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DISSERTATION

OCCUPATIONAL EXPERIENCE AND TECHNICAL
COMPETENCE OF VO-AG TEACHERS

Submitted by

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In partial fulfillment of the requirements
for the Degree of Doctor of Philosophy

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WE HEREBY RECOMMEND THAT THE THESIS PREPARED UNDER
OUR SUPERVISION BY JOHN DOUGLAS OADES

ENTITLED OCCUPATIONAL EXPERIENCE AND TECHNICAL
COMPETENCE OF VO-AG TEACHERS

BE ACCEPTED AS FULFILLING IN PART REQUIREMENTS FOR THE
DEGREE OF DOCTOR OF PHILOSOPHY

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ABSTRACT OF THESIS

OCCUPATIONAL EXPERIENCE AND TECHNICAL COMPETENCE OF VO-AG TEACHERS

The main purpose of this study was to determine if there was a significant relationship between ability to perform selected technical agriculture competencies and certain other variables dealing with the related occupational experiences of vocational agriculture teachers. Variables of length, experience source, recency and attitude toward the value of occupational experience were considered. A secondary purpose of this study was to gather profile data concerning the related occupational experiences completed by vocational agriculture teachers in Colorado.

A six page, 108 item survey instrument was used to gather data for this study. The research instrument was composed of three sections: demographic, designed to gather respondent data concerning education completed, related occupational experience, and opinions concerning value and duration of occupational experience; teacher attitude scale, designed to provide an indication of respondent attitude toward the value of occupational experience; technical competence self evaluation section, designed to allow the respondent to evaluate his ability to perform

selected technical subject matter competencies, and identify from what experience source he gained each competency.

Vocational agriculture program areas to be included in the study were chosen on the basis of having 10 or more operational secondary programs in Colorado. Program areas thus selected were production agriculture (70) and ornamental horticulture (12). The population included all secondary production agriculture (98) and ornamental horticulture (12) teachers in Colorado.

The Statistical Program for the Social Sciences (SPSS) was used to analyze all data gathered. Descriptive statistics were computed for all variables. Statistical tests used included Pearson product moment, multiple regression and one-way analysis of variance.

Seven hypotheses were tested and the major findings included: (1) There was no statistically significant correlation (.05 level) between the technical subject matter competence of production agriculture teachers and (a) belief in the necessity of occupational experience to program success, (b) source of occupational experience from which competencies were learned, (c) total hours of occupational experience completed, (d) recency of occupational experience completed, and (e) attitude toward the value of occupational experience; (2) There was a statistically significant correlation (.05 level) between technical subject matter competence of ornamental horticulture teachers and (a) source of occupational experience from

which competencies were learned, and (b) total hours of occupational experience completed, while no statistically significant correlation was found for (c) belief in necessity of occupational experience to program success, (d) recency of occupational experience completed, and (e) attitude toward the value of occupational experience.

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CHAPTER I

INTRODUCTION

National recognition of vocational education came with passage of the Smith Hughes Act in 1917. One of the concerns brought forth by the passage of this act was the qualifications of vocational teachers. Both the educational background and the occupational experience of the vocational teacher became major concerns.

Universities have provided vocational teacher preparation programs designed to build the professional and pedagogical competence of the vocational teacher. To a lesser degree the teacher preparation program has also served to supplement the technical competence of the vocational teacher. Coupled with the teacher preparation efforts, vocational teachers have been required to have some fixed amount of occupational experience to better assure technical competence. The basic assumption underlying this requirement was the belief that the vocational teacher must have first hand experience with those skills and knowledge he undertakes to teach, before that instruction can be successfully conducted. Thus, that occupational experience must have been closely related to the area of vocational instruction in which the teacher was to be employed. The amount of occupational experience to be

required of the vocational teacher has always been an issue, and remains so today.

Statement of the Problem

The occupational experience requirements for vocational teachers vary considerably from state to state, and from service area to service area. While it is commonly agreed that occupational experience is valuable and desirable, little research is evident which can be used to substantiate any occupational experience requirement.

Teachers of vocational agriculture, in the State of Colorado, are required to have a minimum of 6000 hours of occupational experience. This experience must have been completed after the age of 14 years, and be completed in the area of production agriculture or related agricultural business. The investigator has found no research, completed in Colorado, which would effectively substantiate any part of this requirement. While this study does not respond to all the many concerns of occupational experience requirements of vocational agriculture teachers, it does address those segments dealing with amount, recency and source of occupational experience. More specifically, answers are sought to three major questions concerning the occupational experience of vocational agriculture teachers in Colorado:

- 1) Do Colorado vocational agriculture teachers believe that they are technically competent in agriculture, and if so, from what primary source(s) did they gain that competence?

- 2) Do Colorado vocational agriculture teachers believe that a need exists for related occupational experience, and if so, what amount of experience will best meet their needs?
- 3) Do Colorado vocational agriculture teachers believe that recent occupational experience is necessary to maintain technical competence, and if so, how recent should that experience be?

Through the development of specific objectives and testing of related hypothesis, this study will seek to answer the above questions.

Objectives of the Study

Seven primary objectives provide focus to the study:

- 1) To determine if Colorado vocational agriculture teachers believe they possess selected "high ability" technical agriculture competencies in production agriculture and ornamental horticulture.
- 2) To determine from what primary source(s) Colorado vocational agriculture teachers gained selected "high ability" technical agriculture competencies in production agriculture and ornamental horticulture.
- 3) To determine if teachers of vocational agriculture in Colorado believe that occupational experience, in agriculture, is necessary for program success.
- 4) To determine the optimal length (number of hours) of occupational experience in agriculture, for teachers of vocational agriculture in Colorado.
- 5) To determine if teachers of vocational agriculture in Colorado believe that recent occupational experience, in agriculture, is necessary to maintain competence in technical agriculture.
- 6) To determine how recent (in months) occupational experience in agriculture should be, to maintain the technical agriculture competence of Colorado vocational agriculture teachers.

- 7) To determine the attitude of Colorado vocational agriculture teachers toward the value of occupational experience.

Through accomplishment of these seven objectives a broader understanding of the values of related occupational experience to teachers of vocational agriculture in Colorado was sought.

Hypotheses of the Study

The following hypotheses were developed to accomplish and test the seven primary objectives of the study. Corresponding numbers were assigned each objective and related hypotheses. Following each statement, a brief justification of the investigator's position as stated in the hypothesis is given. The hypotheses to be considered were: (Null form stated in Chapter IV)

Hypothesis 1) There is a positive relationship between belief in necessity of occupational experience and competence in technical agriculture.

Justification: Technical competence is thought to be a primary function of occupational experience. Thus, teachers who have highest technical competence in agriculture are likely to have strong beliefs about the necessity of occupational experience.

Hypothesis 2) There is a positive relationship between the source of occupational experience and competence in technical agriculture.

Justification: Technical competence is usually gained where not only exposure but related application is evident. Teachers with greatest technical competence will likely come from heavily application oriented sources of occupational experience.

Hypothesis 3) There is a positive relationship between belief in necessity of occupational experience and length of occupational experience completed.

Justification: Philosophic dogma of vocational education teaches that occupational experience is good and necessary for vocational teachers. Thus, it is likely that the more experience a teacher had completed, the more likely he is to believe that experience was necessary. The notion of "I went through it, he ought to go through it" is also evident.

Hypothesis 4) There is a positive relationship between length of occupational experience completed and competence in technical agriculture.

Justification: If indeed technical competence does accumulate through occupational experience, then the more occupational experience one has the more competent he should become.

Hypothesis 5) There is a positive relationship between belief in need for recent occupational experience and recency of occupational experience completed.

Justification: Very much the same justification applies here as on hypothesis number three. Further it is likely that teachers with recent experience will be more cognizant of the dynamic nature of agriculture and will thus see a need for recent experience to stay abreast of technological change.

Hypothesis 6) There is a positive relationship between recency of occupational experience completed and competence in technical agriculture.

Justification: Where industry is involved in continuous technological advancement, recency of experience in that industry will be vital to maintaining technical competence. Thus, the more recent the completion of occupational experience, the more likely one is to be technically competent.

Hypothesis 7) There is a positive relationship between attitude toward the value of occupational experience and competence in technical agriculture.

Justification: Attitude is said to be a powerful influence in one's effectiveness and ability to perform any task. If technical competence accumulates through experience and the teacher has a highly positive attitude toward the value of that experience, he is then likely to be more technically competent.

Further explanation of the statistical techniques to be applied to the above hypotheses may be found in Chapter III.

Definition of Terms

The following terms are defined for the purpose of this study:

Technical Agriculture Competencies: Skills and abilities specifically oriented to performance of production agriculture (farming and ranching) and/or ornamental horticulture occupations.

"High Ability" Technical Agriculture Competencies: Agriculture related competencies identified by agriculture industry representatives, as reflective of high ability to perform in production agriculture and/or ornamental horticulture occupations.

Technical Competence: The summation of the vocational agriculture teachers' ability to perform selected "high ability" technical agriculture skills.

Related Occupational Experience: Any practical industry experience (not teaching) with technical agriculture competencies, including part or full-time work, paid or unpaid.

Recent Occupational Experience: Any practical industry experience with technical agriculture competencies, acquired within the last five years, including part or full-time work, paid or unpaid.

Full-Time Occupational Experience: Any practical industry experience with technical agriculture competencies, acquired through continuous, full-time paid employment, extending over a period of three months or longer.

Part-Time Occupational Experience: Any practical industry experience with technical agriculture competencies acquired on a regular, but less than full-time basis, whether paid or unpaid.

Attitude: The summation of the vo-ag teachers responses to a 22 item "Attitude Scale", designed to determine respondents state of mind or feeling toward the values of related occupational experience.

Recency of Occupational Experience: That period of time lapsed, since last full-time, related occupational experience, and the total hours of occupational experience completed in the last five years.

Vocational Program Success: The effectiveness of the vocational program based upon the percentage of program graduates which are placed in agricultural occupations (production or agribusiness), or who pursue further training (at sub-BS level) for an agricultural occupation.

Vocational Education Teacher: Those vocationally credentialed instructors who provide training in skills and knowledge for specific occupations, requiring less than a baccalaureate degree.

General Education Teacher: Those instructors not vocationally credentialed who provide instruction in the arts and sciences.

Purpose of the Study

Considerable variation exists between states in the occupational experience requirements for vocational agriculture teachers. In the Colorado State Plan for Vocational Education - 1976 (82:19) occupational experience requirements for secondary vocational agriculture teachers now reads:

Experience. . . shall have had a minimum of three years or 6000 hours experience in an occupation or combination of occupations directly related to the agricultural occupations for which the training is offered.

The Colorado vocational agriculture state supervisors and Colorado State University teacher educators in agriculture indicated a need to determine, if indeed 6000 hours is the optimal length of occupational experience. While some vocational service areas require only one year of occupational experience and others as much as ten years of related experience, agriculture requires three years. The need seems to exist then, to determine what reasonable length of occupational experience (assuming quality of experience equal) is optimum in providing the most competent vocational agriculture teacher.

Further, Colorado vocational agriculture leadership has voiced a need to have available, current data indicating the status of technical agriculture competence among Colorado vocational agriculture teachers. Acquiring and maintaining technical competence is becoming increasingly of concern when considering the very dynamic nature of the modern agricultural industry. There is a pressing need to know how technically competent practicing vocational agriculture teachers are, from what sources they gained their competence, and if recent or renewed occupational experience is necessary to maintain technical agriculture competence.

State supervisors and teacher educators have expressed a desire to know what vocational teachers felt about occupational experience when surveyed in an anonymous fashion. What is the predominant attitude toward the value

of occupational experience among vocational agriculture teachers? It was indicated that if Colorado vocational agriculture teachers are to continue to provide top quality vocational programs, then answers to these questions are necessary.

The findings of this study thus seek to provide basic research data dealing with the major aspects of occupational experience among Colorado vocational agriculture teachers. This data should be of value to some or all of the following groups:

- 1) State teacher credentialing agencies in up-dating vocational agriculture credentialing requirements.
- 2) State Departments of Vocational Education in making recommendations for credentialing vocational agriculture teachers.
- 3) Teacher education institutions in advising current and prospective students preparing to enter the teaching profession as vocational agriculture teachers.
- 4) Local administrators in employing new vocational agriculture teachers.
- 5) Vocational agriculture teachers and prospective teachers who are entering, re-entering, or preparing to teach.
- 6) Researchers interested in determining occupational competence of vocational agriculture teachers, or the value of occupational experience to the vocational agriculture teacher.

Assumptions

The following assumptions are basic to proper use and interpretation of this study. It is assumed:

- 1) That a primary reason for requiring occupational experience for vocational agriculture credentialing is to better assure occupational competence of the teacher, in agriculture. Further, it is assumed that occupational competence will make the vocational agriculture teacher better able to teach those skills and knowledge necessary for entry level employment in agricultural occupations.
- 2) That a fixed amount of occupational experience will provide sufficient variety of practice so as to assure breadth in technical agriculture competence. That in meeting the hour requirement one has such variety of related experience as to be broadly competent, rather than having had "one experience a thousand times".

Delimitations

The study operated within several notable boundaries, including:

- 1) The study is delimited to one vocational service area, that being vocational agriculture.
- 2) The study is delimited to, two occupational areas within the vocational agriculture service area. They are production agriculture (farming and ranching) and ornamental horticulture.
- 3) The population to be sampled is delimited to credentialed teachers of vocational agriculture in the state of Colorado.
- 4) The study is delimited to teachers in secondary vocational agriculture programs, excluding any consideration of adult, young farmer or post-secondary programs.

Limitations

Users of this research should be mindful of the following limitations of the study:

- 1) No direct correlation is drawn between occupational experience and competence as a vocational agriculture teacher; rather correlations are drawn between

experience and competence in technical agriculture. No attempt was made to evaluate the vocational agriculture instructors ability to teach; rather his ability to perform selected technical agriculture competencies.

- 2) No attempt was made to varify data returns of the respondents. Amounts of occupational experience completed and self evaluated technical competence responses were tabulated as reported, without varification.

Summary

This study undertook an indepth review of occupational experience of vocational agriculture teachers in Colorado. Factors of length, recency, source and attitude toward the value of occupational experience are examined. The product of this research should be of value to leaders in vocational agriculture as they review occupational experience requirements for vocational agriculture teachers.

Chapter II undertakes an indepth review of literature related to the subject of occupational experience of vocational teachers.

CHAPTER II

REVIEW OF RELATED LITERATURE

Introduction

This chapter is presented as a summary of the research and professional literature related to the topic of occupational experience of vocational teachers. Sources were consulted including books as well as professional journals relative to vocational education. In addition, the following specific sources were examined:

1. Abstracts of Instructional Materials in Vocational and Technical Education
2. Abstracts of Research and Related Materials in Vocational and Technical Education
3. Current Index to Journals in Education
4. Dissertation Abstracts International
5. Readers' Guide to Periodical Literature
6. Research in Education

Recognizing that there is a certain amount of overlap between the topics covered, this review is organized into the following sub-topics:

1. Historical Aspects of Occupational Experience
2. Current Basis for Occupational Experience

3. Relationship of Experience to Competence
4. Depth of Occupational Experience
5. Recency of Occupational Experience
6. Variability of Occupational Experience Requirements
7. Attitudes and Beliefs concerning Occupational Experience
8. Implications of Competency Based Teacher Education to Occupational Experience
9. Sources of Occupational Experience
10. The Future of Occupational Experience Requirements

Historical Aspects of Occupational Experience

Concerns of occupational experience have been evident since the early history of vocational education in the United States. As early as 1908 teachers in then "manual arts" voiced concern about quality factors for manual arts teachers. While in route to Europe in the spring of 1908 Charles A. Bennett stopped briefly in New York to visit with Robert W. Selvidge, who was at that time a graduate student at Teachers College, Columbia University. The results of the Bennett-Selvidge meeting are discussed by Barlow (4:92-5):

. . . a portion of their discussion was concerned with the general condition of manual arts in the Middle West. The Middle West had developed a number of teacher training programs during the early 1900's and the necessity of sharing viewpoints was evident to both Selvidge and Bennett. By mutual agreement (although the idea appears to have been suggested

by Selvidge) they decided to call a conference of men responsible for the preparation of teachers of manual arts in order to discuss common problems. . .

. . . thus in November 1909 the first 'Mississippi Valley Conference' came to be held at the Bradley Institute in Peoria. . . Bennett, who acted as conference secretary noted several points which he felt represented a reasonable conclusion:

- 1) The schools cannot get efficient men from the trades because these men, if they know their trades thoroughly, can get more pay in the industries than the school can offer.
- 2) Owing to the division of labor in the industries very few men are learning their trades thoroughly enough to become teachers in vocational schools. . .

The concern that vocational teachers be able to understand the theory as well as apply the practice was noted as early as 1908. Barlow (5:20-1) comments:

Theory and Practice

The modern idea in 1908 was to place emphasis on both theory and practice. 'The thoroughly skilled mechanic ought to understand not only the physics of his work, the science and mathematics, but something of the art itself.' It was intended that the student learn a maximum amount of a trade in a minimum time and still receive a diploma of graduation. The 'theory of doing' and the 'practice of doing' were to be integrated with an appropriate amount of collateral academic training. The intent of instruction was clearly to produce an exceptional craftsman (journeyman) who could advance to positions of higher responsibility. The terms *theory* and *practice* went hand in hand and both were important.

A landmark in the historical development of vocational education came with passage of the Smith-Hughes Act in 1917. Passage of this act brought a national focus to the needs for and purpose of vocational education. The act included provisions for training of vocational education teachers, with specific provision for occupational

experience of those to be trained. Milan (58:24-7)

discussed those provisions:

SECTION 12 - Smith Hughes Act
Legal Obligations to the Training of Vocational Teachers

That in order for a state to receive the benefits of the appropriation . . . for the training of teachers . . . of trade and industrial subjects, the State Board of such states shall provide in its plan for such training.

That such training shall be given only to persons who have had adequate vocational experience in the line of work for which they are preparing as teachers, or who are acquiring such contact as a part of their training.

Precedent in Training Vocational Teachers

That other institutions recognize the importance of trade and industrial teacher training work is evidenced by the following college catalogues:

Purdue University.	<u>Trade and Industries</u>
University of California . .	<u>Vocational Education</u>
University of Wisconsin. . .	<u>Industrial Education</u>
Iowa State College	<u>Training of Secondary</u>
	<u>Teachers and Supervisors in Trade and Industry</u>
Stout Institute.	<u>Course for Industrial</u>
	<u>Teachers</u>

The above examples will serve to indicate . . . other schools are aware of the problem and have established definite programs to meet the special needs of trade and industrial teachers.

Importance of the Problem

For teachers and desirable qualifications are:

1. Education
 - A. Graduate from college, university, or normal school or equivalent training.
2. Experience
 - A. Teaching
 - (1) At least twenty hours of practice teaching.
 - B. Trade
 - (1) At least five years of practical experience in a trade or industrial occupation.

Barlow (4:174-7) reported that in 1918 at least 184 institutions were offering curricular of varying lengths designed to prepare teachers of manual arts. Programs were found in 43 states in state universities agricultural colleges, normal schools and teachers colleges, and in private and municipal institutions. Siepert (4:174-7) reported:

Only 14 land-grant colleges were offering four-year curricula for the training of manual arts teachers in 1918, but the demand for manual arts teachers with four years of training was not large. A larger number of programs requiring a much shorter period provided stiff competition to the four-year programs. Prerequisites were so varied that classification was nearly impossible. Some schools required only four years of trade experience, and others required a combination of both high school and trade experience.

Some problems encountered by the land-grant colleges included:

Universities tended to place much emphasis upon education courses and to give little consideration to actual shop practice. Prime consideration was not given to the man being trained, 'with reference to his having, or acquiring, the skill required as the basis for effective teaching.'

It was common practice to 'pick up' a mechanic from the trades. 'Having found this man, we still have the problem of training him to be an effective teacher with the spirit, the point of view, and the attitude toward education, toward industry, and life in general which we need in leaders of boys and men.' (This appeared to be influenced by the Smith-Hughes Act.)

The accelerated program of vocational education brought on by passage of the Smith-Hughes Act in 1917, carried with it an established principle that has had a profound effect on the training of vocational teachers.

This principle ran contrary to the rising tide for normal school or college preparation as a minimum for all teachers. The Federal Board for Vocational Education (12:6) made its position clear in its pronouncement of August 1918:

It is, of course, essential always that the teacher shall be able to teach, but it does not follow that he shall always qualify as a professional teacher. It is much more important that the instructor in carpentering, for example, at least as regards shopwork instruction, shall be a competent carpenter than that he shall have attended a normal school. Provided he can teach carpentry to beginners, he fulfills the chief professional requirement for a vocational teacher of carpentering. This is the prime requisite and all other qualifications are secondary. He must be of good moral character, and unobjectionable in every respect, but provided always, that he can teach carpentering, he should be judged and certified in other respects as a man, rather than as a professional pedagogue.

In 1924, the Federal Board for Vocational Education in their Bulletin Number 17 (33:21-2) outlined additional qualifications for trade and industrial teachers and teacher trainers, setting the stage for our present day training program. The similarity of thinking of vocational leaders of that period and our present training structure is worth noting:

Qualifications of Teachers

There are two possible modifications as to the qualifications of teachers as given for unit trade schools, which can be made in the case of general industrial schools: (1) A teacher may be selected who has had extended experience in one of the trades and intimate contact with each of the others which are to be taught. It is now impossible to find in the smaller cities and towns men who have these qualifications. (2) The school may employ graduates of approved teacher-training institutions, who

have had at least the minimum amount of trade experience as well as the professional training required in the several state plans for teachers in general industrial schools.

This training would include the following: (1) methods of teaching industrial subjects; (2) analysis and classification of trade content; (2) the organization of a progressive training course; and (4) instructional management.

Although the courses listed will meet the immediate needs of the instructor, it is advisable to give the teachers, either prior to or coincident with their employment as teachers, a better appreciation of the importance of industrial education and the relationships existing between various phases of our social and economic development through the following additional courses: (1) history and philosophy of industrial education; (2) organization and administration of industrial education; (3) follow-up and coordination of activities; (4) vocational and educational guidance.

Qualifications of Teacher Trainers

While the federal board has not as yet required the states to submit qualifications of teacher trainers in the field of industrial education, it believes that the best results in training teachers of trade and industrial subjects are secured where the teacher trainer has at least the qualifications set up for a supervisor of industrial education. In this connection it may be stated that a teacher trainer in the field ought to be able to qualify as a teacher of approved trade and industrial classes in addition to his general and professional qualifications. Minimum professional qualifications should include a command of the technique of teaching to such an extent that the teacher trainer can use it in his work and can impart it to others, so that they can use it under industrial training conditions.

In other words, he should have not only the scholastic and professional preparation needed by a person in this important line of work, but also at least as much firsthand contact with industry as is demanded of the related subjects teacher. It would seem obvious that a teacher trainer cannot train trade and industrial teachers effectively if he himself has not had adequate working experience in one of the fields for which he is training them.

Basic to any study of vocational education are the "Sixteen Theorems on Vocational Education" developed by Dr. Charles A. Prosser. The implication of his seventh theorem is that a teacher cannot teach that which he does not know. Teachers who are recognized as highly competent workers themselves through actual occupational experience are indicated to be most desirable for a vocational program. Prosser (69:217-232) stated in his seventh theorem:

Vocational education will be effective in proportion as the instructor has had successful experience in the application of skills and knowledge to the operations and processes he undertakes to teach.

On August 15, 1926, H. A. Tieman of Colorado Agricultural College (now Colorado State University) prepared and submitted to the Board of Agriculture a proposal to train trade and industrial teachers in the state of Colorado. This proposal was identified as Memorandum Number 90 and was the basis for present day trade and industrial teacher education program at Colorado State University, in the Department of Vocational Education. Excerpts from this document are reported in this study to better understand the development of the occupational experience requirements observed in the present vocational teacher education program (86:20-4):

Introduction

Each year we have a demand from teachers of industrial education subjects for extension training in the field of their profession. Invariably, these men request that they be enrolled for the

Bachelor of Science degree in Industrial Education, and that they be permitted to complete the work during the summer session. . . . In the field of Trade and Industrial Education, there are 89 evening school teachers, 27 teachers of part-time classes, and 6 teachers of all day trade schools, making a total of 122 trade and industrial teachers in the state of Colorado alone. Of course, this number could easily be doubled or perhaps tripled, if we consider the service we may render to teachers in adjoining states. . . . We are sure that the schools cannot secure enough trained teachers of industrial subjects. . . and invariably turn to the trade when they need a manual training teacher. This means, of course, that they are forced to take people who may be well trained in mechanic arts, but who know little or nothing of the methods of teaching. . .

It would be redundant to quote many of the bulletins produced by the Federal Board for Vocational Education through the years, and even prior to their existence, by the National Society for the Promotion of Industrial Education. The opinions of the vocational educators and administrators throughout history have held steadfast to the need for good trade background with adequate pre-service and inservice teacher training courses for vocational teachers. The dichotomy of the problem is expressed well by the Federal Board of Vocational Education in Bulletin Number 164 (32:2), of 1932:

College graduates fail because they have no practical experience; skilled workmen fail because they have never mastered the art of teaching. The latter know the practical work from the ground up. What problem in training lies here? The mechanic is not a teacher, nor is he a theoretical man. He thinks in terms of production difficulties. To illustrate, when one assigns him a green man for illustration, the mechanic uses technical or trade names which are over the head of the new workman. Through long experience much of his own work has become automatic. He picks out a job which he thinks is easy for the new man to start on. The

inexperienced worker falls down. Why? The job, when analyzed, covers 30 or 40 processes which he cannot grasp at once. The mechanic has been entirely unconscious of these steps, for with him the processes are mechanical and have been back in his subconscious mind for so long that he does not separate them for the new workman who must learn the steps one by one.

The mechanic needs help on how to teach. It is necessary to bring about a shift in his mental attitude. He must learn to separate the mechanical work from the training elements: he must learn to draw intelligently on his own experience.

All indications are that history has run a very true course on the issue of occupational experience for vocational teachers. Allen (2:112-25) comments on principles of vocational education developed by Melvin Barlow in 1963:

Once a philosophy of education has been established, principles of instruction begin to emerge that can serve as a basic educational document. Through the years, a number of principles specifically concerned with vocational education instruction have been established and have weathered the test of time. Principles of vocational education instruction, in many cases, can be applied to all students in a school; however, the emphasis on these principles is always directed to the end result of vocational education instruction--successful employment in a particular occupation for which instruction has been given.

From the many principles developed by Melvin L. Barlow. . . these selected principles are recognized as valid throughout the nation:

Instruction should be given by teachers who have had occupational experience in the subject(s) that they are teaching.

Teachers must be equipped with both practical experience and professional training to provide students with the skills, knowledge, attitudes and appreciations they will need to fulfill their occupational goals. No one would accept a football coach who had never been out on a playing field. Yet, there are some who believe vocational education instruction can be provided by teachers who have completed a number of technical school or college courses but haven't had any occupational experience in their fields. The strength of vocational

education instruction lies in the subject competency of its teachers and their desire and ability to teach. Of course, this holds true for all teachers; however, vocational education instruction is preparing students for work and the working environment of each occupation has its uniqueness--a uniqueness that only becomes apparent to the practitioners of the occupation.

Leighbody summarized the historic concerns of occupational experience nicely in his discussion of teachers and leaders of vocational education (50:139):

Occupational Experience and the Vocational Teacher

The priority upon practical experience as a requirement for vocational teaching goes back to the early days of the vocational program and reflects early emphasis upon specific job training and mechanical performance as the chief goal of the vocational teacher. Given this goal, it was argued that although these skills were being developed in prospective teachers in some public and private institutions and colleges, their graduates could not transmit to their students the actual working atmosphere of the shop or factory and therefore the students would not be employable. This theory was never subjected to research but nevertheless it prevailed, in spite of evidence to the contrary in other fields of vocational education. It has led to many problems and has contributed to the separatism and the status consciousness that still hinder the full development of occupational education.

Current Basis For Occupational Experience

The basic necessity of occupational experience has not changed markedly since the early days of vocational education, however, some new insights have been gained through research. To a great extent, however, what has been thought and required in the matter of occupational experience is still based on opinion and tradition rather than factual research findings.

Employability of the student has always been a critical measure of vocational education program success. The occupational competence of the vocational teacher has tended to have a marked effect on that employability. United States Commissioner of Education Terrel H. Bell (8:11) expressed a current opinion:

Technological and industrial innovations over the past 50 years have changed the character of life for everyone. The education and skills needed to comprehend and utilize these innovations have also changed--vocational education most of all because it must reflect the demands and trends of a labor market rapidly incorporating each innovation.

Beasley (7:116) comments specific to vocational agriculture:

Agricultural educators have long recognized that vocational agriculture teachers need experience in the subject field in which they teach. Many states require that teachers come from a farming background. Many institutions require that teachers possess farming experience but do not provide teachers with needed experiences in off-farm occupations. As we broaden the offerings in agricultural education, a problem of growing concern is that of developing and improving the occupational competency of teachers.

Because some vocational agriculture teachers may not keep abreast of occupational changes brought about by advancing technology in business and industry, they are failing to provide students with current knowledge and skills needed for successful employment.

White, in a 1971 study (91:189-91) and Miller in a 1974 effort (59:61) maintained that "teachers industry experience is a significant, positive factor in relation to student achievement".

Lamar reported that the "principle of practice" (48:218) is critical to effecting modes of behavior:

Principle of Practice. The Principle of Practice applies to the different modes of behavior--knowing, feeling, and doing. What is learned is what is practiced. Practice seems to bring about change in behavior because it permits other learning factors to be effective. Learning does not go on without practice because it is an active process. Intensity or vividness of the practice, as well as the times the act is repeated, influence the rate and degree of change in behavior. The individual can be taught only what he can be caused to do. As he practices, he is drawn toward the level of aspiration that he accepts.

Miller and Kazanas (60:39-41) similarly reported that vocational teachers must have "an adequate background in an occupational field upon which the teacher may draw for relevant application of educational principles in creating behavior change".

Increasing in-school responsibilities of teachers has tended to hamper industry involvement of teachers. Teacher-industry exchange programs have been created to help remedy this situation. Wells commented on one such program (89:281-2):

Why do we need this program? Increasingly vocational agriculture and other vocational teachers are being "caged up" in the classroom and teaching laboratories because of the increased student enrollment and the shortage of vocational teachers. This provides them with only a very limited exposure to the outside area of business and industry. Our knowledge of the many activities in the world of work is limited as a result of lack of time for self training and the time lapse since entering the teaching field of our choice. We feel that the program has brought the businesses and the school much closer together in their understanding of each other's problems.

Stivala (84:28-9) reported very similar concerns, commenting that "The very nature of many large school systems militates against the establishment of a climate conducive to self improvement".

Fiscus in a 1973 study (35:22-3) conducted in Washington State, found that the highest ranked concern of administrators in evaluating beginning vo-ag teachers was "Demonstrating competence in the agricultural subject matter". When beginning vo-ag teachers evaluated themselves "Demonstrating competence in the agricultural subject matter" was ranked second as a concern.

Goodrich (39:199) reported a different basis for the necessity of occupational experience. She commented that the "human relations" aspects of dealing with industry situations are a most vital facet of industry experience. This attitude has been very prominent among business and office educators. Technical competence could be gained from instruction, while the people-human relations concerns could be developed through industry exposure.

Rhodes (72:23-6) proposed that "educational snobbery" is currently a blight on the educational system, and that practicality and usefulness must be added if the educational system is to survive. Real world experience of teachers, Rhodes contends, is central to adding that practicality to the system.

Relationship of Experience to Competence

As is evident by the preceding content of this chapter, opinion is very strong that a positive relationship exists between occupational experience and technical competence of the vocational teacher. Research to support that opinion was found to be very limited in quantity and somewhat questionable in quality. It would appear that much of the research has been approached on a too narrow and limited basis to be of much value. Sjogren comments on evaluation activities related to occupational experience (77:178):

Checking the assumptions is very important. Elsewhere in this text the assumptions underlying certain patterns of vocational teacher education are described. Each of the patterns presented is rational, and it is highly unlikely that any evaluation could prove one of them is best for all purposes. Evaluation activities could be designed, however, that would permit an examination of the validity or criticality of the assumptions. Such information would be very useful for many people. For example, nearly all vocational teacher education programs make certain assumptions about prior work experience. It would be nice if we could get some definitive information on the validity of these assumptions. Even this example is too simplified. It is very likely that work experience is important to some kinds of teacher behavior, but not others. Thus, it may be that the rationale for requiring work experience for teachers is more valid for teachers in some areas than in others. For example, extensive work experience which ended ten years ago may be of less importance for an instructor of computer programming than his keeping current with computer language developments. On the other hand, extensive and continued work experience may be very important for teaching the trades where much of the content is difficult or expensive to learn in other than on-the-job situations.

In that research that has been completed on the subject, findings were very mixed concerning the relationship of experience to competence. In a 1967 study

Meyer (57:72-5) reported an improvement of score, pre-test to post-test, on technical competencies acquired through occupational experience, with distributive education teachers. The study failed to report the level of significance of the improvement in score. In a 1968 study Ellis (28:73) reported a "positive correlation between work experience and the success of beginning high school teachers," in business education. Again the significance level of the correlation was not reported. In a 1970 study completed at CSU, Orr (66:80) reported "no significant correlation between scores achieved by teachers in the fields of auto mechanics, carpentry and machine shop on a trade competency test and their years of trade experience. In a North Carolina study completed in 1971 Spaulding (81:55-7) reported that:

Results appear to show that it is not necessarily true that an instructor with extensive field experience is a better teacher than one with bare minimal experience when it comes to effective teaching in vocational or technical areas.

Further Spaulding reported:

For many decades, certification regulations for vocational and technical teachers have included in their list of requirements that the candidate be a journeyman in his trade or technical area, with a stated minimum number of years of wage-earning field experience.

In the literature search, which was made in connection with this study, no proof was offered in concrete support of such certification requirements. There were apparently few statistics supporting the contention, which has been made by those agencies which certify vocational instructors, that a candidate who had spent a substantial number of years in a wage earning field experience would become a better or more effective shop or laboratory

instructor than would a candidate who had spent only a few years in the field. Several states have certification requirements which require that to be certified a candidate must have had seven, eight, five, or some other number of years of outside experience in the discipline he plans to teach.

From the lack of data on this question, one may conclude that an assumption was made, perhaps decades ago, which has promulgated and preserved the concept that extensive wage-earning field experience in the subject area is necessary to insure that an instructor will be proficient and successful. This study has indicated that such an assumption may be false.

Lacey (47:24-30) in a 1973 study reported:

. . . that actual hands-on office-work experience is important to the classroom effectiveness of teachers. A large percentage of the teachers which she surveyed reported that their office-work experience had enriched their teaching effectiveness; also, the office-work experience was as valuable to teaching as was their student teaching experience. Teacher training institutions and departments of certification need to look seriously at such a work experience requirement of all teachers to upgrade the profession. The 'experience opportunities' provided in a well-organized and functioning teacher education program are invaluable in broadening the VBOE teacher's spectrum of and appreciation for the profession.

In a 1974 study, completed in New Jersey, Jurist (45:112) reported:

The variables of teaching experience, business work experience, age, academic attainment, and participation in in-service activities were not significantly correlated to the degree that teachers performance could be predicted from any one or a combination of these variables.

Thus it would appear that research findings on the subject of occupational experience are very mixed and inconclusive. This writer has, however, observed that

those more soundly structured studies tended not to support occupational experience, while opinion based studies show strong positive correlation of occupational experience to competence.

Depth of Occupational Experience

Factors of length of experience and quality of experience seemed to have been an issue in the question of occupational experience since the first experience requirements were written. Leighbody (50:139) addressed the experience length and quality issue, having stated:

The quality of a learning experience is by no means easy to measure, but if a field of study is mastered in a program offered by an approved college or university, some recognized standards have been met. Such institutions are subject to program review and to common accreditation standards which include quality of staff, facilities and curriculum. No such standards exist by which to appraise the quality of the learning experience when it is acquired on the job and prior to any plans for teaching. Five years of employment may mean five years of varied and valuable experience or it may mean one year of experience repeated five times. Vocational educators have recognized this and have attempted to evaluate the breadth of the experience of those accepted as teachers by the use of trade competency tests. Still, there are no accepted norms which can be applied to such tests and this has led to heavy reliance upon the length of occupational experience as the principal criterion for judging competence.

In a 1972 Illinois study Forgey (36:33-4) summarized his effort with the following comments:

It is conceivable that many types of occupational experience add little to an employee's bank of occupational skills that will help in his professional career. Further, the level of responsibility an employee had in his occupational experience can be misleading. The real educational worth of occupational experience is the applicability of the skills learned to the person's present teaching area.

The value of occupational experience can never be known until governing boards, vocational people and the clientele they serve agree on occupational goals. Further, the goals must be in quantifiable terms which lend themselves to measurement. At this point competencies which lead to goal attainment can be identified and occupational experiences selected which will produce these competencies.

In the evaluation of vocational personnel for selection, promotion and salary increases, only two schools mentioned performance. Productivity was suggested by one director as an area in which his school should be giving consideration. The most just way of dealing with vocational personnel and the taxpayers would be to base promotions and salaries on productivity. The problem is that education at all levels has never really come to grips with this knotty problem. The solution to this problem is a must.

More specific research results concerning the length of occupational experience have been compiled. Again the findings showed mixed results, however the predominant finding was that no significant relationship existed between length of experience and competence. Evans reported in 1971 (31:244):

It is generally agreed that the number of years of experience does not correlate well with the criterion of competence, but only three states have used occupational competency examinations extensively. Even they require a number of years of experience prior to taking the examination. Large school systems often do not depend on state certification, but establish their own certification or other approval procedures, occasionally using local advisory committees.

In a Tennessee study completed in 1971 Brooks reported (13:94-6)

There was no significant difference in teaching effectiveness of VOE teachers categorized according to number of hours of related work experience performed.

Factors other than age, years of teaching experience, educational level attained, amounts of related work experience, and variety of related work experience account for differences in teaching effectiveness.

Until the value of work experience can be substantiated through further research, vocational office education teachers should not be required to complete hours of related work experience beyond the 2,000-hour minimum.

In 1972 Delzer reported (26:79)

The major findings were: (1) technical teachers should have three to five years of work experience; (2) related/applied teachers should have two to three years of work experience.

In a 1972 study completed at CSU Milan (58:83)

concluded:

There is no significant difference between T&I teachers grouped by an evaluation score from the Official State Board Visitation Report in relation to the effect of the exposure to years of occupational work experience above the minimum required for credentialing. The results of this study indicate that the strong emphasis placed on long years of occupational experiences needs to be re-evaluated.

In 1974 Covey (24:125) made specific recommendation concerning length of occupational experience by service area:

It was determined that the respondents of this study strongly supported the concept that occupational experience is important in the preparation of a vocational-technical educator. By service areas, it was determined that the respondents favored the following requirements in occupational experience; agriculture educators one or two years of experience, business education educators one or two years of experience, distributive education educators two, three, or five years of experience; health occupations educators two or three years of experience. Technical education educators two or three years of experience; trade and industry education educators three, four, or five years of experience.

Finch (34:63) commented that the longer the occupational experience of the vocational teacher, the more "the teacher's personal and interpersonal values seem to identify with the tradesman or technician rather than the teacher".

The literature seemed to indicate that quality of experience may well be a more important factor than the length of experience.

Recency of Occupational Experience

The literature has indicated that renewal of related occupational experience is yet another concern of vocational educators. Blomgren (10:84) and White (90:77) each presented similar concerns and solutions to the problem:

As agriculture becomes more sophisticated and expands to related fields, teachers must acquire new and improved technical skills in order to keep abreast of inevitable changes.

In addition to technical ability acquired, becoming familiar with the pressures of the world of work, current industry standards and conditions, will enable teachers to counsel more effectively and better relate to problems of their students.

During the summer of 1971, the Agricultural Education Department at the University of California, Davis came up with a novel approach to teacher involvement in the world of work. The primary purpose was to help the high school and community college teacher of vocational education upgrade his occupational competency and acquire new competencies through on-the-job experience in a carefully selected business or industry for a minimum of four weeks while concurrently enrolled for related class work before, during, and after the work experience.

In a 1969 study Brown (17:36-8) evaluated the effects of an in-service education program on 40 vo-ag

teachers. He found improved teacher subject matter competence, but the program had no effect on student learning.

Mannebach (54:168-9) in 1970, analyzed the effectiveness of a four-week experimental program in which teachers were placed on jobs for update of occupational experience. He found that junior college teachers gained significantly more knowledge as a result of their experience. He recommended that short term experiences be offered so teachers would be better able to keep current in the knowledges and skills needed to prepare students for agricultural occupations.

In a 1970 study dealing with experience update Stitt (83:9-10) reported

Competency Levels

Participants reported statistically significant increases in competency levels in 5 of the 11 units of 'General' agriculture. The five included Orientation, Career Opportunities, Agriculture Salesmanship, Business Structure and Procedure, and Sales and Service. . . Curriculum changes were evident as a result of this improved competence.

Ansolabehere (3:98) recommended in a 1973 Illinois study:

Efforts should be made to integrate previous and ongoing occupational experience into vocational-technical teacher education programs in the colleges and universities throughout Illinois and thus provide the additional skill development needed by specialized teachers in area centers and other vocational-technical settings.

In a distributive education study completed in 1974 by Weatherford, (88:29) it was reported that 47 percent of the national DE leaders responding agreed that

teacher-coordinators should be required to renew (or supplement) their occupational experience every three to five years.

A 1974 study completed by Erterl (30:68) concluded that:

Recent contact could, in general, be indicative of exposure to the current office systems and procedures and updated equipment. Such exposure is indeed necessary for the VBOE teacher to improve classroom effectiveness, to build relevant program content, and to be knowledgeable in current equipment usage.

This frequency of contact could, in general, motivate the teachers to evaluate their instruction and classroom procedures and to provide enriched and office-oriented experiences for their students.

Hill (42:75) nicely summarized the recency issue with the following comment:

It is imperative that vocational educators continue education to improve their performance and to keep up-to-date in: (a) The discipline(s) which provide the subject matter, the basic knowledge for an occupation, (b) the occupational field which is the source of the skills, procedures, and knowledge for occupational education. . .

Variability of Occupational Experience Requirements

To gain a better understanding of the existing occupational experience requirements the writer reviewed several sources which had studied state certification requirements for occupational experience, in the several vocational service areas. The literature review revealed considerable variation in requirements among the states and between the various service areas. Ramp (70:61) concluded in a 1970 study:

To meet the increasing demand for teachers in vocational programs, most states have adopted requirements for certification that are quite different from their requirements for academic subject teachers. In academic areas at the secondary level, a baccalaureate degree in education is the standard minimum requirement for teacher certification. However, vocational certification at both the secondary and post-secondary level is based upon occupational competency in the specialty areas, as well as academic accomplishment. In many states, certification of teachers in post-secondary technical and trades programs is not required at all. Further, qualification requirements for vocational teachers are tailored by each individual state, and adjusted to alleviate varying teacher shortages in those states. Consequently, certification requirements are vastly different from state to state.

In the T&I area, Reeder (71:34) reported in 1973:

Journeyman Experience: According to Walsh, teachers rated this direct experience as the most conducive to success. All states reported a requirement in this area but the work experience specified for T&I teachers ranged from 2,000 hours in two states (not necessarily journeyman level) to a maximum of eight years in one state (learner and journeyman level). Between these two extremes, the rest of the states indicated work experience requirements ranging from three to six years.

In a 1973 study of certification requirements in the 50 states Rogers (75:51) reported:

The findings of this study indicated that there were both similarities and differences in the certification requirements in the 50 states. Similarities existed for isolated certification criteria. However, when the total certification requirements of the states were compared, there were more differences than similarities among the states' certification requirements.

Brantner (12:14) reported in a 1974 study:

Work Experience Requirements

Work experience requirements for secondary trades and industries teacher certification not only varied greatly from state to state, but also varied within a state depending upon the academic accomplishment of prospective teachers. For

example, one state reduced the work experience requirement from three years to two years for a teacher holding the master's degree. On the other hand, two states considered work experience as fulfilling college training requirements. One offered this on an individual evaluation basis, and the other specified that each two years of work experience would be considered equivalent to one year of college.

In a 1974 study of Trade and Industrial certification requirements, Klehm (46:68) reported:

In terms of the occupational experience for the initial certificate for T&I teachers two states reported one year; three state administrators reported two years; nine indicated three years; three four years; six, five years; seven, six years; one for seven years; and one for eight years. The mean is four and two-tenths years of occupational experience.

The writer was unable to locate certification requirements specific to the vocational agriculture service area for the 50 states. General to all service areas Moss (62:37) concluded:

Present certification requirements provide no realistic guide. Not only are they not keyed to predicted role expectations, but the requirements are so varied within and between vocational fields that they flaunt our indecision. In some instances, certification standards are so low or so irrelevant as to probably harm teachers and students and severely limit class activity.

Attitude and Beliefs About Occupational Experience

Some considerable appreciation has been gained previously in this chapter for the beliefs concerning occupational experience. The writer included this section to bring sharper focus to those beliefs and attitudes shared by professionals in the field.

Attitude throughout the literature appeared to have been very positive for occupational updating experiences, among those teachers who had been involved. Byers (19:253) reported comments of teachers who took in an update inservice in 1975:

We need the instruction to be combined with an experienced practitioner as well as the professor. This was done in this class and its results were excellent. This has been the best workshop I have ever taken. . . It is felt that the practice of involving the Departments of Horticulture and Agricultural Education, along with the practitioners from the horticultural industry is a most effective way of providing the teachers with the technical skills needed for a good instructional program at the local level.

In a 1970 study Cesta (20:11) reported similar comments from an update experience. Teachers pointed out the merits of better understanding, educators and industry, of one another's problems.

In a 1969 article Eck (27:30-2) stated the opinion of first year teachers concerning occupational experience:

If some were to ask me what was the most important contributing factor to my first year as a business teacher, I would definitely have to answer *occupational experience*.

Importance of occupational experience. After having worked about five years full time and over a period of five years part time, I feel that work experience itself has contributed positively in many phases of my career as a business teacher. Perhaps if you have taught for a year, or even many years, without having occupational experience, you may feel that your teaching has been satisfactory without actual on-the-job training. My contention is not that teaching without on-the-job experience is less satisfactory than teaching with job experience, but that this experience can contribute much to the teaching.

Teacher confidence. Probably one of the most important traits for a beginning teacher is to express and reflect personal confidence in his teaching area. What greater assurance could a business teacher have in presenting subjects and developing skill in clerical areas than to have participated in office routine, handled telephone calls, and taken dictation.

In a 1972 California study, Bowden (11:43-4) investigated the willingness of traditional home economics teachers to instruct occupational classes. The reason most often expressed for lack of willingness to teach occupational classes was "Their lack of work experience other than teaching in the home economics-related occupations."

In a 1974 study Brooks (14:109) attempted to determine predictions of teacher attitude toward occupational orientation. He concluded:

Knowledge of the type school district in which teachers are employed, race, sex, age, years experience teaching occupational orientation, hours of credit received in vocational guidance courses, and amount of time spent teaching occupational orientation does not significantly contribute to the prediction of the attitudes that occupational orientation teachers hold toward career education/occupational orientation.

At the 1975 Iowa vo-ag teachers summer conference Lockwood (51:47-9) investigated teachers priorities on 35 selected functions of vo-ag teachers. Below teaching day classes, working with the FFA and spending time with family, "Keeping up-to-date in agriculture subject matter" ranked eighth. A positive attitude toward occupational competence seemed evident.

In a 1974 journal article Haynes (41:175) promoted use of non-degree instructors in the agricultural mechanics phase of vo-ag teacher preparation. He emphasized the need for occupational currency and competence in selection of such instructors.

Goddard (38:25) provided an excellent summary of current attitude toward the value of occupational experience:

In reviewing the literature of the past 40 years frequent references are found concerning the lack of evidence to support the value of work experience programs for business teachers. During the same period, numerous statements made by leading business educators, conclusions arrived at by researchers, and beliefs expressed by scores of classroom teachers support the contention that work experience is valuable and that it should be a part of the preparation of all business teachers. Business teachers who taught for several years before acquiring business experience are perhaps the best sources of information for determining the real worth of such experience. These teachers have witnessed the immediate benefits of work experience programs and are among the strongest supporters of such programs.

Implications of Competency Based Teacher Education to Occupational Experience

It became evident to this writer that competency based teacher education and related teacher certification practices hold major implication for occupational experience practice. The literature indicated that full implementation of the CBTE and related certification processes would greatly enhance the prominence of subject matter competence in the total process of teacher preparation. Much work has been completed nationally toward implementation of CBTE.

Gray (40:9) commented:

All over the United States competency-based education programs are being talked about, debated and argued. Questions such as these are at the center of the controversy: What are the necessary and sufficient competencies for teachers to have? Does competency mean ability to perform in a certain way or to produce certain pupil outcomes? Who is to decide on the competencies and their evaluation? What about technical skills?

Specific to vocational agriculture Trotter (87:9-12) reported development of CBTE for summer experience programs. Competencies were identified which were needed but lacking among vo-ag teachers. Experiences were then designed to build the identified competencies. Pre to post test scores indicated significant improvement in 69 of 71 identified competencies.

Competency evaluation must precede effective CBTE or competency based certification. Gray emphasized this point (40:11):

There are a number of problems that have to be faced before a CBTE program can be implemented. There is also great promise in this approach. The problem looms largest is the specification of competencies and the subsequent evaluation of an individual in relation to them. Every other concern involved with implementing CBTE program centers around this one. The promise is that we will have, as time goes on, a more and more reliable way to predict which prospective teachers will be most effective.

Both Gillie (37:30-1) and Broudy (15:1-3) have issued pleas to proceed with caution in implementation of CBTE programs. They have reasoned that validated competency lists (particularly in subject matter) have not yet been completed. Further they contended that technical competencies are in a continuous state of flux and provision must be

provided for continuous update. Finally they have proposed that instruments for evaluation of technical and pedagogical competence have not been validated.

Crawford (25:53-5) spoke even more vehemently against the CBTE concept:

Where certification is based on a research approach, I can support it. But what frightens me is that where there is no research to support the competency-based approach, there may be a tendency to utilize some type of competency examination. Such a move could ultimately lead to "teaching to the test" and would most probably eliminate the variety of techniques that distributive teacher educators use in evaluating a student's competence. For those reasons, I vehemently oppose it.

Panitz (67:1-7) related the urgency for reliable competency evaluation instrumentation:

Need for Occupational Competency Evaluation

When vocational training became a school responsibility through the passage of the Smith-Hughes Act in 1917, the selection of occupationally competent people for teaching became a major responsibility of teacher educators and vocational administrators. With the growth of vocational education the need for objective, valid, and reliable instruments for the evaluation of occupational competence has become more and more urgent.

Whether vocational education relates to the preparation of youth, new workers or the retraining or upgrading of adults; whether the training is carried on in educational institutions, industry, by unions or the military, there is a force common to all to make the potential manpower actual manpower. That force is the occupational competence of the teachers.

Hulle (43: 147-9) proposed a model for occupational based competency examinations and commented in favor of their use:

Subject-matter competence is fundamental to successful teaching, and a major responsibility of teacher education institutions is to insure

that the prospective teacher has achieved a minimal level of subject-matter competency. Teacher education institutions offer programs of instruction to prospective industrial-vocational teachers. The instructional staff, equipment, and material for the widely varying industrial-vocational programs differ significantly. Instructional costs are high, and student enrollment in each program is low. Occupational competency examinations are a vital tool to maintenance of worthwhile teacher training programs.

Corman (23:105) pointed out that much work has been done in the area of development of occupational competency examinations. He indicated that two major problems hamper its further development:

Two considerations have governed activity in the area of competency testing. One, there has been no unanimity of opinion, nationwide, on the need for such testing. And two, there has been only a fraction of the necessary funding available for the development, printing, dissemination and security of the tests.

Blankenship (9:50-51) pointed out that much work remains to be done if the "advantages" of CBTE, occupational competency evaluation and competency based certification are to be realized. She advised that keeping an open mind toward the concept should result in better professionally and occupationally prepared teachers, and ultimately more job ready students.

Sources of Occupational Experience

The vocational agriculture service area has relied heavily upon home-farm experience as the basis for agricultural competence among vo-ag teachers. With fewer vo-ag teachers coming from quality farm backgrounds and with the

inclusion of off-farm occupational training in vocational agriculture, teacher training institutions have been obliged to develop alternate avenues for developing occupational competence.

Moss (62:43-6) has suggested that there are four methods by which beginning teachers can acquire subject matter competencies: 1) as a worker in a work setting, 2) as a prospective worker in a school setting, 3) in school as a prospective teacher, and 4) in the work setting as a prospective teacher.

The literature indicated an increasing reliance upon the third and fourth methods cited above. A wealth of literature indicated current development and use of structured internships designed to develop occupational competence. Mannebach (54:168-71), Clouse (21:156-8), Beasley (7:22) and Storm (85:48-50) each discussed the merits of structured, supervised occupational internships as a regular part of the pre-service teacher education program. In each case the internship included college credit varying from six to eighteen quarter hours, attributable to completion of the baccalaureate degree. Strong success in development of occupational competencies was indicated by each.

Williams (92:157), Snowden (80:48-9) Colvin (22:266-7), and Smith (79:186-8) presented strong arguments for structured occupational experiences as part of in-service teacher education. Indications were that teacher education

must assume an increased role in up-date and maintenance of occupational competence of practicing teachers. Since passage of the 1963 vocational education act, off-farm agricultural occupations have become the responsibility of vocational agriculture. It was indicated that structured occupational experience (credit or non-credit) was gaining success and popularity in developing agribusiness competencies among vo-ag teachers.

Valentine and Larson (49:11-12) provided a representative conclusion concerning structured occupational experiences:

This extended internship project has continued to verify the importance of this method of professional development for vocational educators both for preservice and inservice development. Most of the interns expressed in some way the idea that the experiences gained through the internships were invaluable, produced some of the highlights of their total education, and could not have been secured as effectively or as realistically in any other way.

A variety of other sources for gaining and updating occupational competencies were discussed by Addland (1:52-4), Brown (16:50-3), Ely (29:33-4), Jaska (44:52), Pauter (68:46-8), and Smith (78:28-30). Suggested sources included: summer study tours, attendance at industry trade fairs, participation in industry training schools and increased use of quality professional journals. It was indicated that teacher education programs should encourage students to take the "technical block" of their preparation at technical or trade school where total emphasis is placed

on job preparation. Improved technical competence has resulted from such programs now in operation. Specific to vocational agriculture it was suggested that SOEP supervisory activities, advisory committee contacts and operation of adult and young farmer programs could serve to improve technical competencies.

The Future of Occupational Experience Requirements

The review of literature presented an interesting array of predictions concerning occupational experience developments of the future. Generally the predictions indicated that occupational experience and maintenance of occupational competence will become more formalized and a greater concern of teacher education institutions and teacher certification agencies.

Nichols (63:7) predicted in 1969 that structured occupational internships were needed and would doubtlessly be developed. His prediction has reached reality in many states.

In 1970 McDowell (56:58-61) predicted two major developments concerning occupational experience

- 1) Occupational proficiency tests will come into extensive use for two purposes: (a) determining occupational competence prior to employment of the new teacher, and (b) substituting trade competence for academic credit.

- 2) There is a tendency to lower the number of required years of occupational experience for entrance into vocational-industrial teaching. This may relate only to those states requiring extensive experience; it would seem likely that reductions in the present requirements of other states may tend to endanger quality programs.

In 1971 Beardsley (6:120) predicted increased use of the year around school concept with eventual inclusion of planned, paid occupational experience for vocational teachers, during their off-quarter.

Specific to vocational agriculture, Moore (61:99-100) predicted in 1972:

Teacher certification requirements for vocational teachers will become more realistic. Procedures and policies will change to make it easier for Agriculture Science graduates to meet certification requirements. More consideration will be given in evaluating the practical experience and specialized training of individuals.

Both Evans (31:258) and Martin (55:30) predicted increased use of planned professional development programs for vocational teachers, which would include provisions for improvement of occupational competence. Evans stated:

. . . a requirement for renewal of tenure at the end of ten years would force a periodic look at faculty competence only at the time of hiring and at the end of a short probationary period. Unfortunately, too many teachers stop professional improvement at the end of their probationary period, though they may go on teaching for forty more years. Stated negatively, if vocational education is to survive, it must find some way of getting rid of its deadwood. To put it in a more positive sense, it should be the responsibility of every administrator to build, in cooperation with each staff member, an individualized staff development plan covering five to ten years. If it works, the teacher should be retained. If it does not work, he should be released.

Burkett (18:92) added a note of reassurance concerning the future with his comments in review of Melvin Barlow's recent writing "200 Years of Vocational Education":

Inscribed on the statuary of the Federal Archives building in the nation's capital are the words: 'What is Past is Prologue.' No adage could more aptly set the stage for a look into the future of vocational education. The historical perspective of the program as described in the preceding chapters establishes the basic principles upon which vocational education was founded. These principles, tested for more than half a century, have proved valid. They should be guarded jealously: this is part of the challenge to vocational educators as they face a future of many changes. And it is one of two basic assumptions I make in predicting the future: that the principles of vocational education will be preserved in concept, though not necessarily in application. My second assumption is that preparation for making a living, as well as preparation for life, will continue to be regarded as a prime purpose of education.

Summary

From the review of literature this writer concluded that historically strong emphasis had been placed on occupational experience as a criteria in vocational teacher development. Quality research has not tended to support increased amounts of occupational experience, though vocational teacher opinion of the value of occupational experience, appeared very high. Considerable variation existed among states and between service areas in required amounts of occupational experience. Recency of occupational experience was supported as valuable by research findings, though correlations between recency and competence lacked consistent strength. Competency based teacher education and related evaluation and certification procedures indicated increased emphasis of occupational competence of vocational education teachers. Increased use of structured occupational experiences for both pre-service

and in-service teacher education programs are likely in the future.

Chapter III will undertake an indepth review of the methods and procedures used in completion of this study.

CHAPTER III

METHODS AND PROCEDURES

In the previous chapters, the rationale for examining the occupational experience of secondary vocational agriculture teachers was developed. This chapter is concerned with the methodology and procedures employed in collecting and analyzing the study data.

Design of the Study

The basic purpose of the study was to explore and draw conclusions concerning the relationships of related occupational experience to technical subject matter competence of vo-ag teachers. To accomplish that purpose required identification of subject matter competencies, development of survey instrumentation, surveying the population, and statistically analyzing the gathered data. A number of selected variables were considered in the design and analysis process.

The Variables

Those variables which were considered in analysis of the data were:

Independent/Predictor Variables -

- 1) Length of occupational experience (THRSEXP) - As reflected by the total hours of related occupational experience completed to date, including full-time experience prior to teaching (FTPRIOR), full-time since teaching (FTSINCE) and part-time experience since teaching (PTSINCE).

$$\text{FTPRIOR} + \text{FTSINCE} + \text{PTSINCE} = \text{THRSEXP}$$

- 2) Recency of occupational experience - As reflected by the number of months since last full-time employment (MOLASTFT), and the total hours occupational experience completed during the last five years (EXP5YRS).
- 3) Source of technical agriculture competencies (EXPSRCE) - As reflected by response to a seven category experience source code.
- 4) Ability to perform selected technical agriculture competencies (PRFLVL) - As reflected by response to a five category performance code.

Dependent/Predicted Variables -

- 1) Competence in technical agriculture (TECHCOMP) - As reflected by a summation of responses indicating ability to perform selected technical agriculture competencies.

$$\text{PRFLVL1} + \text{PRFLVL2} + \dots + \text{PRFLVL66} = \text{TECHCOMP}$$

- 2) Belief in necessity of occupational experience for program success (OPSUCCES) - As reflected by response on a ten point opinion scale.
- 3) Belief in necessity of recent occupational experience to maintain technical agriculture competence (OPRECENT) - As reflected by response on a ten point opinion scale.
- 4) Attitude toward the value of occupational experience (ATTITUDE) - As reflected by response to selected items (ATSCAL) on a 22 item attitude scale.

$$\text{ATSCAL1} + \text{ATSCAL7} + \text{ATSCAL13} + \text{ATSCAL14} + \text{ATSCAL15} + \text{ATSCAL17} + \text{ATSCAL18} = \text{ATTITUDE}$$
- 5) Opinion optimum number of years of occupational experience (OPYRS) - As reflected by free-chose number response.

Validity and Reliability Controls

A number of controls were incorporated into the design of the study to better assure valid and reliable results. Early in the development of the study an expert review committee was engaged to provide critique of the original project proposal. The State Professional Improvement Advisory Committee under the direction of Dr. Richard Edsall, acted as that review committee.

As this study was part of a larger research project, all major design decisions were reached by consensus of the project staff, composed of Dr. Glen Rask, Dr. Windol Wyatt,

Dr. Douglas Sjogren and Mr. John Oades. Considerable continuity was thus maintained throughout the study. A full population sample was used, alleviating concern of random selection of a sample population. All secondary vocational agriculture teachers in Colorado were surveyed.

Validation processes included involvement of the agricultural industry, CSU vocational education staff members, Larimer County Voc-Tech Center staff members and EPDA graduate students in the Department of Vocational Education, CSU. Details of the validation process may be found in the "Collection of Data" section of this chapter.

Procedures

The following procedures were formulated in the project design for completion of the study. Appropriate methods detail may be found under each heading:

1. Selection of Participants
2. Identification of Technical Agriculture Competencies
3. Development of Final Survey Instrument
4. Collection of Data
5. Treatment and Analysis of Data

Selection of Participants

Seven program areas are currently defined by the U.S. Office of Education within the vocational agriculture service area. Due to sample size it was determined that only those program areas with 10 or more operational

secondary programs, within the state of Colorado, would be selected. Number of programs was a major concern as each program area was analyzed separately. Number of programs was roughly proportionate to the number of available teachers for sampling. As no program area contained more than 100 teachers, it was determined to survey the entire population of each selected program area. The 1975-76 Vocational Program - Personnel Directory (53:6-24) provided by the State Board for Community Colleges and Occupational Education was the source used for participant selection. Table 1 provides details on program areas and number of participants selected.

TABLE 1
PARTICIPANTS IN THE STUDY

Program Area	Office of Education Code	Number of Programs	Number of Teachers
Production Agriculture	01.0100	70	98
Ornamental Horticulture	01.0500	12	12

Identification of Technical Agriculture Competencies

Having selected the program areas of production agriculture and ornamental horticulture, it was then necessary to develop representative competency lists for each program area. The purpose of the competency lists were that they be used as a technical competence, self evaluation tool, to be included in the final survey instrument.

The primary sources for initial development of the production agriculture competence list was the Oregon (65:10-Cluster Curriculum Guide for Vocational Agriculture 108), and the Ohio Curriculum Guide for Production Agriculture (73:27-90). Similarly the Horticulture Supplement (52:3-29) to the above Oregon guide, and the Ohio Curriculum Guide for Horticulture (74:15-135) served as the basic source for the ornamental horticulture competency list. The original lists were refined in content and statement format by the project staff. Following staff review the preliminary competency lists (Appendix A and B) were ready for validation.

In order to validate the lists review committees from the production agriculture and ornamental horticulture industries were formed. The State Advisory Committee for Vocational Agriculture provided the names for that review committee (Appendix C). Those individuals were contacted by telephone and asked to cooperate in validating the competency lists. Instructions and the appropriate competency list was then mailed to each committee member. The committee provided excellent cooperation in selecting those competencies reflective of "high ability" in the respective occupational area. Members were encouraged to list additional competencies indicative of high occupational ability.

After all competency lists were returned the committee ratings were tabulated and analyzed. Mean scores were

computed for each competency, to determine which competencies would be used in the final survey instrument. The project staff determined that approximately 60 competencies, receiving the highest ratings from the review committee, would be included in the final instrument. Those competencies receiving a 1.90 (1 indicating high ability, 5 indicating no ability) and above mean score, on the production agriculture list, were selected for the final instrument. That effort provided exactly 60 competencies, with an additional six competencies added on the basis of referral by the review committee. Any additional competency listed by three or more members of the review committee were automatically added to the final list. Fifty-nine competencies received a 2.66 or above on the ornamental horticulture list and were accepted for the final instrument. Seven additional competencies were referred by the review committee. Those final competencies composed the "Technical Competence - Self Evaluation" section of the final instrument.

Development of Final Survey Instrument

In development of the final survey instruments (Appendix D and E), three component sections were designed:

1. Demographic section, to be identical in both the production agriculture and ornamental horticulture instruments.

2. Attitude scale section, again identical on both instruments.
3. Technical competence self evaluation section, unique to each program area.

Demographic Section

The demographic section was designed to obtain personal data on each respondent concerning education completed, related occupational experience, and opinions concerning the value and duration of occupational experience. It included 16 questions and was two pages in length. Respondents were encouraged to write additional comments concerning their beliefs about occupational experience. A number of respondents took that opportunity to either support or deny occupational experience as an important criteria of being a vocational teacher (Appendix F and G).

Attitude Scale Section

The attitude scale was designed to provide an indication of the respondents' attitude toward the value of occupational experience. The scale consisted of 22 individual statements reflecting length, recency, relatedness and value of occupational experience.

The scale was developed by the project staff, using an instrument developed by Rothenberg (76:208-22) as a pattern. It included a five point Likert type response scale.

The instrument was constructed such that an attitude score (ATTITUDE) could be computed from a summation of responses. In validation of the instrument it was determined that only selected statements provided consistent strength of response. From a validation procedure with 15 members of the Larimer County Vocational Technical Center staff, only 11 statements provided consistent strength of response. Strength was indicated by computed mean score of 2.0 or below and 4.0 or above (1.0-2.0 strongly disagree, 4.0-5.0 strongly agree). After the first validation minor wording changes were made to clarify some statements. The instrument was then revalidated by 19 EPDA Graduate Fellows in the Vocational Education Department at CSU. The second validation produced seven statements with consistent strength of response, six statements of which matched those indicated by the LCVTC validation. It was determined to use all seven EPDA validated statements in computation of respondent attitude score (ATTITUDE). The seven statements used were statements (ATSCAL) numbered 1,7,13,14,15, 17 and 18.

Responses on statements 14 and 15 (1.0-2.0, agree statements) were subjected to a recode procedure in determining their value in the final attitude score. This procedure was necessary to give equal value to "agree" and "disagree" statements in computation of the attitude score. The values were recoded such that a response of 5 would equal 1, 4 equal 2, 2 equal 4 and 1 equal 5.

Technical Competence - Self Evaluation Section

The technical competence self evaluation section was designed to allow the respondent to evaluate his subject matter competence. The competencies included in this section were determined in the manner described under "Identify Technical Agricultural Competencies" above. Directions requested that the respondent evaluate his "ability to perform" each competency using a five point Likert type performance scale. The length of the technical competence section sought to provide breadth to the evaluation, and yet not be so long as to discourage the respondent. The instrument was designed such that a technical competence score (TECHCOMP) could be computed from a summation of the performance responses.

The finalized survey instrument included six pages in total. Validation of the instrument was completed in two phases, first as described above, using the Larimer County Vocational Technical Center staff members. A panel of CSU, Vocational Department staff members assisted by departmental graduate students completed the second validation exercise. Response suggestions from the two groups were very consistent and provided the input for final editing of the survey instrument.

Collection of Data

As the population was not large, every effort was made to achieve a high return of the data gathering instrument. The assistance of the State Board for Community Colleges and Occupational Education was enlisted to enhance that effort. Under the signature of State Vocational Agriculture Supervisor, Mr. Sid Koon, a letter of introduction was sent to all Colorado vo-ag teachers. The letter (Appendix H) explained the necessity of occupational experience related research and asked the cooperation of all teachers in completing the survey instrument.

Within one week after the introductory letter was mailed, the survey instrument (Appendix D and E) and a cover letter (Appendix I) were sent to 98 production agriculture and 12 ornamental horticulture teachers. The cover letter encouraged immediate attention to completion of the instrument. A packet of instant coffee was attached to the letter as an enticement to the respondent to take a break and complete the survey.

Each instrument included a coded number identifying it for follow-up purposes. The number was placed on the back of the instrument in hope that respondents would not notice it, or be influenced by it.

Approximately 10 days after the instrument was mailed a follow-up letter (Appendix J) was forwarded to those who had not returned the survey instrument. Approximately 10 days after the first follow-up letter, a second

and final follow-up letter (Appendix K) was sent to the remaining non respondents. As a result of four mailed contacts over a period of approximately one month, 76 usable production agriculture instruments were returned for a 77.5 percent return. Eleven ornamental horticulture responses were completed, for a 91.8 percent return.

Treatment and Analysis of Data

Data gathered was interpreted, placed on Fortran coding forms and keypunched on computer cards for analysis. A small amount of computation was necessary prior to coding, as all occupational experience responses were converted to an hour equivalent for compatability in analysis.

Computer programming needs were minimized through use of a prepared program, the Statistical Program for the Social Sciences (64:1-584). The SPSS program proved very adequate, with all necessary processing components and flexibility needed to process the data. Descriptive statistics were computed for all variables, and specific statistical tests were run as required to satisfy the objectives of this study and test the hypotheses of the study. Analysis of the data was catagorized into three sections:

1. Profiles
2. Relationships
3. Differences

Profiles

This section simply involved computing and tabling the data for Objectives 1,2,3,5 and 7 of this study. Descriptive statistics provided by the FREQUENCIES technique of SPSS satisfied the needs of this section.

Relationships

Testing the seven hypotheses of this study involved determining the relationship between selected variables. The Pearson Product Moment technique and an extension of that technique, Multiple Regression, were used. The Pearson r technique was used to test hypotheses 1,3,4 and 7. This test involved use of the PEARSON CORR task definition from the SPSS program. The Multiple R technique was used to test hypotheses 2,5 and 6. This test involved use of the REGRESSION task definition from the SPSS program. An alpha level of .05 was used to determine the significance of results computed.

Differences

In order to satisfy all of the objectives of this study it was necessary to determine the differences in mean scores on some variables. The Oneway Analysis of Variance technique was thus used to determine differences in experience level factors in objective number 4, and recency of occupational experience factors in objective

number 6. This test involved use of the ONEWAY task definition of the SPSS program. Again the alpha level of .05 was used to determine the significance of computed results.

Summary

Nine primary variables were identified to analyze the implications of related occupational experience of Colorado vo-ag teachers. Vocational agriculture program areas with 10 or more functioning secondary programs were included in the study. Ninety-eight production agriculture, and 12 ornamental horticulture teachers made up the population. Sixty-six technical subject matter competencies were identified in production agriculture and ornamental horticulture to be used in a technical competence self evaluation instrument. A six page survey instrument was used to gather data, including demographic, attitude and technical competence sections. Validation of the instrument involved Larimer County Vocational Technical Center staff, CSU Vocational Education Department staff and EPDA graduate fellows. A 92 percent return was achieved on the ornamental horticulture survey instruments, with a 78 percent return on production agriculture. The Statistical Program for the Social Sciences (SPSS) was used to analyze the data. Pearson r, multiple regression and oneway analysis of variance techniques were used.

The results of computations and related findings are presented in Chapter IV.

CHAPTER IV

FINDINGS

Introduction

The purpose of this chapter is to present the statistical analysis and interpretation of the data gathered by this study. The concern regarding the occupational experience of Colorado vocational agriculture teachers and its relationship to technical agriculture competence provided the emphasis of this study. The data analyzed was gathered with a six page, 108 item survey instrument. The study was based upon seven major objectives and seven related hypotheses. The statistical treatments of Pearson product moment, multiple regression, and oneway analysis of variance were used to analyze the data gathered.

The use of multiple analysis techniques on some portions of the data posed certain problems in clear presentation of the findings. Thus the decision was made to present the findings according to the method of statistical analysis used, with all other considerations as sub-topics under those major headings. Accordingly the major headings for this chapter are:

- 1 - Profiles
- 2 - Differences
- 3 - Relationships

Profiles

This section was provided for the purpose of presenting useful background information and descriptive statistics designed to satisfy selected objectives of the study. The purpose was not to hypothesize or test, but to report information

Background Data on Respondents

A total of 87 respondents were involved in this study, 76 production agriculture teachers and 11 ornamental horticulture teachers. All respondents were male with the exception of one female ornamental horticulture teacher. The mean age of the production agriculture teachers was 31.1 years, while ornamental horticulture teachers averaged 36.8 years. Production agriculture teachers had a mean of 2.5 years of high school vocational agriculture training, while ornamental horticulture teachers averaged only 1.0 year of high school vocational agriculture training. Production agriculture teachers averaged 16.7 years of formal education (beginning grade 1), as compared to 16.1 years for ornamental horticulture teachers. The baccalaureate degree was the highest degree obtained by 68.4 percent (52) of the production agriculture teachers, while the 31.6 percent (24) reported having obtained the masters degree. Ornamental horticulture teachers reported degree attainment as follows: high school only 18.5 percent (2), associate degree 9.1 percent (1), baccalaureate degree 45.0 percent (5), and

masters degree 27.4 percent (3). Eighty-four percent (58) of the production agriculture teachers reported completing their last degree in Colorado, while 16.0 percent (11) reported completing their last degree out-of-state. Sixty percent (6) of the ornamental horticulture teachers reported completing their last degree in-state, while 40.0 percent reported completion out-of-state. Of those responding 80.3 percent (61) production agriculture teachers reported completing their undergraduate teacher education program at Colorado State University, while 19.7 percent (15) reported completion of the teacher training out-of-state. Of those ornamental horticulture teachers responding 42.9 percent (3) reported completion of undergraduate teacher training at CSU, while 57.1 percent (4) reported completing the work out-of-state. Production agriculture teachers reported an average 8.2 years of public school teaching, with ornamental horticulture teachers reporting 8.6 years. Production agriculture teachers reported an average 7.8 years teaching in production agriculture, while ornamental horticulture teachers reported a mean of 6.6 years of teaching horticulture.

Study Objectives Findings

In order to achieve Objectives 1, 2, 3, 5 and 7 of this study it was necessary to compute descriptive statistics of those variables involved. In this section each of the above objectives is stated followed by an introductory

discussion, tabled data findings and interpretations of those findings. Testing of related hypotheses follows in the "Relationships" section of this chapter.

Objective 1: To determine if Colorado vocational agriculture teachers believe they possess selected "high ability" technical agriculture competencies in production agriculture and ornamental horticulture.

In order to accomplish this objective a "Technical Competence - Self Evaluation" instrument was completed by each respondent. That instrument contained 66 competencies unique to production agriculture or ornamental horticulture, which were identified by the respective industries as indicative of high ability to perform in that occupational area.

Those competencies identified for production agriculture are presented in Table 2. A three word abbreviated statement follows each competency listed in the table. In later tables dealing with these same competencies only the abbreviated statement will be listed rather than the full competency statement. Those competencies identified for ornamental horticulture are presented in Table 3.

In order to determine the extent to which vo-ag teachers believe they possess the ability to perform selected technical agriculture competencies, frequency distributions were computed for all stated competencies. The frequency distributions for the production agriculture competencies are presented in Table 4.

TABLE 2
LIST OF
PRODUCTION AGRICULTURE COMPETENCIES
AND ABBREVIATIONS

Competency Number	Competency Statement	Abbreviated Statement
1.	Safely operate a tractor under various loads in both field and road conditions	Safely operate tractor
2.	Determine the nutrient requirements of various types of livestock found in the community	Livestock nutrient req.s
3.	Make decisions concerning use of fertilizers and soil amendments based upon results of soil and/or foliage tests	Soil amendments
4.	Plan a soil improvement program for a specific crop using various materials purchased from local sources	Soil improvement prog.
5.	Store various fuels so as to maintain purity and safety	Store fuels safely
6.	Prepare a budget for common farm enterprises	Prepare budgets
7.	Develop maintenance schedules for common farm equipment using service manual	Dev. maintenance schedules
8.	Plan a livestock improvement program for a type of livestock in the community; specify breed, schedules for breeding, sire-dam ratio, culling program indicating standards	Livestock improvement prog.
9.	Identify nutrient deficiency signs in crops	Crop nutrient deficiencies
10.	Properly use parliamentary procedure to participate in making a decision through use of motions and discussion	Parliamentary procedure
11.	Interpret market reports in newspaper and official reporting services	Market reports
12.	Select farm equipment on the basis of needs, price, and available service	Select farm equip.
13.	Analyze production records to determine if management practices were profitable	Analyze records
14.	Participate in civic affairs as an informed member of the community	Civic affairs
15.	Establish and maintain an accurate record system for: production records	Production records
16.	breeding records	Breeding records
17.	machinery maintenance records	Maintenance records
18.	tax records	Tax records
19.	Use a chart for determining gestation and heat periods for farm animals	Gestation periods
20.	Identify forms of credit and possible lending agencies available to the farmer	ID available credit
21.	Carry out a maintenance program on farm implements in a safe and workmanlike manner	Conduct Maintenance Prog.
22.	Recondition and return to proper working order common farm implements	Recondition equipment
23.	Calculate application rates of fertilizer for a specific crop	Application rates
24.	Select livestock, in accordance with breeding and marketing standards	Livestock selection
25.	Demonstrate the proper technique in using the oxy-acetylene equipment in cutting, brazing and mild steel welding	Oxy-acety weld
26.	Recognize and treat parasite infestations in livestock	Treat parasites
27.	Compute the cost of fertilizing a crop using various materials purchased from local sources	Compute fertilizer Costs
28.	Identify common noxious weeds in the community	ID Noxious weeds
29.	Properly reconcile a bank statement	Reconcile bank stmt.

TABLE 2 (continued)

Competency Number	Competency Statement	Abbreviated Statement
30.	Plan and conduct a winterizing program for farm equipment	Winterize equipment
31.	Compute and compare the interest rates charged by various merchants and lending institutions in the community	Compute interest rates
32.	Read labels and analyze fertilizers on the market	Analyze fertilizer labels
33.	Analyze management practices for possible improvements to increase profits	Analyze mgt. practices
34.	Determine when a soil is ready to till	Determine tillage needs
35.	Present and expand personal views logically and concisely to individuals or groups	Present personal views
36.	Design a program to promote good health and safety of farm animals	Animal health program
37.	Determine correct applications and safety measures for a weed control program	Weed control program
38.	Calibrate or adjust common farm implements	Calibrate equipment
39.	Apply the decision-making process, using established budgeting criteria to make management decisions	Mgt. decision making
	Perform common livestock practices such as	
40.	Castrating	Castrating
41.	dehorning	Dehorning
42.	hoof trimming	Hoof trimming
43.	giving injections	Injections
44.	treat for bloat	Treat bloat
45.	Compare the cost of various chemicals designed to accomplish like purposes	Compare chemical costs
46.	Compute the yield, value of product, and cost of production for crops and livestock enterprises	Compute production costs
47.	Apply fertilizer to a crop using acceptable methods, recommended rates, and at the proper time	Apply fertilizers
48.	Develop a crop rotation system	Develop crop rotation
49.	Demonstrate proper welding technique for different kinds of welds from various welding positions	Arc weld
	Analyze progeny records for such things as:	
50.	pounds of gain per pound of feed	Gain/lb. of feed
51.	average daily weight gain	Average daily gain
52.	carcass yield and quality	Carcass yield
53.	cost per pound of gain	Cost/lb. of gain
54.	Determine market grades of livestock and crops	Determine mkt. grades
55.	Select good quality livestock feedstuffs	Select feed stuffs
56.	Recognize common livestock diseases and health problems	Livestock diseases
57.	Analyze farm enterprises in terms of profit or loss	Determine profit, loss
58.	Irrigate and determine the frequency of irrigation for profitable crop production	Profitable irrigation
59.	Interpret the meaning of labels found on chemical and pesticide containers	Interpret chemical labels
60.	Determine land use and capability of typical soils in the community	Land use capability
61.	Safely and properly operate the following equipment in the field: tractor, tillage implement, seeding or fertilizing implement, and harvesting implement	Safely operate machinery
62.	Make intelligent management decisions when problems arise suddenly and unexpectedly	Pressure decisions
63.	Make proper use of current soil and water conservation practices	Soil, water conservation
64.	Determine how adverse weather conditions will effect production, and make necessary adjustments in the farming operation	Adjust to weather
65.	Determine the best time to plant, cultivate and harvest	Times-plant, till, harvest
66.	Use new varieties and farm chemicals for maximum crop production	New varieties

TABLE 3
LIST OF
ORNAMENTAL HORTICULTURE COMPETENCIES
AND ABBREVIATIONS

Competency Number	Competency Statement	Abbreviated Statement
1.	Retail diversified stock, (flowers, plants, ceramics), or (seed shrubs, lawn equipment).	Sell retail stock
2.	Identify and correct soil drainage problems	Correct soil drainage
3.	Read and properly interpret chemical and fertilizer labels	Interpret chemical labels
4.	Clean and sterilize greenhouse prior to use	Sterilize greenhouse
5.	Properly regulate greenhouse environment including: temperature	Regulate temperature
6.	light	Regulate light
7.	humidity	Regulate humidity
8.	Sterilize soil	Sterilize soil
9.	Sell plants and complete related business transactions	Business transactions
10.	Propagate plants from cuttings and layerage	Cuttings & layerage
11.	Properly calibrate such equipment as: sprayers	Calibrate sprayers
12.	fertilizer spreaders	Calibrate spreaders
13.	seeding equipment	Calibrate seeders
14.	Determine proper application rates for chemicals and fertilizers	Application rates
15.	Apply spray, smoke, and fog to control plant pests	Apply pest controls
16.	Prepare soil mixtures	Prepare soil mix
17.	Estimate cost of landscape job	Estimate jobs
18.	Fertilize plants based on need as determined by soil and/or foliage test	Fertilize by need
19.	Identify and install landscape complements according to a landscape plan; aggregate, river rock, large rocks, gravel, etc.	Install landscape
20.	Develop a plot plan for landscaping	Develop plot plan
21.	Identify common plant materials flowers	ID common flowers
22.	shrubs	ID common shrubs
23.	trees	ID common trees
24.	Identify and properly install plants according to a landscape plan	Install plants
25.	Prune fruit trees for production	Prune fruit trees
26.	Maintain parent stock	Maintain parent stock
27.	Properly prepare a budget for horticulture enterprises	Prepare budgets
28.	Start plants from seeds, bulbs and tubers	Seeds, bulbs, tubers
29.	Shape trees and shrubs for growth and beauty	Shape shrubs
30.	Recognize problems arising from insects, rodents, and diseases	Recognize pest problems
31.	Establish and properly maintain such business records as: production records	Production records
32.	inventory records	Inventory records
33.	sales records	Sales records
34.	equipment maintenance records	Maintenance records
35.	tax records	Tax records
36.	Determine and properly apply control measures for insects, rodents, and diseases	Control plant pests
37.	Level and grade land with motorized equipment and by hand	Level, grade site
38.	Determine moisture needs of plants	Determine moisture needs

TABLE 3 (continued)

Competency Number	Competency Statement	Abbreviated Statement
	Safely operate and conduct routine maintenance on such equipment as:	
39.	small tractor	Operate/maintain tractor
40.	rototiller	Operate/maintain roto-tiller
41.	loader	Operate/maintain loader
42.	soil shredder	Operate/maintain shredder
43.	spray equipment	Operate/maintain sprayers
44.	light duty trucks	Operate/maintain trucks
45.	Identify common plant pests (weeds)	ID common weeds
46.	Operate and maintain a shade house (lathe)	Operate shade house
47.	Identify and select plants for production, based upon market demand	Select production plants
48.	Determine drift hazard for spraying	Determine drift hazard
49.	Produce and wholesale horticultural plant materials	Wholesale stock
50.	Take soil samples and interpret soil test results	Interpret soil tests
51.	Select plant materials for a specific purpose	Select plants to purpose
52.	Plan, and construct plant growing structures including: plumbing, electrical, carpentry and concrete	Plan, construct structures
53.	Regulate plant growth through use of chemicals	Regulate plant growth
54.	Develop detailed landscape design plans	Design landscapes
55.	Prepare seedbeds	Prepare seedbeds
56.	Give correct advice on plant care	Advise for plant care
57.	Investigate available sources of credit and make credit arrangements	Make credit arrangements
58.	Make routine plumbing and electrical repairs	Plumbing/electrical repairs
59.	Read and properly interpret schematic drawings and blueprints	Interpret drawings
60.	Knowledge of plant materials in relation to plant height color of blossom and foliage, where the plant grows best	Know plant materials
61.	Can determine and incorporate methods of reducing overhead costs in operation of the business	Reduce overhead costs
62.	Knowledgeable in the proper application of COSHA and OSHA (Occupational Safety and Health Act) regulations which apply to the horticulture industry	Apply OSHA rules
	Have the ability to deal expertly with consumers of horticultural products on wholesale and retail levels	
63.	positive attitude toward the consumer	Deal with consumers
64.	good product knowledge	Good product knowledge
65.	good knowledge of purchase habits	Know purchase habits
66.	able to establish rapport with customer	Customer rapport

TABLE 4
FREQUENCY DISTRIBUTION OF RESPONSES
TO ABILITY TO PERFORM PRODUCTION
AGRICULTURE COMPETENCIES

Competence Number	Competency Statement	Performance Level*					Mean Score	Standard Deviation
		Low 1	Average 2	3	4	High 5		
1	Safely operate tractor	1	2	21	17	35	4.09	.98
2	Livestock nutrient req.s	-	-	16	40	20	4.05	.69
3	Soil amendments	-	11	46	12	6	3.13	.85
4	Soil improvement prog.	-	8	51	14	3	3.16	.65
5	Store fuels safely	1	3	23	27	22	3.87	.93
6	Prepare budgets	-	3	20	37	1	3.88	.82
7	Dev. maintenance schedules	1	3	24	29	19	3.82	.91
8	Livestock improvement prog.	-	2	22	27	24	4.00	.88
9	Crop nutrient deficiencies	2	18	31	20	4	3.04	.97
10	Parliamentary procedure	-	1	18	21	36	4.21	.85
11	Market reports	1	4	26	34	11	3.66	.84
12	Select farm equip.	1	3	31	28	13	3.65	.86
13	Analyze records	1	3	24	37	11	3.71	.81
14	Civic affairs	1	5	23	35	11	3.70	.86
15	Production records	-	1	25	31	18	3.83	.90
16	Breeding records	-	4	24	29	18	3.76	.96
17	Maintenance records	1	2	30	34	8	3.57	.87
18	Tax records	-	9	31	24	10	3.46	.99
19	Gestation periods	-	1	9	25	41	4.40	.75
20	ID available credit	-	1	27	29	18	3.88	.83
21	Conduct maintenance prog.	1	1	27	27	20	3.84	.88
22	Recondition equipment	1	1	22	32	20	3.91	.85
23	Application rates	1	12	35	19	9	3.30	.92
24	Livestock selection	-	4	22	24	25	3.96	.94
25	Oxy-acety weld	-	1	10	32	33	4.28	.74
26	Treat parasites	1	2	29	30	13	3.65	.93
27	Compute fertilizer costs	-	12	31	24	8	3.33	.96
28	ID noxious weeds	2	9	32	23	9	3.33	1.01
29	Reconcile bank stmt.	1	6	25	35	9	3.59	.85
30	Winterize equipment	1	2	27	32	14	3.74	.84
31	Compute interest rates	1	5	34	26	10	3.51	.86
32	Analyze fertilizer labels	-	5	35	25	11	3.55	.82
33	Analyze mgt. practices	1	2	32	35	5	3.50	.83
34	Determine tillage needs	1	6	28	28	13	3.60	.91
35	Present personal views	-	2	32	27	14	3.74	.84
36	Animal health program	-	3	25	34	13	3.80	.82
37	Weed control program	3	7	44	15	7	3.21	.88
38	Calibrate equipment	1	12	28	24	11	3.42	.97
39	Mgt. decision making	-	4	33	31	7	3.58	.79
40	Castrating	1	1	18	21	34	4.09	1.04
41	Dehorning	1	2	20	24	28	3.96	1.04
42	Hoof trimming	2	8	23	18	24	3.67	1.18
43	Injections	1	1	19	28	26	3.97	.99
44	Treat bloat	2	9	23	24	17	3.55	1.12
45	Compare chemical costs	1	9	39	22	5	3.28	.81
46	Compute production costs	1	2	24	39	10	3.72	.78

TABLE 4 (continued)

Competence Number	Competency Statement	Performance Level*					Mean Score	Standard Deviation
		Low 1	Average 2	Average 3	Average 4	High 5		
47	Apply fertilizers	-	12	42	18	4	3.18	.76
48	Develop crop rotation	1	3	30	30	12	3.65	.84
49	Arc weld	-	1	13	35	26	4.09	.88
50	Gain/lb. of feed	-	-	21	32	22	4.04	.79
51	Average daily gain	-	-	21	33	21	4.03	.78
52	Carcass yield	1	6	27	24	17	3.70	.99
53	Cost/lb. of gain	-	-	21	34	20	4.01	.77
54	Determine mkt. grades	1	10	26	28	11	3.50	.95
55	Select feed stuffs	-	-	30	30	16	3.82	.76
56	Livestock diseases	-	5	33	31	7	3.53	.76
57	Determine profit, loss	-	2	27	38	8	3.65	.81
58	Profitable irrigation	1	11	33	17	13	3.45	1.06
59	Interpret chemical labels	2	5	37	25	7	3.40	.85
60	Land use capability	1	3	29	30	13	3.67	.86
61	Safely operate machinery	1	6	23	27	19	3.75	.97
62	Pressure decisions	1	-	35	32	8	3.61	.73
63	Soil, water conservation	1	1	34	32	7	3.53	.84
64	Adjust to weather	1	7	37	25	6	3.37	.81
65	Times-plant, till, harvest	1	3	35	31	6	3.50	.76
66	New varieties	1	8	37	24	5	3.28	.89
Response Total		47	295	1830	1851	972	3.56	

*Performance Levels

- 1 - Cannot Perform - Unable to perform this skill.
- 2 - Low Level - Can perform, but only at a moderate level.
- 3 - Average Level - Can perform at an average level.
- 4 - Above Average Level - Can perform at a better than average level.
- 5 - High Level - Highly competent in performing this skill.

The findings in Table 4 indicate that production agriculture teachers believe they can perform the selected technical agriculture competencies at only a slightly above average level (grand mean 3.56). Interpretation of the findings indicate that strongest competence (Mean Score 4.00 and above) was evident in the animal science and agricultural mechanics skill areas. Ability to perform animal related competencies dealing with livestock nutrition, breeding and improvement and livestock practices were evident. Agricultural mechanics competence appeared strongest in the skill areas of welding practices and agricultural equipment operation. Though no mean scores indicated "low level" ability to perform production agriculture competencies, some areas of lesser strength were evident. The skill areas of crop and soil sciences reflected the lowest level of competence (mean score 3.30 and lower). Ability to perform soil related competencies dealing with soil improvement programs, soil amendments, and fertilizer usage, showed some weakness. Crops related skills dealing with new varieties, nutrient deficiency symptoms, and identification and control of weeds also reflected lower ability to perform.

The apparent differences in ability to perform the technical agriculture competencies could have been caused by any of a variety of factors. One such factor may have been the quality or quantity of the technical block of the teacher education program. Possibly those training elements in animal science and agricultural mechanics were

stronger than those in crops or soils. Another major possibility is that the occupational experience of Colorado vo-ag teachers has developed better performance ability in the animal science and agricultural mechanics skill areas than in the crops and soils areas.

A frequency distribution for the ability to perform selected ornamental horticulture competencies is presented in Table 5.

The findings in Table 5 indicate that ornamental horticulture teachers have evaluated their ability to perform the selected horticulture competencies at an above average level (grand mean 3.66). Though the sample was much smaller than that for production agriculture, more extreme scores both high and low were evident. The overall performance score proved slightly higher for ornamental horticulture, with a 3.66 grand mean as compared to a 3.56 grand mean for production agriculture.

Interpretation of the findings indicate that strongest competence (mean score 4.00 and above) was evident in the propagation and customer relations skill areas. Ability to perform soil and moisture control skills, start plants from seed, cuttings, bulbs and tubers and select plant materials to specific purpose, all indicated strength in propagation skills. Ability to perform retail sales transactions, maintain positive customer attitude and establish customer rapport reflected strength in customer related skills.

TABLE 5
FREQUENCY DISTRIBUTION OF RESPONSES
TO ABILITY TO PERFORM ORNAMENTAL
HORTICULTURE COMPETENCIES

Competence Number	Competency Statement	Performance Level*					Mean Score	Standard Deviation
		Low 1	Average 2 3 4			High 5		
1	Sell retail stock	1	-	3	5	2	3.64	1.12
2	Correct soil drainage	1	1	3	4	2	3.46	1.21
3	Interpret chemical labels	-	1	1	5	4	4.09	.94
4	Sterilize greenhouse	-	2	2	5	2	3.64	1.03
5	Regulate temperature	-	-	3	4	4	4.09	.83
6	Regulate light	1	-	2	4	4	3.91	1.22
7	Regulate humidity	1	-	3	3	4	3.82	1.25
8	Sterilize soil	1	-	3	4	3	3.73	1.19
9	Business transactions	-	1	1	6	3	4.00	.89
10	Cuttings & layerage	-	1	-	4	5	3.91	1.58
11	Calibrate sprayers	-	1	3	5	2	3.73	.91
12	Calibrate spreaders	-	1	3	6	1	3.64	.81
13	Calibrate seeders	-	1	4	5	1	3.55	.82
14	Application rates	1	-	3	5	2	3.64	1.12
15	Apply pest controls	1	-	2	7	2	3.82	1.08
16	Prepare soil mix	-	-	3	4	4	4.09	.83
17	Estimate jobs	1	3	3	2	2	3.09	1.30
18	Fertilize by need	-	-	6	4	1	3.55	.69
19	Install landscape	1	1	3	4	2	3.46	1.21
20	Develop plot plan	1	2	2	4	2	3.36	1.29
21	ID common flowers	-	1	4	2	3	3.36	1.50
22	ID common shrubs	-	2	3	3	3	3.64	1.12
23	ID common trees	-	2	3	3	3	3.64	1.12
24	Install plants	1	1	2	5	2	3.55	1.21
25	Prune fruit trees	1	2	4	3	1	3.09	1.37
26	Maintain parent stock	1	-	5	4	1	3.64	1.03
27	Prepare budgets	-	1	6	2	2	3.46	.93
28	Seeds, bulbs, tubers	-	-	-	7	4	4.36	.51
29	Shape shrubs	1	-	3	5	2	3.64	1.12
30	Recognize pest problems	-	1	1	5	3	3.65	1.50
31	Production records	-	1	6	2	2	3.46	.93
32	Inventory records	-	2	5	2	1	2.91	1.30
33	Sales records	-	2	5	2	1	2.91	1.30
34	Maintenance records	-	1	6	2	1	3.00	1.27
35	Tax records	1	1	5	2	1	2.82	1.40
36	Control plant pests	-	1	3	4	3	3.82	.98
37	Level, grade site	1	1	2	4	3	3.64	1.29
38	Determine moisture needs	-	-	1	6	4	4.27	.64
39	Operate/maintain tractor	1	1	2	2	5	3.82	1.40
40	Operate/maintain rototiller	-	2	2	2	5	3.91	1.22
41	Operate/maintain loader	1	1	3	2	4	3.64	1.36
42	Operate/maintain shredder	1	1	3	1	5	3.73	1.42
43	Operate/maintain sprayers	1	1	2	1	6	3.91	1.46
44	Operate/maintain trucks	-	2	2	2	5	3.91	1.22
45	ID common weeds	-	1	2	6	2	3.82	.87

TABLE 5 (continued)

Competence Number	Competency Statement	Performance Level*					Mean Score	Standard Deviation
		Low 1	Average 2	Average 3	Average 4	High 5		
46	Operate shade house	1	1	2	3	3	3.27	1.68
47	Select production plants	-	1	5	3	2	3.55	.93
48	Determine drift hazard	1	2	1	4	3	3.55	1.37
49	Wholesale stock	1	1	3	3	3	3.55	1.29
50	Interpret soil tests	-	-	4	5	2	3.82	.75
51	Select plants to purpose	-	-	2	7	2	4.00	.63
52	Plan, construct structures	1	2	3	3	2	3.27	1.27
53	Regulate plant growth	1	3	4	1	2	3.00	1.27
54	Design landscapes	2	2	1	5	1	3.09	1.38
55	Prepare seedbeds	-	-	2	3	6	4.36	.81
56	Advise for plant care	-	1	2	5	3	3.91	.94
57	Make credit arrangements	2	1	3	4	1	3.09	1.30
58	Plumbing/electrical repairs	1	2	3	3	2	3.27	1.27
59	Interpret drawings	1	2	3	2	3	3.36	1.36
60	Know plant materials	-	2	1	4	4	3.91	1.14
61	Reduce overhead costs	1	3	2	2	3	3.27	1.42
62	Apply OSHA rules	1	3	3	4	-	2.91	1.04
63	Deal with consumers	-	-	2	6	3	4.09	.70
64	Good product knowledge	-	1	2	5	3	3.91	.94
65	Know purchase habits	-	1	4	3	3	3.73	1.01
66	Customer rapport	-	-	1	5	5	4.36	.67
Response Total		33	73	185	249	182	3.66	

*Performance Levels

- 1 - Cannot Perform - Unable to perform this skill
- 2 - Low Level - Can perform, but only at a moderate level
- 3 - Average Level - Can perform, at an average level
- 4 - Above Average Level - Can perform at a better than average level
- 5 - High Level - Highly competent in performing this skill

The skill areas involving records management and landscape design reflected least strength (3.10 and below) in ability to perform. Skills involving establishment and maintenance of inventory, sales and tax records were among those with the lowest mean scores. Ability to develop detailed landscape design plans likewise had low performance scores. Ability to incorporate Occupational Safety and Health Act (OSHA and OSHA) regulations also had a noticeably low score. As with production agriculture, indicated strengths and weaknesses may be caused by a variety of factors including the quality and quantity of teacher training programs and occupational experiences.

Overall ability of production agriculture and ornamental teachers to perform technical competencies can be affected by in-service education and structured industry internships as indicated by Williams (92:157) and Colvin (22:266-7). Implications for content of such activities are evident within the findings of Objective 1.

Overall technical competence scores were computed for all respondents by summing the responses to "Ability to perform" across all competencies. Scores ranged from 188 to 328 for production teachers and 128 to 305 for horticulture teachers. The range of possible technical competence scores was 66 to 330. Production teachers indicated overall technical competence at 73.5 percent of maximum, with horticulture teachers indicating 72.3 percent

of maximum. Table 6 provides a frequency distribution of the technical competence scores.

TABLE 6
FREQUENCY DISTRIBUTION OF TECHNICAL
COMPETENCE SCORES FOR PRODUCTION AGRICULTURE
AND ORNAMENTAL HORTICULTURE TEACHERS

Technical* Competence Scores	Frequency Distribution		Mean Score		Standard Deviation	
	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>
125-174	-	1	242.66	238.73	32.55	50.29
175-200	10	-				
201-225	14	4				
226-250	28	1				
251-275	20	3				
276-300	11	-				
301-328	3	2				
Total	76	11				

*Technical Competence Score range was 66 to 330.

Objective 2: To determine from what source(s) Colorado vocational agriculture teachers gained selected "high ability" technical agriculture competencies in production agriculture and ornamental horticulture.

Production agriculture and ornamental horticulture teachers were asked to indicate the single primary source from which they gained each competency listed in the "Technical Competence - Self Evaluation" instrument.

Production agriculture teachers were provided a seven category experience source selection, ornamental horticulture teachers a six source selection. Table 7 provides a frequency distribution of the technical competence sources for production agriculture.

Production agriculture teachers indicated two primary sources of occupational experience to account for their technical competence. On-farm experience prior to teaching was that source indicated as most important with 32.8 percent of the responses (1583) falling in that category. Following on-farm experience, was a very close second in the experience source "vo-ag teaching experience". Responses totaled 1549 for 32.2 percent of all responses registered. Third, as an indicated source of technical competence, was "preservice teacher preparation", tallying 16.7 percent of the total responses. The remaining four experience sources each obtained a rather small percentage of the responses: "Inservice teacher education" 6.4 percent, "Other occupational experience" 4.6 percent, "Part-time farming while teaching" 4.0 percent and "Ag-related off-farm experience" 3.3 percent.

Twelve of the 66 production agriculture skills had 40 or more responses registered with a single experience source. That source was "On-farm experience prior to teaching". Four of those competencies were agricultural mechanics related, 5 animal science related, and 3 crops and soils related. The only other experience source registering

TABLE 7
 FREQUENCY DISTRIBUTION OF SOURCES
 OF OCCUPATIONAL EXPERIENCE FOR
 PRODUCTION AGRICULTURE COMPETENCIES

Competency Number	Competency Statement	1	2	Experience Source*				7	Total Responses
				3	4	5	6		
1	Safely operate tractor	66	2	1	-	-	3	1	73
2	Livestock nutrient req.s	5	2	2	40	5	15	2	71
3	Soil amendments	5	3	2	30	5	29	-	74
4	Soil improvement prog.	10	4	4	23	7	26	-	74
5	Store fuels safely	41	6	2	6	2	10	6	73
6	Prepare budgets	10	3	3	21	7	30	-	74
7	Dev. maintenance schedules	30	3	2	11	5	20	3	74
8	Livestock improvement prog.	12	2	4	16	4	31	3	72
9	Crop nutrient deficiencies	10	2	2	24	11	22	-	71
10	Parliamentary procedure	1	1	-	16	3	50	3	74
11	Market reports	22	5	1	6	4	29	7	74
12	Select farm equip.	34	3	7	4	4	21	-	73
13	Analyze records	10	4	4	11	7	33	4	73
14	Civic affairs	3	3	-	2	1	38	27	74
15	Production records	16	3	5	14	4	28	4	74
16	Breeding records	26	4	3	9	7	22	3	74
17	Maintenance records	21	2	4	9	6	27	4	73
18	Tax records	16	1	6	7	7	25	11	73
19	Gestation periods	33	4	3	10	3	18	3	74
20	ID available credit	14	3	3	6	7	35	6	74
21	Conduct maintenance prog.	38	2	4	5	2	21	2	74
22	Recondition equipment	49	-	2	4	3	14	2	74
23	Application rates	12	3	2	20	7	28	2	74
24	Livestock selection	19	1	3	20	3	27	1	74
25	Oxy-acety weld	6	3	-	19	7	35	2	72
26	Treat parasites	37	3	4	9	2	18	-	73
27	Compute fertilizer costs	11	2	5	11	3	36	5	73
28	ID noxious weeds	9	4	1	12	4	41	2	73
29	Reconcile bank stmt.	25	3	5	8	1	12	20	74
30	Winterize equipment	38	2	2	3	4	23	2	74
31	Compute interest rates	10	5	3	13	3	23	16	73
32	Analyze fertilizer labels	13	3	2	16	4	30	3	71
33	Analyze mgt. practices	19	4	4	14	5	28	-	74
34	Determine tillage needs	53	2	3	3	3	9	1	74
35	Present personal views	3	2	1	13	5	38	11	73
36	Animal health program	21	2	3	16	4	25	3	74
37	Weed control program	17	2	2	17	8	24	2	72
38	Calibrate equipment	41	1	5	3	5	16	3	74
39	Mgt. decision making	14	3	4	15	7	26	3	72
40	Castrating	49	1	3	6	2	11	-	72
41	Dehorning	56	2	2	2	1	8	-	71
42	Hoof trimming	44	2	2	4	1	16	2	71
43	Injections	50	2	4	3	1	8	3	71
44	Treat bloat	50	2	3	3	2	10	1	71
45	Compare chemical costs	13	4	2	10	8	31	5	73
46	Compute production costs	19	1	3	12	6	30	2	73

TABLE 7 (continued)

Competency Number	Competency Statement	Experience Source*							Total Responses
		1	2	3	4	5	6	7	
47	Apply fertilizers	23	3	3	13	4	23	4	73
48	Develop crop rotation	21	2	2	21	6	20	1	73
49	Arc weld	4	2	-	23	9	35	1	72
50	Gain/lb. of feed	12	2	2	21	6	28	2	73
51	Average daily gain	14	2	2	20	4	30	1	73
52	Carcass yield	8	1	1	25	6	27	4	72
53	Cost/lb. of gain	13	2	1	22	5	29	1	73
54	Determine mkt. grades	13	3	-	23	8	24	2	73
55	Select feed stuffs	34	2	3	14	5	15	1	74
56	Livestock diseases	30	3	2	15	3	20	-	73
57	Determine profit, loss	21	2	6	13	6	24	1	73
58	Profitable irrigation	39	2	2	7	3	16	2	71
59	Interpret chemical labels	15	3	1	13	13	25	2	72
60	Land use capability	4	3	4	21	10	32	-	74
61	Safely operate machinery	61	2	3	-	1	5	1	73
62	Pressure decisions	32	2	7	2	3	18	8	72
63	Soil, water conservation	20	1	5	9	8	27	1	71
64	Adjust to weather	41	2	6	4	1	16	3	73
65	Times-plant, till, harvest	52	1	4	2	1	11	2	73
66	New varieties	25	2	5	11	3	24	2	72
Totals		1583	162	192	802	306	1549	219	4813

*Experience Sources:

- 1 - On-Farm Experience -- Gained this skill primarily from farm or ranch experience prior to teaching
- 2 - Ag-Related, Off-Farm Experience -- Gained this skill primarily from experience in ag-related business prior to teaching
- 3 - Part-Time Farming While Teaching -- Gained this skill primarily from part-time farming while teaching
- 4 - Preservice Teacher Preparation -- Gained this skill primarily through my teacher preparation program, prior to teaching.
- 5 - Inservice Teacher Preparation -- Gained this skill primarily through workshops, short courses, etc., since I began teaching.
- 6 - Voc Ag Teaching Experience -- Gained this skill primarily through teaching vocational agriculture
- 7 - Other -- Gained this skill primarily from sources other than those listed above

40 or more responses on a single skill was "Vo-ag teaching experience". In this case the skill dealt with identification of noxious weeds.

Several reasons are possible why production agriculture teachers are gaining nearly one-third of their technical competence after entering the teaching profession. One possible reason is that the need becomes paramount, thus skills are finally learned to the "performance" level. Another possible reason is that technical coursework in the teacher preparation program may not be taken to the "doing" or "performance" level. Yet another reason might be that the occupational experience lacks breadth thus leaving the beginning teacher technically incompetent in some skill areas.

Sources through which technical competence was gained by ornamental horticultural teachers are presented in Table 8. Findings related to sources of ornamental horticulture competency performance showed much similarity to those of production agriculture. Again, two sources of occupational experience covered more than 60 percent of the responses. "Industry experience in horticulture prior to teaching" was indicated as the most important source with 36.8 percent of the responses (22). Second in indicated importance as a source of technical competence was "Horticulture teaching experience" with 26.5 percent of the responses (184). "Preservice teacher preparation" received 122 responses for 17.8 percent of the total. The three

TABLE 8
FREQUENCY DISTRIBUTION OF SOURCES
OF OCCUPATIONAL EXPERIENCE FOR
ORNAMENTAL HORTICULTURE COMPETENCIES

Competency Number	Competency Statement	Experience Source*						Total Responses
		1	2	3	4	5	6	
1	Sell retail stock	4	1	-	-	4	1	10
2	Correct soil drainage	5	-	1	-	3	1	10
3	Interpret chemical labels	2	1	4	-	3	1	11
4	Sterilize greenhouse	3	1	2	-	3	-	9
5	Regulate temperature	3	1	4	-	3	-	11
6	Regulate light	3	-	4	-	3	-	10
7	Regulate humidity	3	-	4	-	3	-	10
8	Sterilize soil	3	-	4	-	3	-	10
9	Business transactions	4	2	-	-	5	-	11
10	Cuttings & layerage	3	1	3	-	3	1	11
11	Calibrate sprayers	6	1	1	-	1	2	11
12	Calibrate spreaders	6	1	1	-	1	2	11
13	Calibrate seeders	5	1	1	-	1	3	11
14	Application rates	4	-	3	-	-	3	10
15	Apply pest controls	4	1	2	-	3	-	10
16	Prepare soil mix	3	1	3	-	4	-	11
17	Estimate jobs	6	1	-	-	3	-	10
18	Fertilize by need	3	2	4	-	2	-	11
19	Install landscape	5	2	-	-	3	-	10
20	Develop plot plan	4	1	1	-	4	-	10
21	ID common flowers	1	1	4	-	3	1	10
22	ID common shrubs	2	1	4	-	4	-	11
23	ID common trees	2	1	4	-	4	-	11
24	Install plants	5	2	-	-	3	-	10
25	Prune fruit trees	1	3	4	-	1	1	10
26	Maintain parent stock	5	-	3	-	2	-	10
27	Prepare budgets	3	2	1	-	5	-	11
28	Seeds, bulbs, tubers	4	1	3	-	2	1	11
29	Shape shrubs	5	1	2	-	1	1	10
30	Recognize pest problems	3	2	4	-	2	-	11
31	Production records	3	1	2	-	4	1	11
32	Inventory records	4	1	2	-	2	1	10
33	Sales records	3	1	1	-	4	1	10
34	Maintenance records	2	1	1	-	5	1	10
35	Tax records	2	1	2	-	3	1	9
36	Control plant pests	4	1	3	-	3	-	11
37	Level, grade site	6	1	-	-	1	1	10
38	Determine moisture needs	3	1	3	-	3	1	11
39	Operate/maintain tractor	6	-	-	-	2	2	10
40	Operate/maintain rototiller	7	1	-	-	1	2	11
41	Operate/maintain loader	6	-	-	-	2	2	10
42	Operate/maintain shredder	6	-	-	-	2	2	10
43	Operate/maintain sprayers	5	-	1	-	2	2	10
44	Operate/maintain trucks	6	1	1	-	1	2	11
45	ID common weeds	3	1	5	-	1	1	11
46	Operate shade house	5	1	1	-	2	-	9

TABLE 8 (continued)

Competency Number	Competency Statement	Experience Source*						Total Responses
		1	2	3	4	5	6	
47	Select production plants	4	2	1	-	4	-	11
48	Determine drift hazard	3	1	4	-	1	1	10
49	Wholesale stock	4	2	1	-	3	-	10
50	Interpret soil tests	3	2	3	-	2	1	11
51	Select plants to purpose	5	1	2	-	3	-	11
52	Plan, construct structures	4	-	1	-	3	2	10
53	Regulate plant growth	3	-	3	1	3	2	10
54	Design landscapes	4	-	1	-	4	-	9
55	Prepare seedbeds	6	1	1	-	2	1	11
56	Advise for plant care	4	2	1	-	4	-	11
57	Make credit arrangements	3	-	2	1	2	1	19
58	Plumbing/electrical repairs	4	1	1	-	2	2	10
59	Interpret drawings	3	-	1	1	2	3	10
60	Know plant materials	3	1	3	1	3	-	11
61	Reduce overhead costs	5	-	-	-	5	-	10
62	Apply OSHA rules	-	1	4	2	3	1	11
63	Deal with consumers	4	2	-	-	4	1	11
64	Good product knowledge	3	2	1	-	5	-	11
65	Know purchase habits	3	3	-	-	4	1	11
66	Customer rapport	3	2	1	-	3	2	11
Response Totals		252	67	122	6	134	54	685

*Experience Sources:

- 1 - Industry Experience in Horticulture - Gained this skill primarily through working in the horticulture industry, prior to teaching
- 2 - Part-Time Experience - Gained this skill primarily through part-time work in the horticulture industry, while teaching
- 3 - Preservice Teacher Preparation - Gained this skill primarily through my teacher preparation
- 4 - Inservice Teacher Preparation - Gained this skill primarily through workshops, short courses, etc., since I began teaching
- 5 - Horticulture Teaching Experience - Gained this skill primarily through teaching vocational horticulture
- 6 - Other - Gained this skill primarily from sources other than those listed above

remaining sources obtained the following percentages:

"Part-time horticulture experience while teaching" achieved 9.8 percent of the responses (67), "Other sources of occupational experience" 7.9 percent (54), and "Inservice teacher preparation" 1.2 percent (6).

Only one experience source received 60 percent or more of the responses on any one competency. "Industry experience in horticulture prior to teaching" received 6 or more of the average number of responses (10) on 10 competencies. Those competencies dealt with calibration and operation of horticultural equipment and estimating the cost of jobs.

The apparent lack of responses directed to the experience source "Inservice teacher preparation" was a noticeable response void. This writer wondered if the absence was caused by the absence of inservice education in horticulture, or training in competencies other than those used in the "Technical Competence - Self Evaluation", in the inservice activities provided.

Objective 3: To determine if teachers of vocational agriculture in Colorado believe that occupational experience, in agriculture, is necessary for program success.

Vo-ag teachers were asked to respond to the question "In your opinion, how important is the instructors' related occupational experience to vocational program success?"

"Program success" was defined as "the effectiveness of the

program based upon the percentage of program graduates which are placed in agricultural occupations, or who pursue further training (at sub-BS level) for an agricultural occupation." Table 9 provides a frequency distribution of the responses to the above question.

TABLE 9

FREQUENCY DISTRIBUTION OF RESPONSES
TO OPINION OF IMPORTANCE OF OCCUPATIONAL
EXPERIENCE TO PROGRAM SUCCESS

Response Scale	Response Frequency		Mean Score		Standard Deviation		
	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	
Not important-	1	-	-	8.74	8.82	2.36	.98
	2	-	-				
	3	1	-				
	4	-	-				
	5	5	-				
	6	2	-				
	7	5	1				
	8	12	3				
	9	13	4				
Very important-	10	35	3				
Response Total		73	11				

It is obvious by the findings presented in Table 9 that Colorado vo-ag teachers feel that occupational experience of the instructor is quite important to success of their programs. Eck (27:30-2) and Lockwood (51:47-9) presented findings which indicated very much the same attitude among vocational teachers in other states.

Objective 4 is presented in the "Differences" section of this chapter.

Objective 5: To determine if teachers of vocational agriculture in Colorado believe that recent occupational experience, in agriculture, is necessary to maintain competence in technical agriculture.

Two opinion questions were asked of the vo-ag teachers in order to gather data appropriate to the above objective. The first question asked, "In your opinion, how important is recent occupational experience in maintaining subject matter competence in your vocational service area?" Table 10 presents a frequency distribution of the responses to that question.

Findings in Table 10 indicate a recency opinion (Mean Score 7.58) well above the mean possible response of 5.0, among production agriculture teachers. Ornamental horticulture teachers indicated an opinion of necessity of recent experience in maintenance of technical competence somewhat lower than production agriculture teachers (Mean Score 6.46).

It was interesting to note that both production agriculture and ornamental horticulture teachers considered occupational experience to program success appreciably more important than recent occupational experience to maintenance of technical competence. In written comments concerning occupational experience (Appendix F and G)

TABLE 10

FREQUENCY DISTRIBUTION OF RESPONSES TO
OPINION OF IMPORTANCE OF RECENT OCCUPATIONAL
EXPERIENCE TO TECHNICAL COMPETENCE

Response Scale	Response Frequency		Mean Score		Standard Deviation	
	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>
Not important-	1	-	7.58	6.46	2.48	2.42
	2	-				
	3	2				
	4	-				
	5	2				
	6	2				
	7	1				
	8	2				
	9	-				
Very important-	10	2				
Response Total	74	11				

respondents may have provided justification to this position. Respondents noted the necessity to gain experience prior to teaching in order to be able to better teach to industry needs. Many comments related to recent occupational experience, claimed it unnecessary as technical competence was said to be maintained through work with young and adult farmer programs, SOEP supervision, advisory committee contact and technical journal readings. Jaska (44:52) indicated similar findings in 1974.

The second question asked reflective of recent occupational experience stated, "In your opinion, how often should a vocational instructor return to industry

for update of related occupational experience?" Table 11 provides descriptive and frequency statistics to that question.

TABLE 11
FREQUENCY DISTRIBUTION OF RESPONSES TO
OPINION OF HOW OFTEN (YEARS) TO UPDATE
OCCUPATIONAL EXPERIENCE

Number of Years	Response Frequency		Mean Score		Standard Deviation	
	Prod. Ag.	Orn. Hort.	Prod. Ag.	Orn. Hort.	Prod. Ag.	Orn. Hort.
0	21	-	4.11	4.10	2.92	2.42
1	4	1				
2	10	1				
3	8	2				
4	7	-				
5	22	5				
6	1	-				
7	2	1				
20	1	-				
Response Total	76	10				

Little variance was noted between the opinions of production agriculture (4.11 years) and ornamental horticulture (4.10 years) teachers as to periods between industry update experiences (zero responses were not considered). Again written respondent comments (Appendix F and G) provide general inference to this concern. Teachers indicated considerable concern at the prospect of returning to full-time industry experience when active 11-month vo-ag programs are required for state vocational program reimbursement. Indeed,

some incompatibility seems evident between full-time summer programs and summer, industry update experience.

Objective 6 is presented in the "Differences" section of this chapter.

Objective 7: To determine the attitude of Colorado vocational agriculture teachers toward the value of occupational experience.

The teachers were asked to respond to a 22 item attitude evaluation scale designed to gather data for the above objective. Table 12 displays a frequency distribution and summary statistics for response by both production agriculture and ornamental horticulture teachers. Readers are encouraged to refer to Appendix D or E for complete statement of the attitude scale items.

For purposes of this study it was determined that attitude scale item responses with a mean score of 2.0 or below would be considered "strongly disagree" responses, while items with response mean scores of 4.0 or above would be considered "strongly agree" responses. Production agriculture teachers produced only one item response in each category, while ornamental horticulture teachers produced three "strongly agree" responses and no "strongly disagree" responses. Production teachers strongly agreed that, "the more recent the occupational experience the more valuable it is" (Item 7). Horticulture teachers strongly agreed that, "full-time occupational experience. . . should

TABLE 12
 FREQUENCY DISTRIBUTION OF RESPONSES TO ATTITUDE
 SCALE FOR PRODUCTION AGRICULTURE AND ORNAMENTAL
 HORTICULTURE TEACHERS

Attitude Scale* Item No.	Production Agriculture							Ornamental Horticulture						
	Response Scale					Mean Score	Standard Deviation	Response Scale					Mean Score	Standard Deviation
	Disagree 1	2	3	4	Agree 5			Disagree 1	2	3	4	Agree 5		
1**	2	7	7	34	25	3.92	1.12	-	1	2	7	1	3.73	.79
2	8	30	19	15	4	2.68	1.07	1	5	1	4	-	2.73	1.10
3	9	24	7	28	8	3.03	1.27	1	4	-	4	2	3.18	1.40
4	-	12	9	43	12	3.72	.92	-	3	0	7	1	3.55	1.04
5	2	5	10	46	12	3.76	.98	-	1	2	5	3	3.91	.94
6	4	5	6	45	16	3.84	1.01	-	2	1	6	2	3.73	1.01
7**	2	4	7	38	25	4.05	.94	-	1	2	8	-	3.64	.67
8	6	19	11	33	5	3.08	1.23	-	4	1	4	2	3.36	1.21
9	9	20	14	23	8	2.93	1.31	1	1	4	4	1	3.27	1.10
10	3	17	30	20	6	3.12	.98	-	1	6	4	-	3.27	.65
11	5	14	16	27	14	3.41	1.18	-	4	3	3	1	3.09	1.04
12	12	40	14	8	2	2.32	.96	2	5	3	1	-	2.27	.91
13**	3	10	11	34	18	3.71	1.09	-	1	1	5	4	4.09	.94
14**	18	38	6	9	5	2.28	1.15	-	-	4	4	3	3.91	.83
15**	18	40	10	5	3	2.15	.99	-	1	1	6	3	4.00	.89
16	13	18	13	29	3	2.88	1.21	-	4	2	5	-	3.09	.94
17**	2	8	12	48	6	3.63	.88	-	1	1	7	2	3.91	.83
18**	4	14	10	39	9	3.46	1.09	-	-	2	6	2	4.00	1.36
19	3	22	15	30	6	3.18	1.07	-	3	2	6	-	3.27	.91
20	2	9	12	41	12	3.68	.97	-	2	-	6	3	3.91	1.04
21	2	14	16	39	5	3.41	.96	-	1	2	6	2	3.82	.87
22	15	38	8	2	2	1.75	1.09	2	5	3	1	-	2.27	.91
Response Total	142	412	263	636	206			7	49	43	109	32		

*Attitude Scale - Refer to Appendix D for Attitude Scale Standards.

**Indicate items that were included in final ATTITUDE score.

be required of all vocational teachers prior to teaching" (13), "teacher training is a better source of subject matter competencies than occupational experience" (15) and, "periodic occupational experience should be required of all practicing vocational teachers" (18). Production teachers strongly disagreed that "occupational experience more than five years past is of little value to the vocational teacher" (22).

It would appear that a considerable percentage of the response mean scores were near the middle (3 - Neutral) of the response scale. Response means falling between 2.5 and 3.5 were considered neutral, no opinion responses. Production agriculture teachers produced nine (41%) neutral response items, while ornamental horticulture produced eight (36%) neutral response items. Both production and horticulture teachers produced neutral responses on items 2, 3, 8, 9, 10, 11, 16 and 19, with production teachers tallying an additional response on item 21.

Many scale items produced similar responses from both production agriculture and ornamental horticulture teachers. Four scale items produced a mean score response variance of .50 or more. On items 14, 15 and 18 production teachers indicated disagree responses while horticulture teachers produced agree and strongly agree responses. Thus while horticulture teachers agree that "one year occupational experience is adequate" (14), "teacher training is a better source of subject matter competencies than occupational

experience" (15), and "periodic occupational experience should be required of practicing vocational teachers" (18), production teachers disagree on all three items. Item 22 produced agreement from both production and horticulture teachers, though a .52 difference in mean scores was produced. Production teachers tallied a much stronger agreement that "experience more than five years past is of little value to the vocational teacher" than did horticulture teachers.

No grand mean was computed across all responses as only selected scale items were used to compute the final attitude scale score. As discussed in Chapter III only selected items were used where consistent strength of response was noted from the attitude scale validation process. Those seven scale items finally selected are indicated in Table 11 with double asterisks (**).

A frequency distribution of the final attitude scale scores is presented in Table 13.

The summed scores of seven attitude scale items (1, 7, 13, 14, 15, 17, 18) produced the attitude scale scores displayed in Table 13. As discussed in Chapter III a recode technique was used on items 14 and 15 (1.0-2.0 agree items) in order to give equal value to "agree" and "disagree" statements in computation of the final attitude score. It was interesting to note that the attitude scores ranged from 11 to 33 while the possible range of scores was 7 to 35.

TABLE 13

FREQUENCY DISTRIBUTION OF SCORES ON ATTITUDE
TOWARD THE VALUE OF OCCUPATIONAL EXPERIENCE
FOR PRODUCTION AGRICULTURE AND ORNAMENTAL
HORTICULTURE TEACHERS

Attitude* Score	Frequency Distribution		Mean Score		Standard Deviation	
	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>
11	1	-	26.36	26.91	4.28	3.30
15	1	-				
18	1	-				
19	1	-				
20	5	-				
21	2	-				
22	2	-				
23	5	-				
24	2	5				
25	6	1				
26	7	-				
27	8	-				
28	8	1				
29	9	-				
30	9	2				
31	3	1				
32	3	1				
33	3	-				
Total	76	11				

*Attitude Scale Score Range Possible 7-35.

The mean attitude scores of production agriculture (26.36) and ornamental horticulture teachers (26.91) were very similar, differing by only .55. The scores indicated a reasonably positive attitude toward the value of occupational experience with production teachers achieving 75.31 percent of the possible high score, and horticulture teachers achieving 76.89 percent of the possible high score.

Differences

In order to more fully achieve Objectives 4 and 6 of this study it was necessary to determine the differences in mean scores on selected variables. The one-way analysis of variance technique was thus used to determine differences in experience level variables in Objective number 4 and recency of occupational experience variables in Objective number 6. In addition, descriptive statistics are also provided to better establish the findings of these objectives.

Objective 4: To determine the optimal length (number of hours) of occupational experience in agriculture, for teachers of vocational agriculture in Colorado.

Teachers were asked to respond to the question, "In your opinion, how many years of full-time occupational experience, related to the area of vocational instruction, should be required of teachers in your vocational service area:" A frequency distribution of the responses to that question is provided in Table 14.

TABLE 14

FREQUENCY DISTRIBUTION OF RESPONSES
TO OPINION OF YEARS OF OCCUPATIONAL
EXPERIENCE REQUIRED

Number of Years	Response Frequency		Mean Score		Standard Deviation	
	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>	<u>Prod. Ag.</u>	<u>Orn. Hort.</u>
0	7	-	2.97	3.55	1.50	1.37
1	4	-				
2	14	4				
3	25	1				
4	13	2				
5	11	4				
6	2	-				
Response Total	76	11				

Findings presented in Table 14 indicate that there is some difference of opinion about how much occupational experience should be required of vo-ag teachers. Production agriculture teachers indicated that less than three years should be required while ornamental horticulture teachers indicated that more than three and one-half years should be required. It is possible that horticulture teachers may believe that more occupational experience is necessary to gain a command of the very dynamic horticulture industry. It is interesting to note that production teachers indicated requiring experience very near the 6000 hours (3 years) presently required for credentialing vo-ag teachers while horticulture teachers indicated that requirements should be higher than they are at present.

Computation of the actual hours of related occupational experience were completed to provide additional substance to the findings of Objective 4. Table 15 presents the frequency distributions for the "total hours of related occupational experience completed" as computed from the sum of "full-time experience prior to teaching," "full-time experience since teaching", and "part-time experience since teaching".

Mean scores presented in Table 15, indicate that both production agriculture and ornamental horticulture teachers have experience hours well in excess of that required for credentialing. The three year experience requirement is exceeded by nearly 2 years (1983 hours) with production teachers, and nearly 3.75 years (7405 hours) by horticulture teachers.

It is interesting to note that the majority of the total occupational experience completed by both groups was completed prior to teaching. Production teachers completed 83.9 percent prior to teaching, horticulture 95.2 percent. Only small percentages of the total experience completed were completed after respondents began teaching. In full-time experience since teaching production teachers completed 5.7 percent, and horticulture teachers 3.7 percent, of the total experience completed to date. In part-time experience since teaching, production teachers completed 10.4 percent, and horticulture teachers

TABLE 15

FREQUENCY DISTRIBUTION OF HOURS OF
RELATED OCCUPATIONAL EXPERIENCE
OF RESPONDENTS

Hour Range	Response Frequencies				Hour Range	Response Frequencies			
	THRSEXP*		FTPRIOR*			FTSINCE*		PTSINCE*	
	Prod. Ag.	Orn. Hort.	Prod. Ag.	Orn. Hort.		Prod. Ag.	Orn. Hort.	Prod. Ag.	Orn. Hort.
0-2000	8	1	1	1	0	50	6	22	7
2001-4000	6	-	6	-	1-100	-	-	12	1
4001-6000	4	1	6	1	101-500	3	1	11	2
6001-8000	15	-	14	-	501-1000	9	-	11	1
8001-10000	8	-	8	1	1001-2000	4	4	9	-
10001-12000	10	4	13	3	2001-3000	3	-	5	-
12001-14000	10	2	9	2	3001-4000	5	-	2	-
14001-16000	3	-	3	1	4001-7000	2	-	2	-
16001-18000	3	1	3	-	7001-10000	-	-	2	-
18001-22000	5	1	1	1					
22001-50000	4	1	2	1					
Response Total	76	11	66	11		76	11	76	11
Mean Score	9983	13405	8381	12768		569	501	1033	136
Standard Deviation	7461	9707	7053	9846		1157	668	1897	302

*THRSEXP - Total hours occupational experience

*FTPRIOR - Full-time occupational experience prior to teaching

*FTSINCE - Full-time occupational experience since teaching

*PTSINCE - Part-time occupational experience since teaching

1.1 percent of their total experience completed to date. It was of further interest to note the substantial numbers of respondents who indicated no occupational experience either full or part-time, since they began teaching.

In order to determine the most useful number of hours of occupational experience for vo-ag teachers, the total hours of experience completed by respondents were broken down into experience levels. The range of experience hours covered by each experience level is presented in Table 16. A one-way analysis of variance was then applied to determine which level(s) of experience was most significant to competence in technical agriculture. Descriptive statistics and an analysis of variance summary are presented in Table 16.

The total hours of related occupational experience completed by production agriculture teachers was broken down into five experience levels. Findings in Table 16 indicate very little difference in mean scores between the five experience levels. Consequently the F Ratio computed were quite low (.10) and the F probability figure was very high (.98). This probability figure would indicate that the likelihood of any one of the designated experience levels being more significant to technical competence than another as being extremely unlikely. One could assume that, other than by chance differences, the mean scores of the five experience levels are essentially equal.

The findings indicate that quite the opposite is true of the experience levels designated for ornamental

TABLE 16
SUMMARY STATISTICS AND ANOVA SUMMARY
OF TECHNICAL COMPETENCE BY LEVELS OF
OCCUPATIONAL EXPERIENCE FOR PRODUCTION
AGRICULTURE AND ORNAMENTAL HORTICULTURE

Experience Levels (Hrs)	n per Level	Mean Score	Standard Deviation	Source of Variance	df	Sum of Squares	Mean Squares	F Ratio	F Probability
<u>Production Agriculture</u>									
0-4600	15	244.27	32.02	Between Groups	4	447.57	111.89	.10	.98
4601-7400	16	243.56	38.61						
7401-10800	15	240.80	25.23	Within Groups	71	78993.54	1112.59		
10801-13750	15	238.93	31.79						
13751-50000	15	245.67	37.05						
Totals	76	242.66	32.55		75	79441.11			
<u>Ornamental Horticulture</u>									
0-4010	2	166.00	53.74	Between Groups	2	15063.51	7531.76	5.89	.03
4011-12850	6	244.00	35.25						
12851-38250	3	276.67	23.69	Within Groups	8	10224.67	1278.08		
Totals	11	238.73	50.29		10	25288.18			

horticulture. Considerable difference is indicated between the mean scores of the three experience levels, particularly between the first experience level (mean score 166.0) and the second two experience levels (mean scores 244.0 and 276.67 respectively). Consequently the "between groups" variance is high, the F Ratio is high, and the F probability is very low (.03). Keeping in mind that a very small N (11) was involved which may have effected the quality of those findings, technical competence in horticulture was significantly correlated to total hours of occupational experience completed. The more hours of related occupational experience the respondent had completed, the more likely he was to be technically competent in horticulture.

Other than the above stated reason which could possibly effect this very notable difference between production agriculture and ornamental horticulture, another reason might be considered. The highly specialized and dynamic nature of the horticulture industry may possibly result in increased competence with additional experience, whereas the broader, possibly less dynamic, production agriculture industry is less likely to realize increased competence through extended occupational experience.

Objective 6: To determine how recent (in months) occupational experience in agriculture should be, to maintain the technical agriculture competence of Colorado vocational agriculture teachers.

To develop data reflective of recency of occupational experience completed, respondents were asked to indicate the month and year of last employment, which was three months or longer in duration. Table 17 provides a frequency distribution of those responses.

TABLE 17

FREQUENCY DISTRIBUTION OF MONTHS SINCE
LAST FULL TIME OCCUPATIONAL EXPERIENCE OF
RESPONDENTS

Months Since Last Full-Time Experience	Response Frequency		Mean Score		Standard Deviation	
	Prod. Ag.	Orn. Hort.	Prod. Ag.	Orn. Hort.	Prod. Ag.	Orn. Hort.
0-12	7	3	104.54	58.27	97.17	69.83
13-24	5	1				
25-36	9	1				
37-48	4	2				
49-60	5	-				
61-72	1	-				
73-84	5	3				
87-96	1	-				
97-108	-	-				
109-156	3	-				
157-216	3	-				
217-276	10	1				
277-336	4	-				
Response Total	57	11				

Production agriculture teachers indicated a mean score of 8.71 years since last full-time occupational experience, nearly double the 4.86 years indicated by the ornamental horticulture teachers.

A second recency factor was considered under Objective 6, that of total occupational experience completed in the last five years. A frequency distribution of recent occupational experience completed is presented in Table 18.

TABLE 18
FREQUENCY DISTRIBUTION OF RECENT
OCCUPATIONAL EXPERIENCE OF RESPONDENTS

Hour Range	Response Frequencies					
	Total Exp. Last 5 Years		Full-Time Exp. Last 5 Years		Part-Time Exp. Last 5 Years	
	Prod. Ag.	Orn. Hort.	Prod. Ag.	Orn. Hort.	Prod. Ag.	Orn. Hort.
0	14	4	39	5	-	6
1-250	10	1	2	-	18	3
251-600	6	1	2	2	16	1
601-1000	8	-	10	-	8	1
1001-1500	13	2	4	1	4	-
1501-2000	2	-	5	-	3	-
2001-2500	8	-	2	-	2	-
2501-3000	2	-	3	-	-	-
3001-4000	4	-	5	1	2	-
4001-5000	3	3	3	2	2	-
5001-6000	1	-	-	-	-	-
6001-7000	3	-	1	-	-	-
7001-8036	2	-	1	-	-	-
Response Total	76	11	76	11	55	11
Mean Score	1600.63	1409.27	953.58	1244.91	647.05	164.36
Standard Deviation	1922.86	1866.63	1533.09	1710.20	1031.94	323.53

Total occupational experience completed during the last five years was computed by summing the variables "full-time experience last 5 years" and "part-time experience last

5 years". Some 18.4 percent of the production agriculture and 36.6 percent of the ornamental horticulture teachers indicated that they had completed no related occupational experience in the last five years. Mean scores show .80 years of experience completed by production teachers in the last five years, while .70 years were completed by horticulture teachers. Of that experience completed by production teachers 59.71 percent was indicated as full-time experience, 40.43 percent as part-time experience. Recent experience completed by horticulture teachers was indicated as 88.34 percent full-time experience, and 11.66 percent part-time experience.

In order to better understand the effects of lapsed time since last full-time experience upon technical competence, the number of months since last experience were broken down into levels for analysis. The individual levels are described in Table 19. A one-way analysis of variance was then applied to determine which level(s) were most significant to technical competence in agriculture. Descriptive statistics and an analysis of variance summary are presented in Table 19.

The months since last full-time experience were broken down into four levels for production agriculture. Findings in Table 19 indicate very little difference in mean scores between the levels. As a result, little of the variance on production agriculture competence was accounted for by the designated periods since last full-time experience. Consequently, no one level is indicated to be more statistically significant to competence than any other.

TABLE 19

SUMMARY STATISTICS AND ANOVA SUMMARY
OF TECHNICAL COMPETENCE BY PERIODS OF
MONTHS SINCE LAST FULL-TIME OCCUPATIONAL EXPERIENCE

Months Since Last Full-Time Exp.	n per Group	Mean Score	Standard Deviation	Source of Variance	df	Sum of Squares	Mean Squares	F Ratio	F Probability
<u>Production Agriculture</u>									
1-24	12	254.67	35.29	Between Groups	3	4172.92	1390.97	1.29	.29
25-48	13	238.46	27.65						
49-168	17	239.88	31.12	Within Groups	53	57080.06	1076.98		
169-336	15	229.80	36.56						
Totals	57	240.02	33.07		56	61252.98			
<u>Ornamental Horticulture</u>									
1-24	3	239.00	26.08	Between Groups	2	7267.93	3633.97	5.61	.04
25-48	3	290.33	24.54						
49-248	4	227.50	25.63	Within Groups	7	4533.67	647.67		
Totals	10	249.80	36.21		9	11801.60			

Three levels of months since last occupational experience were designated for horticulture. Significant differences between the mean scores of the three levels was indicated. Again, keeping in mind the very small N (11) one could assume those in the middle level of months since last experience would be more technically competent in horticulture.

Analysis of variance tests were also applied to the second recency factor, that of total hours of occupational experience completed in the last five years. Table 20 presents summary statistics and an analysis of variance summary for that test.

Total experience hours in the last five years was broken down into four experience levels for production agriculture. Mean scores between the levels were not significantly different, thus no one level could be assumed more statistically significant in effecting production agriculture competence than any other.

In similar analysis of variance procedures applied to the ornamental horticulture data, insufficient cases were provided for computer analysis.

TABLE 20

SUMMARY STATISTICS AND ANOVA SUMMARY
OF TECHNICAL COMPETENCE BY LEVELS OF
OCCUPATIONAL EXPERIENCE COMPLETED IN THE LAST
FIVE YEARS

Hours Exp. Last Five Years	n per Group	Mean Score	Standard Deviation	Source of Variance	df	Sum of Squares	Mean Squares	F Ratio	F Probability
<u>Production Agriculture</u>									
1-600	12	254.67	35.29	Between Groups	4	6533.59	1633.40	1.59	.19
601-1277	13	238.46	27.65						
1278-2505	17	239.88	31.12	Within Groups	71	72907.52	1026.87		
2506-8050	15	229.80	36.56						
Totals	57	240.02	33.07		75	79441.11			

Ornamental
Horticulture

Insufficient Cases for computation

Relationships

Seven hypotheses were formulated to test the purpose and objectives of this study. The Pearson r and multiple regression techniques were used to test those seven hypotheses. This section is devoted exclusively to the findings related to those seven hypothesis. Hypotheses are stated in null form for purposes of testing.

Hypothesis 1: There is not a significant positive relationship between belief in necessity of occupational experience and competence in the technical agriculture.

The findings of this test are presented in Table 21.

TABLE 21

CORRELATION COEFFICIENTS BETWEEN
BELIEF IN NECESSITY OF OCCUPATIONAL
EXPERIENCE AND COMPETENCE IN
TECHNICAL AGRICULTURE

Program Area	N	Obtained r	r Req. for one-tailed Sign. at .05 level	Obtained Probability
Production Agriculture	76	.03	.19	.40
Ornamental Horticulture	11	.03	.52	.46

The Pearson r test resulted in an r value of .03 for both production agriculture and ornamental horticulture. These values were not statistically significant at the .05 level, therefore the null hypothesis was accepted.

Hypothesis 2: There is not a significant positive relationship between the source of occupational experience and competence in technical agriculture.

Table 22 provides the findings of this test.

The multiple regression test applied to the seven experience sources identified for production agriculture produced r values ranging from $-.19$ to $.19$. The computed multiple R value of $.32$ was not statistically significant and thus the null hypothesis was accepted. Only about 10 percent of the variance in technical competence in production agriculture was accounted for by the seven experience sources.

The multiple regression test applied to the six experience sources identified for ornamental horticulture produced a Multiple R value of $.95$. This value was statistically significant at the $.05$ level, thus the null hypothesis was rejected. The $.95$ R value would indicate that the six experience levels could account for approximately 90 percent of the variance in technical competence in horticulture.

Simple r values ranging from $-.65$ to $.65$ were produced. Highest r values were produced by two experience sources. They were: Source 1 - "Industry experience in horticulture" ($.65$), and Source 2 - "Part-time horticulture experience while teaching" ($-.65$). Thus teachers who gained technical competence from industry experience prior to teaching were indicated as most likely to be technically

TABLE 22
CORRELATION COEFFICIENTS BETWEEN
SOURCE OF OCCUPATIONAL EXPERIENCE
AND COMPETENCE IN TECHNICAL
AGRICULTURE

Experience Source*	Obtained r	Multiple R	Overall Probability
<u>Production Agriculture</u>			
1	.19	.32	.39
2	-.01		
3	-.02		
4	-.13		
5	.07		
6	-.06		
7	-.19		
<hr/>			
<u>Ornamental Horticulture</u>			
1	.65	.95	.05
2	-.65		
3	-.17		
4	.44		
5	.09		
6	-.24		

*Experience Sources - Production Agriculture

- 1 - On-Farm Experience - Gained this skill primarily from experience prior to teaching.
- 2 - Ag-Related, Off-Farm Experience - Gained this skill primarily from experience in ag-related business prior to teaching.
- 3 - Part-Time Farming While Teaching - Gained this skill primarily from part-time farming while teaching.
- 4 - Preservice Teacher Preparation - Gained this skill primarily through my teacher preparation program, prior to teaching.
- 5 - Inservice Teacher Preparation - Gained this skill primarily through workshops, short courses, etc., since I began teaching.
- 6 - Voc Ag Teaching Experience - Gained this skill primarily through teaching vocational agriculture.
- 7 - Other - Gained this skill primarily from sources other than those listed above.

*Experience Sources - Ornamental Horticulture

- 1 - Industry Experience in Horticulture - Gained this skill primarily through working in the horticulture industry, prior to teaching.
- 2 - Part-Time Experience - Gained this skill primarily through part-time work in the horticulture industry, while teaching.
- 3 - Preservice Teacher Preparation - Gained this skill primarily through my teacher preparation program, prior to teaching.
- 4 - Inservice Teacher Preparation - Gained this skill primarily through workshops, shortcourses, etc., since I began teaching.
- 5 - Horticulture Teaching Experience - Gained this skill primarily through teaching vocational horticulture.
- 6 - Other - Gained this skill primarily from sources other than those listed above.

competent in horticulture. Those who gained competence from part-time horticulture experience while teaching were least likely to be technically competent in horticulture.

It is quite likely that these findings were effected by the very small N for ornamental horticulture. When computing multiple R it is desirable to have a much larger N than number of variables being considered. In this case the degrees of freedom are divided with the residual (N) holding 4 df and the regression (variables) holding 6 df. Consequently much of the variance will likely be accounted for by nature of the mathematics, rather than the variables being considered.

Hypothesis 3: There is not a significant positive relationship between belief in necessity of occupational experience and length of occupational experience completed.

Correlation coefficients for Hypothesis 3 are presented in Table 23.

TABLE 23

CORRELATION COEFFICIENTS BETWEEN
BELIEF IN NECESSITY OF OCCUPATIONAL
EXPERIENCE AND LENGTH OF EXPERIENCE
COMPLETED

Program Area	N	Obtained r	r Req. for one- tailed Sign. at .05 level	Obtained Probability
Production Agriculture	76	.04	.19	.38
Ornamental Horticulture	11	.03	.52	.46

Findings in Table 24 indicate that the correlation between belief in necessity of occupational experience and the length of experience completed is very weak. The Pearson r test resulted in r values of .04 and .03 respectively for production agriculture and ornamental horticulture. These values were not statistically significant at the .05 level, therefore the null hypothesis was accepted. It would seem that vo-ag teachers have not acquired occupational experience proportionate to their belief in its necessity.

Hypothesis 4: There is not a significant positive relationship between length of occupational experience completed and competence in technical agriculture.

This hypothesis provided the central focus of the study, asking the controversial question of the correlation of experience to competence. Findings are presented in Table 24.

TABLE 24
CORRELATION COEFFICIENTS BETWEEN
TOTAL HOURS OF OCCUPATIONAL EXPERIENCE
COMPLETED AND COMPETENCE IN
TECHNICAL AGRICULTURE

Program Area	N	Obtained r	r Req. for one-tailed Sign. at .05 Level	Obtained Probability
Production Agriculture	76	.12	.19	.15
Ornamental Horticulture	11	.58	.52	.03

The coefficient of correlation (Pearson r) between technical competence in production agriculture and length of occupational experience was .12. This value was not statistically significant at the .05 level, and thus the null hypothesis was accepted. Though a positive correlation is indicated between occupational experience and technical agriculture competence, that correlation is not statistically significant. The obtained probability indicates that the designated correlation has a 15 percent probability of happening purely by chance. Orr (66:80), Spaulding (81:55-7) and Jurist (45:112) all reported similar research findings where experience and competence were not significantly correlated.

The correlation coefficient for ornamental horticulture (.58), unlike production agriculture, was statistically significant at the .05 level, and thus the null hypothesis was rejected. A strong positive correlation between occupational experience in horticulture and technical horticulture competence is indicated. Meyer (57:72-5), Ellis (28:73) and Lacey (47 :24-30) each reported similar research findings.

It would appear that the findings of this hypothesis are consistent with the review of literature, indicating that findings related to the experience-competency question are very mixed.

Hypothesis 5: There is not a significant positive relationship between belief in need for recent occupational experience and recency of occupational experience completed.

The findings related this hypothesis are presented in Table 25.

TABLE 25

CORRELATION COEFFICIENTS BETWEEN
OPINION FOR NECESSITY OF RECENT
OCCUPATIONAL EXPERIENCE AND RECENCY
OF OCCUPATIONAL EXPERIENCE COMPLETED

Recency Factors	Obtained r	Multiple R	Overall Probability
<u>Production Agriculture</u>			
EXP5YRS*	.18	.18	.31
MOLASTFT*	-.03		
<u>Ornamental Horticulture</u>			
EXP5YRS*	-.36	.36	.57
MOLASTFT*	.08		

*EXP5YRS - Occupational experience completed during the last five years.

*MOLASTFT - The number of months since last full-time occupational experience.

Correlation coefficients produced by the multiple regression test were not statistically significant at the .05 level, thus the null hypothesis was accepted. As with Hypothesis 3, findings indicate that belief in need for experience, in this case recent experience, and the recency of experience completed have a very low correlation.

Hypothesis 6: There is not a significant positive relationship between recency of occupational experience completed and competence in technical agriculture.

The findings of this major hypothesis are displayed in Table 26.

TABLE 26

CORRELATION COEFFICIENTS BETWEEN
REGENCY OF OCCUPATIONAL EXPERIENCE
COMPLETED AND TECHNICAL COMPETENCE
IN AGRICULTURE

Recency Factors	Obtained r	Multiple R	Overall Probability
<u>Production Agriculture</u>			
EXP5YRS*	-.02	.20	.23
MOLASTFT*	-.19		
<u>Ornamental Horticulture</u>			
EXP5YRS*	.40	.40	.49
MOLASTFT*	-.10		

*EXP5YRS - Occupational experience completed during the last five years.

*MOLASTFT - The number of months since last full-time occupational experience.

Multiple regression produced coefficients were not statistically significant at the .05 level for either production agriculture or ornamental horticulture, thus the null hypothesis was accepted. These findings may be due to some degree to the very small amounts of recent experience completed by vo-ag teachers.

Hypothesis 7: There is not a significant positive relationship between attitude toward the value of occupational experience and competence in technical agriculture.

Table 27 provides the findings related to Hypothesis 7.

TABLE 27

CORRELATION COEFFICIENTS BETWEEN
RESPONDENTS ATTITUDE TOWARD THE
VALUE OF OCCUPATIONAL EXPERIENCE
AND TECHNICAL COMPETENCE IN AGRICULTURE

Program Area	N	Obtained r	r Req. for one-tailed Sign. at .05 Level	Obtained Probability
Production Agriculture	76	.07	.19	.28
Ornamental Horticulture	11	.32	.52	.17

The Pearson r test resulted in r values of .07 and .32 respectively for production agriculture and ornamental horticulture. These correlation coefficients were not statistically significant at the .05 level, therefore the null hypothesis was accepted.

Summary

Twenty-six tables were used to present the findings of the study. Vo-ag teachers indicated their ability to perform competencies included in the study at slightly above average (3.60 on a scale of 5). Teachers indicated most important sources for gaining technical agriculture skills as industry experience prior to teaching and the

teaching experience itself. Responding to opinion of importance to program success, vo-ag teachers responded 8.90 on a scale of 10. Responding to opinion of years of experience to require, production agriculture teachers indicated 2.97 years, ornamental horticulture teachers 3.55 years. Production agriculture teachers indicated they had completed 4.99 years of related occupational experience, horticulture teachers 6.70 years. Analysis of variance tests to determine most useful levels of experience indicated no most significant level on production, above 2 years for horticulture. Responding to necessity of recent occupational experience, production teachers indicated 7.58, and horticulture teachers 6.46, on a scale of ten. When asked how often vo-ag teachers should return to industry for update experience, production teachers indicated every 4.11 years, horticulture teachers every 4.10 years. Mean number of years indicated since last full-time occupational experience was 8.71 years for production teachers, and 4.86 years for horticulture teachers. On occupational experience completed in the last five years a mean of .80 years was indicated for production, and .70 years for horticulture teachers. Analysis of variance indicated that horticulture teachers with recent experience in the last 2 to 4 years were likely to be most technically competent. Analysis of variance produced no significant recency factors for production agriculture teachers. Both production and horticulture teachers produced scores approximating 26.55 (high possible 35)

on an evaluation of teacher attitude toward the value of occupational experience. Seven hypotheses were tested using Pearson r and multiple regression, with only two statistically significant findings. Sources of occupational experience to technical competence among horticulture teachers was found statistically significant at the .05 level. Total hours of occupational experience to technical competence among horticulture teachers was also found statistically significant at the .05 level of confidence.

A summary of the study and related conclusions and recommendations are presented in Chapter V.

CHAPTER V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The main purpose of this study was to determine if there was a significant relationship between ability to perform selected technical agriculture competencies and certain other variables dealing with the related occupational experiences of vocational agriculture teachers. Variables of length, source, recency and attitude toward the value of occupational experience were considered. A secondary purpose of this study was to gather profile data concerning the related occupational experiences completed by vocational agriculture teachers in Colorado.

A 6 page, 108 item survey instrument was used to gather data for this study. The research instrument was composed of three sections: demographic, teacher attitude scale, and technical competence self evaluation. The demographic section was designed to gather personal data on each respondent concerning education completed, related occupational experience, and opinions concerning the value and duration of occupational experience. The teacher attitude scale was designed to provide an indication of the respondents' attitude toward the value of occupational

experience. The 22 item attitude scale was designed by the research project staff. The scale was then submitted to a panel of practicing vocational teachers for review and critique. After revision of the scale it was submitted to a panel of experts for validation. The technical competency self evaluation section was designed to allow the respondent to evaluate his ability to perform subject matter competencies, and identify from what experience source he gained each competency. Competencies to be included in the technical competence self evaluation section were reviewed and validated by a committee of production agriculture and ornamental horticulture industry representatives. Only those competencies agreed upon by the committee as reflective of high ability to perform in the respective occupational areas were included in the final instrument. Sixty-six competencies were identified each for production agriculture and ornamental horticulture. The final survey instrument was validated by staff at Larimer County Vocational Technical center, and CSU Department of Vocational Education.

Within the seven program areas currently defined by the U.S. Office of Education for the vocational agriculture service area, two were chosen for this study. Due to sample size it was determined that only program areas with 10 or more functioning secondary programs, within the state of Colorado, would be included in the study. The program areas of production agriculture and ornamental horticulture

containing 70 and 12 operational programs respectively, were included. All teachers in those program areas, including 98 production agriculture teachers and 12 ornamental horticulture teachers were included in the population.

The State Board for Community Colleges and Occupational Education provided impetus to the data gathering process by providing a letter introducing the research effort and encouraging response of all Colorado vo-ag teachers. Two written follow-up efforts followed the mailing of the survey instrument. A 77.5 percent return was completed on the production agriculture instruments, and 91.8 percent on ornamental horticulture.

All data gathered was interpreted, placed on Fortran coding forms and keypunched to computer cards for analysis. Computer programming needs were minimized through use of a prepared program, the Statistical Program for the Social Sciences (SPSS). The SPSS program proved very adequate, with all necessary processing components and flexibility needed to process the data. Descriptive statistics were computed for all variables and specific statistical tests were run as required to satisfy the objectives of this study and test the hypotheses of the study. Statistical techniques used included Pearson product moment, multiple regression and one-way analysis of variance. Pearson r was used to test the relationships in four hypotheses where only two variables were of concern. Multiple R was used to test the relationships in three

hypotheses where more than two variables were of concern. Oneway analysis of variance was used in meeting two study objectives where it was necessary to compare the mean scores of a series of variables. Seven hypotheses were tested at the .05 level of significance.

Conclusions

The conclusions are based on the findings of this study. Seven hypotheses were tested for significant relationships. Conclusions reached from the analysis of the hypothesis are listed below:

1. There is no statistically significant positive relationship between belief in necessity of occupational experience to program success and competence in technical agriculture. Correlation coefficients for both production agriculture and ornamental horticulture teachers, on the above relationship, were very low. Belief in necessity of occupational experience to program success showed strong positive opinion among both production and horticulture teachers. At the same time technical competence of both groups of teachers was self evaluated at above average. However, when a correlation test was run on these two factors they showed very little linear relationship to one another.

2. There is not a statistically significant positive relationship between the source of related occupational experience and competence in production agriculture. The

most important sources of occupational competence for production agriculture teachers were on-farm experience prior to teaching, and vocational agriculture teaching. The correlation between those experience sources and technical competence, however, were very weak.

3. Considering a very small N , there is a statistically significant positive relationship between the source, occupational experience gained in the horticulture industry prior to teaching and technical horticulture competence. Those teachers who gained technical competencies from horticulture industry experience, prior to teaching, are most likely to be technically competent, while those who gained competencies from part-time horticulture experience while teaching, are least likely to be technically competent.

4. There is not a statistically significant positive relationship between belief in necessity of occupational experience for program success and length of related occupational experience completed. Though belief in the necessity of experience is strong among vo-ag teachers, and length of related experience completed is considerably in excess of that required for credentialing, the correlation between the two variables is very weak.

5. There is not a statistically significant positive relationship between the length of production agriculture experience completed and technical competence in production agriculture. There is however, a positive correlation between these two variables (probability .15), though not significant at the .05 level.

6. There is a statistically significant positive relationship between the length of ornamental horticulture experience completed and technical competence in ornamental horticulture. The more related occupational experience the horticulture teacher has completed the more likely he is to be technically competent in horticulture. In fact those horticulture teacher with related experience in excess of approximately two years are likely to be more competent than those teachers with less than two years related occupational experience.

7. There is not a statistically significant positive relationship between the belief in need for recent related occupational experience and the recency of related occupational experience completed. Positive beliefs are held by vo-ag teachers that recent occupational experience is necessary to maintain technical competence. However, the number of months since last full-time occupational experience is considerable (PA 105 months, OH 58 months). On the average, less than 2000 hours of occupational experience have been completed per vo-ag teacher during the last five years.

8. There is not a statistically significant positive relationship between recency of related occupational experience completed and competence in technical agriculture. However, when recency of experience was broken down into time segments, horticulture teachers tended to be most technically competent if there last experience was

between approximately two and four years past. Thus, one might assume that there is some degree of correlation between recency of occupational experience and competence of ornamental horticulture teachers.

9. There is not a positive statistically significant relationship between attitude toward the value of related occupational experience and competence in technical agriculture. Measured vo-ag teacher attitude toward the values of occupational experience was quite positive. Self evaluated technical competence of vo-ag teachers, indicated above average ability to perform related technical competencies. However, when the relationship between these two variables was tested no significant correlation was found.

Recommendations.

Considering the findings and conclusions of this study, the following recommendations are presented:

1. In view of the fact that insufficient findings were accumulated to suggest expansion or reduction of occupational experience hour requirements, it is recommended that the required number of hours of occupational experience of Colorado vo-ag teachers be maintained at present levels (6000 hours). Further it is recommended that provisions for control of quality of occupational experience be considered, such that individuals have breadth of experience in the program area for which they are credentialed.

2. It is recommended that specific competencies be identified in each skill area for production agriculture and ornamental horticulture, such that individuals entering the vo-ag major might structure personal occupational experiences to upgrade areas of technical skill weakness, prior to teaching.

3. It is recommended that steps be considered to improve the technical competence of beginning vocational agriculture teachers, such that they no longer need to gain up to one-third of their subject matter competencies while teaching. Identification of core competencies as recommended in 2 above is critical to this recommendation. Methods must then be considered to assure that beginning teachers have had the opportunity of exposure to these skills, and that they do indeed possess the skills prior to teaching.

4. It is recommended that avenues be explored for structured updating of occupational experiences of practicing Colorado vocational agriculture teachers. Based on the review of literature, consideration should be given to providing university credit for the experience, supervision by qualified individuals, and that the experience be paid on a basis similar to the current teaching salary.

5. It is recommended that steps be considered to improve the competence of Colorado production agriculture teachers in the skill areas of crops and soils. Consideration should be given to preservice, inservice as well as structured occupational experiences for such competency upgrading.

6. It is recommended that steps be considered to improve the competence of Colorado ornamental horticulture teachers in the skill areas of landscape design and records management. Upgrading methods similar to those in recommendation 5 should be considered.

7. It is recommended that the utilization of improved inservice teacher education offerings in ornamental horticulture be considered as a means of overcoming the identified weaknesses in technical competence in ornamental horticulture.

Recommendations For Further Study

Others interested in research in the area of occupational experience of vocational teachers should consider the following:

1. It is recommended that this study be repeated with additional resources such that more objective measures of technical competence can be made, and indepth review of experiences completed by respondents, conducted.

2. It is recommended that research be undertaken to explore the aspects of quality of occupational experience as opposed to the quantity of occupational experience.

3. It is recommended that research be undertaken to explore the success of currently operating programs for structured updating of occupational experience. Truly objective measures of these programs are necessary if improvement and growth is to be encouraged.

4. It is recommended that research be undertaken to explore the value of supervised occupational experience completed as part of the preservice teacher education program.

Summary Statement

Occupational experience of vocational teachers has long been a basic qualification for credentialling. Recent trends toward competency based teacher education and certification would seem to elevate the importance of occupational experience. Yet much of what vocational educators believe about occupational experience is based upon tradition rather than highly objective research. The need is great to undertake research to such depth and refinement that the true merits of occupational experience can finally be realized and placed into practice.

REFERENCES CITED

1. Addland, Richard. "Vehicles for Occupational Updating", American Vocational Journal. Vol. 46, No. 8, November, 1971.
2. Allen, David. "Instruciton", The Philosophy For Quality Vocational Education Programs. Fourth Yearbook American Vocational Association, Washington D.C., 1974.
3. Ansolabehere, Jean Maurice. A Comparative Study of Selected Vocational-Technical Teacher Characteristics in Illinois Secondary Area Vocational Centers and Participating Schools. Doctoral Dissertation, University of Illinois at Urbana-Champaign, 1973.
4. Barlow, Melvin L. History of Industrial Education in the United States. Charles A. Bennett Co., Peoria, Illinois, 1967.
5. Barlow, Melvin L. "Prologue", THE Philosophy For Quality Vocational Education Programs. Fourth Yearbook, American Vocational Association, Washington, D.C., 1974.
6. Beardsley, Jim. "Teachers Work In Industry To Keep Credentials Valid", Agriculture Education Magazine. Vol. 44, No. 5, November, 1971.
7. Beasley, Gary F. "Occupational Experience For Teachers," Agricultural Education Magazine. Vol. 44, No. 5, November, 1971.
8. Bell, Terrel H. "Vocational Education: '76 and Beyond", American Vocational Journal. Vol. 51, No. 5, May, 1976.
9. Blankenship, Martha Lee. "What Billlionth for Beginning Home-Ec Teachers?", American Vocational Journal Vol. 49, No. 4, April, 1974.
10. Blomgren, Gary and Juergenson, E. M. "Work Experience For Teachers", Agricultural Education Magazine. Vol. 45, No. 4, October, 1972.

11. Bowden, Shirley. "Expressed Willingness and Competence of Home Economics Teachers to Instruct Occupational Classes". Department of Home Economics, California State University, Fresno, 1972.
12. Branter, Seymour T. "Certification of Vocational - Technical Educators:" Department of Vocational Education, Pennsylvania State University, 1974.
13. Brooks, Lloyd Demar. The Relationship Between Related Work Experience and Teaching Effectiveness of Vocational Office Education Teachers. Doctoral Dissertation, The University of Tennessee, 1971.
14. Brooks, William Kent, A Study of the Attitudes and Teaching Behaviors of Occupational Orientation Teachers in Mississippi. Doctoral Dissertation The Ohio State University, 1974.
15. Broudy, H.D., and Applegate, William K. "A Cautionary Appraisal of CBTE," Journal of the American Association of Teacher Educators in Agriculture Vol. 16, No. 3, November, 1975.
16. Brown, David V. and Achilles, C. M. "How To Teach Teachers and Technicians Under One Roof," American Vocational Journal. Vol. 49, No. 7, October, 1974.
17. Brown, William J., Jr. "The Effects of In-Service Education and Resource Unit Components on Teacher and Student Learning," Research Series No. 12, North Carolina State University, 1969.
18. Burkett, Lowell A. "A Look To The Future," American Vocational Journal. Vol. 51, No. 5, May, 1976.
19. Byers, Charles and Tulloch, Rodney. "In-Service Education Through Industry," Agricultural Education Magazine. Vol. 48, No. 11, May, 1976.
20. Cesta, Carmen A. "Teacher Cooperative Exchange Program: Evaluation Report. Summer Program, July-August, 1970." New York State Education Department, Albany Division of Teacher Education and Certification, Albany, New York, August, 1970.
21. Clouse, James P. and Gray, Avery. "Extern Program Provides Occupational Experience for Teachers," Agricultural Education Magazine. Vol. 43, No. 6. December, 1970.

22. Colvin, T. S. "Internship In Off-Farm Agriculture,
Agricultural Education Magazine. Vol. 43, No.
11, May, 1971.
23. Corman, Myron N. "Testing the Occupational Competency
of T & I Teachers," American Vocational Journal.
Vol. 48, No. 1, January, 1973.
24. Covey, James W. The Testing of Four Major Dimensions
of Professional Preparation Models for the
Development of Vocational-Technical Educators.
Doctoral Dissertation, University of Wisconsin,
1973.
25. Crawford, Lucy C. "Professional Issues in Distributive
Education" American Vocational Journal. Vol.
50, No. 4, April, 1975.
26. Delzer, Christian Lincoln. Credentialing Technical
Teachers. Doctoral Dissertation, Colorado
State University, 1972.
27. Eck, Marilyn J. "Occupational Experience A Business
Teachers' Asset," Business Education Forum.
Vol. 24, No. 3, December, 1969.
28. Ellis, William G. The Relationship of Related Work
Experience to Teaching Success of Beginning
Business Teachers. Doctoral Dissertation, The
Pennsylvania State University, 1968.
29. Ely, R. H. "Developing Inservice Programs - Based on
Teacher Competency," Agricultural Education
Vol. 46, No. 2, August, 1973.
30. Ertel, Harry C. An Analysis of Business and Office
Education Teacher Contacts With Business,
Industry, and Government. Doctoral Dissertation,
University of Cincinnati, 1974.
31. Evans, Rupert N. Foundations of Vocational Education.
Charles E. Merrill Publishing Company, Columbus
Ohio, 1971.
32. Federal Board for Vocational Education. Report of a
Training Course for Foreman Conference Leaders.
U. S. Government Printing Office, Bulletin
No. 164, Washington, D.C. 1932.
33. Federal Board for Vocational Education. Trade and
Industrial Education. U.S. Government Printing
Office, Bulletin No. 17, Washington, D.C., March
1924.

34. Finch, Curtis R. "The Trade and Industrial Education Teacher's Background, Values and Attitude Toward Teaching," Journal of Industrial Teacher Education. Vol. 6, No. 2, Winter, 1969.
35. Fiscus, Keith E. "Evaluation of Beginning Agricultural Education Teachers," Agricultural Education Magazine. Vol. 47, No. 1, July 1974.
36. Forgey, George W. "Survey Study of Selected Illinois Vocational Education Personnel: Qualifications, Needs, Trends and Implications." Final Report Mid State Educational Consultants, Normal, Illinois, August, 1972.
37. Gillie, Angelo C., Sr. "Competency Based Teacher Education: A Plea for Caution," American Vocational Journal. Vol. 49, No. 4, April, 1974.
38. Goddard, M. Lee. "Work Experience for Prospective and In-Service Business Education Teachers," Business Education Forum. Vol. 25, No. 3, December, 1970.
39. Goodrich, Elizabeth Anne. "Business Teachers Get Out and Work," Journal of Business Education. Vol. 15, No. 5, February, 1970.
40. Gray, Peter J. "Competency Based Teacher Education: What Does That Mean?" The Journal of the American Association of Teacher Educators in Agriculture. Vol. 15, No. 2, July, 1974.
41. Haynes, Robert C. "Teacher Preparation With The Aid of a Non-Degree Instructor," Agricultural Education Magazine. Vol. 46, No. 8, February, 1974.
42. Hill, Alberta D. "Assumptions Underlying Inservice Vocational Teacher Education Programs," Changing the Role of Vocational Teacher Education. McKnight and McKnight Publishing Co., Bloomington, Illinois, 1971.
43. Hulle, William. "A Model for an Occupational Based Competency Examination," Man/Society/Technology. Vol. 33, No. 5, February, 1974.
44. Jaska, Robert C. "Adult and Young Farmer Education: Texas Style," American Vocational Journal. Vol. 49, No. 5, May, 1974.

45. Jurist, Rodney G. An Analysis of High School Secretarial Business Education Teacher Performance. Doctoral Dissertation, Rutgers University, 1974.
46. Klehm, Merwyn Allen. The States of the Certification Requirements For Trade and Industrial Teachers In The United States. Doctoral Dissertation, The Ohio State University, 1974.
47. Lacy, Annell. "Teacher Job Satisfaction: Factor and Implication," The Delta Pi Epsilon Journal. Vol. 151, No. 4, August, 1973.
48. Lamar, Carl F. "Occupational Experience For The Individual In Vocational Education," The Individual and His Education. Second Yearbook, American Vocational Association. Washington D.C., 1972.
49. Larson, Milton E. and Valentine, Ivan E. "An Internship Program for Occupational Teachers Involving Industry-Exchange, Curriculum Building, Career Education, or Leadership Development Activities." Directos' Final Report, Department of Vocational Education, Colorado State University, June, 1974.
50. Leighbody, Gerald B. Vocational Education in America's Schools: Major Issues of the 1970's. American Technical Society, Chicago, Illinois, 1972.
51. Lockwood, Larry. "Vo-Ag Teachers Struggle to Find Time," American Vocational Journal. Vol. 51, No. 3, March, 1976.
52. Loewen, Curtis E. Occupational Cluster Guide: Agriculture - Horticulture Supplement. State of Oregon Department of Education, Salem, Oregon, 1971.
53. Management Information Systems. "Vocational Staff Information: Secondary 1975-76," State Board for Community Colleges and Occupational Education, Denver, Colorado, 1975.
54. Mannebach, Alfred J. "Structured Occupational Experience for Teachers," Agricultural Education Magazine. Vol. 42, No. 7, January, 1970.
55. Martin, Travis. "Professional Improvement While On The Job," American Vocational Journal. Vol. 50, No. 4, April, 1975.
56. McDowell, L.C. "Trade and Industrial Teacher Education In The 1970's," Journal of Industrial Teacher Education. Vol. 7, No. 4, Spring, 1970.

57. Meyer, Warren G. "Pilot Training Project, Based on Directed Occupational Experience For Teachers of Marketing and Distribution." Report No. BR-6-159, College of Education, University of Minnesota, June, 1967.
58. Milan, Joseph Edward. Comparison Of Colorado Trade and Industrial Teachers. Doctoral Dissertation, Colorado State University, 1972.
59. Miller, Robert. "Organization of Vocational Education In the Instructional System," The Philosophy For Quality Vocational Education Programs. Fourth Yearbook, American Vocational Association, Washington D.C., 1974.
60. Miller, W.R., and Kazamas, H.C. "Preparing Teacher Educators for an Expanding Role," American Vocational Journal. Vol. 49, No. 2, February 1974.
61. Moore, Carlos H. "Agricultural Education in Transition," Agricultural Education Magazine. Vol. 45, No. 2, November, 1972.
62. Moss, Jerome, Jr. "Assumptions Underlying Preservice Programs For Beginning-Level Vocational Teachers," Changing the Role of Vocational Teacher Education. McKnight and McKnight Publishing Co., Bloomington, Illinois, 1971.
63. Nichols, Charles W. "Internships for Prospective Vocational TEachers," National Business Education Quarterly. Vol. 38, No. 2, December, 1969.
64. Nie, Norman H., Hull, Hadlai C., Jenkins, Jean G., Steinbrenner, Karin, and Bent, Dale H. Statistical Program For The Social Sciences. Second Edition, McGraw-Hill Book Company, New York, 1975.
65. Oregon Board of Education. Occupational Cluster Guide: Agriculture. State of Oregon Department of Education, Salem, Oregon, 1970.
66. Orr, Ralph O. Credentialing Trade and Industrial Teachers. Doctoral Dissertation, Colorado State University, 1970.
67. Panitz, A. "A National Effort of Experience Evaluations by Occupational Competency Examinations." A Paper presented to American Vocational Research Association, Atlanta, Georgia, December, 1973.

68. Pantler, Albert J. and Buzzell, Charles H. "Blazing a New Trail in the Training of T & I Teachers," School Shop. Vol. 28, No. 5, January, 1969.
69. Prosser, Charles A. and Quigley, T. H. Vocational Education In A Democracy. American Technical Society, Chicago, Illinois, 1949.
70. Ramp, Wayne S. and Reeder, Ronald C. "An Analysis and Synthesis of State Certification Requirements for Teachers of Secondary Trades and Industries and Post Secondary Trades and Technical Programs." Department of Technical and Industrial Education, Southern Illinois University, Carbondale, October 1970.
71. Reeder, Ronald C. "Teacher Competencies and Certification," American Vocational Journal. Vol. 48, No. 3, March, 1973.
72. Rhodes, James A. Alternative To A Decadent Society. Howard W. Sams and Co., New York, 1969.
73. Ridenour, Harlan E. Career Preparation In Ornamental Horticulture: A Curriculum Guide for High School Vocational Agriculture. Ohio Career Education and Curriculum Management Laboratory in Agricultural Education, The Ohio State University, Columbus, Ohio, 1974.
74. Ridenour, Harlan E. Career Preparation In Agriculture Production: A Curriculum Guide for High School Vocational Agriculture. Ohio Career Education and Curriculum Management Laboratory in Agriculture Education, The Ohio State University Columbus, Ohio, 1974.
75. Rogers, Evelyn E. Certification Requirements for Vocational Stenographic-Secretarial Teachers in Post-Secondary Vocational-Technical Schools in the United States. Masters Thesis, University of North Dakota, 1973.
76. Rothenberg, Harvey David. Attitudes Toward Vocational Education. Doctoral Dissertation, Colorado State University, 1972.
77. Sjogren, Douglas. "Evaluation of Vocational Teacher Education," Changing The Role of Vocational Teacher Education. McKnight and McKnight Publishing Co., Bloomington, Illinois, 1971.

78. Smith, Charles W. "Internships in Non Farm Agriculture for Prospective Teachers," Agri-cultural Education Magazine. Vol. 47, No. 8, February, 1975.
79. Smith, Jay T., Sr. "Georgia's Answer to T & I Teacher Certification," School Shop. Vol. 32, No. 10, June, 1973.
80. Snowden, Obed L. and McMinn, J. H. "In-Service Development of Vocational Teachers for Competencies in Non-Farm Agricultural Occupations: Vocational Agriculture Special Project Report." State College Department of Agricultural Education, Mississippi State University, July, 1971.
81. Spaulding, Lloyd Frederic. A Study of Relationships Between Selected Characteristics of Shop and Laboratory Instructors and Student Achievement in Vocational and Technical Education. Doctoral Dissertation, North Carolina State University, Raleigh, 1971.
82. State Board For Community Colleges and Occupational Education. Colorado State Plan For Vocational Education Fiscal Year 1976. Part I, Administrative Provisions, SBCCDE, Denver, Colorado, 1976.
83. Stitt, Thomas, R. "Structured Occupational Internship For Experienced Vocational Teachers." Department of Agricultural Industries, Southern Illinois University, 1970.
84. Stivala, Saverio R. "Morale and Bureaucracy: Horns of the Professional Development Dilemma," American Vocational Journal. Vol. 50, No. 4, April, 1975.
85. Storm, George. "Vocational Teacher Education at Ferris State College," American Vocational Journal. Vol. 49, No. 1, January, 1974.
86. Tiemann, H.A. Training Industrial Teachers, Memo #90. Morgan Library Archives, Colorado State University, August, 1926.
87. Trotter, Eugene E. and Williams, David L. "For More Effective Teacher Education: Use A Competency Based Plan For The Summer Experience Program." The Journal of the American Association of Teacher Educators in Agriculture. Vol. 14, No. 2, July, 1973.

88. Weatherford, John Wilson. Identification and Analysis of Issues in Distributive Education. South-Western Publishing Co., Cincinnati, Ohio, 1974.
89. Wells, Warren. "Teacher-Industry Personnel Exchange," Agricultural Education Magazine. Vol. 46, No. 12, June, 1974.
90. White, J.A. "Upgrading Through In-Service Education," Agricultural Education Magazine. Vol. 45, No. 4, October, 1972.
91. White, T.R. "The Area Vocational School: An Emerging Institution," Phi Delta Kappan. Vol. 53, No. 3, 1971.
92. Williams, David L. "Structured Occupational Experiences A Part of In-Service Teacher Education," Agri-cultural Education Magazine. Vol. 43, No. 6, December, 1970.

APPENDICES

APPENDIX A

PRODUCTION AGRICULTURE COMPETENCY LIST FOR
INDUSTRY VALIDATION OF "HIGH ABILITY"
COMPETENCIES

INSTRUCTIONS: For Completing Competency
Selection Instrument

1. Remember the purpose:

We are attempting to identify those job skills (competencies) which will tend to reflect the greatest degree of competence (ability) in each occupational area.

2. Review the attached "Response Code Definitions" to be used in responding to each competency listed.
3. Rank all listed competencies using the above five point scale. Circle only one number for each competency. Choose that number which most nearly reflects your feelings about that competency.
4. We encourage you to alter the wording of competencies which are incorrectly stated or which could be stated more clearly. Please note such alterations directly above the competency or on the back of the page.
5. Please do not discuss any competency with your fellow committee members while completing the instrument. We desire your valuable individual opinions rather than a consensus of the group. If you have questions I will be happy to provide individual assistance.
6. PLEASE NOTE - - - VERY IMPORTANT!

You are very close to the industry which provides jobs for the occupational areas represented here. Please help us by completing the last section of the instrument--which requests that you write in other competencies which we have missed! Please add any other competencies which you feel would fall in the "Highest (1)" or "Above Average (2)" competence levels for this occupational area. Please consider those competencies that you most like to see in employees in this occupational area. Only with your help can we compile a complete listing of those "high quality" competencies.

7. Please be sure to place your name in the upper right-hand corner of the front page of each instrument.

Thank you for your valuable assistance!

RESPONSE CODE DEFINITIONS:

<u>Response Code</u>	<u>Definition</u>
1	This skill reflects the <u>highest</u> level of competence in the occupational area.
2	This skill reflects an <u>above average</u> level of competence in the occupational area.
3	This skill reflects an <u>average</u> level of competence in the occupational area.
4	This skill reflects a <u>low</u> level of competence in the occupational area.
5	This skill does not reflect competence in the occupational area. (Column headed <u>none</u>).

The underlined words in each definition are used to head the appropriate number column on the competency listing. Please circle that number most representative of your feelings about the competency. Circle only one number per competency.

Your Name _____

AGRICULTURAL PRODUCTION OCCUPATIONS
(01.0100)

Please CIRCLE only ONE response per line.Competence Level

		Highest	Above Average	Average	Low	None
<u>Skills or Competencies</u>						
1.	Identify in the field the important breeds of livestock in the community.	1	2	3	4	5
2.	Identify the various body parts of animals	1	2	3	4	5
3.	Select livestock, in accordance with breeding and marketing standards	1	2	3	4	5
4.	Determine the nutrient requirements of various types of livestock found in the community	1	2	3	4	5
5.	Explain the information given on feed bag tags	1	2	3	4	5
6.	Design a balanced least cost balanced ration for common farm animals, using local feeds and prices.	1	2	3	4	5
7.	Use a chart for determining gestation and heat periods for farm animals	1	2	3	4	5
8.	Plan a livestock improvement program for a type of livestock in the community; specify breed, schedules for breeding, sire-dam ratio, culling program indicating standards	1	2	3	4	5
9.	Analyze progeny records for such things as:					
	a. pounds of gain per pound of feed	1	2	3	4	5
	b. average daily weight gain	1	2	3	4	5
	c. carcass yield and quality	1	2	3	4	5
	d. cost per pound of gain	1	2	3	4	5
10.	Design a program to promote good health and safety of farm animals	1	2	3	4	5
11.	Recognize and treat parasite infestations	1	2	3	4	5
12.	Recognize common livestock diseases and health problems . .	1	2	3	4	5
13.	Prepare livestock, crops, etc. for exhibit at fairs and shows	1	2	3	4	5
14.	Plan a calendar of events for a specific class of livestock covering breeding, feeding, and management during one production cycle	1	2	3	4	5
15.	Analyze production records to determine if management practices were profitable	1	2	3	4	5
16.	Analyze management practices for possible improvements to increase profits	1	2	3	4	5
17.	Perform common livestock practices such as:					
	a. castrating	1	2	3	4	5
	b. dehorning	1	2	3	4	5
	c. hoof trimming	1	2	3	4	5
	d. giving infections	1	2	3	4	5

AGRICULTURAL PRODUCTION		Competence Level				
Skills or Competencies		Highest	Above Avg.	Average	Low	None
17.	Perform common livestock practices such as: (cond't)					
	e. docking	1	2	3	4	5
	f. shearing	1	2	3	4	5
	g. weaning	1	2	3	4	5
	h. branding	1	2	3	4	5
	i. treat for bloat	1	2	3	4	5
	j. herd or drive animals	1	2	3	4	5
18.	Interpret market reports in newspaper and official reporting services	1	2	3	4	5
19.	Determine market grades of livestock and crops	1	2	3	4	5
20.	Identify the major cuts of meat	1	2	3	4	5
21.	Compile a list of marketing agencies in the community, noting advantages and disadvantages of each	1	2	3	4	5
22.	Determine soil texture by feel	1	2	3	4	5
23.	Identify horizons in soil profile	1	2	3	4	5
24.	Identify a plowpan, hardpan, and/or clay pan	1	2	3	4	5
25.	Determine when a soil is ready to till	1	2	3	4	5
26.	Read a soil map.	1	2	3	4	5
27.	Determine water holding capacity of various soils	1	2	3	4	5
28.	Determine slope	1	2	3	4	5
29.	Determine land use and capability of typical soils in the community	1	2	3	4	5
30.	Test soil sample to determine acidity or alkalinity	1	2	3	4	5
31.	Take soil sample and send to soils lab for analysis	1	2	3	4	5
32.	Make decisions concerning use of fertilizers and soil amendments based upon results of soil tests	1	2	3	4	5
33.	Determine presence of organic matter in soils	1	2	3	4	5
34.	Read labels and analyze fertilizers on the market	1	2	3	4	5
35.	Compute the cost of fertilizing a crop using various materials purchased from local sources	1	2	3	4	5
36.	Plan a soil improvement program for a specific crop after having the soil tested and reviewing the recommendations	1	2	3	4	5
37.	Apply fertilizer to a crop using acceptable methods, recommended rates, and at the proper time	1	2	3	4	5
38.	Plan soil drainage systems	1	2	3	4	5
39.	Operate farm level and surveying equipment	1	2	3	4	5
40.	Layout a contour line after determining the slope of a field	1	2	3	4	5
41.	Irrigate and determine the frequency of irrigation for profitable crop production	1	2	3	4	5
42.	Work with Soil Conservation Service in planning irrigation and drainage needs	1	2	3	4	5
43.	Calculate application rates of fertilizer for a specific crop	1	2	3	4	5
44.	Identify nutrient deficiency signs in crops	1	2	3	4	5
45.	Identify common noxious weeds in the community	1	2	3	4	5

		<u>Competence Level</u>				
		<u>AGRICULTURAL PRODUCTION</u>				
<u>Skills or Competencies</u>		<u>Highest</u>	<u>Above Avg.</u>	<u>Average</u>	<u>Low</u>	<u>None</u>
46.	Plan and carry out a rodent control program in the community, or on the home farm	1	2	3	4	5
47.	Determine correct applications and safety measures for a weed control program	1	2	3	4	5
48.	Compare the cost of various chemicals designed to accomplish like purposes	1	2	3	4	5
49.	Interpret the meaning of labels found on chemical and pesticide containers	1	2	3	4	5
50.	Prune shrubs or trees to remove damaged portions	1	2	3	4	5
51.	Plan a crop management program in the community for a major crop, from seedbed preparation to harvesting	1	2	3	4	5
52.	Identify both seeds and plants of major crops grown in the community	1	2	3	4	5
53.	Select good quality livestock feedstuffs	1	2	3	4	5
54.	Classify forage plants according to legume or grasses and as annual, biennial, or perennial	1	2	3	4	5
55.	Develop maintenance schedules for common equipment using service manual	1	2	3	4	5
56.	Carry out a maintenance program on farm implements in a safe and workmanlike manner	1	2	3	4	5
57.	Plan and conduct a winterizing program for farm equipment	1	2	3	4	5
58.	Safely and properly operate the following equipment in the field: tractor, tillage implement, seeding or fertilizing implement, and harvesting implement	1	2	3	4	5
59.	Calibrate or adjust common farm implements	1	2	3	4	5
60.	Recondition and return to proper working order common farm implements	1	2	3	4	5
61.	Select a pump for a home water or irrigation system	1	2	3	4	5
62.	Make carburetion, governor, and ignition adjustments for proper operation of both four- and two-cycle engines	1	2	3	4	5
63.	Store various fuels safely	1	2	3	4	5
64.	Safely operate a tractor under various loads in both field and road conditions	1	2	3	4	5
65.	Plan an electrical system showing location of switches, outlets, ground fixtures, etc.	1	2	3	4	5
66.	Install electrical circuits according to code requirements	1	2	3	4	5
67.	Service an electric motor	1	2	3	4	5
68.	Select and install an electric motor with belt and pulleys	1	2	3	4	5
69.	Reverse the direction of an electric motor	1	2	3	4	5
70.	Service electrical circuits	1	2	3	4	5
71.	Identify common building materials, including lumber, nails, hardware items, and fencing materials	1	2	3	4	5
72.	Figure a bill of materials and compute its cost from a farm building plan	1	2	3	4	5
73.	Plan and carry out a building maintenance and improvement program	1	2	3	4	5

		<u>Competence Level</u>				
		<u>AGRICULTURAL PRODUCTION</u>				
		<u>Skills or Competencies</u>				
		Highest	Above Avg.	Average	Low	None
74.	Using a farm level, lay out a building foundation complete with batten boards.	1	2	3	4	5
75.	Properly select and use both hand and power tools	1	2	3	4	5
76.	Sharpen various cutting tools	1	2	3	4	5
77.	Lay out and erect fences	1	2	3	4	5
78.	Select a paint or preservative, prepare the surface, and apply paint	1	2	3	4	5
79.	Compute storage volumes of barns, silos, bins, and concrete jobs	1	2	3	4	5
80.	Properly care for and maintain the home disposal system . . .	1	2	3	4	5
81.	Construct farm buildings	1	2	3	4	5
82.	Select electrodes for various welding jobs	1	2	3	4	5
83.	Demonstrate proper welding technique for different kinds of welds from various welding positions	1	2	3	4	5
84.	Demonstrate the proper technique in using the oxyacetylene equipment in cutting, brazing, and mild steel welding . . .	1	2	3	4	5
85.	Select a plan and construct farm implements	1	2	3	4	5
86.	Select pipe, fittings, measure, mark, cut, ream, and thread pipe	1	2	3	4	5
87.	Repair and maintain water system	1	2	3	4	5
88.	Select, measure, mark, cut, and splice plastic pipe	1	2	3	4	5
89.	Couple remote hydraulic cylinder according to needs	1	2	3	4	5
90.	Select hydraulic remote cylinder according to needs	1	2	3	4	5
91.	Maintain hydraulic systems	1	2	3	4	5
92.	Interpret Nebraska Tractor Test Reports as an aid in tractor selection	1	2	3	4	5
93.	Select farm equipment on the basis of needs, price, and available service	1	2	3	4	5
94.	Participate in civic affairs as an informed member of the community	1	2	3	4	5
95.	Present and expand personal views logically and concisely to individuals or groups	1	2	3	4	5
96.	Properly use parliamentary procedure to participate in making a decision through use of motions and discussion . .	1	2	3	4	5
97.	Organize and develop an agenda for a business meeting . . .	1	2	3	4	5
98.	Chair an orderly business meeting	1	2	3	4	5
99.	Establish and maintain an accurate record system for:					
	a. production records	1	2	3	4	5
	b. breeding records	1	2	3	4	5
	c. machinery maintenance records	1	2	3	4	5
	d. tax records	1	2	3	4	5
100.	Develop a farm lease	1	2	3	4	5
101.	Establish a calendar of job operations for common farm enterprises	1	2	3	4	5
102.	Prepare a budget for common farm enterprises	1	2	3	4	5
103.	Analyze needs and purchase adequate insurance coverages . .	1	2	3	4	5

Competence LevelAGRICULTURAL PRODUCTION

<u>Skills or Competencies</u>		Highest	Above Avg.	Average	Low	None
104.	Complete federal and state income tax forms	1	2	3	4	5
105.	Compute property taxes on home farm from assessments made by the county assessor	1	2	3	4	5
106.	Compute depreciation, interests, and discounts	1	2	3	4	5
107.	Write and interpret written contracts, and evaluate them on the basis of equitable rights and obligations	1	2	3	4	5
108.	Properly reconcile a bank statement	1	2	3	4	5
109.	Compute and compare the interest rates charged by various merchants and lending institutions in the community	1	2	3	4	5
110.	Fill out a loan application	1	2	3	4	5
111.	Identify forms of credit and possible lending agencies available to the farmer	1	2	3	4	5
112.	Analyze farm enterprises in terms of profit or loss	1	2	3	4	5
113.	Develop a crop rotation system	1	2	3	4	5
114.	Apply the decision-making process, using established budgeting criteria to make management decisions	1	2	3	4	5
115.	Using established criteria determine a fair price for land	1	2	3	4	5
116.	Identify those farm organizations active in the local community	1	2	3	4	5
117.	Complete forms for participation in various government programs	1	2	3	4	5
118.	Compute the yield, value of product, cost of production for crops and livestock enterprises	1	2	3	4	5
119.	Compare costs of doing business through a cooperative with other businesses	1	2	3	4	5
120.	Establish criteria and evaluate local community agriculture occupations in terms of opportunities	1	2	3	4	5
121.	Prepare a personal data sheet to include:					
	a. personal information	1	2	3	4	5
	b. job objective	1	2	3	4	5
	c. education	1	2	3	4	5
	d. work experience	1	2	3	4	5
	e. references	1	2	3	4	5
122.	Correctly fill out an application for employment	1	2	3	4	5
123.	Write a letter of application	1	2	3	4	5

6

AGRICULTURAL PRODUCTIONCompetence Level

Please write below any other competencies (skills) which you feel would fall in the "Highest (1)" or "Above Average (2)" competence levels for this occupational area. In the column at the right please indicate by number the competence level of each skill.

Highest	Above Avg.	Average	Low	None
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Thank you for your assistance!

APPENDIX B

ORNAMENTAL HORTICULTURE COMPETENCY LIST
FOR INDUSTRY VALIDATION OF "HIGH ABILITY"
COMPETENCIES

INSTRUCTIONS: For Completing Competency
Selection Instrument

1. Remember the purpose:

We are attempting to identify those job skills (competencies) which will tend to reflect the greatest degree of competence (ability) in each occupational area.

2. Review the attached "Response Code Definitions" to be used in responding to each competency listed.
3. Rank all listed competencies using the above five point scale. Circle only one number for each competency. Choose that number which most nearly reflects your feelings about that competency.
4. We encourage you to alter the wording of competencies which are incorrectly stated or which could be stated more clearly. Please note such alterations directly above the competency or on the back of the page.
5. Please do not discuss any competency with your fellow committee members while completing the instrument. We desire your valuable individual opinions rather than a consensus of the group. If you have questions I will be happy to provide individual assistance.
6. PLEASE NOTE - - - VERY IMPORTANT!

You are very close to the industry which provides jobs for the occupational areas represented here. Please help us by completing the last section of the instrument--which requests that you write in other competencies which we have missed! Please add any other competencies which you feel would fall in the "Highest (1)" or "Above Average (2)" competence levels for this occupational area. Please consider those competencies that you most like to see in employees in this occupational area. Only with your help can we compile a complete listing of those "high quality" competencies.

7. Please be sure to place your name in the upper right-hand corner of the front page of each instrument.

Thank you for your valuable assistance!

RESPONSE CODE DEFINITIONS:

<u>Response Code</u>	<u>Definition</u>
1	This skill reflects the <u>highest</u> level of competence in the occupational area.
2	This skill reflects an <u>above average</u> level of competence in the occupational area.
3	This skill reflects an <u>average</u> level of competence in the occupational area.
4	This skill reflects a <u>low</u> level of competence in the occupational area.
5	This skill does not reflect competence in the occupational area. (Column headed <u>none</u>).

The underlined words in each definition are used to head the appropriate number column on the competency listing. Please circle that number most representative of your feelings about the competency. Circle only one number per competency.

Name _____

ORNAMENTAL HORTICULTURE OCCUPATIONS
(01.0500)

Please CIRCLE only ONE response per line.Competence Level

<u>Skills or Competencies</u>	<u>Competence Level</u>				
	Highest	Above Average	Average	Low	None
1. Identify common plant materials:					
a. flowers	1	2	3	4	5
b. turf, grasses	1	2	3	4	5
c. shrubs	1	2	3	4	5
d. trees	1	2	3	4	5
2. Identify and select plants for production, based upon market demand	1	2	3	4	5
3. Prepare growing media for each type of plant, to be produced	1	2	3	4	5
4. Prepare rooting media	1	2	3	4	5
5. Start plants from seeds, bulbs and tubers	1	2	3	4	5
6. Propagate plants from cuttings and layerage	1	2	3	4	5
7. Maintain parent stock	1	2	3	4	5
8. Determine moisture needs of plants	1	2	3	4	5
9. Fertilize plants based on need as determined by soil test	1	2	3	4	5
10. Take soil samples and interpret soil test results	1	2	3	4	5
11. Properly regulate greenhouse environment including:					
a. temperature	1	2	3	4	5
b. light	1	2	3	4	5
c. humidity	1	2	3	4	5
12. Identify common plant pests (weeds)	1	2	3	4	5
13. Apply spray, smoke, and fog to control plant pests	1	2	3	4	5
14. Pot and transplant various sizes of plants	1	2	3	4	5
15. Disbud, cut, and grade flowers	1	2	3	4	5
16. Regulate plant growth through use of chemicals	1	2	3	4	5
17. Safely operate and conduct routine maintenance on such equipment as:					
a. small tractors	1	2	3	4	5
b. rototiller	1	2	3	4	5
c. loader	1	2	3	4	5
d. soil shredder	1	2	3	4	5
e. spray equipment	1	2	3	4	5
f. mowers	1	2	3	4	5
g. sodcutter	1	2	3	4	5
h. chainsaw	1	2	3	4	5
i. small trencher	1	2	3	4	5
j. areator and thatcher	1	2	3	4	5
k. light duty trucks	1	2	3	4	5

ORNAMENTAL HORTICULTURE		Competence Level				
Skills or Competencies		Highest	Above Avg.	Average	Low	None
18.	Properly calibrate such equipment as:					
	a. sprayers	1	2	3	4	5
	b. fertilizer spreaders	1	2	3	4	5
	c. seeding equipment	1	2	3	4	5
19.	Make routine plumbing and electrical repairs	1	2	3	4	5
20.	Read and properly interpret schematic drawings and blue-print	1	2	3	4	5
21.	Construct and install simple structures such as fences, decks, paths and patios	1	2	3	4	5
22.	Design floral arrangements	1	2	3	4	5
23.	Prepare floral arrangements for weddings, funerals and commercial display	1	2	3	4	5
24.	Cut and recondition flowers	1	2	3	4	5
25.	Package plants and flower arrangements according to special characteristics of plant materials	1	2	3	4	5
26.	Design and arrange artificial flowers	1	2	3	4	5
27.	Give correct advice on plant care	1	2	3	4	5
28.	Sell plants and complete related business transactions	1	2	3	4	5
29.	Establish and properly maintain such business records as:					
	a. production records	1	2	3	4	5
	b. inventory records	1	2	3	4	5
	c. sales records	1	2	3	4	5
	d. equipment maintenance records	1	2	3	4	5
	e. tax records	1	2	3	4	5
30.	Investigate available sources of credit and make credit arrangements	1	2	3	4	5
31.	Properly prepare a budget for horticulture enterprises	1	2	3	4	5
32.	Properly complete state and federal tax forms	1	2	3	4	5
33.	Estimate types of flowers and plants to be used for special occasions according to records	1	2	3	4	5
34.	Rotate stock being displayed for sale	1	2	3	4	5
35.	Deliver merchandise by motor vehicle	1	2	3	4	5
36.	Take merchandise orders, transfer orders by phone or wire service	1	2	3	4	5
37.	Produce and wholesale horticultural plant materials	1	2	3	4	5
38.	Retail diversified stock, (flowers, plants, ceramics), or (seed, shrubs, lawn equipment)	1	2	3	4	5
39.	Shape trees and shrubs for growth and beauty	1	2	3	4	5
40.	Properly graft fruit tree stock	1	2	3	4	5
41.	Prune fruit trees for production	1	2	3	4	5
42.	Recognize problems arising from insects, rodents, and diseases	1	2	3	4	5
43.	Determine and properly apply control measures for insects, rodents, and diseases	1	2	3	4	5
44.	Identify and correct soil drainage problems	1	2	3	4	5
45.	Plan, install, and operate watering systems	1	2	3	4	5
46.	Ball and wrap plants	1	2	3	4	5
47.	Grade plants according to quality	1	2	3	4	5

ORNAMENTAL HORTICULTURECompetence LevelSkills or Competencies

48.	Plan, and construct plant growing structures including: plumbing, electrical, carpentry and concrete	1	2	3	4	5
49.	Repair and maintain plant growing structures including: plumbing, electrical, carpentry, and concrete	1	2	3	4	5
50.	Plant and maintain turf	1	2	3	4	5
51.	Install and maintain turf	1	2	3	4	5
52.	Level and grade land with motorized equipment and by hand	1	2	3	4	5
53.	Condition soils: apply bark dust, peat moss, sand, loamite, etc.	1	2	3	4	5
54.	Identify and properly install plants according to a landscape plan	1	2	3	4	5
55.	Identify and install landscape complements according to a landscape plan; aggregate, river rock, large rocks, gravel, etc.	1	2	3	4	5
56.	Install edging materials to contain soil, aggregate and turf	1	2	3	4	5
57.	Remove old shrubs and trees using winch, etc.	1	2	3	4	5
58.	Determine drift hazard for spraying.	1	2	3	4	5
59.	Estimate cost of landscape jobs	1	2	3	4	5
60.	Develop a plot plan for landscaping.	1	2	3	4	5
61.	Develop detailed landscape design plans	1	2	3	4	5
62.	Conduct aerating and thatching operations on turf	1	2	3	4	5
63.	Clean and sterilize greenhouse prior to use	1	2	3	4	5
64.	Maintain a completed landscape	1	2	3	4	5
65.	Transplant mature shrubs and trees	1	2	3	4	5
66.	Stratify and treat seed	1	2	3	4	5
67.	Select plant materials for specific purpose	1	2	3	4	5
68.	Sterilize soil	1	2	3	4	5
69.	Prepare soil mixtures	1	2	3	4	5
70.	Prepare seedbeds	1	2	3	4	5
71.	Read and properly interpret chemical and fertilizer labels	1	2	3	4	5
72.	Determine proper application rates for chemicals and fertilizers	1	2	3	4	5
73.	Operate and maintain a shade house	1	2	3	4	5

4

ORNAMENTAL HORTICULTURECompetence Level

Please write below any other competencies (skills) which you feel would fall in the "Highest (1)" or "Above Average (2)" competence levels for this occupational area. In the column at the right please indicate by number the competence level of each skill.

Highest	Above Avg.	Average	Low	None
1	2	3	4	5

Thank you for your assistance!

APPENDIX C

TECHNICAL AGRICULTURE COMPETENCY REVIEW
VALIDATION COMMITTEE

TECHNICAL AGRICULTURE COMPETENCY
REVIEW AND VALIDATION COMMITTEE

Ornamental Horticulture
Committee:

Mr. Al Ekblad
Fort Collins Nursery
2121 E. Mulberry
Fort Collins, Colorado 80521

Mr. Larry Watson
Western Evergreen, Inc.
14201 W. 44th
Golden, Colorado 80401

Mr. William Gunesch
Park Floral Co.
1090 W. Hampton Ave.
Englewood, Colorado 80110

Mr. Glen Bechtholdt
Highland Nursery
5002 W. 20th St.
Greeley, Colorado 80631

Mr. Paul Shapard
Shapard's Garden
5350 Arapahoe
Boulder, Colorado 80303

Mr. Robert Horst
Kroh Nursery
5250 N. Garfield Ave.
Loveland, Colorado 80537

Mr. Tom Bathe
Bathe Landscape
P.O. Box 1966
Fort Collins, Colorado 80522

Mr. Gary Stretesky
1590 S. Queen St.
Lakewood, Colorado 80226

Production Agriculture
Committee:

Mr. Arven Vondy
Box 260
Woodrow, Colorado 80757

Mr. Ben Weitzel
215 Hospital Road
Brush, Colorado 80723

Mr. Roy Swanson
E. County Road 54
Fort Collins, Colorado 80521

Mr. Richard Boxberger
30805 E. Vine
Fort Collins, Colorado 80521

Mr. Glen Johnson
3901 S. County Road 9
Fort Collins, Colorado 80521

Mr. Harold Einarson
1312 NE Frontage Road
Fort Collins, Colorado 80521

Mr. Ken Ochsner
403 Horsetooth West Road
Fort Collins, Colorado 80521

Mr. Maynard Smith
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Eagle, Colorado 81631

Mr. Carl Zeiler
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Loveland, Colorado 80537

Mr. Ronnie Ruff
5117 S. County Road 9
Fort Collins, Colorado 80521

Ornamental Horticulture
Committee: (cont)

Mr. Tom Haynie
Fossil Creek Nursery
4919 S. College
Fort Collins, Colorado 80521

Mr. Steve Driftmier
W.W. Wilmore Nursery
Box 218
Wheat Ridge, Colorado 80033

Mr. Darrell Stapleton
Stapleton Greenhouse
1833 Ridgecrest Road
Fort Collins, Colorado 80521

Mr. Dean Roberts
The Plantorium
Box 485
LaPorte, Colorado 80535

Mr. James Barnes
Country Gardens
2417 E. Mulberry
Fort Collins, Colorado 80521

Mr. Clyde Bauer
Bristol Floral
114 S. College Ave.
Fort Collins, Colorado 80521

Mr. Richard Darst
Leah's Flowers
423 S. Mason
Fort Collins, Colorado 80521

Production Agriculture
Committee: (cont)

Mr. Robert Stiben
5608 NE Frontage Rd.
Fort Collins, Colorado 80521

Mr. M. A. (Pat) Ferree
Rural Route
Livermore, Colorado 80536

Mr. Art Koldeway
6228 N. County Road 13
Loveland, Colorado 80537

Mr. Harlan Seaworth
11801 N. County Road 9
Wellington, Colorado

APPENDIX D

FINAL SURVEY INSTRUMENT FOR PRODUCTION
AGRICULTURE

OCCUPATIONAL EXPERIENCE STUDY
PERSONAL DATA SHEET

Instructions:

This is the first of three sections in this instrument. It is designed to gather demographic data about the individual respondent. Please circle the appropriate number or enter data in the space provided. Necessary instructions are provided on each question. Please remember that your totally honest answers are most valuable to this research effort!

1. Sex (Circle number): 1 - Male 2 - Female

2. Your Age: _____
Years

3. Indicate the Vocational Service area in which you have primary teaching responsibility (Circle number):

- | | |
|-----------------------------------|-------------------------------|
| 1 - Vocational Agriculture | 3 - Vocational Home Economics |
| 2 - Business and Office Education | 4 - Other _____ |

4. Indicate the occupational area in which you are currently employed as a vocational teacher (Circle number):

- | | | |
|------------------------------|-------------------------|----------------------------|
| 1 - Production Agriculture | 5 - General Clerical | 8 - Food Service |
| 2 - Ornamental Horticulture | 6 - Steno-Secretarial | 9 - Child Care/Development |
| 3 - Accounting and Computing | 7 - Consumer Homemaking | 10 - Other _____ |
| 4 - Data Processing | | |

5. Indicate years of high school vocational training, received in the occupational area in which you are now teaching (Circle number):

- | | | |
|------------|-------------|--------------------------------|
| 1 - None | 3 - 2 years | 5 - 4 years |
| 2 - 1 year | 4 - 3 years | 6 - _____ years (Indicate No.) |

6. Indicate number of years of formal education completed to date, beginning grade 1 (Circle number):

- | | | |
|-----------------------|--------------|---------------------------------|
| 1 - Less than 8 years | 5 - 12 years | 9 - 16 years |
| 2 - 9 years | 6 - 13 years | 10 - 17 years |
| 3 - 10 years | 7 - 14 years | 11 - 18 years |
| 4 - 11 years | 8 - 15 years | 12 - _____ years (Indicate No.) |

7. Indicate degree(s) completed to date and if completed in Colorado or out of State (Circle all appropriate numbers):

	Completed In	
	Colorado	Other State
1 - High School	1	2
2 - Associate (AS).	1	2
3 - Baccalaureate (BS).	1	2
4 - Masters (MS).	1	2
5 - Doctorate (PhD)	1	2
6 - Other _____	1	2

8. Where did you obtain your undergraduate teacher training? (Circle one number):

- | | | |
|--------------------------------|--------------------------------|-------------------------------|
| 1 - Adams State College | 4 - University of Colorado | 7 - Western State College |
| 2 - Colorado State University | 5 - Univ. of Northern Colorado | 8 - Other Colo. Schools _____ |
| 3 - Metropolitan State College | 6 - Univ. of Southern Colorado | 9 - Another State |

9. Indicate the total number of years employed in public school teaching, including this year.

(Years)

10. Indicate the number of years of full-time public school teaching in the vocational service area in which you are now teaching (include this year).

(Years)

Definition RELATED OCCUPATIONAL EXPERIENCE - "Practical" Industry experience (not teaching) with those technical subject matter competencies related to your area of vocational instruction.

11. Indicate the number of:

- A. Months of full-time occupational experience related to your area of vocational instruction, prior to becoming a vocational teacher. _____
(Months)
- B. Months of full-time occupational experience related to your area of vocational instruction completed since becoming a vocational teacher. _____
(Months)
- C. Hours of part-time occupational experience related to your area of vocational instruction completed since becoming a vocational teacher. _____
(Hours)
- D. Months of full-time occupational experience related to your area of vocational instruction completed in the last 5 years.
(Since January, 1971) _____
(Months)
- E. Hours of part-time occupational experience related to your area of vocational instruction completed in the last 5 years.
(Since January, 1971) _____
(Hours)
12. Indicate the month and year that you were last involved in related, full-time occupational experience which was 3 months or longer in duration. _____
(Month) (Year)
13. In your opinion, how important is the instructor's related occupational experience to vocational program success?
(Circle the number which most nearly reflects your opinion) XXXXXXXXXXXXXXXX
10 -- 9 -- 8 -- 7 -- 6 -- 5 -- 4 -- 3 -- 2 -- 1
Very Important Not Important
14. In your opinion, how many years of full-time occupational experience related to the area of vocational instruction should be required of teachers in your vocational service area? _____
(Years)
15. In your opinion, how important is recent occupational experience in maintaining subject matter competence in your vocational service area?
(Circle the number which most nearly reflects your opinion) XXXXXXXXXXXXXXXX
10 -- 9 -- 8 -- 7 -- 6 -- 5 -- 4 -- 3 -- 2 -- 1
Very Important Not Important
16. In your opinion, how often should a vocational instructor return to industry for update of related occupational experience? Every _____ Years

Write below any comments you wish to add concerning occupational experience:

TEACHER ATTITUDE SCALE

This is the second of three sections in this instrument. Below are several statements related to occupational experience of vocational teachers. Read each statement carefully and indicate the degree to which you agree or disagree, according to the following scale:

- 1 - Strongly Disagree - I strongly disagree with the statement.
- 2 - Disagree - I disagree with the statement, but not strongly so.
- 3 - Neutral - I am neutral toward the statement, or I just don't know enough about it.
- 4 - Agree - I agree with the statement, but not strongly so.
- 5 - Strongly Agree - I strongly agree with the statement.

CIRCLE only ONE response per line.

- | | Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree |
|---|---|
| As a vocational teacher, I believe that | |
| 1. Recent occupational experience is vital in maintaining subject matter competence. . . | 1 2 3 4 5 |
| 2. Occupational experience unrelated to the area of vocational instruction is as valuable to vocational teachers as related occupational experience. | 1 2 3 4 5 |
| 3. Vocational teachers should have a minimum of five years of occupational experience related to the area of vocational instruction, prior to teaching. | 1 2 3 4 5 |
| 4. Of that occupational experience gained prior to teaching, part-time experience is as valuable as full-time experience, in development of subject matter competence. . . | 1 2 3 4 5 |
| 5. Teacher communication with related industry is directly dependent upon the vocational instructors' subject matter competence | 1 2 3 4 5 |
| 6. Occupational experience, to be of value, must be both recent, and related to the area of occupational instruction. | 1 2 3 4 5 |
| 7. The more recent the related occupational experience, the more valuable it is to the vocational teacher in providing relevant instruction. | 1 2 3 4 5 |
| 8. Full-time occupational experience related to the area of vocational instruction, is necessary for vocational instructors to gain subject matter competence | 1 2 3 4 5 |
| 9. If the vocational teacher knows how to teach, he can acquire subject matter competence on the job | 1 2 3 4 5 |
| 10. Recent, related occupational experience by vocational teachers is necessary for successful student placement. | 1 2 3 4 5 |
| 11. The more occupational experience, of any kind, that instructors have, the more competent they will be in their service area. | 1 2 3 4 5 |
| 12. All occupational experience is of equal value to the vocational teacher | 1 2 3 4 5 |
| 13. Full-time occupational experience related to the area of occupational instruction should be required of all vocational teachers prior to teaching | 1 2 3 4 5 |
| 14. One year of occupational experience related to the area of vocational instruction will provide sufficient subject matter competence to teach my occupational area . . . | 1 2 3 4 5 |
| 15. Teacher training course work is a better source of subject matter competencies than related occupational experience. | 1 2 3 4 5 |
| 16. Periodic, full-time occupational experience related to the area of vocational instruction should be required of practicing vocational teachers. | 1 2 3 4 5 |
| 17. Related occupational experience is necessary for the vocational teacher to relate to the needs of industry for which he trains workers. | 1 2 3 4 5 |
| 18. Periodic, part-time occupational experience related to the area of vocational instruction should be required of practicing vocational teachers. | 1 2 3 4 5 |
| 19. Successful student placement is dependent upon the subject matter competence of the vocational teacher. | 1 2 3 4 5 |
| 20. Effectiveness of the vocational teacher is directly related to subject matter competence. | 1 2 3 4 5 |
| 21. Occupational experience related to the area of vocational instruction is necessary to provide for successful student placement | 1 2 3 4 5 |
| 22. Related occupational experience, more than five years past, is of little value to the vocational teacher | 1 2 3 4 5 |

TECHNICAL COMPETENCE--SELF EVALUATION
Agricultural Production Occupations

This is the third and final part of a three part instrument. Listed below are a number of skills used in Production Agriculture Occupations. Read each skill statement carefully, and in the left hand columns, indicate your ability to perform that skill, according to the following scale:

- 1 - Cannot Perform -- Unable to perform this skill.
- 2 - Low Level -- Can perform, but only at a moderate level.
- 3 - Average Level -- Can perform at an average level.
- 4 - Above Average Level -- Can perform at a better than average level.
- 5 - High Level -- Highly competent in performing this skill.

In the right hand columns, indicate that single primary source from which you gained each skill, using the following code:

- 1 - On-Farm Experience -- Gained this skill primarily from farm or ranch experience prior to teaching
- 2 - Ag-Related, Off-Farm Experience -- Gained this skill primarily from experience in ag-related business prior to teaching.
- 3 - Part-Time Farming While Teaching -- Gained this skill primarily from part-time farming while teaching.
- 4 - Preservice Teacher Preparation -- Gained this skill primarily through my teacher preparation program, prior to teaching.
- 5 - Inservice Teacher Preparation -- Gained this skill primarily through workshops, short courses, etc., since I began teaching.
- 6 - Voc Ag Teaching Experience -- Gained this skill primarily through teaching vocational agriculture.
- 7 - Other -- Gained this skill primarily from sources other than those listed above.

Performance
Level

Source

Cannot
Low Level
Average
Above Avg.
High Level

CIRCLE only ONE performance number and ONE source number per skill.

Skills

On-Farm
Ag-Related
Part-Time
Preservice
Inservice
Vo Ag Teach.
Other

- | | | |
|-------------|--|---------------|
| 1 2 3 4 5 - | 1. Safely operate a tractor under various loads in both field and road conditions. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 2. Determine the nutrient requirements of various types of livestock found in the community | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 3. Make decisions concerning use of fertilizers and soil amendments based upon results of soil and/or foliage tests. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 4. Plan a soil improvement program for a specific crop using various materials purchased from local sources | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 5. Store various fuels so as to maintain purity and safety. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 6. Prepare a budget for common farm enterprises | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 7. Develop maintenance schedules for common farm equipment using service manual | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 8. Plan a livestock improvement program for a type of livestock in the community; specify breed, schedules for breeding, sire-dam ratio, culling program indicating standards. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 9. Identify nutrient deficiency signs in crops. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 10. Properly use parliamentary procedure to participate in making a decision through use of motions and discussion | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 11. Interpret market reports in newspaper and official reporting services | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 12. Select farm equipment on the basis of needs, price, and available service. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 13. Analyze production records to determine if management practices were profitable. | 1 2 3 4 5 6 7 |
| 1 2 3 4 5 - | 14. Participate in civic affairs as an informed member of the community. | 1 2 3 4 5 6 7 |

Performance Level					Source											
Cannot	Low Level	Average	Above Avg.	High Level	On-Farm Ag-Related Part-Time Preservice Inservice No Ag Teach. Other											
					CIRCLE only ONE performance number and ONE source number per skill.											
					Skills											
1	2	3	4	5	15. Establish and maintain an accurate record system for:	1	2	3	4	5	6					
1	2	3	4	5	a. production records	1	2	3	4	5	6	7				
1	2	3	4	5	b. breeding records	1	2	3	4	5	6	7				
1	2	3	4	5	c. machinery maintenance records.	1	2	3	4	5	6	7				
1	2	3	4	5	d. tax records.	1	2	3	4	5	6	7				
1	2	3	4	5	16. Use a chart for determining gestation and heat periods for farm animals.	1	2	3	4	5	6	7				
1	2	3	4	5	17. Identify forms of credit and possible lending agencies available to the farmer.	1	2	3	4	5	6	7				
1	2	3	4	5	18. Carry out a maintenance program on farm implements in a safe and workmanlike manner	1	2	3	4	5	6	7				
1	2	3	4	5	19. Recondition and return to proper working order common farm implements.	1	2	3	4	5	6	7				
1	2	3	4	5	20. Calculate application rates of fertilizer for a specific crop. . . .	1	2	3	4	5	6	7				
1	2	3	4	5	21. Select livestock, in accordance with breeding and marketing standards.	1	2	3	4	5	6	7				
1	2	3	4	5	22. Demonstrate the proper technique in using the oxyacetylene equipment in cutting, brazing and mild steel welding	1	2	3	4	5	6	7				
1	2	3	4	5	23. Recognize and treat parasite infestations in livestock	1	2	3	4	5	6	7				
1	2	3	4	5	24. Compute the cost of fertilizing a crop using various materials purchased from local sources	1	2	3	4	5	6	7				
1	2	3	4	5	25. Identify common noxious weeds in the community	1	2	3	4	5	6	7				
1	2	3	4	5	26. Properly reconcile a bank statement.	1	2	3	4	5	6	7				
1	2	3	4	5	27. Plan and conduct a winterizing program for farm equipment.	1	2	3	4	5	6	7				
1	2	3	4	5	28. Compute and compare the interest rates charged by various merchants and lending institutions in the community.	1	2	3	4	5	6	7				
1	2	3	4	5	29. Read labels and analyze fertilizers on the market.	1	2	3	4	5	6	7				
1	2	3	4	5	30. Analyze management practices for possible improvements to increase profits	1	2	3	4	5	6	7				
1	2	3	4	5	31. Determine when a soil is ready to till	1	2	3	4	5	6	7				
1	2	3	4	5	32. Present and expand personal views logically and concisely to individuals or groups.	1	2	3	4	5	6	7				
1	2	3	4	5	33. Design a program to promote good health and safety of farm animals .	1	2	3	4	5	6	7				
1	2	3	4	5	34. Determine correct applications and safety measures for a weed control program.	1	2	3	4	5	6	7				
1	2	3	4	5	35. Calibrate or adjust common farm implements	1	2	3	4	5	6	7				
1	2	3	4	5	36. Apply the decision-making process, using established budgeting criteria to make management decisions.	1	2	3	4	5	6	7				
					37. Perform common livestock practices such as:											
1	2	3	4	5	a. castrating	1	2	3	4	5	6	7				
1	2	3	4	5	b. dehorning.	1	2	3	4	5	6	7				
1	2	3	4	5	c. hoof trimming.	1	2	3	4	5	6	7				
1	2	3	4	5	d. giving injections.	1	2	3	4	5	6	7				
1	2	3	4	5	e. treat for bloat.	1	2	3	4	5	6	7				

Performance Level						Source									
Cannot	Low Level	Average	Above Avg.	High Level			On-Farm	Ag-Related	Part-Time	Preservice	Inservice	Vo Ag Teach.	Other		
CIRCLE only ONE performance number and ONE source number per skill.															
Skills															
1	2	3	4	5	-	38.	Compare the cost of various chemicals designed to accomplish like purposes.	1	2	3	4	5	6	7	
1	2	3	4	5	-	39.	Compute the yield, value of product, and cost of production for crops and livestock enterprises.	1	2	3	4	5	6	7	
1	2	3	4	5	-	40.	Apply fertilizer to a crop using acceptable methods, recommended rates, and at the proper time.	1	2	3	4	5	6	7	
1	2	3	4	5	-	41.	Develop a crop rotation system	1	2	3	4	5	6	7	
1	2	3	4	5	-	42.	Demonstrate proper welding technique for different kinds of welds from various welding positions	1	2	3	4	5	6	7	
						43.	Analyze progeny records for such things as:								
1	2	3	4	5	-	a.	pounds of gain per pound of feed	1	2	3	4	5	6	7	
1	2	3	4	5	-	b.	average daily weight gain.	1	2	3	4	5	6	7	
1	2	3	4	5	-	c.	carcass yield and quality.	1	2	3	4	5	6	7	
1	2	3	4	5	-	d.	cost per pound of gain	1	2	3	4	5	6	7	
1	2	3	4	5	-	44.	Determine market grades of livestock and crops	1	2	3	4	5	6	7	
1	2	3	4	5	-	45.	Select good quality livestock feedstuffs	1	2	3	4	5	6	7	
1	2	3	4	5	-	46.	Recognize common livestock diseases and health problems.	1	2	3	4	5	6	7	
1	2	3	4	5	-	47.	Analyze farm enterprises in terms of profit or loss.	1	2	3	4	5	6	7	
1	2	3	4	5	-	48.	Irrigate and determine the frequency of irrigation for profitable crop production.	1	2	3	4	5	6	7	
1	2	3	4	5	-	49.	Interpret the meaning of labels found on chemical and pesticide containers	1	2	3	4	5	6	7	
1	2	3	4	5	-	50.	Determine land use and capability of typical soils in the community.	1	2	3	4	5	6	7	
1	2	3	4	5	-	51.	Safely and properly operate the following equipment in the field: tractor, tillage implement, seeding or fertilizing implement, and harvesting implement	1	2	3	4	5	6	7	
1	2	3	4	5	-	52.	Make intelligent management decisions when problems arise suddenly and unexpectedly.	1	2	3	4	5	6	7	
1	2	3	4	5	-	53.	Make proper use of current soil and water conservation practices	1	2	3	4	5	6	7	
1	2	3	4	5	-	54.	Determine how adverse weather conditions will effect production, and make necessary adjustments in the farming operation.	1	2	3	4	5	6	7	
1	2	3	4	5	-	55.	Determine the best time to plant, cultivate and harvest.	1	2	3	4	5	6	7	
1	2	3	4	5	-	56.	Use new varieties and farm chemicals for maximum crop production	1	2	3	4	5	6	7	

You have completed the survey. Please quickly recheck the instrument to make certain that your response is recorded on each item. Return the completed instrument to Colorado State University in the enclosed post-paid envelope at your earliest convenience. Thank you for your efforts, it is most appreciated!

APPENDIX E

FINAL SURVEY INSTRUMENT FOR ORNAMENTAL
HORTICULTURE

OCCUPATIONAL EXPERIENCE STUDY
PERSONAL DATA SHEET

Instructions:

This is the first of three sections in this instrument. It is designed to gather demographic data about the individual respondent. Please circle the appropriate number or enter data in the space provided. Necessary instructions are provided on each question. Please remember that your totally honest answers are most valuable to this research effort!

1. Sex (Circle number): 1 - Male 2 - Female
2. Your Age: _____
Years
3. Indicate the Vocational Service area in which you have primary teaching responsibility (Circle number):

1 - Vocational Agriculture	3 - Vocational Home Economics
2 - Business and Office Education	4 - Other _____
4. Indicate the occupational area in which you are currently employed as a vocational teacher (Circle number):

1 - Production Agriculture	5 - General Clerical	8 - Food Service
2 - Ornamental Horticulture	6 - Steno-Secretarial	9 - Child Care/Development
3 - Accounting and Computing	7 - Consumer Homemaking	10 - Other _____
4 - Data Processing		
5. Indicate years of high school vocational training, received in the occupational area in which you are now teaching (Circle number):

1 - None	3 - 2 years	5 - 4 years
2 - 1 year	4 - 3 years	6 - _____ years (Indicate No.)
6. Indicate number of years of formal education completed to date, beginning grade 1 (Circle number):

1 - Less than 8 years	5 - 12 years	9 - 16 years
2 - 9 years	6 - 13 years	10 - 17 years
3 - 10 years	7 - 14 years	11 - 18 years
4 - 11 years	8 - 15 years	12 - _____ years (Indicate No.)
7. Indicate degree(s) completed to date and if completed in Colorado or out of State (Circle all appropriate numbers):

	<u>Completed In</u>	
	<u>Colorado</u>	<u>Other State</u>
1 - High School	1	2
2 - Associate (AS).	1	2
3 - Baccalaureate (BS).	1	2
4 - Masters (MS).	1	2
5 - Doctorate (PhD)	1	2
6 - Other _____	1	2
8. Where did you obtain your undergraduate teacher training? (Circle one number):

1 - Adams State College	4 - University of Colorado	7 - Western State College
2 - Colorado State University	5 - Univ. of Northern Colorado	8 - Other Colo. Schools _____
3 - Metropolitan State College	6 - Univ. of Southern Colorado	9 - Another State _____
9. Indicate the total number of years employed in public school teaching, including this year. _____
(Years)
10. Indicate the number of years of full-time public school teaching in the vocational service area in which you are now teaching (include this year). _____
(Years)

Definition RELATED OCCUPATIONAL EXPERIENCE - "Practical" Industry experience (not teaching) with those technical subject matter competencies related to your area of vocational instruction.

11. Indicate the number of:

A. Months of full-time occupational experience related to your area of vocational instruction, prior to becoming a vocational teacher.

(Months)

B. Months of full-time occupational experience related to your area of vocational instruction completed since becoming a vocational teacher.

(Months)

C. Hours of part-time occupational experience related to your area of vocational instruction completed since becoming a vocational teacher.

(Hours)

D. Months of full-time occupational experience related to your area of vocational instruction completed in the last 5 years.
(Since January, 1971)

(Months)

E. Hours of part-time occupational experience related to your area of vocational instruction completed in the last 5 years.
(Since January, 1971)

(Hours)

12. Indicate the month and year that you were last involved in related, full-time occupational experience which was 3 months or longer in duration.

(Month) (Year)

13. In your opinion, how important is the instructor's related occupational experience to vocational program success?

(Circle the number which most nearly reflects your opinion)

10 -- 9 -- 8 -- 7 -- 6 -- 5 -- 4 -- 3 -- 2 -- 1

Very Important

Not Important

XXXXXXXXXXXXXX

14. In your opinion, how many years of full-time occupational experience related to the area of vocational instruction should be required of teachers in your vocational service area?

(Years)

15. In your opinion, how important is recent occupational experience in maintaining subject matter competence in your vocational service area?
(Circle the number which most nearly reflects your opinion)

10 -- 9 -- 8 -- 7 -- 6 -- 5 -- 4 -- 3 -- 2 -- 1

Very Important

Not Important

XXXXXXXXXXXXXX

16. In your opinion, how often should a vocational instructor return to industry for update of related occupational experience?

Every _____ Years

Write below any comments you wish to add concerning occupational experience:

TEACHER ATTITUDE SCALE

This is the second of three sections in this instrument. Below are several statements related to occupational experience of vocational teachers. Read each statement carefully and indicate the degree to which you agree or disagree, according to the following scale:

- 1 - Strongly Disagree - I strongly disagree with the statement.
- 2 - Disagree - I disagree with the statement, but not strongly so.
- 3 - Neutral - I am neutral toward the statement, or I just don't know enough about it.
- 4 - Agree - I agree with the statement, but not strongly so.
- 5 - Strongly Agree - I strongly agree with the statement.

CIRCLE only ONE response per line.

- | | Strongly Disagree
Disagree
Neutral
Agree
Strongly Agree |
|---|---|
| As a vocational teacher, I believe that | |
| 1. Recent occupational experience is vital in maintaining subject matter competence. . . | 1 2 3 4 5 |
| 2. Occupational experience unrelated to the area of vocational instruction is as valuable to vocational teachers as related occupational experience. | 1 2 3 4 5 |
| 3. Vocational teachers should have a minimum of five years of occupational experience related to the area of vocational instruction, prior to teaching. | 1 2 3 4 5 |
| 4. Of that occupational experience gained prior to teaching, part-time experience is as valuable as full-time experience, in development of subject matter competence. . . | 1 2 3 4 5 |
| 5. Teacher communication with related industry is directly dependent upon the vocational instructors' subject matter competence | 1 2 3 4 5 |
| 6. Occupational experience, to be of value, must be both recent, and related to the area of occupational instruction. | 1 2 3 4 5 |
| 7. The more recent the related occupational experience, the more valuable it is to the vocational teacher in providing relevant instruction. | 1 2 3 4 5 |
| 8. Full-time occupational experience related to the area of vocational instruction, is necessary for vocational instructors to gain subject matter competence | 1 2 3 4 5 |
| 9. If the vocational teacher knows how to teach, he can acquire subject matter competence on the job | 1 2 3 4 5 |
| 10. Recent, related occupational experience by vocational teachers is necessary for successful student placement. | 1 2 3 4 5 |
| 11. The more occupational experience, of any kind, that instructors have, the more competent they will be in their service area. | 1 2 3 4 5 |
| 12. All occupational experience is of equal value to the vocational teacher | 1 2 3 4 5 |
| 13. Full-time occupational experience related to the area of occupational instruction should be required of all vocational teachers prior to teaching | 1 2 3 4 5 |
| 14. One year of occupational experience related to the area of vocational instruction will provide sufficient subject matter competence to teach my occupational area . . . | 1 2 3 4 5 |
| 15. Teacher training course work is a better source of subject matter competencies than related occupational experience. | 1 2 3 4 5 |
| 16. Periodic, full-time occupational experience related to the area of vocational instruction should be required of practicing vocational teachers. | 1 2 3 4 5 |
| 17. Related occupational experience is necessary for the vocational teacher to relate to the needs of industry for which he trains workers. | 1 2 3 4 5 |
| 18. Periodic, part-time occupational experience related to the area of vocational instruction should be required of practicing vocational teachers. | 1 2 3 4 5 |
| 19. Successful student placement is dependent upon the subject matter competence of the vocational teacher. | 1 2 3 4 5 |
| 20. Effectiveness of the vocational teacher is directly related to subject matter competence. | 1 2 3 4 5 |
| 21. Occupational experience related to the area of vocational instruction is necessary to provide for successful student placement | 1 2 3 4 5 |
| 22. Related occupational experience, more than five years past, is of little value to the vocational teacher | 1 2 3 4 5 |

TECHNICAL COMPETENCE--SELF EVALUATION
Ornamental Horticulture Occupations

This is the third and final part of a three part instrument. Listed below are a number of skills used in Ornamental Horticulture Occupations. Read each skill statement carefully, and in the left hand columns, indicate your ability to perform that skill, according to the following scale:

- 1 - Cannot perform -- Unable to perform this skill
- 2 - Low Level -- Can perform, but only at a moderate level
- 3 - Average Level -- Can perform at an average level
- 4 - Above Average Level -- Can perform at a better than average level
- 5 - High Level -- Highly competent in performing this skill

In the right hand columns, indicate that single primary source from which you gained each skill, using the following code:

- 1 - Industry Experience in Horticulture -- Gained this skill primarily through working in the horticulture industry, prior to teaching.
- 2 - Part-Time Experience -- Gained this skill primarily through part-time work in the horticulture industry, while teaching.
- 3 - Preservice Teacher Preparation -- Gained this skill primarily through my teacher preparation program, prior to teaching.
- 4 - Inservice Teacher Preparation -- Gained this skill primarily through workshops, short courses, etc., since I began teaching.
- 5 - Horticulture Teaching Experience -- Gained this skill primarily through teaching vocational horticulture.
- 6 - Other -- Gained this skill primarily from sources other than those listed above.

Performance
Level

Level					Source									
Cannot	Low Level	Average	Above Avg.	High Level	If you cannot perform the skill, leave the source column blank. Please remember that your <u>honest</u> answers are most valuable to this research! <u>CIRCLE</u> only <u>ONE</u> performance number and <u>ONE</u> source number per skill.									
1	2	3	4	5	<u>Skills</u>									
1	2	3	4	5	1.	Retail diversified stock, (flowers, plants, ceramics), or (seed shrubs, lawn equipment)	1	2	3	4	5	6		
1	2	3	4	5	2.	Identify and correct soil drainage problems	1	2	3	4	5	6		
1	2	3	4	5	3.	Read and properly interpret chemical and fertilizer labels.	1	2	3	4	5	6		
1	2	3	4	5	4.	Clean and sterilize greenhouse prior to use	1	2	3	4	5	6		
1	2	3	4	5	5.	Properly regulate greenhouse environment including:								
1	2	3	4	5	a.	temperature	1	2	3	4	5	6		
1	2	3	4	5	b.	light	1	2	3	4	5	6		
1	2	3	4	5	c.	humidity.	1	2	3	4	5	6		
1	2	3	4	5	6.	Sterilize soil.	1	2	3	4	5	6		
1	2	3	4	5	7.	Sell plants and complete related business transactions.	1	2	3	4	5	6		
1	2	3	4	5	8.	Propagate plants from cuttings and layerage	1	2	3	4	5	6		
1	2	3	4	5	9.	Properly calibrate such equipment as:								
1	2	3	4	5	a.	sprayers.	1	2	3	4	5	6		
1	2	3	4	5	b.	fertilizer spreaders.	1	2	3	4	5	6		
1	2	3	4	5	c.	seeding equipment	1	2	3	4	5	6		
1	2	3	4	5	10.	Determine proper application rates for chemicals and fertilizers. . .	1	2	3	4	5	6		
1	2	3	4	5	11.	Apply spray, smoke, and fog to control plant pests.	1	2	3	4	5	6		
1	2	3	4	5	12.	Prepare soil mixtures	1	2	3	4	5	6		
1	2	3	4	5	13.	Estimate cost of landscape jobs	1	2	3	4	5	6		
1	2	3	4	5	14.	Fertilize plants based on need as determined by soil and/or foliage test.	1	2	3	4	5	6		
1	2	3	4	5	15.	Identify and install landscape complements according to a landscape plan; aggregate, river rock, large rocks, gravel, etc.	1	2	3	4	5	6		
1	2	3	4	5	16.	Develop a plot plan for landscaping	1	2	3	4	5	6		
					Industry	Part-Time	Preservice	Inservice	hort. Tchgs.	Other				

Performance Level					Skills	Source					
Cannot	Low Level	Average	Above Avg.	High Level		Industry	Part-Time	Preservice	Inservice	Hort. Tchng.	Other
					If you cannot perform the skill, leave the source column blank. Please remember that your <u>honest answers</u> are most valuable to this research! <u>CIRCLE</u> only <u>ONE</u> performance number and <u>ONE</u> source number per skill.						
					17. Identify common plant materials:						
1	2	3	4	5	a. flowers	1	2	3	4	5	6
1	2	3	4	5	b. shrubs	1	2	3	4	5	6
1	2	3	4	5	c. trees	1	2	3	4	5	6
1	2	3	4	5	18. Identify and properly install plants according to a landscape plan.	1	2	3	4	5	6
1	2	3	4	5	19. Prune fruit trees for production.	1	2	3	4	5	6
1	2	3	4	5	20. Maintain parent stock	1	2	3	4	5	6
1	2	3	4	5	21. Properly prepare a budget for horticulture enterprises.	1	2	3	4	5	6
1	2	3	4	5	22. Start plants from seeds, bulbs and tubers	1	2	3	4	5	6
1	2	3	4	5	23. Shape trees and shrubs for growth and beauty.	1	2	3	4	5	6
1	2	3	4	5	24. Recognize problems arising from insects, rodents, and diseases.	1	2	3	4	5	6
					25. Establish and properly maintain such business records as:						
1	2	3	4	5	a. production records.	1	2	3	4	5	6
1	2	3	4	5	b. inventory records	1	2	3	4	5	6
1	2	3	4	5	c. sales records	1	2	3	4	5	6
1	2	3	4	5	d. equipment maintenance records	1	2	3	4	5	6
1	2	3	4	5	e. tax records	1	2	3	4	5	6
1	2	3	4	5	26. Determine and properly apply control measures for insects, rodents, and diseases.	1	2	3	4	5	6
1	2	3	4	5	27. Level and grade land with motorized equipment and by hand	1	2	3	4	5	6
1	2	3	4	5	28. Determine moisture needs of plants.	1	2	3	4	5	6
					29. Safely operate and conduct routine maintenance on such equipment as:						
1	2	3	4	5	a. small tractor	1	2	3	4	5	6
1	2	3	4	5	b. rototiller.	1	2	3	4	5	6
1	2	3	4	5	c. loader.	1	2	3	4	5	6
1	2	3	4	5	d. soil shredder	1	2	3	4	5	6
1	2	3	4	5	e. spray equipment	1	2	3	4	5	6
1	2	3	4	5	f. light duty trucks	1	2	3	4	5	6
1	2	3	4	5	30. Identify common plant pests (weeds)	1	2	3	4	5	6
1	2	3	4	5	31. Operate and maintain a shade house (lathe).	1	2	3	4	5	6
1	2	3	4	5	32. Identify and select plants for production, based upon market demand	1	2	3	4	5	6
1	2	3	4	5	33. Determine drift hazard for spraying	1	2	3	4	5	6
1	2	3	4	5	34. Produce and wholesale horticultural plant materials	1	2	3	4	5	6
1	2	3	4	5	35. Take soil samples and interpret soil test results	1	2	3	4	5	6
1	2	3	4	5	36. Select plant materials for a specific purpose	1	2	3	4	5	6
1	2	3	4	5	37. Plan, and construct plant growing structures including: plumbing, electrical, carpentry and concrete.	1	2	3	4	5	6
1	2	3	4	5	38. Regulate plant growth through use of chemicals.	1	2	3	4	5	6
1	2	3	4	5	39. Develop detailed landscape design plans	1	2	3	4	5	6
1	2	3	4	5	40. Prepare seedbeds.	1	2	3	4	5	6
1	2	3	4	5	41. Give correct advice on plant care	1	2	3	4	5	6

You have completed the survey. Please quickly recheck the instrument to make certain that your response is recorded on each item. Return the completed instrument to Colorado State University in the enclosed post-paid envelope at your earliest convenience. Thank you for your effort, it is most appreciated!

APPENDIX F

COMMENTS CONCERNING OCCUPATIONAL EXPERIENCE
BY PRODUCTION AGRUCULTURE RESPONDENTS

AGRICULTURAL PRODUCTION

Comments Concerning Occupational Experience

- The occupational experience that an instructor receives every five years should be three months. This would let the instructor keep his present job and also receive the needed training.
- I was raised on a farm and have gained a great deal of experience from my home life.
- On item 16. The instructor should be involved in updating workshops, using resource personnel and supervision of experience programs. If involved in these areas he should not need to return to industry for updating experience.
- Occupational experience is important but it is not feasible for a Vo-Ag teacher since I work on a 12 month contract. A Vo-Ag teacher who is doing his job is on ranches gaining new information all of the time.
- I feel the experience should be post-secondary (received after a person graduates from high school). I own a small farm; thats why my answers may sound strange.
- I feel that summers should be spent in industry, not cleaning out ones office. Production Ag is no longer No. 1, few too many teachers know about agri-business or agri-industry.
- I have owned and operated my own farms since 1963. I believe Ag teachers should be closely involved with current Ag practices but they don't need to go back to farming. I don't feel qualified to speak for other areas.
- Should vary from program to program. Shouldn't require full-time experience of a new teacher--when has he been able to be employed full-time? Many inequities in present system, also in so called "full-time" and "part-time".
- With extended contracts, it is very difficult for some Ag Instructors to gain occupational experience. I see as the only possible alternative--short leaves of absence in order for occupational experience to be obtained.
- My occupational experience involves being raised on an irrigated farm in S.W. Colorado. None of your items in this section are very applicable to Vocational Agriculture. The experience counts on a production farm after the age of fourteen.

AGRICULTURAL PRODUCTION, Continued

Comments on Occupational Experience

- An instructor should strive to obtain as much actual experience as possible in his/her area of occupational training. In some cases this is difficult since many instructors are employed for an 11 month period. However, this time allows the instructor to obtain experience in the field that is being taught. In my instance, I utilize part of my vacation to gain experience and also hold down a part-time job during the school year. Experience gained in both on-farm and agri-related areas are of importance in increasing an instructor's skills.
- Teaching is being involved--you have got to stay up on new things--I don't believe that just "workshops" do this.
- Occupational experience is very important. Every vocational teacher must have actual experience in their field. NEVER DROP THIS STANDARD. Each teacher can up-date their experience by attending workshops which are related to their teaching.
- I, myself, was raised on a farm and cannot determine part-time and full-time experience run together. Occupational experience is an important tool if used right. It takes a tremendous amount of cooperation between student/teacher/parent/ and counselor/principal. I have found that if any of the above come to regard a vocational class as just another class--without need of an occupational experience program--it makes it extremely difficult to meet the goals that should be met.

I might suggest that all vocational teachers have courses in counseling and salesmanship.

All vocational teachers should have past and frequent occupational experiences, but I am not in favor of making this mandatory.

I might add that one of the biggest drawbacks to running adequate occupational experiences--behind selling the program, of course--is pay. Vocational Agriculture teachers are not paid in proportion with other teachers for the amount of work done. Instructors should receive pay for occupational experience programs.

- Occupational experience is very essential to the success of a program, however, I think in the teaching profession an individual must strive to keep up-to-date daily with new ideas and technology, rather than standing still for 5, 7 or 10 years and then be introduced to the industry once again.

AGRICULTURAL PRODUCTION, Continued

Comments on Occupational Experience

- We need more of it--only way to keep current in changes and new information.
- Ag men cannot get away from summer work for full-time occupational experience.
- I don't feel that returning to the industry is as important or would be much more beneficial as would keeping current with subject matter in the industry through workshops as well as other educational means.
- Two to four weeks should be spent each year in the industry to help keep up with the new ideas.
- A Voc-Ag teacher is around it with his supervised program.
- Occupational experience can be gained while teaching by being observant on S.O.E.P. visits, asking questions, and from industry people brought into the classroom, but you must have some background to profit from this.
- Without some occupational experience prior to entering the teaching field, I don't feel that a teacher is prepared to do his best.
- I don't believe I'm concerned with the number of years as I am with the number of different types of occupational experience. I believe we should have to work with these different areas as part of college credits. Even 1-2 months would help!
- I feel that in Vocational Agriculture that an instructor keeps up his occupational experience with on-the-farm visitations to secondary students and young farmers.
- In production ag a variety of non-ag experiences can be helpful.
- I think occupational experience is very beneficial--it is much better than the theory you receive in a college or university. There is one problem I believe! It is pretty tough sometimes to gain occupational experience especially in one locale, also its tough on the pocketbook to leave ones professional job to get occupational experience. This I believe is where state governments may help, by giving individuals an opportunity to gain occupational experience in some facet of their vast industrys. For example, an Agricultural educator could be put to work on state owned lands.

AGRICULTURAL PRODUCTION, Continued

Comments on Occupational Experiences

- One month of occupational experience is equal to about one year of further schooling.
- I feel that hours may be more important. The more experiences you gain whether part-time or full-time is of great value. Vocational teachers need to be jack of all trades and master of some.
- I have my own operations in Production Ag.
- Workshops in vocational education are very important. If you are contemplating requiring a teacher to work so many hours in his field as well as having the college credits to renew his certificate, you are overdoing it. Industry should go to the instructor not visa versa. Vocational education may not have the money to stay abreast of industry anyway.
- I know it would cut down on the number of teacher trainees, but I feel that some time in each area would be of some help in vocational teacher training. Example: Ag instructor--Dairy, Feedlot, Mechanics, Sales--Cooperative Farm--Dryland and Irrigation.
- The more work experience the better. I would like to receive some credit for work experience in place of college credit for re-certification.
- In the field of Vo-Ag part-time occupational experience is more than adequate--Work with adults and young farmers keeps ag teachers well informed of the agricultural changes.
- I've been employed with farming all my life and feel that I've needed all the experiences that I've gained throughout the years to be successful in my vocational field.
- As fast as new tech. is being introduced in the ag industry, I'm not sure that returning to industry every two years is sufficient for updating.
- Agriculture teachers should keep current but it is not necessary to be employed or to farm or ranch in order to keep current. Experience is a good teacher but not the only teacher. It would not be possible to gain all the experiences from any job, farm, or other employment.
- We are required by the State of Colorado to renew our certificate with nine credit hours every five years and no credit is ever given for work experience so all these hours are extra or over and above those and we usually work 11 months of the year so time is limited for work experience. The fact that ag teachers make farm visits allows us to keep abreast of most of the developments in production ag.
- Occupational (practical) experience is that which a vocational instructor is faced with every class day, on weekends, during summer. For this reason there is no logical

AGRICULTURAL PRODUCTION, Continued

Comments on Occupational Experience

basis for suggesting that vocational people should be forced to spend time in outside occupational experience. They stay current with upcoming trends simply because of the nature of their work. Imposing this requirement (outside experience) is some more bureaucratic foolishness. Those who sit in places of authority and think up these ridiculous schemes should be permitted to leave this phase of education.

- Occupational experience is the key to successful teaching. Most of the experiences I've gained were outside of the college experiences. However, college classes gave me technical knowledge which I can apply to my students' programs.
- If an ag teacher is continually observing agriculture and keeping up with new methods and products by reading the various agricultural magazines and other available materials he should not necessarily have to return to industry for updating.
- Agriculture has changed so vastly that if it were not for my activity in part-time farming I might just as well have packed my bags five to ten years ago. I really realized this when I started farming our land lab at our school.
- More course and area covered by teacher, then the more confident and benefit to teaching you become.
- An instructor needs some way of updating his experience and course of study but this can be done in several ways. By reading current magazines or belletins an instructor can update himself faster and in a broader area than by just working.
- In Vocational Agriculture we are in the field on enterprise visits. I feel this helps keep us updated. I don't feel we need release time.
- I really never realized how out dated I had become until our school purchased land for a school farm laboratory.
- It would be determined by what area you are involved in and what contact you have with that area during the school year.

APPENDIX G

COMMENTS CONCERNING OCCUPATIONAL EXPERIENCE
BY ORNAMENTAL HORTICULTURE RESPONDENTS

ORNAMENTAL HORTICULTURE

Comments Concerning Occupational Experiences

- Along with the on-the-job experience an instructor must have a way, means, and knowledge to present material to a class or all his experience is useless.
- A teacher in our field who maintains contact with the field of horticulture, reads current literature and attends workshops, etc., shouldn't need to return to "industry" to update his skills.
- Relevant occupational experience can be obtained in several ways in addition to actually working for someone else. The school greenhouse and nursery provide a training station for the instructor! Contact with businessmen on a regular basis also can give a lot of insight to the instructor. Also, attending trade meetings, short courses, and conventions gives a lot of information that is relevant to the instructor. Also reading trade related literature is important. If we spent a summer every few years working in a business we certainly would be reminded and informed of the skills employees need. We would also become more competent in those skills ourselves.
- There are two major areas of training--greenhouse and floral work, and nursery, landscaping, maintenance work. It would be good to have some work experience in the two major areas working with students along the front range.
- A good vocational teacher will never be completely out of contact with his vocational service area. With almost daily contact with people in his field exchanging ideas, asking advice (both ways) there is no need to actually be employed by that industry.
- Occupational experience is a continuing process, as much or more working knowledge is gained while teaching the subject as is realized "on the job".

APPENDIX H

LETTER OF INTRODUCTION FROM THE STATE
SUPERVISOR OF VOCATIONAL AGRICULTURE



RICHARD D. LAMM, Governor

STATE BOARD FOR COMMUNITY COLLEGES AND OCCUPATIONAL EDUCATION

207 STATE SERVICES BUILDING • 1525 SHERMAN STREET • DENVER, COLORADO 80203

WILLIAM O. WOOLF, Director
OCCUPATIONAL EDUCATION
(303) 892-3011

F. DEAN LILLIE, Director
COMMUNITY COLLEGES
(303) 892-3151

CONGRATULATIONS! You have recently been selected as one of approximately three hundred Colorado vocational teachers to participate in a special research project. This project will be conducted by Colorado State University in cooperation with the State Board for Community Colleges and Occupational Education.

The purpose of this research effort is to measure the value of occupational (industry) experience to vocational teachers. Colorado, like most states, requires all vocationally credentialed teachers to have some industry experience in that occupational area in which they teach. From this research we hope to determine if indeed that experience was of any value to the teacher, if the recency of that experience affects its value, and what length of occupational experience would be most useful. Your valuable input will help us answer these questions.

You will receive a survey instrument by mail within the next ten days. We ask that you complete that instrument at your earliest convenience and return it to CSU for tabulation. We encourage your most honest and candid responses to all survey questions.

We feel that the product of this research effort will be of notable value to the profession. Your assistance is encouraged and most appreciated.

Sincerely,

Sid Koon
State Supervisor
Vocational Agriculture

John Oades
Principal Investigator

Glen Rask
Project Co-Director

Windol L. Wyatt
Project Co-Director

APPENDIX I

SURVEY INSTRUMENT COVER LETTER TO
INTENDED RESPONDENTS

Department of Vocational Education



Colorado State University
Fort Collins, Colorado
80523

March 31, 1976

We need your help! We would like you to give one-half hour of your valuable time to the professional improvement of vocational education. We can provide you only a small reward for this valuable effort--please enjoy a cup of fresh, hot coffee while you provide a notable service to our profession.

Several days ago you received an introductory letter from Sid Koon, State Supervisor for Vocational Agriculture Education. In that letter he asked your assistance in completing an occupational experience research effort, being conducted in cooperation with Colorado State University. Enclosed please find your vocational teacher survey instrument, designed to gather data from your specific area of occupational instruction.

The purpose of this project is to measure the value of occupational (industry) experience to Colorado vocational teachers. To accomplish that purpose we are asking that you complete the enclosed survey instrument.

The instrument is divided into three sections, requesting: (1) Descriptive data of your educational and occupational experience, (2) Your beliefs about the value of occupational experience, and (3) Self-evaluation of your ability to perform selected technical subject matter skills. All necessary instructions for completion of each section are printed on the survey instrument. We ask that you not identify yourself on the instrument, and remind you that only your totally honest responses are of value to this research effort. Your individual responses will be held in strictest confidence and will in no way be identified in any output of this research.

Should you have any difficulty in completing the survey please feel free to call John Oades or Glen Rask at CSU (491-6859). Once you have completed the instrument please return it to CSU in the enclosed postage paid envelope.

We wish to thank you for your time and effort. Your valuable input will serve well in moving our profession forward.

Sincerely,

John Oades
Principal Investigator

Glen Rask
Project Director

P.S. If you are busy like most it is easy to put off tasks such as this. Please enjoy that cup of coffee today, and place the completed instrument in return mail.

eaw
Enclosure



APPENDIX J

FIRST FOLLOW-UP LETTER TO INTENDED
RESPONDENTS



Department of Vocational Education

Colorado State University
Fort Collins, Colorado
80523

April 9, 1976

Dear Vocational Educator:

Some ten days ago you received a questionnaire concerning occupational experience of vocational teachers. We sincerely hope that you will take this opportunity to express, through the questionnaire, your opinions concerning the value of industry experience. Your opinions may well influence future occupational experience requirements for vocational teachers.

Please take the time today to complete and return the questionnaire. If you need assistance or have misplaced the questionnaire please call John Oades or Glen Rask at CSU (491-6859).

Your valuable opinions are most appreciated!

Sincerely,

John Oades
Principal Investigator

JO/mh



APPENDIX K

SECOND FOLLOW-UP LETTER TO INTENDED
RESPONDENTS



Department of Vocational Education

Colorado State University
Fort Collins, Colorado
80523

April 16, 1976

Dear Vocational Educator:

Are occupational experience requirements for credentialing of concern to you? Could you benefit from release time from your teaching assignment to update or broaden your industry experience? Many vocational teachers have expressed strong feelings about occupational experience, yet no recent consensus of the value of that experience has been gathered.

Some weeks ago you received a questionnaire designed to measure the value of occupational experience. As your response has not yet reached us, we have enclosed a second questionnaire for your use. We encourage you to register your professional opinion on occupational experience, by completing and returning the enclosed questionnaire.

Several respondents have inquired about the meaning of "related occupational experience". For purposes of this study we define related occupational experience as: "Practical industry experience (not teaching) with those technical subject matter competencies related to your area of vocational instruction".

If we can assist you in any way in completing the questionnaire please don't hesitate to call John Oades or Glen Rask at CSU (491-6859).

Please remember that your professional opinions are valuable and essential in answering current concerns about occupational experience requirements. One-half hour is required to complete the questionnaire. Please invest that time and return the completed questionnaire today.

We appreciate your effort!

Professionally,

John Oades
Principal Investigator

JO/mh