult Farmer program.
2. If you have not taught a competency, leave the columns blank.
3. If you can not make a choice, circle the item number.

C. Definition of Terms:

1. Manipulative Competence: The operational skills leading to relatively immediate and concrete observable results.
2. Cognitive Competence: The knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made.

COMPETENCIES	ITEMS TAUGHT: ALL-DAY	YOUNG FARMER	ADULT FARMER
If you can not make a choice, circle the question number.			
Section I: Mechanical Competencies (Manipulative)			
Manipulative Competence: the operational skills leading to relatively immediate and concrete observable results.			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
1. Operate simple hand and machine tools and equipment			
2. Locate sources of failure; repair or replace defective parts and wiring			
3. Make electrical connections and install electrical wiring			
4. Install, align and service electric motors			
5. Dismantle, inspect, and clean electrical equipment			
6. Check and replace electronic controls			
7. Cut, bend, and fit electrical conduit			
8. Maintain and use electrical testing equipment			
9. Dismantle and service thermostatically operated valves			
10. Install 115 and 230 volt electrical systems from the service entrance			

COMPETENCIES

If you can not make a choice, circle the question number.

ITEMS TAUGHT

	ALL-DAY	YOUNG FARMER	ADULT FARMER
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
11. Install three phase circuits			
12. Install equipment, and pipeline and wiring systems by interpreting sketches, prints, and verbal engineering instructions			
13. Lay out a job from blueprint and select proper materials			
14. Inspect, clean, and adjust circuit breakers			
15. Install a building drain			
16. Cut and thread pipe			
17. Test vacuum and liquid pipeline systems for leaks			
18. Break and make pipe joints; clean and renew pipe gaskets			
19. Measure, cut, and install cast iron, stainless steel, plastic and glass pipe			

COMPETENCIES If you can not make a choice, circle the qudstion number.	ITEMS TAUGHT ALL-DAY	YOUNG FARMER	ADULT FARMER
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
20. Find dimensions of various pipe sizes, types of fittings, and number of threads on pipe			
21. Install and service vacuum and liquid pumps, and filtering systems			
22. Rebuild pumps			
23. Utilize the proper lubricants for pipe, valves, pumps, and milking equipment			
24. Dismantle dairy equipment; clean, inspect and replace worn parts			
25. Locate, adjust, and replace faulty valves pressure regulators, and controls			
26. Determine the equipment required for the milking parlor			
27. Determine the equipment required for the milk house			
28. Assemble and install standard walk-through, tandem, and herringbone milking stalls			

COMPETENCIES If you can not make a choice, circle the question number.	ITEMS TAUGHT ALL-DAY	YOUNG FARMER	ADULT FARMER
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
29. Install and service a pipeline milking system in a milking parlor or stanchion-type barn			
30. Install pipeline milking system accessory equipment (wash tank, storage rack, etc.)			
31. Assemble pipeline system milker units			
32. Recommend the proper cleaning materials for the milking equipment			
33. Sanitize milking equipment			
34. Milk a cow properly with a mechanical milker			
35. Install, operate, and service a bulk tank cooler			
36. Utilize a water hardness test kit and an iron test kit			
37. Conduct periodic maintenance inspections of electrical equipment and pipeline milker systems			

COMPETENCIES	ITEMS TAUGHT: ALL-DAY	YOUNG FARMER	ADULT FARMER
If you can not make a choice, circle the question number.			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
38. Solve problems using Newton's laws of motion			
39. Recognize the relationship between the cause of equipment malfunction and effective remedial action			
40. Calculate the components of force			
41. Solve problems through the application of principles of rotational motion			
42. Measure the unit pressure of liquids			
43. Calculate the pressure on immersed plane surfaces			

COMPETENCIES

ITEMS TAUGHT

ALL-DAY	YOUNG FARMER	ADULT FARMER

If you can not make a choice, circle the question number.

Section II; Mechanical Competencies (Cognitive)

Cognitive Competence: the knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made

DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:

1. Prescribed safety practice
2. Equipment requirements for standard milking parlor layouts
3. The general sanitary requirements for the placement of drains in the milk house
4. The air space and ventilation requirements for the milk house
5. The kinds, forms, and physical properties of matter
6. The principles of velocity
7. The meaning, types and units of force
8. The principles of centrifugal force
9. The machine elements of mechanics (lever, wheel and axle, etc.)
10. The physical properties of liquids
11. The velocity and discharge in the flow of liquids

COMPETENCIES If you can not make a choice, circle the question number.	ITEMS TAUGHT ALL-DAY	YOUNG FARMER	ADULT FARMER
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:			
12. The basic laws of equilibrium			
13. The principles of impulse and momentum			
14. The principles of electricity			
Section III: Selling Competencies (Manipulative)			
Manipulative Competence: the operational skills leading to relatively immediate and concrete observable results.			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
1. Continuously build company good-will			
2. Write up a bill of sale and a credit agreement			
3. Display and demonstrate a product			
4. Utilize a "flip-flop" chart and other visual aids			

COMPETENCIES	ITEMS TAUGHT		
If you can not make a choice, circle the question number.	All-DAY	YOUNG FARMER	ADULT FARMER
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
5. Locate and schedule visits with potential customers			
6. Assume an outward appearance which is in accordance with the customer's expectations			
7. Determine the customer's real wants and needs; appeal to his buying motives			
8. Become persuasive			
9. Resolve customer objections into purchases			
10. Close out a sale			
11. Operate a cash register			
12. Fill out depreciation schedules for equipment			
13. File reports of present and future sales conditions			
14. Use sales engineering and training manuals as guides			

COMPETENCIES

If you can not make a choice, circle the question number.

ITEMS TAUGHT		
ALL-DAY	YOUNG FARMER	ADULT FARMER

Section IV: Selling Competencies (Cognitive)

Cognitive Competence: the knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made.

DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:

1. The advantages of the firm's products and services
2. The attributes of a salesman's personality
3. Typical customer questions
4. The kind, quality, cost, and source of materials used in equipment which is sold
5. Legal and ethical business conduct
6. The basic principles of merchandising
7. The types of retail credit that are utilized by business firms
8. Federal, state, and local regulations affecting product installation and use

COMPETENCIES	ITEMS TAUGHT: ALL-DAY	YOUNG FARMER	ADULT FARMER
If you can not make a choice, circle the question number.			
Section V: Competencies in Human Relations (Manipulative)			
Manipulative Competence: the operational skill leading to relatively immediate and concrete observable results.			
DURING THE INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
1. Participate in a group to change business policy			
2. Assume the role of the new employee in a business organization			
3. Relate to fellow employees and employers satisfactorily			
4. Accept changes in business policy and procedure			

COMPETENCIES	ITEMS TAUGHT: ALL-DAY	YOUNG FARMER	ADULT FARMER
If you can not make a choice, circle the question number.			
Section VI: Competencies in Human Relations (Cognitive)			
Cognitive Competence: the knowledge and understanding of which responsible judgments concerning the manipulative aspects of competence can be made.			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:			
1. The principles of good human relations			
2. How to recognize individual differences in people			
3. How to recognize types of relationships among employees as reflected in attitudes and patterns of behavior			
4. How to solve problems scientifically			
5. How to distinguish problems which should be referred to the supervisor			
6. How to evaluate the results of action which has been taken and make effective adjustments			
7. The rights and responsibilities of employees and employers in collective bargaining			
8. The characteristics of democratic and autocratic supervision			

COMPETENCIES	ITEMS TAUGHT: ALL-DAY	YOUNG FARMER	ADULT FARMER
If you can not make a choice, circle the question number.			
DURING THE INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:			
9. The causes of poor human relations			
10. How to analyze an individual's behavior in terms of his own frame of reference			
11. The effect of frustration on attitudes and behavior			
12. The social dynamics of a work group			
13. Methods which are utilized to motivate people			
14. The causes of fatigue and boredom			
15. How to accept authority and the subsequent responsibility in a democratic business organization			
16. How to evaluate worker competence			
17. The type of relationship which should exist between a business firm and an employee			
18. How to aid in establishing cooperative relations between employers and employees, as well as among employees			
19. The relationship between personality development and job success			

COMPETENCIES	ITEMS TAUGHT: ALL-DAY	YOUNG FARMER	ADULT FARMER
If you can not make a choice, circle the question number.			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:			
20. The need for mutual respect for the rights of managers, supervisors, and employees			
21. Why company philosophy and policy should be adopted			
22. The characteristics and function of the power structure within a business organization			
23. Current business promotion policies			
24. The various types of business organizations			
25. What a fair days work and wages are			
26. How to evaluate employment and unemployment benefits			
27. How to complete an application, and interview for a job			
28. How to read and interpret the Dictionary of Occupational Titles			

COMPETENCIES	ITEMS TAUGHT: ALL-DAY	YOUNG FARMER	ADULT FARMER
If you can not make a choice, circle the question number.			
Section VII: Farming Competencies (Manipulative)			
Manipulative Competence: the operational skill leading to relatively immediate and concrete observable results			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
1. Calculate milk production per cow, price per pound of milk, and labor requirement per cow			
2. Determine the net return per dairy cow, per year, to the farmer			
3. Plan an improvement program for the dairy herd			
4. Calculate the cost of installing and using a bulk milk tank			
5. Select the proper size bulk milk tank			
6. Recommend approved milk production practices			
7. Recommend dairy herd management practices to increase labor income			
8. Recommend management practices to control disease in the dairy herd			
9. Plan a barn layout and milking system to meet the needs of a farm			
10. Determine the strengths and weaknesses in a specific farm livestock program			

COMPETENCIES If you can not make a choice, circle the question number.	ITEMS TAUGHT ALL-DAY	YOUNG FARMER	ADULT FARMER
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD BE ABLE TO:			
11. Plan changes in the dairy program to increase the efficiency of the farm business			
12. Suggest changes in the dairy enterprise to improve the size and volume of a farm business			
13. Suggest changes in the farm crop and soils program to improve the size and volume of a farm business			

COMPETENCIES	ITEMS TAUGHT: ALL-DAY	YOUNG FARMER	ADULT FARMER
If you can not make a choice, circle the question number. Section VIII: Farming Competencies (Cognitive) Cognitive Competence: the knowledge and understanding out of which responsible judgments concerning the manipulative aspects of competence can be made.			
DURING INITIAL EMPLOYMENT, THE WORKER SHOULD KNOW:			
1. How to use records of production in the selection of breeding stock			
2. The need for providing suitable housing and equipment for dairy cattle			
3. The general construction features of farm buildings			
4. The relationship between the size and volume of the farm business and farm income			
5. The importance of well-kept farm buildings to the dairy farmer			

APPENDIX C

List of persons who completed a trial questionnaire
Names and addresses of panel members
List of names of teachers who were mailed a questionnaire

List of Persons Who Completed a Trial Questionnaire

Mr. John B. Kazsuh
Milk Sanitarian
Bay County Health Department
Bay City, Michigan

Mr. Donald G. Morman
Oakley Hardware
Oakley, Michigan

Mr. Edwin L. Shreve
Milk Sanitarian
Saginaw County Health Department
Saginaw, Michigan

Mr. Charles A. Shuler
Field Supervisor
Borden Dairy
Saginaw, Michigan

Mr. James Szott
Szott-Ballard Farm Equipment Sales
211 South Park
Saginaw, Michigan

Mr. Richard Wentz
Sales Representative
Surge Sales and Service
Chesaning, Michigan

Names and Addresses of Panel Members

Dr. Robert Aldrich
Extension Expecialist in
Farm Equipment
Michigan State University
East Lansing, Michigan

Mr. Leon Alger
Sales Representative
Conde Milking Machines
Lapeer, Michigan

Mr. Paul B. Bagrow
Sales Representative
Majonnier Brothers Company
3655 Oakwood
Ann Arobr, Michigan

Dr. Raymond M. Clark
Agricultural Education Services
Michigan State University
East Lansing, Michigan

Mr. Carl Crosby
Sales Representative
DeLaval Separator Company
830 Prospect
VanWert, Ohio

Mr. C. L. Dickson
Director of Research
Farm Equipment Institute
608 South Dearborn Street
Chicago 5, Illinois

Mr. Mickey McGuire
McGuire Dairy Equipment Sales, Inc.
4615 North Grand River
Lansing, Michigan

Dr. D. L. Murray
Extension Specialist in Dairy
Michigan State University
East Lansing, Michigan

Dr. George E. Parsons
Extension Specialist in Dairy
Michigan State University
East Lansing, Michigan

Mr. Jack Tanner
Tanner Dairy Equipment Co.
2611 North Grand River
Lansing, Michigan

Dr. Guy E. Timmons
Agricultural Education Services
Michigan State University
East Lansing, Michigan

List of Names of Teachers Who were Mailed a Questionnaire

(The names are alphabetized according to the schools in which the vocational agriculture teachers were employed.)

Mr. Douglas Hitchcock
Vocational Agriculture Teacher
Addison High School
Addison, Michigan

Mr. Carroll Hart
Vocational Agriculture Teacher
Allegan High School
Allegan, Michigan

Mr. George Pattulo
Vocational Agriculture Teacher
Almont High School
Almont, Michigan

Mr. William Shafer
Vocational Agriculture Teacher
Armada High School
Armada, Michigan

Mr. Victor Finch
Vocational Agriculture Teacher
Bad Axe High School
Bad Axe, Michigan

Mr. Norman Brown
Vocational Agriculture Teacher
Bath High School
Bath, Michigan

Mr. David Morey
Vocational Agriculture Teacher
Beal City High School
Beal City, Michigan

Mr. Richard S. Bird
Vocational Agriculture Teacher
Belding High School
Belding, Michigan

Mr. William J. Garvey
Vocational Agriculture Teacher
Bellevue High School
Bellevue, Michigan

Mr. Richard Kent
Vocational Agriculture Teacher
Blanchard High School
Blanchard, Michigan

Mr. Jacob Venema
Vocational Agriculture Teacher
Blissfield High School
Blissfield, Michigan

Mr. Ronald J. Fritch
Vocational Agriculture Teacher
Britton High School
Britton, Michigan

Mr. Charles R. Hilton
Vocational Agriculture Teacher
Bronson High School
Bronson, Michigan

Mr. Maurice W. Fritch
Vocational Agriculture Teacher
Brown City High School
Brown City, Michigan

Mr. Donald Shepard
Vocational Agriculture Teacher
Byron High School
Byron, Michigan

Mr. William Harrison
Vocational Agriculture Teacher
Caledonia High School
Caledonia, Michigan

Mr. Paul Pontious
Vocational Agriculture Teacher
Camden-Frontier High School
Camden, Michigan

Mr. Charles Stewart
Vocational Agriculture Teacher
Capac High School
Capac, Michigan

Mr. C. Richard Karelse
Vocational Agriculture Teacher
Caro High School
Caro, Michigan

Mr. James Starr
Vocational Agriculture Teacher
Carson City High School
Carson City, Michigan

Mr. Clifton J. Bowers
Vocational Agriculture Teacher
Carsonville High School
Carsonville, Michigan

Mr. Lyle C. Clarke
Vocational Agriculture Teacher
Cass City High School
Cass City, Michigan

Mr. Larry Herweyer
Vocational Agriculture Teacher
Cedar Springs High School
Cedar Springs, Michigan

Mr. Emery Toensend
Vocational Agriculture Teacher
Cement City High School
Cement City, Michigan

Mr. Clyde B. Ray
Vocational Agriculture Teacher
Charlotte High School
Charlotte, Michigan

Mr. Stephen A. Kayden
Vocational Agriculture Teacher
Chelsea High School
Chelsea, Michigan

Mr. Norman W. Braun
Vocational Agriculture Teacher
Chesaning High School
Chesaning, Michigan

Mr. John Jansen
Vocational Agriculture Teacher
Clinton High School
Clinton, Michigan

Mr. Harby H. Harris, Jr.
Vocational Agriculture Teacher
Coopersville High School
Coopersville, Michigan

Mr. Dale F. Wightman
Vocational Agriculture Teacher
Corunna High School
Corunna, Michigan

Mr. Edward L. Gregory
Vocational Agriculture Teacher
Croswell-Lexington High School
Croswell, Michigan

Mr. Garrett Wheaton
Vocational Agriculture Teacher
Dansville High School
Dansville, Michigan

Mr. T. B. Poole
Vocational Agriculture Teacher
Deckerville High School
Deckerville, Michigan

Mr. William M. Dunnavin
Vocational Agriculture Teacher
Dexter High School
Dexter, Michigan

Mr. Roy W. Wallis
Vocational Agriculture Teacher
Durand High School
Durand, Michigan

Mr. Earl C. McKim
Vocational Agriculture Teacher
Eaton Rapids High School
Eaton Rapids, Michigan

Mr. Jerrold Brown
Vocational Agriculture Teacher
Edmore High School
Edmore, Michigan

Mr. F. Dale Kuenzli
Vocational Agriculture Teacher
Elkdon-Pigeon-Gay Port High School
Pigeon, Michigan

Mr. Blaine Lentz
Vocational Agriculture Teacher
Elsie High School
Elsie, Michigan

Mr. Ronald Nagy
Vocational Agriculture Teacher
Akron Fairgrove High School
Fairgrove, Michigan

Mr. William Gleason
Vocational Agriculture Teacher
Fennville High School
Fennville, Michigan

Mr. Harold Elenbaas
Vocational Agriculture Teacher
Fowlerville High School
Fowlerville, Michigan

Mr. Ronald K. Richmond
Vocational Agriculture Teacher
Grand Ledge High School
Grand Ledge, Michigan

Mr. Mogens Jensen
Vocational Agriculture Teacher
Greenville High School
Greenville, Michigan

Mr. James Johnston
Vocational Agriculture Teacher
Harbor Beach High School
Harbor Beach, Michigan

Mr. John D. Anibal
Vocational Agriculture Teacher
Hartland High School
Hartland, Michigan

Mr. Theodore N. Knopf
Vocational Agriculture Teacher
Hastings High School
Hastings, Michigan

Mr. Elwin G. Darling
Vocational Agriculture Teacher
Hemlock High School
Hemlock, Michigan

Mr. Lloyd A. Morningstar
Vocational Agriculture Teacher
Hillsdale High School
Hillsdale, Michigan

Mr. Carrell A. Adler
Vocational Agriculture Teacher
Holland High School
Holland, Michigan

Mr. Henry Noller
Vocational Agriculture Teacher
Homer High School
Homer, Michigan

Mr. Roy A. Miller
Vocational Agriculture Teacher
Hopkins High School
Hopkins, Michigan

Mr. Merle J. Weaver
Vocational Agriculture Teacher
Howell High School
Howell, Michigan

Mr. Jerry Godfrey
Vocational Agriculture Teacher
Hudson High School
Hudson, Michigan

Mr. Clayton E. Preisel
Vocational Agriculture Teacher
Imlay City High School
Imlay City, Michigan

Mr. Marvin E. Cress
Vocational Agriculture Teacher
Ionia High School
Ionia, Michigan

Mr. Warren Parsons
Vocational Agriculture Teacher
Jackson High School
Jackson, Michigan

Mr. Lawrence Rubeck, Jr.
Vocational Agriculture Teacher
Jackson North West High School
Jackson, Michigan

Mr. David E. Spotts
Vocational Agriculture Teacher
Jonesville High School
Jonesville, Michigan

Mr. Ralph White
Vocational Agriculture Teacher
Kent City High School
Kent City, Michigan

Mr. Arthur L. Berkey
Vocational Agriculture Teacher
Kinde High School
Kinde, Michigan

Mr. Charles E. Mumby
Vocational Agriculture Teacher
Kingston High School
Kingston, Michigan

Mr. George Maiville
Vocational Agriculture Teacher
Laingsburg High School
Laingsburg, Michigan

Mr. Ronald K. Stevens
Vocational Agriculture Teacher
Lakewood High School
Lake Odessa, Michigan

Mr. Russell J. Johnson
Vocational Agriculture Teacher
Lakeview High School
Lakeview, Michigan

Mr. James H. Jessop
Vocational Agriculture Teacher
Lapeer High School
Lapeer, Michigan

Mr. Russell J. Miller
Vocational Agriculture Teacher
Leslie High School
Leslie, Michigan

Mr. Keith Avery
Vocational Agriculture Teacher
Lowell High School
Lowell, Michigan

Mr. Theodore Sprangel
Vocational Agriculture Teacher
Litchfield High School
Litchfield, Michigan

Mr. Ira E. Jump
Vocational Agriculture Teacher
Manchester High School
Manchester, Michigan

Mr. Stanley Knopf
Vocational Agriculture Teacher
Marlette High School
Marlette, Michigan

Mr. Jack Anderson
Vocational Agriculture Teacher
Marshall High School
Marshall, Michigan

Mr. Carl Rossman
Vocational Agriculture Teacher
Mason High School
Mason, Michigan

Mr. Ivan F. Smith
Vocational Agriculture Teacher
Mayville High School
Mayville, Michigan

Mr. Richard L. Barnes
Vocational Agriculture Teacher
Merrill High School
Merrill, Michigan

Mr. Michael J. O'Malley
Vocational Agriculture Teacher
Milan High School
Milan, Michigan

Mr. Jake L. Meachum
Vocational Agriculture Teacher
Millington High School
Millington, Michigan

Mr. Robert Kirkbride
Vocational Agriculture Teacher
Morenci High School
Morenci, Michigan

Mr. Douglas Ferrier
Vocational Agriculture Teacher
Morrice High School
Morrice, Michigan

Mr. Glen Samuelson
Vocational Agriculture Teacher
Mt. Pleasant High School
Mt. Pleasant, Michigan

Mr. Russell Keech
Vocational Agriculture Teacher
Nashville High School
Nashville, Michigan

Mr. Miroslav Rumisek
Vocational Agriculture Teacher
New Lothrop High School
New Lothrop, Michigan

Mr. Glen Ruder
Vocational Agriculture Teacher
North Adams High School
North Adams, Michigan

Mr. Roland A. Cook
Vocational Agriculture Teacher
Okemos High School
Okemos, Michigan

Mr. Howard Lahring
Vocational Agriculture Teacher
Olivet High School
Olivet, Michigan

Mr. David Reed
Vocational Agriculture Teacher
Onsted High School
Onsted, Michigan

Mr. Kenneth Baker
Vocational Agriculture Teacher
Otsego High School
Otsego, Michigan

Mr. Albert D. Ackley
Vocational Agriculture Teacher
Ovid High School
Ovid, Michigan

Mr. Lewis Harper
Vocational Agriculture Teacher
Owendale-Gagetown High School
Owendale, Michigan

Mr. Duane Dalgleish
Vocational Agriculture Teacher
Owosso High School
Owosso, Michigan

Mr. James D. Potier
Vocational Agriculture Teacher
Perry High School
Perry, Michigan

Mr. Lance Jepson
Vocational Agriculture Teacher
Pewamo-Westphalia High School
Pewamo, Michigan

Mr. Clare E. Monroe
Vocational Agriculture Teacher
Pittsford High School
Pittsford, Michigan

Mr. Carl A. Stuewer
Vocational Agriculture Teacher
Plainwell High School
Plainwell, Michigan

Mr. Clayton Dailey
Vocational Agriculture Teacher
Port Hope High School
Port Hope, Michigan

Mr. Clark H. Bullen
Vocational Agriculture Teacher
Portland High School
Portland, Michigan

Mr. Oscar J. Fischer
Vocational Agriculture Teacher
Quincy High School
Quincy, Michigan

Mr. Donald Leader
Vocational Agriculture Teacher
Reading High School
Reading, Michigan

Mr. Earl French
Vocational Agriculture Teacher
Reese High School
Reese, Michigan

Mr. Lucien P. Fay
Vocational Agriculture Teacher
Romeo High School
Romeo, Michigan

Mr. Fred Bartlett
Vocational Agriculture Teacher
Rockford High School
Rockford, Michigan

Mr. Carl D. Nelson
Vocational Agriculture Teacher
St. Charles High School
St. Charles, Michigan

Mr. George Bartow
Vocational Agriculture Teacher
St. Clair High School
St. Clair, Michigan

Mr. John Baker
Vocational Agriculture Teacher
St. Johns High School
St. Johns, Michigan

Mr. Alton F. Ealy
Vocational Agriculture Teacher
Saline High School
Saline, Michigan

Mr. Kenneth Mitchell
Vocational Agriculture Teacher
Sand Creek High School
Sand Creek, Michigan

Mr. Louis Reuter
Vocational Agriculture Teacher
Sandusky High School
Sandusky, Michigan

Mr. Lyle Plewis
Vocational Agriculture Teacher
Saranac High School
Saranac, Michigan

Mr. Robert Pangman
Vocational Agriculture Teacher
Sebewaing High School
Sebewaing, Michigan

Mr. Paul Simon
Vocational Agriculture Teacher
Shepherd High School
Shepherd, Michigan

Mr. Douglas Claflin
Vocational Agriculture Teacher
Sheridan High School
Sheridan, Michigan

Mr. Don M. McCormack
Vocational Agriculture Teacher
South Lyon High School
South Lyon, Michigan

Mr. Gordon Reyburn
Vocational Agriculture Teacher
Sparta High School
Sparta, Michigan

Mr. Joseph W. Ames
Vocational Agriculture Teacher
Springport High School
Springport, Michigan

Mr. Glenn Tarrant
Vocational Agriculture Teacher
Stanton High School
Stanton, Michigan

Mr. E. W. Granskog
Vocational Agriculture Teacher
Stephenson High School
Stephenson, Michigan

Mr. Donovan G. Cronkhite
Vocational Agriculture Teacher
Stockbridge High School
Stockbridge, Michigan

Mr. Richard Jones
Vocational Agriculture Teacher
Sunfield High School
Sunfield, Michigan

Mr. Paul F. Burns
Vocational Agriculture Teacher
Tecumseh High School
Tecumseh, Michigan

Mr. Clarence L. Miller
Vocational Agriculture Teacher
Tekonsha High School
Tekonsha, Michigan

Mr. Robert Lewis
Vocational Agriculture Teacher
Ubly High School
Ubly, Michigan

Mr. Kenneth Weirich
Vocational Agriculture Teacher
Union City High School
Union City, Michigan

Mr. Robert Colestock
Vocational Agriculture Teacher
Unionville High School
Unionville, Michigan

Mr. Walfred Tollefson
Vocational Agriculture Teacher
Vassar High School
Vassar, Michigan

Mr. Burr Hartenburg
Vocational Agriculture Teacher
Vertmontville High School
Vertmontville, Michigan

Mr. John F. Leech
Vocational Agriculture Teacher
Waldron High School
Waldron, Michigan

Mr. Walter C. Search
Vocational Agriculture Teacher
Webberville High School
Webberville, Michigan

Mr. Peter Zaldokas
Vocational Agriculture Teacher
Williamston High School
Williamston, Michigan

Mr. Johann Ingold
Vocational Agriculture Teacher
Yale High School
Yale, Michigan

Mr. Herbert L. DeKleine
Vocational Agriculture Teacher
Zeeland High School
Zeeland, Michigan

APPENDIX D

Qualifications of the panel members
List of Michigan counties from which teachers of vocational agriculture submitted data for the study

Qualifications of the Panel Members

Panel Member	Position: Hold a high echelon position in a business or organization serving the dairy farmer	Hold a high echelon position in a institution of higher learning	Concerned with training workers for non-farm agricultural occupations	Work with supervisor of or directly with workers who provide dairy farmer with direct-contact services	Writer or researcher on subject of agricultural occupations or equipment	Title
Aldrich		X	X		X	Farm Equipment Extension specialist
Alger	X			X		National Sales Representative
Bagrove	X			X		National Sales Representative
Clark		X	X		X	Professor, Teacher Education
Crosby	X			X		National Sales Representative
Dickson	X		X	X	X	Director of Research
McGuire	X			X		President, Dairy Equipment Company
Murray		X		X	X	Dairy Extension Specialist
Parsons		X		X	X	Dairy Extension Specialist
Tanner	X			X		President, Dairy Equipment Company
Timmons		X	X		X	Professor, Teacher Education

List of Michigan Counties from which Teachers of Vocational Agriculture Submitted Data for the Study

Allegan
Barry
Branch
Calhoun
Clinton
Eaton
Hillsdale
Huron
Ingham
Ionia
Isabella
Jackson
Kent
Lapeer
Lenawee
Livingston
Macomb
Menominee
Montcalm
Ottawa
Saginaw
St. Clair
Sanilac
Shiawassee
Tuscola
Washtenaw

APPENDIX E

Table 22 through 34

Table 22.--Mechanical manipulative competencies in Section I of the Check List and their ratings by the panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: (VV+V)	S	I	M	SI	SIM	SM	IM	NC
1. Operate simple hand and machine tools and equipment	100[b]						55	45	
3. Make electrical connections and install electrical wiring	100		9					91	
5. Dismantle, inspect, and clean electrical equipment	100			55				45	
6. Check and replace electronic controls	100			9				91	
9. Dismantle and service thermostatically-operated valves	100			73				27	
12. Install equipment, and pipeline and wiring systems by interpreting sketches, prints, and verbal engineering instructions	100		55		9			36	
13. Lay out a job from blueprint and select proper materials	100		46		45		9		
16. Cut and threat pipe	100		27				9	64	
17. Test vacuum and liquid pipeline for leaks	100						36	64	
19. Measure, cut, and install cast iron, stainless steel, plastic and glass pipe	100		27					73	

Table 22.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: (VV+V)	S	I	M	SI	SIM	SM	IM	NC
21. Install and service vacuum and liquid pumps, and filtering systems	100		9				18	73	
23. Utilize the proper lubricants for pipe, valves, pumps, and milking equipment	100			18			9	73	
24. Dismantle dairy equipment; clean, inspect, and replace worn parts	100			55			27	18	
25. Locate, adjust, and replace faulty valves, pressure regulators, and controls	100			55				45	
26. Determine the equipment required for the milking parlor	100	46			36		18		
27. Determine the equipment required for the milk house	100	55			27		18		
28. Assemble and install standard walk-through tandem, and herringbone milking stalls	100		64	9			18	9	
29. Install and service a pipeline milking system in a milking parlor or stanchion-type barn	100		18				27	55	
30. Install pipeline milking system accessory equipment (wash tank, storage rack, etc.)	100		46				18	36	
31. Assemble pipeline system milker units	100		27		9		46	18	

Table 22.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: (VV+V)	S	I	M	SI	SIM	SM	IM	NC
32. Recommend the proper cleaning materials for the milking equipment	100					27	55	18	
35. Install, operate, and service a bulk tank cooler	100						18	82	
37. Conduct periodic maintenance inspections of electrical equipment pipeline milker systems	100			46		27	9	18	
2. Locate sources of failure; repair or replace defective parts and wiring	91			27			9	64	
4. Install, align, and service electric motors	91			18				82	
7. Cut, bend, and fit electrical conduit	91		27	9				64	
8. Maintain and use electrical testing equipment	91			9			18	73	
10. Install 115 and 230 volt electrical systems from the service entrance	91		27					64	9
18. Break and make pipe joints; clean and renew pipe gasket	91			36				64	
22. Rebuild pumps	91			73				27	
34. Milk a cow properly with a mechanical milker	91	9				27	64		
39. Recognize the relationship between the cause of equipment malfunction and effective remedial action	91	9		27		18	37	9	

Table 22.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: (VV+V)	S	I	M	SI	SIM	SM	IM	NC
14. Inspect, clean, and adjust circuit breakers	82			36				55	9
20. Find dimensions of various pipe sizes, types of fittings and number of threads on pipe	82			9			27	64	
33. Sanitize milking equipment	82		9	18		18	55		
36. Utilize a water hardness kit and an iron test kit	82		9			46	45		
42. Measure the unit pressure of liquids	64	9			9		27	36	18
15. Install a building drain	63		91						9
11. Install three phase circuits	55		36	9				27	28
38. Solve problems using Newton's laws of motion	36	36		9		27		9	11
40. Calculate the components of force	36	27	18				18	18	19
41. Solve problems through the application of principles of rotational motion	35	9		9	9		18	27	28
43. Calculate the pressure on immersed plane surfaces	27	18					18	27	37

Table 22.--Continued

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
I = Important for Installation personnel
M = Important for Maintenance personnel
SI = Important for Sales and Installation personnel
SIM = Important for Sales, Installation and Maintenance personnel
SM = Important for Sales and Maintenance personnel
IM = Important for Installation and Maintenance personnel
NC = No choice was made

[b]This table should be read as follows: 100 per cent of the panel members rated Item Number 1 as "Highly Valuable" (VV+V, i.e., "Very Valuable" plus "Valuable"). This competency, "Operate simple hand and machine tools and equipment," was rated by 55 per cent of the panel members as important for personnel who sell and maintain (SM) equipment; by 45 per cent of the panel members as important for personnel who install and maintain (IM) equipment.

Table 23.--Mechanical manipulative competencies rated as "Highly Valuable" by 60 per cent or more of the panel members, with a scattered personnel rating[a]

Competencies and Item Number	(VV+V)	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: S	I	M	SI	SIM	SM	IM	NC
1. Operate simple hand and machine tools and equipment	100						55	45	
13. Layout a job from blueprint and select proper materials	100		46		45		9		
31. Assemble pipeline system milking units	100		27		9		46	18	
32. Recommend the proper cleaning materials for the milking equipment	100					27	55	18	
39. Recognize the relationship between the cause of equipment malfunction and effective remedial action	91	9		27		18	37	9	
36. Utilize a water hardness kit and an iron test kit	72		9			46	45		
42. Measure the unit pressure of liquids	64	9			9		27	36	18

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
I = Important for Installation personnel
M = Important for Maintenance personnel
SI = Important for Sales and Installation personnel
SIM = Important for Sales, Installation, and Maintenance personnel
SM = Important for Sales and Maintenance personnel
IM = Important for Installation and Maintenance personnel
NC = No Choice was made of the item

Table 24.--Percentage of teachers who taught mechanical manipulative competencies rated as "Highly Valuable" by 60 per cent or more of the panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating (N=11) (VV+V)	Percentage of Teachers Who Taught (N=88) All-Day	YF	Adult	Total
1. Operate simple hand and machine tools and equipment	100	67	1	14	82
3. Make electrical connections and install electrical wiring	100	65	1	5	71
16. Cut and thread pipe	100	56	1	6	63
4. Install, align, and service electric motors	91	48	1	3	52
34. Milk a cow properly with a mechanical milker	91	40	3	8	51
2. Locate sources of failure; repair or replace defective parts and wiring	91	41	3	5	49
33. Sanitize milking equipment	82	34	2	10	46
20. Find dimensions of various pipe sizes, types of fittings and number of threads on pipe	82	40		3	43
5. Dismantle, inspect, and clean electrical equipment	100	35	1	3	39
10. Install 115 and 230 volt electrical systems from the service entrance	91	33	5	1	39
18. Break and make pipe joints; clean and renew pipe gasket	91	31	2	6	39
32. Recommend the proper cleaning materials for the milking equipment	100	28	5	1	34
26. Determine the equipment required for the milking parlor	100	24	3	6	33
27. Determine the equipment required for the milk house	100	24	2	6	32

Table 24.--Continued

Competencies and Item Number	Percentage of Panel Members Rating (N=11) (VV+V)	Percentage of Teachers Who Taught (N=88) All-Day	YF	Adult	Total
7. Cut, bend, and fit electrical conduit	91	28	2	1	31
15. Install a building drain	63	28	1	2	31
13. Lay out a job from blueprint and select proper materials	100	22	2	1	25
24. Dismantle dairy equipment; clean, inspect, and replace worn parts	100	17		8	25
8. Maintain and use electrical testing equipment	91	17	1	3	21
12. Install equipment, and pipeline and wiring systems by interpreting sketches, prints, and verbal engineering instructions	100	15	1	1	17
17. Test vacuum and liquid pipeline for leaks	100	10		7	17
23. Utilize the proper lubricants for pipe, valves, pumps, and milking equipment	100	15	1	1	17
6. Check and replace electronic controls	100	11	3	2	16
35. Install, operate, and service a bulk tank cooler	100	11		5	16
14. Inspect, clean, and adjust circuit breakers	82	11	1	3	15
19. Measure, cut, and install cast iron, stainless steel, plastic and glass pipe	100	11	2	2	15
31. Assemble pipeline system milker units	100	11	1	1	13
28. Assemble and install standard walk-through, tandem, and herringbone milking stalls	100	8	2	1	11

Table 24.--Continued

Competencies and Item Number	Percentage of Panel Members Rating (N=11) (VV+V)	Percentage of Teachers Who Taught (N=88) All-Day	YF	Adult	Total
36. Utilize a water hardness kit and an iron test kit	82	7	2	2	11
37. Conduct periodic maintenance inspections of electrical equipment and pipeline milker systems	100	7	2	2	11
9. Dismantle and service thermostatically-operated valves	100	5	5		10
25. Locate, adjust, and replace faulty valves, pressure regulators, and controls	100	2	2	6	10
21. Install and service vacuum and liquid pumps, and filtering systems	100	5	1	2	8
29. Install and service a pipeline milking system in a milking parlor or stanchion type barn	100	7	1		8
30. Install pipeline milking system accessory equipment (wash tank, storage rack, etc.)	100	7	1		8
39. Recognize the relationship between the cause of equipment malfunction and effective remedial action	91	6	2		8
22. Rebuild pumps	91	1	1	1	3
42. Measure the unit pressure of liquids	64	1	1		2

Table 24.--Continued

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
All-Day = Taught as a part of All-Day instruction
YF = Taught as a part of Young Farmer instruction
Adult = Taught as a part of Adult Farmer instruction
Total = Sum of percentages under All-Day, YF, and Adult for each competency

Table 25.--Percentage of teachers who taught mechanical manipulative competencies rated as "Highly Valuable" by 60 per cent or more of the panel members for installation or maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) as Important for Personnel Who: (I+M+IM)	Percentage of Teachers Who Taught (N=88) All-Day	YF	Adult	Total
17. Test vacuum and liquid pipeline systems for leaks	64	10		7	17
6. Check and replace electrical controls	100	11	3	2	16
35. Install, operate, and service a bulk tank cooler	82	11		5	16
14. Inspect, clean, and adjust circuit breakers	91	11	1	3	15
19. Measure, cut, and install cast iron, stainless steel, plastic and glass pipe	100	11	2	2	15
28. Assemble and install standard walk-through tandem, and herringbone milking stalls	82	8	2	1	11
37. Conduct periodic maintenance inspections of electrical equipment and pipeline milker systems	64	7	2	2	11
9. Dismantle and service thermostatically-operated valves	100	5	5		10
25. Locate, adjust, and replace faulty valves, pressure regulators, and controls	100	2	2	6	10
29. Install and service a pipeline milking system in a milking parlor or stanchion-type barn	73	7	1		8
30. Install pipeline milking system accessory equipment (wash tank, storage rack, etc.)	82	7	1		8
21. Install and service vacuum and liquid pumps, and filtering systems	82	5	1	2	8
22. Rebuild pumps	100	1	1	1	3

Table 25.--Continued

[a](I+M+IM) = Important for Installation, Maintenance, and/or Installation and Maintenance personnel
All-Day = Taught as a part of All-Day instruction
YF = Taught as a part of Young Farmer instruction
Adult = Taught as a part of Adult Farmer instruction
Total = Sum of percentages under All-Day, YF, and Adult for each competency

Table 26.--Mechanical Cognitive competencies and their ratings by panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who:								
	(VV+V)	S	I	M	SI	SIM	SM	IM	NC
3. The general sanitary requirement for the placement of drains in the milk house	100	36	9		9		46		
2. Equipment requirements for standard milking parlor layouts	91	55			18		27		
4. The air space and ventilation requirements for milk house	91	36	9		9	9	37		
1. Prescribed safety practice	91				9		73	18	
14. The principles of electricity	91		9				64	27	
11. The velocity and discharge in the flow of liquids	73	18			9	18	46	9	
10. The physical properties of liquids	64	9			9	18	46	9	9
9. The machine elements of mechanics (lever, wheel and axle, etc.)	46	9					55	27	9
5. The kinds, forms, and physical properties of matter	36	9	9		9		55		18
6. The principles of velocity	36	9		9	9	9	46	9	9
12. The basic laws of equilibrium	36	9			9		46	27	9
13. The principles of impulse and momentum	36	9			9		55	18	9
7. The meaning, types and units of force	27	9	9	9	9	18	46		9
8. The principles of centrifugal force	27	9				9	64	9	9

Table 26.--Continued

[a](VV+V) = "Very Valuable" or "Valuable" ("Highly Valuable")
S = Important for Sales personnel
I = Important for Installation personnel
M = Important for Maintenance personnel
SI = Important for Sales and Installation personnel
SIM = Important for Sales, Installation and Maintenance personnel
SM = Important for Sales and Maintenance personnel
IM = Important for Installation and Maintenance personnel
NC = No Choice was made of item

Table 27.--Percentage of teachers who taught mechanical cognitive competencies rated as "Highly Valuable" by 60 per cent or more of the panel members for sales and maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating (N=11)		Percentage of Teachers Who Taught (N=88)			
	(VV+V)	(S+SM)	All-Day	YF	Adult	Total
1. Prescribed safety practices	91	73	48		13	61
14. The principles of electricity	91	64	34	3	7	44
3. The general sanitary requirements for the placement of drains in the milk house	100	82	18	1	6	25
2. Equipment requirements for standard milking parlor layouts	91	82	16	2	5	23
4. The air space and ventilation requirements for the milk house	91	73	14	5	6	25
11. The velocity and discharge in the flow of liquids	73	64	5	2	5	12

[a] (VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
(S+SM) = Important for Sales and Sales and Maintenance personnel
All-Day = Taught as a part of All-Day instruction
YF = Taught as a part of Young Farmer instruction
Adult = Taught as a part of Adult Farmer instruction
Total = Sum of percentages under All-Day, YF, and Adult for each competency

Table 28.--Manipulative competencies in the area of salesmanship and their ratings by panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: (VV+V)	S	I	M	SI	SIM	SM	IM	NC
1. Continuously build company good-will	100	18					82		
2. Write up a bill of sale and a credit agreement	100	46					36	9	9
3. Display and demonstrate a product	100	82			9		9		
5. Locate and schedule visits with potential customers	100	91			9				
7. Determine the customer's real wants and needs; appeal to his buying motives	100	91			9				
9. Resolve customer objections into purchases	100	100							
10. Close out a sale	100	100							
4. Utilize a "flip-flop" chart and other visual aids	91	73			9		9		9
6. Assume an outward appearance which is in accordance with the customer's expectation	91	64					27		9
8. Become persuasive	82	82							18
13. File reports of present and future sales conditions	82	91					9		
14. Use sales engineering and training manuals as guides	82	73					18		9
12. Fill out depreciation schedules for equipment	72	73				18	9		
11. Operate a cash register	36	46				18	36		

Table 28.--Continued

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
I = Important for Installation personnel
M = Important for Maintenance personnel
SI = Important for Sales and Maintenance personnel
SIM = Important for Sales, Installation and Maintenance personnel
SM = Important for Sales and Maintenance personnel
IM = Important for Installation and Maintenance personnel
NC = No Choice was made of item

Table 29.--Cognitive competencies in the area of human relations and their rating by the panel members[a]

Competencies and Item Number	Value (VV+V)	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: S	M	SM	IM	NC
6. How to evaluate the results of action which has been taken and make effective adjustments	100	18	9	73		
1. The principles of good human relations	91	9		91		
2. How to recognize individual differences in people	91	36		64		
13. Methods which are utilized to motivate people	91	73		27		
25. What a fair days work and wages are	91	9		73		18
5. How to distinguish problems which should be referred to the supervisor	82	18		64	9	9
15. How to accept authority and the subsequent responsibility in a democratic business organization	82	27		64		9
19. The relationship between personality development and job success	82	27		64		9
21. Why company philosophy and policy should be adopted	82	27		64		9
23. Current business promotion policies	82	36		46		18
27. How to complete an application and interview for a job	82			91		9
9. The causes of poor human relations	73	18		82		
20. The need for mutual respect for the rights of managers, supervisors, and employees	73	9		73		18
3. How to recognize types of relationships among employees as reflected in attitudes and patterns of behavior	64	27		64		9

Table 29.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: Value (VV+V)	S	M	SIM	SM	IM	NC
17. The type of relationship which should exist between a business firm and an employee	64	27			64		9
18. How to aid in establishing cooperative relations between employers and employees, as well as among employees	64	27			55		18
14. The cause of fatigue and boredom	55	36			55		9
10. How to analyze an individual's behavior in terms of his own frame of reference	54	27		9	46		18
4. How to solve problems scientifically	54	18			55	9	18
26. How to evaluate employment and unemployment benefits	54	9			64		27
12. The social dynamics of a work group	45	36			46		18
11. The effect of frustration on attitudes and behavior	45	46			45		9
7. The rights and responsibilities of employees and employers in collective bargaining	45	27			64		9
8. The characteristics of democratic and autocratic supervision	36	27			55		18
16. How to evaluate worker competence	36	36			55		9
24. The various types of business organizations	27	55			27		18
22. The characteristics and function of the power structure within a business organization	27	27			46		27
28. How to read and interpret the Dictionary of Occupational Titles	18	18			55		27

Table 29.--Continued

a(VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
M = Important for Maintenance personnel
SIM = Important for Sales, Installation and Maintenance personnel
SM = Important for Sales and Maintenance personnel
IM = Important for Installation and Maintenance personnel
NC = No Choice was made of item

None of the competencies were rated as important for I (Installation)or SI (Sales and Installation) personnel.

Table 30.--Percentage of teachers who taught cognitive competencies in the area of human relations rated as "Highly Valuable" by 60 per cent or more of the panel members for sales and maintenance personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating (N=11)		Percentage of Teachers Who Taught (N=88)			
	(VV+V)	(S+SM)	All-Day	YF	Adult	Total
6. How to evaluate the results of action which has been taken and make effective adjustments	100	91	10	1	1	12
1. The principles of good human relations	91	100	31		4	35
2. How to recognize individual differences in people	91	100	13		2	15
13. Methods which are utilized to motivate people	91	100	5		3	8
25. What a fair days work and wages are	91	82	13	2	3	18
5. How to distinguish problems which should be referred to the supervisor	82	82	10	1	1	12
15. How to accept authority and the subsequent responsibility in a democratic business organization	82	91	13		2	15
19. The relationship between personality development and job success	82	91	14	2	1	17
21. Why company philosophy and policy should be adopted	82	91	6		3	9
23. Current business promotion policies	82	82	5	1		6
27. How to complete an application, and interview for a job	82	91	14	1	7	22

Table 30.--Continued

Competencies and Item Number	Percentage of Panel Members Rating (N=11)		Percentage of Teachers Who Taught (N=88)			
	(VV+V)	(S+SM)	All-Day	YF	Adult	Total
9. The causes of poor human relations	73	100	13		3	16
20. The need for mutual respect for the rights of managers, supervisors and employees	73	82	11		2	13
3. How to recognize types of relationships among employees as reflected in attitudes and patterns of behavior	64	91	5	1	1	7
17. The types of relationship which should exist between a business firm and an employee	64	91	11	1	1	13
18. How to aid in establishing cooperative relations between employers and employees, as well as among employees	64	82	10	1	1	12

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
(S+SM) = Important for Sales and Sales and Maintenance personnel
All-Day = Taught as a part of All-Day instruction
YF = Taught as a part of Young Farmer instruction
Adult = Taught as a part of Adult Farmer instruction
Total = Sum of percentages under All-Day, YF, and Adult for each competency

Table 31.--Cognitive competencies in the area of human relations rated as "Highly Valuable" by less than 60 per cent of the panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As					
	(VV+V)	VV	V	LV	NV	NC
14. The causes of fatigue and boredom	55	9	46	27	18	
10. How to analyze an individual's behavior in terms of his own frame of reference	54	9	45	18	10	10
4. How to solve problems scientifically	54	27	27	27	9	10
26. How to evaluate employment and unemployment benefits	54	18	36	27	9	10
12. The social dynamics of a work group	45		45	27	18	10
11. The effect of frustration on attitudes and behavior	45	9	36	37	18	
7. The rights and responsibilities of employees and employers in collective bargaining	45	9	36	27	18	10
8. The characteristics of democratic autocratic supervision	36	9	27	26	18	10
16. How to evaluate worker competence	36		36	46	18	
24. The various types of business organizations	27	9	18	45	18	10
22. The characteristics and function of the power structure within a business organization	27		27	36	18	19
28. How to read and interpret the Dictionary of Occupational Titles	18		18	36	27	19

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
VV = "Very Valuable" to the employee
V = "Valuable" to the employee
LV = Of "Little Value" to the employee
NV = Of "No Value" to the employee
NC = No Choice was made

Table 32.--Manipulative competencies in farming and their rating by panel members, in descending order by the value rating[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important For Personnel Who: (VV+V)	S	M	SI	SIM	SM	NC
1. Calculate milk production per cow, price per pound of milk, and labor requirements per cow	100	91	9				
4. Calculate the cost of installation and using a bulk milk tank	100	64		36			
5. Select the proper size bulk milk tank	100	100					
6. Recommend approved milk production practices	100	82			18		
9. Plan a barn layout and milking system to meet the needs of a farm	100	82		18			
2. Determine the net return per dairy cow, per year to the farmer	82	64			9		27
3. Plan an improvement program for the dairy herd	82	100					
7. Recommend dairy herd management practices to increase labor income	82	73			9	9	9
10. Determine the strengths and weaknesses in a specific farm livestock program	82	91					9
11. Plan changes in the dairy program to increase the efficiency of the farm business	82	82			9		9
12. Suggest changes in the dairy enterprise to improve the size and volume of a farm business	82	82			9		9

Table 32.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As						
		Important For Personnel Who:					
	(VV+V)	S	M	SI	SIM	SM	NC
8. Recommend management practices to control disease in the dairy herd	72	64			18		18
13. Suggest changes in the farm crop and soils program to improve the size and volume of a farm business	55	91					9

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
M = Important for Maintenance personnel
SI = Important for Sales and Installation personnel
SIM = Important for Sales, Installation and Maintenance personnel
SM = Important for Sales and Maintenance personnel
NC = No Choice was made of item

None of the competencies were rated as important for the following personnel:
I = Installation personnel
IM = Installation and Maintenance personnel

Table 33.--Percentage of teachers who taught manipulative competencies in farming rated as "Highly Valuable" by 60 per cent or more of the panel members for sales personnel[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) as Important for Personnel Who (VV+V)	S	Percentage of Teachers Who Taught (N=88) All-Day	YF	Adult	Total
1. Calculate milk production per cow, price per pound of milk, and labor requirement per cow	100	91	58	1	14	73
4. Calculate the cost of installing and using a bulk milk tank	100	64	21	3	7	31
5. Select the proper size bulk milk tank	100	100	28		10	38
6. Recommend approved milk production practices	100	82	42	1	17	60
9. Plan a barn layout and milking system to meet the needs of a farm	100	82	39		11	50
2. Determine the net return per dairy cow, per year, to the farmer	82	64	51	2	15	68
3. Plan an improvement program for the dairy herd	82	100	49	1	15	65
7. Recommend dairy herd management practices to increase labor income	82	73	36		18	54

Table 33.--Continued

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) as Important for Personnel Who (VV+V)	S	Percentage of Teachers Who Taught (N=88) All-Day	YF	Adult	Total
10. Determine the strengths and weaknesses in a specific farm livestock program	82	91	34		16	50
11. Plan changes in the dairy program to increase the efficiency of the farm business	82	82	40		19	59
12. Suggest changes in the dairy enterprise to improve the size and volume of a farm business	82	82	43		18	61
8. Recommend management practices to control disease in the dairy herd	72	64	44	1	17	62

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
All-Day = Taught as a part of All-Day instruction
YF = Taught as a part of Young Farmer instruction
Adult = Taught as a part of Adult Farmer instruction
Total = Sum of percentages under All-Day, YF, and Adult for each competency

Table 34.--Cognitive competencies in farming and their rating by panel members[a]

Competencies and Item Number	Percentage of Panel Members Rating Each Item (N=11) As Important for Personnel Who: (VV+V)	S	SI	SIM	SM	NC
1. How to use records of production in the selection of breeding stock	82	91				9
2. The need for providing suitable housing and equipment for dairy cattle	82	73	9	9		9
4. The relationship between the size and volume of the farm business and farm income	82	91				9
5. The importance of well-kept farm buildings to the dairy farmer	73	64			36	
3. The general construction features of farm buildings	73	55			45	

[a](VV+V) = "Very Valuable" plus "Valuable" ("Highly Valuable")
S = Important for Sales personnel
SI = Important for Sales and Installation personnel
SIM = Important for Sales, Installation, and Maintenance personnel
SM = Important for Sales and Maintenance personnel
NC = No Choice was made of the item

None of the competencies were rated as important for the following personnel
I = Installation
M = Maintenance
IM = Installation and Maintenance