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Purposes of the Study

The study had several purposes, the major one being to determine the common professional education competencies needed by community college instructors of trade and industrial education. Two other purposes of the study were to determine if differences existed among community colleges according to scores trade and industrial instructors assigned to each of 99 professional education competencies and determine if community college trade and industrial instructors resembled one another according to values given the 99 professional education competencies.

Procedures

A mail survey questionnaire was developed to collect data. The

99 item questionnaire was designed so that instructors could respond to the level of proficiency necessary for each competency in relation to their job. Their responses consisted of indicating whether no, slight, moderate, considerable or complete competency was needed.

A total of 40 community colleges, ten in each of four states (California, Colorado, Oregon, and Washington), were selected for the study. The sample of 160 instructors was obtained by randomly selecting four trade and industrial instructors from each of the community colleges identified in the population. Data were analyzed by utilizing analysis of variance and factor analytic techniques.

Selected Findings

A one-way classification analysis of variance revealed that, except for one competency, no differences existed among community colleges according to scores trade and industrial instructors assigned to each of 99 professional education competencies. Teacher educators may consider this community college similarity when developing or revising curricula.

The R-technique of factor analysis was used to identify common professional education competencies. A five-factor solution extracted 48 competencies that had factor loadings of ± .50 or higher. Four of the five factors extracted were identified as follows:

1. Factor I was a general factor with three interpretable

sub-factors. Sub-factor 1a was named History, Philosophy, and Objectives; sub-factor 1b was named Community Relations; and sub-factor 1c was named Professionalism and Student Relations.

2. Factor II was identified as Program Operation.

3. Factor III was summarized with the title of Measurement and Course Construction.

4. Factor IV was labeled Instructional Strategies.

Nine of the ten highest mean ranked professional education competencies in the study clustered under Factor IV, Instructional Strategies. The highest mean ranked competency in the study was motivate students in the classroom, shop, and laboratory and the lowest mean ranked competency in the study was interpret the history of education.

The Q-technique of factor analysis revealed that trade and industrial instructors resemble one another with regard to values assigned to professional education competencies. The high specificity of structure--one generated factor--strongly suggested that professional education needs of trade and industrial instructors are not as complex or diverse as had been widely assumed.

The study demonstrated that the development, administration, and factor analysis of a professional education competencies questionnaire does contribute to the identification and evaluation of common

factors among different competencies and instructors. It is an effective and efficient method of obtaining much of the information essential for designing and developing curricula.

A Factor Analysis of Professional Education Competencies and Community College Instructors of Trade and Industrial Education

by

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A FACTOR ANALYSIS OF PROFESSIONAL EDUCATION COMPETENCIES AND COMMUNITY COLLEGE INSTRUCTORS OF TRADE AND INDUSTRIAL EDUCATION

I. INTRODUCTION

Background to the Problem

During this past decade, 35 to 60 new community colleges in the United States opened each year with increasing faculties. This dynamic growth has accentuated the problem of quality instruction in community college trade and industrial education programs. A recent Oregon study (1967) revealed that 73 percent of all vocational-technical instructors in community college programs assumed their positions with no previous teaching experience or formal teacher preparation coursework.

Providing the different types of trade and industrial instructors with pre-service and in-service professional education courses has been pointed out by Gillie (1969) as being one of the most perplexing problems which community college administrators and university teacher educators face. Feirier (1961), writing in Industrial Arts and Vocational Education, pinpointed the problem when he expressed the view that vocational teachers must not only be adept in the content of their field but must also have a thorough grasp of methodology. The requirement for theory and practice, intellectual exposure and

practical experience, and knowing "how to teach" as well as "what to teach" has been emphasized and re-emphasized by Schill (1964), Silvius and Ford (1965), and Walsh and Selden (1965). Byrd (1966), in a study concerned with teacher competencies, summarized the problem by indicating that occupationally oriented persons could best utilize their experience in teaching situations after completing teacher training courses.

The inconsistency between the lack of training or experience that trade and industrial instructors have in professional education and the high priority which community colleges assign to the excellence of teaching has been of concern to community college administrators and teacher educators. However, before community college administrators and university teacher educators can deal with the problems of trade and industrial pre-service and in-service education courses, empirical data regarding the identification of common professional education competencies must be available. The present study was designed to inquire into the process and techniques of curriculum development by focusing on one major problem area--the identification of common professional education competencies and proficiency requirements of community college trade and industrial instructors.

Statement of the Problem

The central purpose of this study was to determine the common

professional education competencies of selected community college instructors of trade and industrial education.

A major aspect of the problem involved the construction and validation of a Professional Education Competencies Instructor Questionnaire as none of the instruments reviewed were found to be appropriate for community college trade and industrial education instructors.

Three major dimensions were considered in the problem.

1. The analysis of data to determine if significant differences existed among the competency mean scores for the community colleges included in the study. The hypothesis tested in this study was that there is no significant difference among the community college responses.
2. The factor analysis of data to determine the common professional education competencies needed by community college instructors of trade and industrial subjects.
3. The factor analysis of data to determine the extent of resemblance among trade and industrial instructors according to values given 99 professional education competencies.

Definition of Terms

The following definitions were included for purposes of standardizing the use of terms in the study. Other terms or phrases used in

the study were considered to be self-explanatory.

Common variance is defined as the sharing of variance by two or more elements. In such a sharing the elements are highly correlated and measure some trait in common.

Competency is the specific ability or capability needed to perform a particular duty or action.

Comprehensive community college is a two-year public institution of higher education with academic, vocational, and general education programs. It is designed to provide a wide range of options and services in response to the needs of the local community. For purposes of this study, no distinction is made among the junior college, the community college, or the comprehensive community college.

Factor is a matrix of competencies whose intercorrelations are positive or negative with factor loadings of $\pm .50$ or higher. A factor is also referred to as a cluster.

Factor analysis is a statistical method which consists essentially of (1) giving a rather large number of tests (competencies) which are presumed to measure some aspects of the general trait (professional education) and which will represent a wide range of elements that might enter into the trait; (2) evaluating intercorrelations among these tests (competencies) to find those which tend to measure the same element or factor; (3) deducing what this trait measures in common

and giving it a name.

Factor loading is the correlation of any particular competency with the other competencies being extracted in the same factor.

Factor solution refers to the number of factors the computer program was set to generate. The different factor solutions were studied in accordance to pre-set criteria in order to select the most appropriate number of factors for analysis.

Professional education competency refers to a specific knowledge, understanding, task, duty, responsibility, or expected behavior needed by a trade and industrial instructor in the pedagogical performance of his job.

Proficiency is the level or degree of expertness required in the performance of a professional education competency.

Q-technique is a factor analytic method which indicates the extent to which respondents resemble each other with regard to the competencies listed in the instructor questionnaire. The literature often refers to the Q-technique as the Q-mode.

R-technique is a factor analytic method which examines the relationship of every competency with every other competency and provides for a clustering of common competencies. The technique orders competencies according to people. The literature frequently refers to the R-technique as the R-mode.

Spurious competency is a competency with a factor loading of

less than ± .50. It is tentatively identified as clustering with the factor in which its highest factor loading occurred, even though its loading is less than ± .50.

Trade and industrial education is instruction which is planned to develop basic manipulative skills, safety, judgement, technical knowledge, and related occupational information for the purpose of fitting persons for initial employment in industrial occupations and upgrading or retraining workers employed in industry. Individuals so trained will engage in occupations concerned with designing, producing, processing, assembling, maintaining, servicing, or repairing of any product or commodity. For purposes of this study, no distinction is made between trade and industrial education and technical education.

Trade and industrial instructor is an individual who, in completing the instructor questionnaire, identified his primary teaching responsibility to be in one or more of the specialized trade and industrial education subject matter areas of auto mechanics, autobody, air-frame and powerplant, engineering technology, diesel, drafting, electronics, metallurgy, machine shop, carpentry, printing, electricity, radio-television, and welding.

Vocational education as used in this study is intended to encompass such terms as occupational education and technical education. It refers to courses, programs, guidance, performance

objectives, and related instruction based upon competencies designed to prepare the learner for entry into an occupation or advancement in a current occupation.

Importance of the Study

The Division of Vocational, Adult, and Community College Education at Oregon State University has been in existence since 1968. The emergence of the community college movement had given the Division the opportunity and responsibility of providing training for trade and industrial instructors through pre-service, in-service, and graduate courses. To date, no studies have been conducted to facilitate the process of developing performance-based professional education curricula for community college trade and industrial instructors. Most research pertaining to the matter of performance-based curriculum development has been of a descriptive nature and has contributed little specific information about the kinds of competencies needed. In November of 1970, the Division of Vocational, Adult, and Community College Education prepared a proposal for change (1970) which outlined the necessity and procedures for developing a relevant, performance-based teacher education curriculum. The proposal stated that

> Oregon State University should take the leadership in building an empirically based training program which is validly related to those tasks which the beginning teacher will find himself confronted with in the field (p. 4).

The proposal was funded and a performance-based, individualized, continual progress curriculum will be developed.

The present study provided for a compilation of empirically derived information for performance-based curricula directly from instructors to whom the curricula apply. The results could serve as guidelines for the process and techniques of designing and developing a performance-based professional education curricula. The importance of identifying common professional education knowledge and skills was recently emphasized by Cotrell (1970) in an address to the Fourth National Vocational Technical Teacher Education Seminar.

The importance of a major effort in curriculum development was succinctly stated in the First Annual Evaluation Report of the Governor's Advisory Council for Vocational Education (1970)

> . . . the teacher training programs for health, education and community college career education personnel are grossly inadequate (p. 2).
>
> The board should "promote change in teacher education" to emphasize performance rather than the lock-step for four or five years procedure which has been so prevalent (p. 6).

The present study was a "probing" effort to "promote change in teacher education." The study should provide useful information for current and innovative efforts that the Division of Vocational, Adult, and Community College Education are making to improve vocational teacher education as outlined in Proposal for Change (1970). The results should contribute knowledge necessary for launching an

"action" program in the design and development of curriculum content, performance objectives, and teaching strategies that could improve the extent and quality of trade and industrial teacher education.

II. REVIEW OF RELATED LITERATURE

As this study was focused toward identifying the common professional education competencies of community college instructors of trade and industrial education, the review of literature was directed toward answering the following questions:

1. Have studies indicated a need for new approaches to the development of a curriculum for community college instructors of trade and industrial education?
2. Can common professional education curriculum content be identified from mailed survey data analyzed by factor analytic techniques?

Preparation of Community College Instructors

The task of preparing superior teachers for community colleges is described by Gleazer (1968) as formidable, but not insurmountable. He says it is a task

> . . . which must be shared alike by the universities and the junior colleges. . . . The immense academic and research resources of the universities must be pooled with the "laboratory" resources of the junior college. And this "mix" is possible only if the junior college administrator pays more than lip service to providing a viable "climate for teaching," and only if the university displays more than a fainthearted approach toward developing programs which are rigorous and realistic (p. 1).

Gleazer emphasized that the importance of classroom teaching as the

primary responsibility of the community college instructor should be reflected in the university curriculum designed to produce such a teacher. The quality and effectiveness of the teaching process ranks very high in the philosophy and objectives of the comprehensive community college.

Blocker et al. (1965) repeatedly make reference to the importance of the "teaching" emphasis of the community college as contrasted to the "research" emphasis of the four-year colleges. The community college's commitment to teaching excellence and the critical problem of undergraduate instruction was also recognized by the Oregon legislature (1969) when it authorized and appropriated $750,000 for research designed to improve the efficiency and effectiveness of undergraduate instruction under Senate Bill 144.

The increasing size and scope of community colleges and their unique role in higher education as "teaching institutions" has made the task of acquiring the services of well-trained and highly qualified teachers a most important one. Maul (1965) has expressed the view that the biggest problem facing junior colleges today is finding enough competent teachers. This need was also expressed in the Peterson (1965) study, in which one of the most important problems identified was to formulate the best pattern or patterns for preparing junior college teachers. The study found that most community college teachers enter the profession having been prepared for

secondary school programs, or with no specialized preparation at all. It was recommended the universities develop curricula that would permit community colleges to select their instructors from a pool of carefully prepared people.

Fields (1960) also believed that the community college instructor needed training additional to that received in secondary school programs. He indicated that preparation for teaching in high school was inadequate for direct entrance into teaching at the junior college level. Garrison (1967) defined the heart of the whole problem as being "faculties of skilled people in sufficient numbers, who not only know what to do, but how to do it."

A recent Oregon State University (1969) study recommended that community college vocational-technical instructors should be provided courses in six specific areas. In regard to curriculum development for in-service education the study concluded that

> The best service the university, in conjunction with the State Department of Education, could render in this area would be to undertake a job analysis on subject mastery, teaching competency. . . . Thus it could be determined how far from the goal present staff are situated and then determine the amount and kind of in-service education that actually is required (p. 18).

These findings lend support to a national study conducted by the American Association of Junior Colleges (1969) which found that there was a critical need for teachers to have improved competencies in teaching techniques, curriculum planning and development, testing and

measurement, learning theory, evaluation, faculty role in counseling, and individualized instruction. The study recommended that junior colleges should provide added training for staff and faculty members in more effective ways of handling the increasingly sophisticated tools and techniques of modern teaching.

Gillie (1969) advocated the idea that universities should conduct studies on effective teaching in vocational-technical education and become more involved in technical teacher preparation programs which have a well-conceived approach to evaluation. Gillie viewed teacher education, research, and design and development of new curricula as the roles through which the university could be of greatest service to community college technical educators. He recommended that the universities re-examine their curricula for community college technical instructors and believed that

> . . . the technical teacher's preparation is probably one of the most important roles the university can play in the betterment of two-year technical college education (p. 34).

Courtney (1970) has proposed that universities use an empirically-based approach to the problem of developing common curricula for teachers of technical subjects. He suggested that the basis for curriculum planning should be centered in the determination of the common training needs and requirements for teachers of technical education. According to his premise, the guiding principle in the organization of an empirically-based procedure for developing

technical teacher education curricula would be

> . . . as content is identified, behaviorial objectives associated with the curricula for training teachers of occupational education can be specified. Using the sequence of behavioral objectives, instructional strategies may then be identified for the training of occupational teachers (p. 3).

Courtney is supported by Cotrell and Miller (1969) who proposed that

> . . . a logical strategy for increasing the efficiency of teacher education is to determine the various skills and knowledge needed by all vocational-technical teachers, which of these skills and knowledge are truly common across several service areas, and which are truly unique to a service area (p. 25).

The present study was focused on the identification of a uniform design for teacher education curriculum content in the unique service area of trade and industrial education. Basic to the establishment of an empirically designed study for determining curriculum content are other supportive and related studies.

Curriculum Changes Needed

Changes in curriculum content for training community college instructors have been advocated in a number of recent studies.

Loomis (1965) surveyed 64 junior college administrators in 11 western states and officials from 13 different State Departments of Education in an attempt to evaluate the preparation of academic instructors in the community college. In his findings he stated that there had been no organized effort in Oregon to prepare academic

instructors for community college teaching. He recommended that appropriate agencies and institutions should make an effort to identify a special preparation program for academic teachers and proceed to implement a program.

LaGrandeur (1966) studied the preparation of occupational as well as academic instructors in Oregon community colleges and found inadequacies were evident in the preparation and performance of many community college instructors. These inadequacies were summarized as being in the following areas:

1. The extent of subject matter and professional education.
2. An understanding of community college philosophy and functions.
3. A knowledge of the learning process, the growth and development, and other characteristics of community college students.

It was found that both academic instructors and instructors in the occupational programs desired professional education courses that appeared to be of practical application.

Garrison (1967) in a later study also noted that few instructors have had specific preparation for junior college teaching. After personally interviewing 650-700 teachers in 20 different junior colleges he found that many teachers were not satisfied with the course offerings available for junior college teachers. He also concluded that

teachers felt that their programs of preparation were inadequate and/ or inappropriate for the teaching situation in the junior college.

Swanson and Kramer (1965) concurred with LaGrandeur and Garrison and in a report on trade and industrial teacher preparation stated the problem in the following manner:

> Just as there is a need for a more comprehensive program for the preparation of individuals to enter the labor force, so it follows that the program of preparation for the vocational teacher must be more rigorous and often quite different from those now provided (p. 169).

Feirer and Lindbeck (1970) recently investigated industrial education teacher preparation programs for community college instructors in the six states of California, New York, Texas, Illinois, Michigan, and Florida. Their study points out the need to develop in-service technical education pilot programs for teachers and the fact that technical teachers in the community-junior colleges and senior institutions need to upgrade their competencies.

Cashin (1968) conducted a study of university programs for the professional preparation of instructors for California public junior colleges. He surveyed 85 California junior colleges and determined that the components considered to be most appropriate for inclusion in such preparation programs were

> . . . planning and organizaing a course of study, innovative techniques in classroom presentations and activities, use and application of teaching devices and equipment, test construction and analysis, purposes and methods of grading and evaluation, psychology of learning, motivations and attitudes of junior college students, aptitudes and abilities of junior college

> students, purposes and functions of the junior college scope and content of the junior college curriculum (p. 3018).

The study concluded with a recommendation that the advice and participation of junior college faculty and administration should be sought in the formulation of pre-service and in-service instructor education programs.

Louk (1966) paralleled Cashin's findings in a study which was directed toward the problem of analyzing the opinions of administrators and instructors regarding the seriousness of instructional problems in Washington community colleges. In relation to planning for in-service education programs his findings indicated that teachers should be included in the planning in order to be sure that their felt needs receive adequate attention.

In a study of the degree of faculty satisfaction in Florida community colleges, Mills (1968) found that one of the factors which characterized the "satisfied" group of teachers, as compared to the "dissatisfied" group, was that a large proportion of them had taken courses designed to improve junior college teaching. The population utilized in the study included all faculty members in the 26 Florida community colleges. Mills concluded that the majority of faculty members had not had specific courses or in-service training designed specifically for junior college work.

Craig (1969) studied the recruitment and retention of teachers in 20 newly established community colleges. It was determined that

teacher needs associated with professional growth were not likely to be satisfied. The author recommended that community colleges consider offering courses on campus to their teachers for greater understanding of community college philosophy and for professional growth.

Purdue's plan for the preparation of technical teachers as described by Arnold (1968), is an excellent example of how one university has attempted to meet the need for better prepared technical teachers. He proposed guidelines for the initiation or revision of technical teacher education programs in six categories: general education, mathematics, science, technical content, occupational experience, and professional education.

Ray (1966) conducted a critical incidents study of all Michigan engineering technology instructors teaching in three different engineering areas. He developed an instructional grid and identified areas of instructional competencies which should be considered in curricula for the preparation of technical instructors.

In summary, the studies reviewed point out that community college trade and industrial education programs are so new, and developing so rapidly, that providing teaching personnel with appropriate professional education courses is a major problem. They also point out the need to develop "meaningful and practical" curricula by working with community college instructors. The situation of

rapidly developing community colleges and the minor consideration given to the training of occupational instructors was best summarized by Dobrovolny (1964) who stated

> Since the two year, post-high school technical programs have emerged so recently in our educational system, it has been difficult to establish a national standard to measure the competency of the staff teaching in these programs. There is no consistent pattern of training that has been followed by those teachers involved in technical programs (p. 11).

Different Methodological Designs for Determining Common Curriculum Content

As the major effort of this study was to determine the common professional education competencies and proficiency requirements of selected community college trade and industrial instructors, this review was focused toward answering questions related to methodology.

Courtney (1967) developed an instrument which could be used for establishing the core of professional knowledge and abilities required in training programs for vocational teachers. The knowledge and skills to be included in the data-collection device were selected by reviewing the literature and utilizing a consultant group of specialists from trade and industrial, business, agriculture, home economics, and distributive education.

Courtney and Halfin (1969) later utilized the vocational education training needs instrument they had developed to determine the common

training requirements of high school vocational teachers through a factor analysis of responses from 40 randomly selected vocational teachers representing the states of Pennsylvania, Iowa, North Carolina, and New Jersey. A factor analysis provided data which led the authors to conclude that commonalities within the five disciplines studied could possibly serve as a common core of training experience within broadly based vocational teacher education curricula.

Halfin and Courtney (1970) in another study identified the common core of curricular experience for the training of technical teachers. One hundred fifty respondents represented teachers who were randomly chosen from each of five vocational disciplines. The ten-state study utilized a Likert-format instrument and factor analytic techniques to analyze the 130 items. The analysis generated six interpretable factors that could be used for curriculum development.

Sjorgren (1967) conducted a study to determine whether common behaviors could be identified across occupations to serve as a basis for curriculum development. He employed methods similar to those used by Courtney and obtained 329 scores for items contained on an interview schedule that was administered to 466 persons. The basic procedure for identifying common job behaviors was to factor analyze the correlation matrix based on intercorrelations among 47 agricultural occupations and 36 occupations in the metal-fabricating industry.

Gordon and McCormick (1963) in a study at Purdue University

used factor analysis in an attempt to identify, measure, and explore the dimensions of worker-oriented job variables. Other examples of factor analysis designed educational research projects include those by Love (1966) and Gunderson (1966).

Walsh (1963) analyzed 107 teacher competencies for trade and industrial education instructors and utilized a Likert-type check list for data collection similar to the one used by Courtney. He used a somewhat different approach in that communities of experts rated teacher competencies in terms of their importance. Teachers rated competencies expressed as ability to do something as most important whereas teacher educators rated competencies expressed in terms of knowledge or understanding as most important. About one-half of the respondents were satisfied with the teacher education programs and one-half dissatisfied.

Leet (1968), in a study to determine the type of preparation that would be of benefit to future junior college teachers, developed a list of competencies with a Likert-type format and surveyed all Missouri junior college teachers. He concluded that the teaching staffs of Missouri junior colleges had little or no preparation in courses specifically designed for junior college teaching.

The clustering technique for developing common core curriculum has been researched and utilized in curriculum development by the Occupational and Career Development Branch of the

Personnel Research Division of the United States Air Force. Smith and Moss (1970), in a study of process and techniques of vocational curriculum development, reported on the implications of the Air Force research and stated

> One successful task inventory technique is to develop a task checklist which can then be submitted to workers in the appropriate role (job) for confirmation and for specification of the relative time spent on each task. The data yielded is apparently valid and reliable. By applying certain statistical clustering techniques to the data, job clusters based upon task similarity can be formulated. Experience with the technique has shown that it is far superior to asking supervisors and former students about the value of prior training; asking about previous training tends to identify missing training elements, but fails to identify instructional "deadwood." That is, tasks taught but which are not being used on the job (p. 3).

A study utilizing the clustering technique is presently in progress at the Ohio Center for Vocational and Technical Education and is entitled "Model Curricula for Vocational and Technical Teacher Education." Cotrell (1970), in an address to the Fourth National Vocational-Technical Teacher Education Seminar, reported that the study is designed to develop, implement, and test curricula for the preparation and in-service education of all types of vocational and technical teachers. In this project the pedagogical aspects of teaching were studied to identify the tasks required of teachers in each of the vocational service areas. The performance elements in the duties and functions of teachers of conventional programs were identified through introspection and interview techniques of occupational analysis. The curricular models developed will eventually be field

tested in a university vocational teacher education program.

In summary, the basic methodological approach and reasons for attempting to identify the common professional education requirements of the different types of community college trade and industrial instructors are best summarized by reviewing a study conducted by Sjorgen and Sahl (1966). The basic premise followed by these researchers was that vocational curricula designed to teach skills, knowledge, and understanding relevant to a number of jobs followed by specific training for a single job was more efficient and effective than vocational curricula designed to teach certain specific jobs. In their report they go on to state

> Rather than attempting to define a general vocational curriculum on a rational basis, the more reasonable approach is to define a general vocational curriculum on the basis of observable similarities among jobs in terms of skills, abilities, tasks, and competencies. With such an approach, job clusters would be identified or defined on the basis of each job in the cluster having relatively high commonality of required skills, tasks, abilities, and competencies with the other jobs in the cluster. The general vocational course for this job cluster would then be designed to teach the factors common to those jobs in the cluster. The training for specific jobs would follow the general course and would consist primarily of experiences designed to teach those specific factors not included in the general curriculum. . . . The first step in developing a general course or curriculum is that of identifying job clusters (p. 4).

This study identified professional education competency clusters. In addition it identified clusters or commonalities of instructors and differences among community college responses to each professional education competency.

III. DESIGN OF THE STUDY

The study was an empirical investigation of professional education competencies with the hope that the findings would provide information for the design and development of curricula in trade and industrial education. The following summary of procedures employed in the study is provided to delineate the specific steps taken during the investigation.

The Dependent Variable

The dependent variable in the study was a score assigned by respondents in the sample to denote the level of proficiency that they felt was necessary for each of 99 professional education competencies. Respondents, which included community college instructors of trade and industrial education, were asked to evaluate the importance of each competency in relation to their job. Each of the 99 competencies was assigned a score based upon the following Likert-type scale:

1. My work as an instructor requires no proficiency with this competency.
2. My work as an instructor requires slight proficiency with this competency.
3. My work as an instructor requires moderate proficiency with this competency.
4. My work as an instructor requires considerable proficiency

with this competency.

5. My work as an instructor requires complete proficiency with this competency.

Preparation of the Questionnaire

The instrument used in this study was a mail survey questionnaire containing 99 professional education competencies together with a five-point Likert scale which enabled the respondent to judgmentally score the level of proficiency necessary for each competency. All service areas of vocational education have used mail surveys as a method of securing information for curriculum development. Recent studies utilizing the mail survey technique in technical education have been conducted by Nichols (1964) and Mills (1966).

The development of the questionnaire was accomplished in conjunction with two similar studies being done concurrently, one by Miller (1971) in business and distributive education, and the other by Lindahl (1971) in home economics, agriculture, and service occupations. This consortium necessitated the identification of competencies which were not considered to be unique only to instructors of trade and industrial education.

The initial step in the development of the questionnaire was to review the literature on professional education competencies and teacher performance in all areas of vocational education. Halfin and

Courtney (1970) used a 130-item questionnaire with a Likert-type scale in a ten-state study of vocational education teachers at the high school level. In trade and industrial education, studies by Gianini (1968), Louk (1966), Nichols (1964), and Sjorgren (1967) were reviewed.

The instrument developed by Halfin and Courtney (1970) provided the base for the cooperative development of the instructor questionnaire used in the three concurrent studies. The format was revised and made more suitable to the community college level needs. Each item was checked to determine its appropriateness to community college teaching and items which appeared to be redundant or inappropriate were deleted. An initial questionnaire containing 140 items was developed and subsequently revised as a result of suggestions from doctoral committee members of each of the three investigators. The revised questionnaire contained 95 competencies.

The second step was to present the questionnaire to a jury of experts for the purpose of evaluating it in relation to format, content, clarity, and comprehensiveness. Each investigator selected a jury of experts representing the respective area he had selected to study. Seven members of the Trade and Industrial Education Curriculum Advisory Committee of the Division of Vocational, Adult, and Community College Education, Oregon State University, were selected to serve on the jury for this study. The composition of the committee included representatives from secondary schools, community colleges, business and industry, and the Oregon Board of

Education. The members were initially contacted by telephone and the instrument and a letter were forwarded at a later date.

This step was similar in procedure to the study conducted by Cotrell (1970) in which a task force of teacher educators, state supervisors, and master teachers was selected to review the performance elements which had been generated. Each jury member was asked to review the questionnaire and to list any recommendations or suggestions he had for revision. The revision form used by the jury of experts is found in Appendix A.

After a jury of experts for each of the three studies had evaluated the questionnaires, the investigators compiled and reviewed each list of suggestions and recommendations. Several items were revised for clarity, one item was deleted, and five competencies were added resulting in a questionnaire containing 99 competencies.

The third step was to field test the revised questionnaire. Twenty-one community college instructors (seven randomly selected by each of the three investigators) were asked to complete the questionnaire. They were also asked to identify any competencies which were not clear or which were difficult to understand. Following the field-testing phase, only minor revisions were required prior to the preparation of the final draft of the instrument. The instrument used in the study is found in Appendix B.

Selection of the Sample

The study's population utilized the four western states of California, Colorado, Oregon, and Washington. The relatively recent emergence of the community college movement in the United States, particularly in the western states, necessitated the careful selection of the states which would lend themselves to this kind of study. Two criteria were considered in the selection of the states, first, the state had to have at least ten community colleges, and second, the community college had to be large enough and have a diverse enough vocational program to provide an adequate sample for each of the areas being investigated in the three concurrent studies. The four states selected met these requirements. Appendix C identifies the geographic location of the states included in the study. Appendix D gives the names of the 40 community colleges which participated in the study.

Forty community colleges, ten in each of the four states, were selected for the study. The sample for the study consisted of four randomly selected trade and industrial education instructors from each of the community colleges identified in the population. Hence, the total sample consisted of 160 respondents. A table of random numbers was used for all randomizations. Names of instructors in the community colleges from which the randomizations were made were obtained from the following sources:

1. In California, participating institutions were asked to provide faculty rosters, college catalogs, or college directories.
2. In Colorado, the Colorado Directory of Teachers of Trade and Industrial Education prepared by the State Board for Community College and Occupational Education was used.
3. In Oregon, names were secured from the Directory of Personnel in Oregon Community Colleges published by the Oregon Community College Association.
4. In Washington, the Vocational Education Directory prepared and published by the Coordinating Council for Occupational Education of the Washington Division of Vocational Education provided names for the selection of respondents.

The Statistical Design

As previously stated, the central problem of this study was to determine the common professional education competencies needed by community college instructors of trade and industrial education. The general design of this study included the following:

1. The population for the study was representative of trade and industrial education instructors at the community college level covering four western states. A random sample of 160 instructors provided data by completing and returning

a 99 item questionnaire which was mailed directly to them by the investigator.

2. Respondents were asked to react to each of the 99 competencies in the questionnaire by recording the level of proficiency required in their jobs. The responses were recorded on a five-point Likert-type scale. Response values ranged from a low of 1.0 to a high of 5.0.

3. There was an interest in learning if differences existed among the competency mean scores for the community colleges used in the study. The hypothesis tested in this study was that there is no significant difference among the community college responses. The one-way classification analysis of variance measured for community college differences and was used to test the hypothesis. The test statistic used to analyze contrasts between the mean scores for each competency was the F statistic with the .01 level of significance being used for the assessment of differences. The Least Significant Difference Test (L.S.D.) was used to determine where specific differences existed between means of community colleges for competency means which were rejected in the analysis of variance.

4. Data were analyzed through the use of two factor analytic techniques--the R-technique and the Q-technique. The

techniques took on the following characteristics for the study:

A. The R-technique ordered competencies according to the respondents included in the study. This form of analysis examined the relationship of every competency with every other competency and provided for a clustering* of common professional education competencies. A 99 item (competency) intercorrelation matrix, based upon data collected from 160 respondents, was generated. Hence. the 99 competencies were clustered in a manner that best accounted for the largest percentage of common variance. Information on the R-technique control cards used for the computer analysis of data is found in Appendix E.

B. The Q-technique basically involved the ordering of respondents according to the competencies which were included for the study. A 160 respondents intercorrelation matrix based upon data furnished on 99 competencies, was generated. Thus, this analysis provided a measure of commonality among respondents and indicated the extent to which trade and industrial education instructors resembled each other with regard to the 99 competencies in the study. Information on the Q-technique control cards used for

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*R- and Q-technique results with factor loadings of ±.50 or higher were recorded as being clustered within a factor.

computer analysis of data is found in Appendix F.

Collection of Data

Several steps were involved in the collection of data in each of the four states. Because of the implications the three studies could have for curriculum development in teacher education programs, the Division of Vocational, Adult, and Community College Education, Oregon State University, was asked to provide Division support in the securing of appropriate agency and community college participation in each state.

The president of each of the 40 community colleges selected for the study was contacted by letter and asked if he would encourage participation by respondents selected in his institution. A sample copy of the letter sent to community college presidents is found in Appendix G.

Enclosed with the letter was a copy of the Instructor Questionnaire and Response Card which was to be completed and returned to the investigator. The response card asked each president to indicate whether or not he was willing to support the study and to identify a contact person in the community college with whom the investigator could direct further communication. Administrative support was granted by all 40 community colleges participating in the study.

Data were collected by mailing a questionnaire, a self-addressed

stamped envelope, and an explanatory letter to each of the four randomly selected instructors in each institution. The initial mailing included Colorado, California, Oregon, and Washington. All data were collected within a period of four weeks. A copy of the explanatory letter sent all respondents is found in Appendix H.

Three methods of follow-up were used. Instructors who did not respond by the date requested were first sent an additional questionnaire and a memorandum requesting their response. A second memorandum was sent to those instructors still not responding. A copy of the first follow-up memorandum is found in Appendix I and a copy of the second follow-up memorandum is found in Appendix J.

The final step in the collection of data was to check and code each returned questionnaire before transferring the data to data processing cards for computer analysis. The method for coding data cards is outlined in Appendix K.

IV. PRESENTATION OF FINDINGS

The analyses of data collected for the study have been presented in four sections. The first section describes the results of the analysis of variance which tested for differences among the competency means of the 40 community colleges. The second section explains how the appropriate factor loading cut-off value and factor solution were selected. The third section outlines the results of the R-technique factor analysis of 99 competencies. The last section presents results of the Q-technique factor analysis of 160 respondents.

Differences Among Community Colleges

The null hypothesis, that there are no significant differences among the community college mean scores of the 99 competencies, was tested. The one-way classification analysis of variance using the F-statistic tested the null hypothesis for each competency. In all, 99 individual hypotheses were tested, one for each competency.

The computed F was less than the critical value of 1.76 at the .01 level for 98 competencies and greater than the critical value of 1.76 at the .01 level for one competency. The null hypothesis was therefore retained for 98 competencies and rejected for one competency. Hence, the testing generally showed that the community colleges were similar in their responses. The results of the analysis of variance are shown in Appendix L.

A Least Significant Difference Test was used to compare the mean score for the rejected competency. The test indicated that competency mean scores from 13 community colleges were significantly different from the community college with the highest competency mean score. The results of the Least Significant Difference Test is shown in Appendix M.

Selection of a Factor Loading Cut-off Value and Factor Solution for the R-technique

Factor analysis was used to examine the statistical relationships for the competencies included in the study. This analysis clustered competencies in such a way as to best account for all the variability represented by the respondents' ratings on all competencies.

The decision on the factor loading level to consider as a cut-off value for inclusion in a factor was recorded as recommended by Fruchter (1954), who stated that loadings of .2 or less are usually regarded as insignificant, loadings of .2 to .3 as low, .3 to .5 as moderate, .5 to .7 as high, and above .7 as very high. For the present study and based upon Fruchter's recommendation, competencies with factor loadings of $\pm$ .50 or higher were recorded as being clustered within a factor. The .50 level was also selected to retain as high a degree of relationship or commonality as possible for each competency with the factor.

Since the factor solution could have included any number of

factors up to the number of competencies involved, the following criteria were considered in selecting the appropriate factor solution.

1. The factor solution chosen had to result in the greatest number of competencies having high factor loadings in any given factor.
2. The chosen factor solution had to account for as many competencies as possible with factor loadings of $\pm$ .50 or higher.
3. The number of factors chosen had to show stability and consistency in their high loading competencies across several factor solutions.
4. Competencies had to be balanced over a number of factors or be identifiable as sub-factors where large numbers of competencies clustered under one factor.

Data were initially analyzed for four-, five-, six-, and eight-factor solutions. The eight-factor solution accounted for 37 competencies with factor loadings of $\pm$ .50 or higher with no competencies clustering in Factors VI, VII, or VIII. The six-factor solution extracted 40 competencies with factor loadings of $\pm$ .50 or higher with none clustering in Factor VI. The five-factor solution had 48 competencies with factor loadings of $\pm$ .50 or higher whereas the four-factor solution had 45 competencies with factor loadings of $\pm$ .50 or higher. Of the four-factor analytic solutions imposed on the data, the

five-factor solution seemed to best fit the data, have fewest overlapping competencies, meet the above criteria, and have meaningfulness and parsimony in interpretation. In other words, the basic ingredients of the first four factors appeared in the six-, five-, and four-factor solutions, but the structure of the factors changed in the eight-factor solution.

The arbitrariness of identifying and selecting the appropriate factor solution was put succinctly by Harman (1954)

> . . . every set of phenomenon can be interpreted consistently in various ways. It is our privilege to choose among the possible interpretations the ones that appear to us most satisfactory, whatever may be the reasons for our choice (p. 23-24).

The cumulative percentage of the common variance accounted for in the analysis increased as the number of factor solutions was increased. The cumulative percentage of the variance accounted for by each factor solution is shown in Table 1.

Table 1. Cumulative percentage of common variance accounted for in different factor solutions.

Factor solution	Percent	Cumulative percentage
1	25.71	25.71
2	6.49	32.20
3	5.39	37.59
4	3.00	40.59
5	2.69	43.28
6	2.48	45.76
7	2.37	48.13
8	2.21	50.34

Results of the R-technique Analysis

An R-technique factor analysis program examined the relationship of every competency with every other competency and ordered them according to people (respondents). The widespread use of the technique was pointed out in a statement by Cattell (1952) who said

> The great majority--perhaps 95% of all factor studies to date--have used R-technique, the correlation of variables using a series of persons as entries (points) in the correlation (p. 90).

The interpretation of the factors in the five-factor solution were defined and indicated, as much as possible, by the descriptive table titles which summarized the general pattern of competencies with factor loadings of $\pm$ .50 or higher. Spurious competencies with less than a $\pm$ .50 factor loading were also identified in factors where their highest factor loadings occurred. The spurious competencies had moderately high factor loadings and in some instances aided the process of interpreting and naming factors. The five factors were extracted from a 99-item (competencies) intercorrelation matrix, based upon data collected from 160 respondents.

Five tables in this section provide the factors, factor loadings, means, standard deviations, and mean rankings for all 99 competencies and provide a comprehensive coverage and evaluation of the major aspects of each competency.

Factor I, the largest factor, accounted for 25.71 percent of the

common variance and was a general factor with three interpretable sub-factors. Table 2 presents the analysis results on the 38 competencies which clustered under this factor.

History, Philosophy, and Objectives was the name assigned to sub-factor Ia. All competencies with the exception of item 11 had low means, wide standard deviations, and low mean rankings. The sub-factor distinguished itself by having the two lowest mean ranked competencies in the entire study namely, interpret the history of vocational education and interpret the history of education. It was interesting to note that the highest mean and mean ranking in sub-factor Ia was item 11, interpret the goals and objectives of vocational education.

Inspection of the sub-factor revealed a relationship between the competencies. This conclusion was strengthened when a close examination indicated that eight of the ten sub-factor Ia competencies clustered in Factor III of the six-factor solution.

Community Relations was the name assigned sub-factor Ib. Five of the six competencies had relatively low means and low mean rankings. Item 42, organize or work with local vocational advisory committees and item 85, work cooperatively with people in the community had high means and mean rankings.

Sub-factor Ic was rather heterogenous and was assigned the name of Professionalism and Student Relations. Items 28, 58, 75,and 97 were

Table 2. Results of R-technique analysis for Factor I. (Sub-factor Ia - History, Philosophy and Objectives; sub-factor Ib - Community Relations; sub-factor Ic - Professionalism and Student Relations.)

Factor	Item number	Competency	Factor loading	Mean	Standard deviation	Mean ranking
Ia	8	interpret the innovative provisions of the Vocational Act as amended in 1968	-.50	3.03	1.16	89
	16	interpret the history of vocational education	-.59	2.60	1.08	98
	25	interpret the philosophy of the comprehensive community college	-.57	3.28	1.07	78
	43	interpret the history of education	-.56	2.35	1.02	99
	89	interpret community college policies	-.69	3.36	1.10	72
	11	interpret the goals and objectives of vocational education	-.64	4.01	1.05	34.5
	12	interpret the goals of general education	-.53	3.35	1.08	73
	48	identify the similarities and differences between the goals of general and vocational education	-.54	3.51	1.02	65
	30	interpret the philosophy of the community college in providing vocational programs for the student	-.62	3.79	1.03	53.5
	52	interpret the objectives of vocational education to others	-.66	3.78	1.05	55.5
Ib	4	involve yourself in civic community activities not directly related to the school	-.51	2.81	.88	93
	86	identify local community power structures and pressure groups	-.50	2.71	1.19	94
	84	identify acceptable community social behaviors for instructors	-.65	3.13	1.12	85
	85	work cooperatively with people in the community	-.69	3.78	1.06	55.5
	42	organize or work with local vocational advisory committees	-.53	4.10	.90	29.5
	70	utilize the services of local and state vocational education agencies	-.52	3.29	1.13	76.5

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Table 2. (Continued)

Factor	Item number	Competency	Factor loading	Mean	Standard deviation	Mean ranking
Ic	7	adapt your appearance and apparel to acceptable standards for instructors	-.71	3.88	1.10	49
	28	maintain student performance or progress records	-.53	4.17	.89	22.5
	29	adhere to the code of ethics adopted in your community college	-.74	3.93	1.12	42
	58	maintain a clean, orderly laboratory or classroom	-.68	4.10	1.03	29.5
	75	maintain discipline in the classroom, shop or laboratory	-.56	4.24	.97	16.5
	97	interpret safety rules and regulations to students	-.65	4.13	1.07	25
	88	make use of available guidance and counseling services within the community college	-.52	3.62	1.13	62
	64	maintain necessary report forms required by state or federal agencies	-.61	3.26	1.33	79
	35	direct, advise, or promote student participation in competitive events or youth organizations related to vocational education	-.50	3.08	1.09	87.5
	34	interpret the legal liabilities of a teacher	-.68	3.29	1.23	76.5
		Spurious Competencies				
	2	interpret the provisions of instructor tenure laws	-.48	2.64	1.15	96.5
	18	interpret state certification requirements for instructors	-.46	3.08	1.13	87.5
	14	participate in the supervision of non-vocational extracurricular activities	-.40	2.64	.99	96.5
	21	locate available standardized tests	-.31	2.89	1.15	91
	23	interpret the state specifications and requirements for vocational facilities	-.46	3.24	1.16	80
	39	interpret your vocational program to others	-.36	4.11	.87	27.5

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Table 2. (Continued)

Factor	Item number	Competency	Factor loading	Mean	Standard deviation	Mean ranking
	41	use the State Plan for Vocational Education in securing reimbursements for vocational programs	-.47	3.15	1.32	84
	45	formulate your own educational philosophy	-.34	3.91	1.00	43.5
	53	break down an occupation or job into its component parts for instructional or guidance purposes	-.36	4.24	.85	16.5
	63	distinguish between two or more educational philosophies	-.46	2.99	1.13	90
	82	inform students of the nature and requirements of specific occupations	-.40	4.18	.78	21
	87	operate duplicating equipment	-.46	3.12	1.23	86

four of the six competencies related to teacher-student relations that had high means and mean rankings. Items 7, 29, 34, and 64 had low means and low mean rankings but high factor loadings.

Upon examination the items seemed to resemble a professionalism cluster. The 12 spurious competencies were studied and ten were identified as reflecting a degree of relationship to sub-factors Ia and Ic. It should also be pointed out that eight of the ten lowest mean ranked competencies in the entire study clustered under Factor I.

Factor II accounted for 6.49 percent of the common variance. The factor was named Program Operation and three general dimensions of competencies emerged. Table 3 summarizes the data on the 28 competencies which clustered under this factor.

Items 22, 20, 77, and 99 suggested leadership and administration competencies; items 51, 73, and 96 suggested articulation competencies; and items 55, 90, and 78 suggested relationships to program development. The factor was fairly homogenous as the values of most factor loadings, means, standard deviations, and mean rankings were in close proximity to one another. It should also be pointed out that 11 of the 16 spurious competencies had fairly high means and low standard deviations.

The factor proved to be a stable factor as a close examination indicated that all Factor II competencies had clustered together in

Table 3. Results of R-technique analysis for Factor II - Program Operation.

Factor	Item number	Competency	Factor loading	Mean	Standard deviation	Mean ranking
II	22	secure on-the-job training positions for students	.51	3.46	1.06	68
	20	prepare budgetary requests for vocational programs	.54	3.93	.95	40.5
	51	relate the vocational program to other instructional programs	.51	3.89	.89	47
	55	conduct community surveys to improve instruction or plan programs	.51	3.16	1.16	83
	65	use a student-centered teaching style	.51	4.01	1.00	34.5
	73	aid students in entering educational or occupational training programs beyond the community college level	.64	3.72	.96	57.5
	77	lead a conference	.52	3.43	1.15	69
	80	develop subjective tests to measure achievement	.51	3.54	1.16	64
	90	provide programs for the student with special needs	.51	3.63	1.05	61
	99	coordinate and supervise cooperative work experience programs	.54	3.49	1.19	67
	96	articulate your instructional program with other educational institutions or agencies	.55	3.72	1.00	57.5
	78	develop student learning activities to facilitate instruction	.50	4.11	.77	27.5
		Spurious Competencies				
	1	assist community college administrators initiate and maintain vocational programs	.41	3.93	.83	40.5
	5	promote and teach adult vocational programs	.43	4.12	1.04	26
	15	aid the student in obtaining job placement after training	.42	3.84	.85	51
	17	relate technological advances to laboratory and classroom instruction	.42	4.35	.69	13

(Continued on next page)

Table 3. (Continued)

Factor	Item number	Spurious Competencies	Factor loading	Mean	Standard deviation	Mean ranking
II	19	assist in the development of the total community college program	.45	3.38	1.01	71
	27	revise courses in accordance with current occupational trends	.38	4.59	.58	5
	47	draw from personal avocational interests to enrich instruction	.41	3.91	.93	43.5
	49	develop classroom instruction based upon the individual needs of the learner	.39	4.21	.84	19
	66	identify students in need of counseling or guidance	.46	4.08	.88	31
	68	evaluate the effectiveness of a classroom or laboratory demonstration	.41	4.25	.72	15
	71	use counseling techniques to help students solve personal and social problems	.48	3.42	1.10	70
	79	communicate your ideas or point of view to other instructors or administrators	.39	4.14	.79	24
	81	relate current events associated with your subject matter area to classroom instruction	.33	3.89	.86	47
	83	interpret the socio-economic class structure of the local community in relation to students enrolled in vocational programs	.42	3.19	1.17	82
	92	write articles for news releases	.44	2.69	1.19	95
	24	develop audio-visual materials for instructional purposes	.41	3.94	.90	38.5

Factor I of the six-factor solution. Twelve of the 16 Factor II spurious competencies also had their highest factor loading in Factor I of the six-factor solution.

Factor III accounted for 5.39 percent of the common variance. Table 4 summarizes the data on the 19 competencies which clustered under this factor. The interpretation of competencies with high factor loadings seemed to indicate a general measurement and lesson-planning area and were summarized with the name of Measurement and Course Construction. Items dealing with measurement tended to have higher means and higher mean rankings than those items dealing with course construction. The factor was found to be very stable and consistent. All Factor III competencies clustered under Factor III of the four-factor solution.

Factor IV was named Instructional Strategies and, as Table 5 illustrates, proved to be the most intriguing factor of the entire study. It accounted for 3.0 percent of the variance and contained only two competencies, namely provide practical shop or laboratory experience to enhance classroom learning and select appropriate equipment and supplies for instructional purposes. These competencies ranked two and four respectively in the list of high-ranked competency scores. It should be pointed out that when spurious competencies were included for this factor, ten of the 11 highest mean ranked competencies for the entire study clustered under Factor IV. All competencies had very

Table 4. Results of R-technique analysis for Factor III - Measurement and Course Construction.

Factor	Item number	Competency	Factor loading	Mean	Standard deviation	Mean ranking
III	32	develop objective tests to measure achievement	-.55	4.42	.79	12
	38	relate the course of study to measurable performance objectives	-.71	4.32	.73	14
	54	write performance objectives	-.73	4.03	.99	32.5
	57	assess the validity, reliability and difficulty of instructor-made tests	-.63	3.85	1.01	50
	60	utilize written shop, classroom and laboratory equipment organizational plans	-.66	3.68	.99	59
	62	make a daily lesson plan	-.51	3.60	1.20	63
	74	develop performance tests to measure achievement	-.63	4.23	.80	18
	95	evaluate teaching effectiveness by measuring student achievement	-.50	4.17	.81	22.5
		Spurious Competencies				
	36	relate to students from different socio-economic backgrounds	-.47	3.96	.87	37
	40	provide special training or assistance to disadvantaged and handicapped students	-.43	3.65	1.03	60
	44	build a display for instructional purposes	-.45	3.50	.99	66
	46	utilize state guidelines for curriculum planning	-.46	3.30	1.07	75
	56	use the information contained in professional journals for personal improvement or improvement of instruction	-.46	4.03	.81	32.5
	67	participate in professional organizations related to your subject matter area	-.47	3.81	.97	52
	72	summarize classroom presentations	-.40	4.00	.82	36

(Continued on next page)

Table 4. (Continued)

Factor	Item number	Spurious Competencies	Factor loading	Mean	Standard deviation	Mean ranking
III	76	participate in outside trade, business or professional organizations related to your subject matter area	-.41	3.79	1.00	53.5
	91	use programmed learning materials	-.38	3.20	1.16	81
	94	conduct follow-up studies for purposes of determining effectiveness of instruction	-.45	3.89	1.02	47.0
	26	select appropriate audio-visual materials for instructional purposes	-.43	3.94	1.00	38.5

Table 5. Results of R-technique analysis for Factor IV - Instructional Strategies.

Factor	Item number	Competency	Factor loading	Mean	Standard deviation	Mean ranking
IV	13	provide practical shop or laboratory experiences to enhance classroom learning	.52	4.70	.54	2
	9	select appropriate equipment and supplies for instructional purposes	.52	4.63	.60	4
		Spurious Competencies				
	3	conduct a shop or laboratory demonstration for an individual student	.42	4.51	.78	7
	6	ask questions during classroom presentations or demonstrations to aid in student learning	.35	4.44	.71	11
	10	arrange and conduct field trips	.24	3.90	.94	45
	37	utilize individualized instruction materials and techniques	.30	4.19	.77	20
	31	select textbooks and instructional materials for the classroom, shop or laboratory	.35	4.69	.54	3
	33	motivate students in the classroom, shop or laboratory	.41	4.71	.53	1
	50	provide appropriate practice for development of basic skills	.43	4.45	.63	10
	59	teach at the students' level and rate of learning	.43	4.50	.69	8.5
	61	maintain student attention during classroom presentations or demonstrations	.48	4.50	.69	8.5
	93	be stimulating in your work as an instructor	.45	4.58	.62	6

small standard deviations which indicated homogenity, or a high degree of agreement, among respondents. The stability and soundness of the factor was verified when it was found that the two highly loaded competencies and all spurious competencies also had their highest factor loading under Factor II of the six-factor solution.

Factor V accounted for 2.69 percent of the variance and is summarized in Table 6. The factor had no competencies with a factor loading of ± .50 or higher but had two spurious competencies. The items suggest a testing and placement factor but any naming of the factor would have been too inconclusive to be justified.

Table 7 summarizes data on the ten highest and ten lowest mean ranked competencies. It was interesting to note that the ten highest ranks all had low standard deviations and all but one clustered under Factor IV, Instructional Strategies. The ten lowest mean ranked competencies tended to have higher standard deviations indicating less agreement among respondents. Any naming of the low mean ranked competencies would have been difficult as many of them were spurious and were included in different factors or sub-factors.

In summary, five factors were extracted in the analysis, the fifth of which was uninterpretable. Of the 99 competencies included in the study, 48 had factor loadings greater than ± .50, 38 had loadings of ± .40 to .49, a further 12 had loadings of ± .30 to .39, and only one had a loading in the ± .20 range. The study's high factor

Table 6. Results of R-technique analysis for Factor V (uninterpretable).

Factor	Item number	Competency	Factor loading	Mean	Standard deviation	Mean ranking
V		(no competencies loaded above .50 for this factor)				
		Spurious Competencies				
	69	use the results of standardized test scores for job placement	.44	2.82	1.11	92
	98	screen and select students for your program	.45	3.32	1.22	74

Table 7. Ranked high and low mean competency scores.

Item number	Competency	Rank	Mean	Standard deviation	Clustered in factor
	High Mean Scores				
*33	motivate students in the classroom, shop or laboratory	1	4.71	.53	4
13	provide practical shop or laboratory experiences to enhance classroom learning	2	4.70	.54	4
*31	select textbooks and instructional materials for the classroom, shop or laboratory	3	4.69	.54	4
9	select appropriate equipment and supplies for instructional purposes	4	4.63	.60	4
*27	revise courses in accordance with current occupational trends	5	4.59	.58	2
*93	be stimulating in your work as an instructor	6	4.58	.62	4
* 3	conduct a shop or laboratory demonstration for an individual student	7	4.51	.78	4
*59	teach at the student's level and rate of learning	8.5	4.50	.69	4
*61	maintain student attention during classroom presentations or demonstrations	8.5	4.50	.69	4
*50	provide appropriate practice for development of basic skills	10	4.45	.63	4
	Low Mean Scores				
*63	distinguish between two or more educational philosophies	90	2.99	1.13	1
*21	locate available standardized tests	91	2.89	1.15	1
*69	use the results of standardized test scores for job placement	92	2.82	1.11	5
4	involve yourself in civic community activities not directly related to the school	93	2.81	.88	1
86	identify local community power structures and pressure groups	94	2.71	1.19	1
*92	write articles for news releases	95	2.69	1.19	2
*14	participate in the supervision of non-vocational extracurricular activities	96.5	2.64	.99	1
* 2	interpret the provisions of instructor tenure laws	96.5	2.64	1.15	1

(Continued on next page)

Table 7. (Continued)

Item number	Competency	Rank	Mean	Standard deviation	Clustered in factor
16	interpret the history of vocational education	98	2.60	1.08	1
43	interpret the history of education	99	2.35	1.02	1

*Clustered as a spurious competency.

loading of .74 occurred on item 29, Factor Ic and the study's low factor loading, .24, occurred on item 10, Factor IV.

Thirty-six competencies had means higher than 4.00, 53 had means in the 3.00 to 3.99 range, and only ten had means of below 3.00. Fifty-three competencies had standard deviations of 1.00 or greater and 46 had standard deviations below 1.00.

Results of the Q-technique Analysis

A Q-technique factor analysis program examined the relationship of every respondent with every other respondent and ordered them according to competencies. The analysis indicated the extent to which respondents resembled each other with regard to the series of competencies in question. Utilization of the Q-technique was largely based on recommendations by Cattell (1952) who stated

> . . . clearly it indicates the extent to which two people resemble each other with regard to the series of tests in question. Q-Technique is thus an ideal method for finding types if such types actually exist with respect to the variables concerned (p. 91-92).

The criterion for the selection of the factor loading cut-off value and factor solution were the same as employed for the R-technique. Data were initially analyzed for eight and four factor solutions. In both instances only two factors were generated.

Factor I accounted for 94.64 percent of the common variance and was named Community College Trade and Industrial Instructors.

Factor II accounted for .67 percent of the common variance and was considered as an uninterpretable factor. Appendix N summarizes the data on the 160 respondents which clustered under Factor I.

Factor I had 159 respondents with factor loadings ranging from .90 to .99. Respondent 154 had a factor loading of .82. None of the respondents had loadings of any consequence on Factor II. In fact, 158 factor loadings were below .20, one was in the .20-.29 range, and one was in the .30-.39 range.

V. SUMMARY, CONCLUSIONS AND IMPLICATIONS

Restatement of Problem and Procedures

The study had several purposes, the major one of which was to determine the common professional education competencies needed by community college instructors of trade and industrial education. Two other purposes of the study were to determine if differences existed among community colleges according to scores trade and industrial instructors assigned to each of the 99 professional education competencies and determine if community college trade and industrial instructors resembled one another according to values given the 99 professional education competencies.

A mail survey questionnaire was developed to collect data. The questionnaire was developed through a critical review of literature on professional education competencies in all areas of community college vocational education. A jury of experts evaluated the questionnaire for format, content, clarity, and comprehensiveness. The revised questionnaire was then field tested with community college trade and industrial instructors. The final questionnaire contained 99 professional education competencies. The questionnaire was designed so that instructors could respond to the level of proficiency necessary for each competency in relation to their job. Their responses

consisted of indicating whether no, slight, moderate, considerable, or complete competency was needed. Response values were assigned Likert-type scale values of 1-5.

A total of 40 community colleges, ten in each of four states, were selected for the study. The sample of 160 instructors was obtained by randomly selecting four trade and industrial instructors from each of the community colleges identified in the population.

Data were coded and punched on data processing cards for analysis at the Oregon State University Computer Center. Data were analyzed utilizing analysis of variance and factor analytic techniques.

Summary of Findings

A one-way classification analysis of variance revealed that, except for one competency, no differences existed among community colleges according to scores trade and industrial instructors assigned to each of 99 professional education competencies.

The R-technique of factor analysis was used to identify common professional education competencies. A five-factor solution extracted 48 competencies that had factor loadings greater than $\pm .50$. Four of the five factors extracted were identified as follows:

1. Factor I was a general factor with three interpretable sub-factors. Sub-factor 1a was named History, Philosophy, and Objectives; sub-factor 1b was named Community Relations,

and sub-factor 1c was named Professionalism and Student Relations.

2. Factor II was identified as Program Operation.
3. Factor III was summarized with the title of Measurement and Course Construction.
4. Factor IV was labeled Instructional Strategies.

The ten highest mean ranked competencies in the study were:

1. Motivate students in the classroom, shop, or laboratory.
2. Provide practical shop or laboratory experiences to enhance classroom learning.
3. Select textbooks and instructional materials for the classroom, shop or laboratory.
4. Select appropriate equipment and supplies for instructional purposes.
5. Revise courses in accordance with current occupational trends.
6. Be stimulating in your work as an instructor.
7. Conduct a shop or laboratory demonstration for an individual student.
8. Teach at the student's level and rate of learning.
9. Maintain student attention during classroom presentations or demonstrations.
10. Provide appropriate practice for development of basic skills.

The lowest mean ranked competency in the study was:

1. Interpret the history of education.

The Q-technique of factor analysis revealed that trade and industrial instructors from the four different states resemble one another with regard to values assigned to professional education competencies.

Conclusions

The first question to which the present study was directed was whether differences existed among community colleges as judged by values selected instructors assigned to each of 99 professional education competencies. Except for one competency, there were no differences among community colleges. The one competency on which community colleges significantly differed in their responses was interpreted as being attributable purely to chance.

The second question was concerned with the determination of common professional education competencies. Four dimensions of common professional education competencies were identified by the R-technique of factor analysis. It was concluded that competencies which clustered in each of the four factors represented meaningful groups of competencies as typified by the study's sample population. The conclusion was strengthened by the strong similarity of results from two different factor solutions. Lending further support to the

results were the findings reported by Halfin and Courtney (1970) who analyzed 130 professional education competencies and identified six factors which corresponded closely to the factors identified in this study.

Nine of the ten highest mean ranked professional education competencies in the study factored under Factor IV, Instructional Strategies.

The third question to which the study was directed was whether community college instructors resembled one another with regard to 99 professional education competencies. From the factorial structures which were generated it was concluded that trade and industrial instructors from four different states resembled one another with regard to values assigned to professional education competencies.

The review of literature and other quantitative and qualitative data gathered during the four state study revealed that current professional education research and development efforts within the Division of Vocational, Adult, and Community College Education are innovative and relevant to the current concerns of community college administrators and trade and industrial instructors.

The most important overall conclusion of the study may have resided in the implicit demonstration that the development, administration, and factor analysis of a professional education competencies questionnaire does contribute to the identification of common

factors among different competencies and instructors. Hence, it is a way of obtaining much of the information essential for designing and developing curricula.

Implications

The following implications were derived from an examination of results.

1. Selected community colleges in four different states did not differ significantly in the way that trade and industrial instructors rated professional education competencies. Therefore, teacher educators of trade and industrial education may consider this community college similarity among states when developing or revising curricula.
2. An examination of the common professional education competencies determined through factor analysis revealed implications for trade and industrial teacher education curricula. The competencies with high factor loadings that clustered within a factor should be viewed as having common characteristics for curriculum development. However, teacher educators should not ignore the fact that many of the high loaded competencies clustered in the different factors vary in importance as indicated by the mean score values.

The present study also showed that many of the competencies with high mean ranks had low factor loadings and, consequently, did not cluster within a factor. Thus, merely selecting clustered or highly loaded competencies for curriculum development would be invalid. Competencies which clustered under the Instructional Strategies Factor should receive particular emphasis when designing or revising future curricula.

3. An examination of the data on the differences of factorial structure on trade and industrial instructors revealed an interesting finding. The education, experience, and qualifications needed to teach in the various complex subject matter areas of trade and industrial education, in all four states, are very heterogeneous. However, they are not to be explained away by the reductionistic dichotomy of "technical versus vocational" or other comparisons in regard to professional education competencies. The high specificity of structure--one factor--strongly suggests that the professional education needs of trade and industrial instructors are not as complex or diverse as had been widely assumed. Properly designed curricula could prepare trade and industrial instructors for community college positions in four different states.

4. The application of factor analyses to a professional

education competency questionnaire can provide a structure for organizing competencies within a factor and evaluating them. The results tended to support the view that a wide range of professional education competencies could be identified, clustered, and ranked and that trade and industrial education curricula might be developed with greater simplicity, efficiency, and economy in terms of a smaller number of relatively independent dimensions.

Overall, the results of the present study should facilitate future efforts toward the design and development of sound curricula for community college trade and industrial instructors in four different states.

Suggestions for Further Study

The following suggestions were made for further study as a result of findings and conclusions of this investigation:

1. Had more than 99 competencies been included in the questionnaire, it is possible that additional factors may have emerged. The consideration of this possibility raises the important question of whether much of the unexplained variance could be accounted for by other kinds of factors which might come from adding other kinds of competencies to the original competencies.

2. Research dealing with the problem of identifying the various domains, and the taxonomic levels which each competency typifies, constitutes an important phase of the curriculum development process for the study findings. Studies dealing with the various domain levels are needed before the present findings are transformed into objective statements.
3. Behavioral objectives, instructional strategies, and evaluation methods should be developed for the appropriate clusters and/or competencies. The developed instructional materials should then be evaluated in an experimental setting using a covariance design or other appropriate procedure.
4. The possibility of the factor structures changing over time needs to be recognized. Thus the present study should be replicated in order to verify the reliability of the findings.
5. The present study does not answer the query whether the same competency factors and instructor factors would emerge in another study of professional education competencies, with different vocational education instructor samples other than trade and industrial, within the community college population.
6. Research dealing with the problem of identifying the common professional education competencies of vocational education administrators and counselors constitutes an area

that should be investigated.

7. Results and findings from the concurrent studies by Gunderson, Lindahl, and Miller should be analyzed to determine the common professional education competencies required by all community college instructors of vocational education. Results of the analysis should then be compared to the practice of having specialized teacher education courses for the different vocational education subject matter areas.

8. While the particular findings of the present study may be restricted to the population in which the data were collected, the method has been sufficiently suggestive to warrant its further use in the study of professional education competencies and for curriculum development in other vocational education service areas.

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APPENDICES

APPENDIX A

Jury of Experts Revision Form

From: _____ _____ _____
name position institution

Subject: Suggested revisions to Professional Education Competencies Instrument

Item No.	Suggested Revisions
_____	_____
	_____
_____	_____
	_____
_____	_____
	_____
_____	_____
	_____

Suggested Additions
(new items)

_____

_____

_____

_____

Item No.	Suggested Deletions		
_____	_____	_____	_____

Note: If additional space is needed, please attach sheet to this memo.

APPENDIX B

Professional Education Competencies

of

Selected Community College

Vocational Instructors

INSTRUCTOR QUESTIONNAIRE

Oregon State University

(1970-1971)

_____
Name

_____
Community College

_____
State

INSTRUCTOR QUESTIONNAIRE

The Professional Education Competencies of Selected Community College Instructors

Purpose of Questionnaire: The purpose of this questionnaire is to seek your assistance in providing information which will be useful in the development of curriculum for colleges and universities seeking to offer relevant teacher education courses and programs for community college instructors.

INSTRUCTIONS FOR COMPLETION OF THE QUESTIONNAIRE

A. In the spaces provided below, check (x) the appropriate subject matter area in which you teach the majority of your courses.

( ) Agriculture (Forestry, Horticulture, Production)

( ) Business and Office

( ) Distributive (mid-management and marketing)

( ) Health Occupations

( ) Home Economics

( ) Trade and Industrial

( ) Service Occupation

( ) Technical

( ) Other (specify) _____

B. This questionnaire contains professional education competencies for community college instructors. You are being asked to indicate the level of proficiency YOU FEEL is NECESSARY for each competency in relation to YOUR JOB.

C. Do not take too much time in thinking about any particular item. Please do not leave out any item--there are no right or wrong answers. We are primarily concerned with how YOU FEEL about the competencies needed by community college instructors.

D. For each item please circle the rating (1, 2, 3, 4, 5) which most closely represents YOUR FEELING. If your exact feeling is not found in one of the choices, pick the one which comes closest to your true feeling.

Here is an example:

What proficiency must you have in your work as an instructor in the ability to:	no	slight	moderate	considerable	complete
1. develop objective tests to measure achievement	1	2	3	4	(5)

This person, in marking the "5" rating, felt that his job required complete proficiency with this activity.

PROFESSIONAL EDUCATION COMPETENCIES QUESTIONNAIRE

What proficiency must you have in your work as an instructor in the ability to:	no	slight	moderate	considerable	complete
1. assist community college administrators initiate and maintain vocational programs	1	2	3	4	5
2. interpret the provisions of instructor tenure laws	1	2	3	4	5
3. conduct a shop or laboratory demonstration for an individual student	1	2	3	4	5
4. involve yourself in civic community activities not directly related to the school	1	2	3	4	5
5. promote and teach adult vocational programs	1	2	3	4	5
6. ask questions during classroom presentations or demonstrations to aid student learning	1	2	3	4	5
7. adapt your appearance and apparel to acceptable standards for instructors	1	2	3	4	5
8. interpret the innovative provisions of the Vocational Act as amended in 1968	1	2	3	4	5
9. select appropriate equipment and supplies for instructional purposes	1	2	3	4	5

What proficiency must you have in your work as an instructor in the ability to:

		no	slight	moderate	considerable	complete
10.	arrange and conduct field trips	1	2	3	4	5
11.	interpret the goals and objectives of vocational education	1	2	3	4	5
12.	interpret the goals of general education	1	2	3	4	5
13.	provide practical shop or laboratory experiences to enhance classroom learning	1	2	3	4	5
14.	participate in the supervision of non-vocational extracurricular activities	1	2	3	4	5
15.	aid the student in obtaining job placement after training	1	2	3	4	5
16.	interpret the history of vocational education	1	2	3	4	5
17.	relate technological advances to laboratory and classroom instruction	1	2	3	4	5
18.	interpret state certification requirements for instructors	1	2	3	4	5
19.	assist in the development of the total community college program	1	2	3	4	5
20.	prepare budgetary requests for vocational programs	1	2	3	4	5
21.	locate available standardized tests	1	2	3	4	5
22.	secure on-the-job training positions for students	1	2	3	4	5
23.	interpret the state specifications and requirements for vocational facilities	1	2	3	4	5
24.	develop audio-visual materials for instructional purposes	1	2	3	4	5
25.	interpret the philosophy of the comprehensive community college	1	2	3	4	5
26.	select appropriate audio-visual materials for instructional purposes	1	2	3	4	5
27.	revise courses in accordance with current occupational trends	1	2	3	4	5
28.	maintain student performance or progress records	1	2	3	4	5
29.	adhere to the code of ethics adopted in your community college	1	2	3	4	5
30.	interpret the philosophy of the community college in providing vocational programs for the student	1	2	3	4	5
31.	select textbooks and instructional materials for the classroom, shop or laboratory	1	2	3	4	5

What proficiency must you have in your work as an instructor in the ability to:

		no	slight	moderate	considerable	complete
32.	develop objective tests to measure achievement	1	2	3	4	5
33.	motivate students in the classroom, shop or laboratory	1	2	3	4	5
34.	interpret the legal liabilities of a teacher	1	2	3	4	5
35.	direct, advise, or promote student participation in competitive events or youth organizations related to vocational education	1	2	3	4	5
36.	relate to students from different socio-economic backgrounds	1	2	3	4	5
37.	utilize individualized instruction materials and techniques	1	2	3	4	5
38.	relate the course of study to measurable performance objectives	1	2	3	4	5
39.	interpret your vocational program to others	1	2	3	4	5
40.	provide special training or assistance to disadvantaged and handicapped students	1	2	3	4	5
41.	use the State Plan for Vocational Education in securing reimbursement for vocational programs	1	2	3	4	5
42.	organize or work with local vocational advisory committees	1	2	3	4	5
43.	interpret the history of education	1	2	3	4	5
44.	build a display for instructional purposes	1	2	3	4	5
45.	formulate your own educational philosophy	1	2	3	4	5
46.	utilize state guidelines for curriculum planning	1	2	3	4	5
47.	draw from personal avocational interests to enrich instruction	1	2	3	4	5
48.	identify the similarities and differences between the goals of general and vocational education	1	2	3	4	5
49.	develop classroom instruction based upon the individual needs of the learner	1	2	3	4	5
50.	provide appropriate practice for development of the basic skills	1	2	3	4	5
51.	relate the vocational program to other instructional programs	1	2	3	4	5
52.	interpret the objectives of vocational education to others	1	2	3	4	5
53.	break down an occupation or job into its component parts for instructional or guidance purposes	1	2	3	4	5

What proficiency must you have in your work as an instructor in the ability to:

		no	slight	moderate	considerable	complete
54.	write performance objectives	1	2	3	4	5
55.	conduct community surveys to improve instruction or plan programs	1	2	3	4	5
56.	use the information contained in professional journals for personal improvement or improvement of instruction	1	2	3	4	5
57.	assess the validity, reliability and difficulty of instructor-made tests	1	2	3	4	5
58.	maintain a clean, orderly laboratory or classroom	1	2	3	4	5
59.	teach at the student's level and rate of learning	1	2	3	4	5
60.	utilize written shop, classroom, and laboratory equipment organizational plans	1	2	3	4	5
61.	maintain student attention during classroom presentations or demonstrations	1	2	3	4	5
62.	make a daily lesson plan	1	2	3	4	5
63.	distinguish between two or more educational philosophies	1	2	3	4	5
64.	maintain necessary report forms required by state or federal agencies	1	2	3	4	5
65.	use a student-centered teaching style	1	2	3	4	5
66.	identify students in need of counseling or guidance	1	2	3	4	5
67.	participate in professional organizations related to your subject matter area	1	2	3	4	5
68.	evaluate the effectiveness of a classroom or laboratory demonstration	1	2	3	4	5
69.	use the results of standardized test scores for job placement	1	2	3	4	5
70.	utilize the services of local and state vocational education agencies	1	2	3	4	5
71.	use counseling techniques to help students solve personal and social problems	1	2	3	4	5
72.	summarize classroom presentations	1	2	3	4	5
73.	aid students in entering educational or occupational training programs beyond the community college level	1	2	3	4	5
74.	develop performance tests to measure achievement	1	2	3	4	5

What proficiency must you have in your work as an instructor in the ability to:

		no	slight	moderate	considerable	complete
75.	maintain discipline in the classroom, shop or laboratory	1	2	3	4	5
76.	participate in outside trade, business, or professional organizations related to your subject matter area	1	2	3	4	5
77.	lead a conference	1	2	3	4	5
78.	develop student learning activities to facilitate instruction	1	2	3	4	5
79.	communicate your ideas or point of view to other instructors or administrators	1	2	3	4	5
80.	develop subjective tests to measure achievement	1	2	3	4	5
81.	relate current events associated with your subject matter area to classroom instruction	1	2	3	4	5
82.	inform students of the nature and requirements of specific occupations	1	2	3	4	5
83.	interpret the socio-economic class structure of the local community in relation to students enrolled in vocational programs	1	2	3	4	5
84.	identify acceptable community social behaviors for instructors	1	2	3	4	5
85.	work cooperatively with people in the community	1	2	3	4	5
86.	identify local community power structures and pressure groups	1	2	3	4	5
87.	operate duplicating equipment	1	2	3	4	5
88.	make use of available guidance and counseling services within the community college	1	2	3	4	5
89.	interpret community college policies	1	2	3	4	5
90.	provide programs for the student with special needs	1	2	3	4	5
91.	use programmed learning materials	1	2	3	4	5
92.	write articles for news releases	1	2	3	4	5
93.	be stimulating in your work as an instructor	1	2	3	4	5
94.	conduct follow-up studies for purposes of determining effectiveness of instruction	1	2	3	4	5
95.	evaluate teaching effectiveness by measuring student achievement	1	2	3	4	5

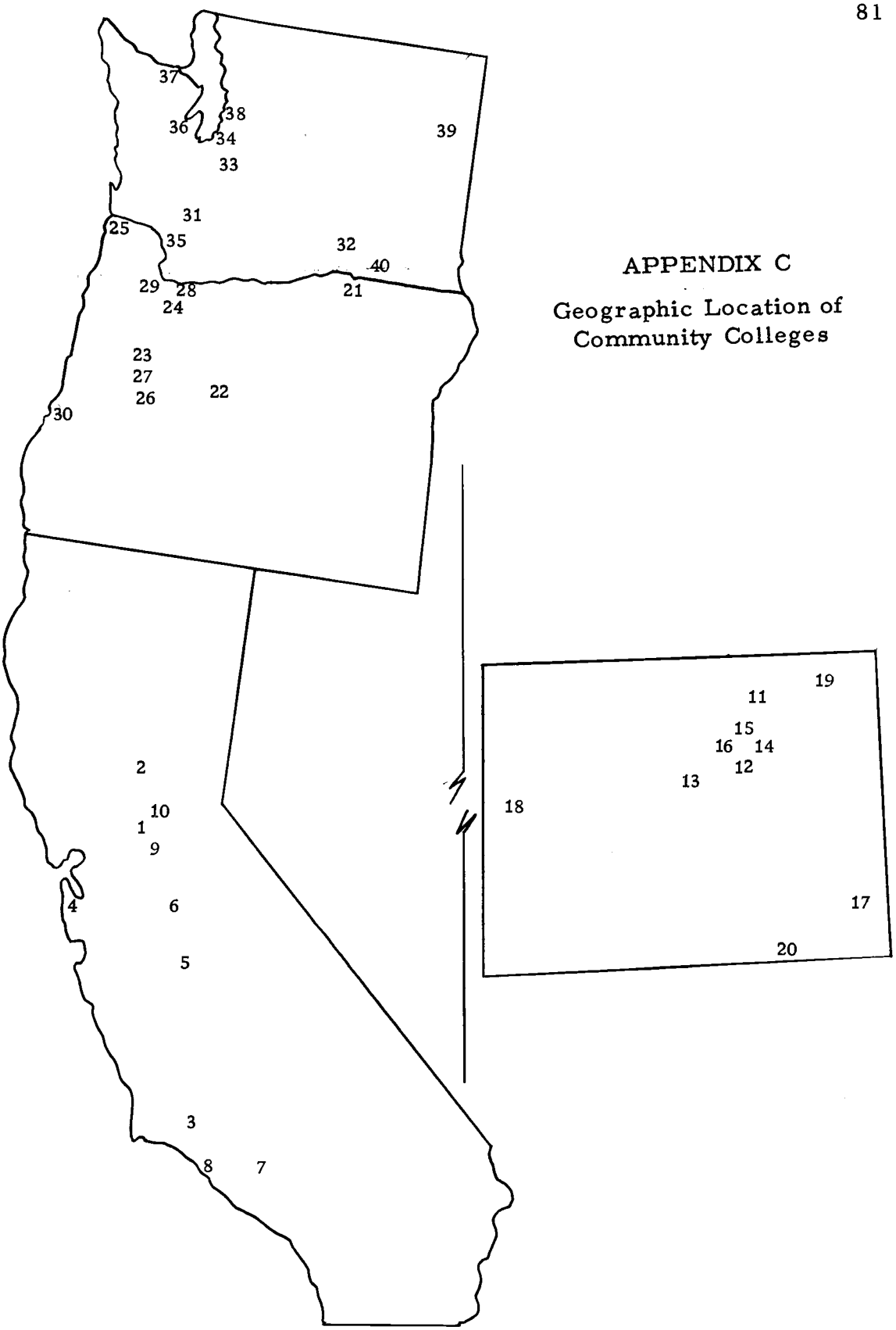
What proficiency must you have in your work as an instructor in the ability to:

		no	slight	moderate	considerable	complete
96.	articulate your instructional program with other educational institutions or agencies	1	2	3	4	5
97.	interpret safety rules and regulations to students	1	2	3	4	5
98.	screen and select students for your program	1	2	3	4	5
99.	coordinate and supervise cooperative work experience programs	1	2	3	4	5

- - - - - - - - -

APPENDIX C

Geographic Location of Community Colleges



APPENDIX D

Community Colleges Participating in the Study

California

1. American River College
   4700 College Oak Drive
   Sacramento, California
   95841

2. Butte College
   2239 Midway
   Durham, California
   95938

3. Citrus College
   18824 East Foothill Boulevard
   Azusa, California
   91702

4. Foothill College
   12345 El Monte Road
   Los Altos Hills, California
   94022

5. Fresno City College
   1101 East University Avenue
   Fresno, California
   93704

6. Mt. San Jacinto College
   21-400 Foothill Road
   P. O. Box 248
   Gilman Hot Springs,
   California 92340

7. Orange Coast College
   2701 Fairview Road
   Costa Mesa, California
   92626

8. Sacramento City College
   3835 Freeport Boulevard
   Sacramento, California
   95822

9. San Bernardino Valley College
   701 S. Mt. Vernon Avenue
   San Bernardino, California
   92403

10. Sierra College
    5000 Rocklin Road
    Rocklin, California
    95677

Colorado

11. Aims Community College
    P. O. Box 69
    Greeley, Colorado
    80631

12. Arapahoe Community College
    5900 S. Santa Fe
    Littleton, Colorado
    81029

13. Colorado Mountain
    Community College
    Leadville, Colorado
    80461

14. Community College of Denver
    Central Campus
    1250 Bannock
    Denver, Colorado
    80216

15. Community College of Denver
    North Campus
    1001 East 62nd Avenue
    Denver, Colorado
    80216

Colorado (continued)

16. Community College of Denver
West Campus
1209 Quail Street
Denver, Colorado
80215

17. Lamar Community College
Lamar, Colorado
81025

18. Mesa Community College
Grand Junction, Colorado
81648

19. Northeastern Community College
Sterling, Colorado
80751

20. Trinidad State Junior College
Trinidad, Colorado
81082

Oregon

21. Blue Mountain Community College
2410 N. W. Carden Avenue
Box 100
Pendleton, Oregon
97801

22. Central Oregon Community College
College Way
Bend, Oregon
97701

23. Chemeketa Community College
4389 Satter Drive N. E.
Salem, Oregon
97303

24. Clackamas Community College
19600 S. Molalla Avenue
Oregon City, Oregon
97045

25. Clatsop Community College
16th and Jerome
Astoria, Oregon
97103

26. Lane Community College
4000 E. 30th Avenue
Eugene, Oregon
97405

27. Linn-Benton Community College
203 W. First Avenue
Albany, Oregon
97321

28. Mt. Hood Community College
26000 S. E. Stark
Gresham, Oregon
97030

29. Portland Community College
12000 S. W. 49th Avenue
Portland, Oregon
97219

30. Southwestern Oregon Community College
Coos Bay, Oregon
97420

Washington

31. Centralia Community College
P. O. Box 639
Centralia, Washington
98531

Washington (continued)

32. Columbia Basin Community College
2600 N. Chase Avenue
Pasco, Washington
99301

33. Green River Community College
12401 S.E. 320th Street
Auburn, Washington
98002

34. Highline Community College
S. 240th at Pacific Hwy S.
Midway, Washington
98031

35. Lower Columbia Community College
1600 Maple Street
Longview, Washington
98632

36. Olympic College
1519 Chester Avenue
Bermerton, Washington
98310

37. Peninsula College
Laurisdan and Ennis
Port Angeles, Washington
98362

38. Shoreline Community College
16101 Greenwood Avenue N.
Seattle, Washington
98133

39. Spokane Community College
E. 3403 Mission Avenue
Spokane, Washington
99204

40. Walla Walla Community College
340 South Park
Walla Walla, Washington
99362

APPENDIX E

R-Mode Control Cards

```
78JOB, 685370, XXX, ORLEY D. GUNDERSON
78*FORMS, 61
78TIME=1000
78MFBLKS=500
78COPY, =80
*GO
*DATA, CARDS=2, ITEMS=99, OUTPUT.
*CORR, RMODE, DIAG=ONE, PRINTCUT=BOTH, OUTPUT.
*FACTOR, NUMFAC=8, EIGEN, OUTPUT.
*ROTATE, VARI, OUTPUT.
*PROJECT, OUTPUT.
*TITLE T+I PROF ED COMP
*LABEL, S01$S02$S03$ . . . . . .S18$
S19$ . . . . . .S38$
S39$ . . . . . .S58$
S59$ . . . . . .S78$
S79$ . . . . . .S98$
S99$.
*FORMAT (9X, 71F1.0/9X, 28F1.0)
*END
Data cards inserted here
**
7788
78REWIND, 80
78*FAST
78LOGOFF
```

APPENDIX F

Q-Mode Control Cards

```
78JOB, 685370, XXXX, ORLEY D. GUNDERSON
78*FORMS, 61
78TIME=1800
78MFBLKS=500
78COPY, =80
*GO
*DATA, TRANS, CARDS=2, ITEMS=99, OUTPUT.
*CORR, QMODE, DIAG=ONE, OUTPUT.
*FACTOR, NUMFAC=8, EIGEN, OUTPUT.
*ROTATE, VARI, OUTPUT.
*PROJECT, OUTPUT.
*TITLE T+I PROF ED COMP
*LABEL, A001$A002$A003$ . . . . . .A01$
A015$ . . . . . .A030$
A031$ . . . . . .A046$
A047$ . . . . . .A062$
A063$ . . . . . .A078$
A079$ . . . . . .A094$
A095$ . . . . . .A110$
A111$ . . . . . .A126$
A127$ . . . . . .A142$
A143$ . . . . . .A158$
A159$ . . . .A160$
*FORMAT (9X, 71F1.0/9X, 28F1.0)
Data cards inserted here
**
7788
78REWIND 80        78*FAST        78LOGOFF
```

APPENDIX G

OSU

OREGON STATE UNIVERSITY
SCHOOL OF EDUCATION

CORVALLIS, OREGON 97331

November 4, 1970

Dr. Dwight C. Baird, President
Clark College
1800 East McLoughlin Boulevard
Vancouver, Washington 98663

Dear Dr. Baird:

The Division of Vocational, Adult and Community College Education at Oregon State University is in the process of developing a program for community college vocational instructors. Instructors in four states, California, Colorado, Oregon and Washington will be surveyed to determine the common professional education competencies needed by community college vocational instructors. This represents the first step of a comprehensive plan to develop a performance based curriculum at the university level. The data you provide will have significant implications for curriculum development relative to the preparation of community college vocational staff.

Instructors from participating community colleges will be randomly selected and asked to complete a questionnaire. A copy of the questionnaire is enclosed for your review. A summary of the findings will be made available to all participants however the names of institutions and respondents will not be identified in the final report. Our schedule calls for this questionnaire to be mailed to respondents by the first week in December and to be returned by December 18.

Mr. Richard Moe, Assistant Director for Instruction, Washington State Board for Community Colleges, has indicated that he is supportive of our efforts and has encouraged our contacting you for the purpose of soliciting your cooperation. Dr. Baird, your help is needed and we would greatly appreciate the approval for your institution's participation.

Enclosed is a self-addressed response card to indicate your willingness to participate. We shall be looking forward to hearing from you at your earliest convenience.

Thank you,

Redacted for Privacy

Dr. Henry Tenras, Director
Division of Vocational, Adult and
Community College Education

Redacted for Privacy

pak
Encl.

APPENDIX H

OSU

CORVALLIS, OREGON 97331

OREGON STATE UNIVERSITY

SCHOOL OF EDUCATION

November 28, 1970

Mr. Victor Kachel
Olympic College
1519 Chester Ave.
Bremerton, Wash. 98310

Dear Mr. Kachel:

Research is currently underway at Oregon State University to determine the professional education competencies needed by community college instructors. Your community college is one of 40 community colleges in four western states selected to participate. Your college administration, as well as the appropriate state agency, has been contacted and in both cases have given their support to this research. They encourage your participation. The data you provide will have significant implications for curriculum development relative to the preparation of community college instructors.

We are aware of the demands on your time and are very appreciative of your professional assistance. The enclosed questionnaire takes only a few minutes to complete and should be returned in the enclosed self-addressed stamped envelope. Your early response by December 11 is appreciated.

Although names of institutions or respondents will not be identified in the final report, a summary of the findings will be made available to all participants.

Cordially,

Redacted for Privacy

Orley D. Gunderson
Division of Vocational, Adult and
Community College Education
309 Waldo Hall

ODG/mjs
Encs:

APPENDIX I

OSU

CORVALLIS, OREGON 97331

OREGON STATE UNIVERSITY

SCHOOL OF EDUCATION

December 11, 1970

TO:

FROM:

Division of Vocational, Adult,
and Community College Education
Waldo Hall 309
Oregon State University
Corvallis, Oregon 97331

SUBJECT: Professional Education Competencies
Instructor Questionnaire

We recently mailed to you a questionnaire requesting your help in evaluating a list of professional education competencies for community college instructors. The data you provide will be extremely useful in the development of community college curricula. If you have already completed and returned the questionnaire, please consider this memorandum as an expression of our appreciation.

If you have not responded please do so within the next few days. For your convenience we have enclosed another questionnaire in the event that the first one was misplaced. Please send the completed questionnaire to the above address.

Thank you again for your cooperation!

APPENDIX J

OSU

OREGON STATE UNIVERSITY
SCHOOL OF EDUCATION

CORVALLIS, OREGON 97331

December 11, 1970

TO:

FROM: Division of Vocational, Adult, and
Community College Education
Waldo Hall 309
Oregon State University
Corvallis, Oregon 97331

SUBJECT: Professional Education Competencies
Instructor Questionnaire

We recently mailed to you a questionnaire requesting your help in evaluating a list of professional education competencies for community college instructors. The data you provide will be extremely useful in the development of community college curricula. If you have already completed and returned the questionnaire, please consider this memorandum as an expression of our appreciation.

If you have not responded please do so within the next few days by sending the completed questionnaire to the above address. It is only through your cooperation that this research project will be successful.

APPENDIX K

Coding of Data Cards

Data for each of the 106 respondents was coded on two cards as follows:

A) Card 1

Column	Code
1-4	A001 to A160. Represents one of the 160 instructors.
5-6	1 to 40. Represents one of the 40 community colleges
7	1 to 4. Represents one of the four states.
8	1 to 8. Represents one of the eight subject matter areas in which respondents taught.
9	1. Data card number one.
10-80	Data. Response values of 1, 2, 3, 4, or 5 which were assigned to 71 competencies.

B) Card 2

	Code
1-8	Same as above.
9	2. Data card number two.
10-37	Data. Responses values of 1, 2, 3, 4, or 5 which were assigned to 28 competencies.

APPENDIX L

Results of Analysis of Variance Using the F Statistic

Competency	Computed F	Hypothesis*	Competency	Computed F	Hypothesis
1	1.15	retain	45	1.69	retain
2	1.25	"	46	1.53	"
3	.80	"	47	.91	"
4	1.35	"	48	1.12	"
5	1.17	"	49	.84	"
6	1.52	"	50	1.18	"
7	1.06	"	51	1.03	"
8	1.17	"	52	1.23	"
9	1.00	"	53	1.19	"
10	1.14	"	54	1.45	"
11	1.29	"	55	1.07	"
12	1.11	"	56	.75	"
13	1.31	"	57	1.16	"
14	1.49	"	58	1.07	"
15	1.49	"	59	.76	"
16	1.32	"	60	1.36	"
17	.91	"	61	1.21	"
18	1.60	"	62	1.37	"
19	1.35	"	63	1.59	"
20	1.61	"	64	.95	"
21	1.52	"	65	1.51	"
22	.84	"	66	1.50	"
23	1.11	"	67	1.38	"
24	.81	"	68	1.03	"
25	.95	"	69	1.47	"
26	1.53	"	70	1.56	"
27	1.09	"	71	1.60	"
28	.78	"	72	1.08	"
29	.69	"	73	1.16	"
30	1.02	"	74	1.02	"
31	1.60	"	75	1.44	"
32	1.32	"	76	1.04	"
33	.97	"	77	1.10	"
34	1.50	"	78	1.11	"
35	1.50	"	79	.92	"
36	1.67	"	80	.95	"
37	.86	"	81	.57	"
38	.83	"	82	1.03	"
39	1.17	"	83	1.28	"
40	1.02	"	84	1.56	"
41	2.04	reject**	85	1.02	"
42	1.29	retain	86	1.53	"
43	1.42	"	87	.65	"
44	.76	"	88	1.21	"

(Continued on next page)

Appendix L. (Continued)

Competency	Computed F	Hypothesis	Competency	Computed F	Hypothesis
89	1.42	retain	94	1.24	retain
90	.73	"	95	.99	"
91	1.72	"	96	.96	"
92	1.49	"	97	1.07	"
93	1.36	"	98	.95	"
			99	.84	"

*The level of significance was the .01 percent level and the critical region with 40 degrees of freedom for the numerator mean square and 120 degrees of freedom for the denominator mean square was $F > 1.76$.

**The L.S.D. Test was used to compare means for the rejected items.

APPENDIX M

Test of Least Significant Difference
for Competency 41

Competency mean score	Community college	Competency mean score	Community college
4.75	20	3.25	35
4.50	16	3.00	33
4.25	27	3.00	26
4.25	28	3.00	31
4.25	05	2.75	23
4.00	13	2.75	37
4.00	01	2.75*	25
4.00	17	2.50	02
4.00	10	2.50	34
4.00	18	2.50	08
4.00	36	2.50	32
3.75	06	2.25	09
3.75	14	2.25	21
3.50	30	2.25	22
3.50	07	2.25	24
3.50	19	2.00	29
3.50	12	2.00	03
3.25	38	2.00	04
3.25	11	1.75	40
3.25	15	1.50	39

*At the .01 level, the computed F of 2.04 is greater than the Tabular F of 1.76 resulting in a rejection of the test of significance. The 2.75 competency mean score reflects the lowest point at which there is no significance. All responses below the 2.75 level exceed the computed L.S.D. of 2.15.

APPENDIX N

Results of Q-mode Analysis

Respondent* number	Factor loading	Respondent number	Factor loading	Respondent number	Factor loading
001	.99	039	.97	074	.92
002	.99	040	.96	075	.99
003	.97	041	.99	076	.99
004	.98	042	.98	077	.99
005	.99	043	.98	078	.97
006	.97	044	.99	079	.99
007	.97	045	.94	080	.98
008	.97	046	.97	081	.98
009	.96	047	.99	082	.91
010	.93	048	.97	083	.99
011	.93	049	.98	084	.98
012	.98	050	.99	085	.97
013	.98	051	.98	086	.95
014	.94	052	.98	087	.96
015	.98	053	.98	088	.96
016	.99	054	.99	089	.94
017	.98	055	.98	090	.98
018	.99	056	.96	091	.98
019	.98	057	.98	092	.97
020	.97	058	.96	093	.95
021	.98	059	.96	094	.98
022	.99	060	.96	095	.98
023	.98	061	.98	096	.97
024	.96	062	.99	097	.99
025	.99	063	.98	098	.98
026	.93	064	.97	099	.94
027	.98	065	.99	100	.99
028	.98	066	.98	101	.98
029	.93	067	.99	102	.97
030	.97	068	.98	103	.99
031	.98	069	.99	104	.99
032	.97	070	.97	105	.98
033	.99	071	.98	106	.99
034	.92	072	.97	107	.98
035	.98	073	.99	108	.99
036	.93	074	.92	109	.98
037	.90	075	.99	110	.99
038	.97	073	.99	111	.98

(Continued on next page)

Appendix N. (Continued)

Respondent number	Factor loading	Respondent number	Factor loading	Respondent number	Factor loading
112	.99	128	.98	144	.99
113	.99	129	.97	145	.99
114	.98	130	.98	146	.97
115	.97	131	.96	147	.99
116	.97	132	.97	148	.98
117	.99	133	.98	149	.99
118	.98	134	.97	150	.96
119	.96	135	.95	151	.99
120	.98	136	.99	152	.97
121	.99	137	.99	153	.99
122	.96	138	.99	154	.82
123	.99	139	.99	155	.96
124	.99	140	.98	156	.95
125	.98	141	.97	157	.96
126	.97	142	.96	158	.98
127	.99	143	.96	159	.95
				160	.97

*The analysis accounted for 94.64 percent of the common variance.