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A COMPARISON OF TWO METHODS
OF MEASURING THE RELATEDNESS OF
THE JOBS OF VOCATIONAL EDUCATION GRADUATES
TO THEIR VOCATIONAL EDUCATION PROGRAMS

presented by

Harvey Ollis

has been accepted towards fulfillment
of the requirements for

Ph. D. degree in Education

Robert Poland
Major professor

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A COMPARISON OF TWO METHODS OF MEASURING THE RELATEDNESS OF THE JOBS OF VOCATIONAL EDUCATION GRADUATES TO THEIR VOCATIONAL EDUCATION PROGRAMS

By

Harvey Tito Ollis

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ABSTRACT

A COMPARISON OF TWO METHODS
OF MEASURING THE RELATEDNESS OF
THE JOBS OF VOCATIONAL EDUCATION GRADUATES
TO THEIR VOCATIONAL EDUCATION PROGRAMS

by

Harvey Tito Ollis

Statement of the Problem

The problem addressed in this study was to compare two different methods of measuring whether the jobs obtained by vocational graduates were related to their instructional program. One measure of job relatedness was graduate self-assessment. The other relatedness measure was based on matching job titles and instructional program titles using a cross-code index.

Another aspect of the study was to identify the predictive nature (if any) of selected student and program characteristics on the two measures of job relatedness.

Research Procedures

The population of this study consisted of a sample of 1,336 program completers who responded to the 1980 Follow-Up Survey from six vocational education instructional programs. The sample data for all the variables were analyzed in multiple regression equations with student and program characteristics serving as independent variables

and the job relatedness measures serving as dependent variables. The variability of the job relatedness measures explained by each of the independent variables was identified.

The two measures of job relatedness were tested for independence and association using contingency table analysis and chi-square and phi statistics. Tests for independence and association between the job relatedness measures provided information on the nature of the relationship, its significance and its strength.

Major Findings of the Study

The two measures of job relatedness did not produce comparable results. A majority (62.0 percent) of the respondents reported that their jobs were related to their instructional program. However, only twenty-five percent of the respondents were in related jobs based on job title-program title matching measure of job relatedness.

ACKNOWLEDGEMENTS

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Chapter I

PROBLEM

Introduction

Vocational education is a form of instruction designed to prepare its students to function in occupational roles by providing skills, attitudes, and knowledge that are relevant to occupational performance. Vocational education curricula, classroom equipment, supplies, and teacher certification all must be appropriate to the relevant occupation or groups of occupations. Taken together, these factors represent a clear occupational emphasis in vocational education. This emphasis in the process of vocational education extends to a strong interest in the employment experiences of former students.

This study addressed the concept of "relatedness" of the occupational employment experiences of former vocational education students to their instructional program. The study explored several methods of measuring this relatedness of programs to occupations. By analyzing information on former students, this study joins the body of literature that focuses on vocational education outcomes.

Historically, vocational education has had a special responsibility for the employment of its graduates. The occupational emphasis in the process of vocational education was reflected in the expectations held for the product of this process. "The acid test of vocational education is the extent to which its graduates are employed

in occupations for which they are trained."[1] This judgment, by the Panel of Consultants on Vocational Education in 1962, clearly indicated the expectations held for occupationally related employment of former students.

Even with this historical emphasis on the outcomes of vocational education programs, evaluation activities at the federal, state, and local levels had not focused on the employment experiences of former students. Prior to 1976, state evaluation activities concentrated mostly on the vocational program's operational processes, rather than experiences of program graduates.[2] The mandate for outcome assessment was contained in the Educational Amendments of 1976, which stated in Section 112(b)(1) that:

> (B) each state shall evaluate, by using data collected . . . each program within the state which purports to impart entry level job skills according to the extent to which program completers and leavers
>
> (i) find employment in occupations related to their training, and
>
> (ii) are considered by their employers to be well trained and prepared for employment[3]

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[1]Panel of Consultants on Vocational Education, Education for a Changing World, (Washington, D.C.: U.S. Department of Health, Education and Welfare, 1962), p. 2.

[2]Esther Gottlieb Smith and Nancy L. Holt, "State Evaluation of Vocational Education Programs: A National Study of Evaluation Procedures and Practices", Journal of Vocational Education Research, Winter, 1980, Vol. V, No. 1, p. 18.

[3]Educational Amendments of 1976, (Washington, D.C.: U.S. Congress, 1976), Section 112(b)(1)(B). p. 2187.

Darcy[4] has noted that this legal mandate for outcome assessment coincided with growing public concern over tax burdens and a greater development and sophistication in educational evaluation. Together these factors have resulted in greatly expanded evaluations of the outcome measures of vocational education programming. Wentling[5] reported, in a recent national study, that local vocational evaluation activities have internalized the importance of outcome assessment, with "improving programs" being cited twice as frequently as "federal and state reporting requirements" as the reason for evaluation. Wentling[6] further noted that student follow-up surveys are the dominant outcome evaluation method used by local educational agencies.

The impact of these developments has resulted in the following status of evaluating the outcomes of vocational education programs:

1. Mandate--Programs which purport to impart entry-level job skills are to be evaluated according to the extent to which program completers and leavers find employment in related occupations.[7]

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[4]Robert L. Darcy, Vocational Education Outcomes: Perspective for Evaluation, (Columbus: The National Center for Research in Vocational Education, The Ohio State University, Research and Development Series No. 163, 1979), p. 32.

[5]Tim Wentling, and William E. Piland, "A Study of Local Education Practices in Vocational Education", Journal of Vocational Education Research, Summer, 1981, Vol. VI, No. 3, pp 37-55, p. 41.

[6]Ibid. p. 47.

[7]Federal Register, Vol. 42, No. 191, Oct. 3, 1977, pp. 538-44.

2. Instrumentation--Student follow-up surveys are the method most frequently used by local educational agencies to evaluate the outcomes of instructional programs.[8]

Even with agreement in these areas, a problem had emerged--how to ascertain that a job is, indeed, related to a vocational program. The solution to this problem required a method of measuring the "relatedness" of the former students' employment to their vocational program. In an Oklahoma Study, Morton[9] observed that ". . .confusion still exists in correctly identifying graduates as working in an occupation for which trained. . ." In a recent national study of vocational education outcomes, Darcy[10] argued that placement in a training-related job was a questionable evaluation criterion because "relatedness" was an ambiguous concept.

Rossman[11] has defined relatedness as ". . .the extent to which there are perceived similarities between characteristics of the training program and the occupation in which the graduate is employed." This definition of relatedness seemed helpful and was the one used in this study. The definition indicated that relatedness

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[8]Tim Wentling, op. cit.

[9]J. B. Morton et al. Parallel Follow-Up, (Stillwater, Oklahoma: State Department of Vocation and Technical Education, 1977), p. 10.

[10]Robert L. Darcy, op. cit., p. 33.

[11]Marilyn Martin Rossman, "Measuring the Relatedness of Vocational Education Graduates' Preparation and Placement," Journal of Vocational Education Research, Summer 1978, Vol. III, No. 3, p. 2.

involves "perceived similarities." The question then became--whose perceptions? And what are the criteria for measuring similarities? The purpose of this study was to compare two different methods of measuring the relatedness of occupational outcomes.

Statement of the Problem

This study was designed to address the problem of measuring job relatedness. Two different measures of job relatedness were tested for their comparability in selected secondary vocational education programs. The "1980 Michigan Follow-Up Survey of Former Students" was used as the data collection instrument. The following job relatedness measures were analyzed in this study.

1. Student Self-Assessment of Relatedness--Student responses identifying how much they use their vocational training on their present job was one measure of relatedness.

2. Job Title Matched to Program Title--Another measure of relatedness was the job title-program title match. This involved comparing the job title as reported by the student to the program title, using a cross-code index which identified the related occupations for each program.

The following related research questions were analyzed in this study:

1. Do the student and program characteristics predict variation in the two measures of job relatedness?

2. Are the two measures of job relatedness independent or related? If they are not independent, what is the strength of their relationship?

Need for the Study

The importance of the issues explored in this study is indicated in the priority of occupationally related outcomes for Michigan vocational education programs. The mission of vocational education in Michigan, as defined in the Annual and Long Range State Plan for Vocational Education in Michigan 1980 (hereafter cited as State Plan), was that

> . . .persons of all ages in all Michigan communities will have ready access to high quality vocational and technical education which is realistic in the light of actual or anticipated opportunities for gainful employment and consistent with their needs, interests and abilities.[12]

One of the goals within this mission is that all local vocational-technical education programs will be planned, monitored, and evaluated in light of actual or anticipated employment opportunities and with regard to the demand by students for programs

[12]The Annual and Long Range State Plan for Vocational Education in Michigan, 1980, (Lansing, Michigan: Vocational-Technical Education Service, Michigan Department of Education, 1980), p. 178.

related to their abilities and occupational objectives.

The definition of vocational instruction in the State Plan specified instruction which was designed to prepare individuals for employment in a specific occupation or in a cluster of closely related occupations in an occupational field.

Each of these statements indicated that Michigan vocational education programs had the purpose of preparing individuals for employment in related occupations. In considering the success of vocational education programs, the operational problem in Michigan, and nationally, was how to identify "relatedness."

The Michigan Department of Education conducted an annual follow-up survey of secondary vocational graduates. According to the State Plan, data from a representative sample of local program completers and leavers was collected and analyzed to determine the extent to which they had found employment in occupations related to their training.

Data from the Michigan follow-up surveys historically had been reported by programs with comparisons of the related and unrelated graduate outcomes using a student self-assessment measure of relatedness. The 1980 follow-up survey also contained the job titles and duties of former students which were subsequently assigned occupational codes. This study used these occupational codes, with available program-job cross-code indexes, to produce a "job title-

program title matching" measure of relatedness. The conduct of this study involved comparing this measure of relatedness to the student self-assessment measure of relatedness.

Outcomes of the Study

The comparative assessment of job relatedness measures is relevant to the national discussions on program evaluation and to the need of state and local educators for information to use in program development, monitoring and evaluation. In this regard, the present study was intended to provide the following outcomes:

1. The Michigan Department of Education would be provided information for use in the design of future follow-up surveys and reporting the results of those surveys.

2. The National Center for Education Statistics would be provided an assessment of the impact of using two different measures of the job relatedness of vocational education outcomes.

3. Vocational education planners and researchers would be provided with an analysis of using alternative measures of relatedness in evaluating vocational program outcomes.

Delimitations of the Study

1. The study sample was limited to those Michigan secondary vocational education students graduating in 1980 and responding to the follow-up surveys in 1981. The sample analyzed was further limited to students from six selected instructional programs: Agricultural Production, General Merchandise, Nurse Aide, Food Management, Steno/Secretarial, Auto Mechanics.

2. The study was limited to the analysis of those student, program, and job characteristics that were identified on the follow-up survey. Other characteristics or other measures of these characteristics were not considered in the analysis.

Limitations of the Study

1. The survey respondents provided data on student, program, and outcome characteristics. The self-reported data was used in this study and limitations in the accuracy of this data affected this study.

2. The occupational coding and vocational program-to-occupational code relationships were provided by Michigan state agencies. Limitations in the accuracy of this data affected this study.

Definition of Terms

Cooperative Education--A program of vocational education for persons who are simultaneously employed (and receiving wages) and receiving instruction (both academic courses and related vocational instruction). These two experiences must be planned and supervised by the school and employers so that they contribute to the person's education and employability.[13]

Cross-Code Indexes--Documents that identify and display the relationships between occupational and educational classification structures. Cross-code indexes have been developed to relate education and training data to employment data for use in educational program planning, curriculum planning, and vocational guidance.[14]

Educational Code Structures--Taxonomies of instructional programs containing codes, titles, and definitions. These structures have been designed by federal agencies to help local and state educational agencies identify, classify, and properly report information about subject matter and curriculum activities.[15] The most widely used educational classification structures include:

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[13]Vocational Education Data System (VEDS) Technical Assistance Handbook (Washington, D.C.: National Center for Education Statistics, U.S. Department of Health, Education and Welfare, 1978) p. 1.

[14]Vocational Preparation and Occupations, Volume I, Interim Edition, (Washington, D.C.: National Occupational Information Coordinating Committee, 1979), p. 3-5.

[15]Ibid. p. 37.

1. U.S. Office of Education (USOE) Codes
2. Higher Education General Information Survey (HEGIS) Codes
3. Classification of Instructional Programs (CIP) Codes

Instructional Programs--See Vocational Education Instructional Programs.

Marketable Skills--Skills and knowledge acquired by a student that meet acceptable standards for employment in a particular field.[16] Marketable skills are also known as salable skills.

New Entrants--New entrants to the labor market are new participants in the labor force who are seeking employment for the first time. Many new entrants into the labor market are recent completers or leavers from training/education institutions and programs.[17]

Occupation--A group of jobs, found at more than one establishment, having work activities that are identical or related in terms of combinations of similar methodologies, materials, products, worker actions, and/or worker characteristics.[18]

[16]Carter V. Good, ed., Dictionary of Education, (New York: McGraw-Hill, 3rd Edition, 1973), p. 537.

[17]Occupational Information System Handbook, Volume I, Occupational Information Development, (Washington, D.C.: National Occupational Information Coordinating Committee, 1981), p. 3-17.

[18]Handbook for Analyzing Jobs, (Washington, D.C.: U.S. Department of Labor, Interim Revision, 1980), p. 4.

Occupational Code Structures--Taxonomies of occupations and groups of occupations containing codes, titles, and definitions. These structures have been designed by federal agencies to collect and report data on employment and to assist in job placement activities. Examples of occupational code or classification structures include:

1. Dictionary of Occupational Titles (DOT) Codes
2. Standard Occupational Classification (SOC) Codes
3. Occupational Employment Statistics (OES) Codes

Occupational Objective--The intended occupational outcome of training and other preparation as stated or implied by the individual student. The occupational objective is usually stated in terms of specific job titles.

Program Completer--A person who has completed all the requirements of a U.S. Office of Education program (11th grade or higher) which prepares persons to enter the job market with entry-level occupational skills.[19]

Relatedness--Measure of the extent to which there are perceived similarities between the characteristics of the training program and the occupation in which the graduate is employed.[20]

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[19]Vocational Education Data System (VEDS) Technical Assistance Handbook, op. cit., p. 5.

[20]Marilyn Martin Rossman, op. cit., p. 2.

Vocational Education Instructional Programs--Organized educational programs which are directly related to preparing individuals for paid or unpaid employment, or for additional preparation for a career requiring other than a baccalaureate or advanced degree.[21]

Vocational Program Area--Groupings of Vocational Education Programs into major instructional areas. For secondary vocational education, the following program areas were used:

1. Agriculture (code 01)
2. Distribution (code 04)
3. Health (code 07)
4. Home Economics (code 09.02)
5. Office (code 14)
6. Trade and Industrial (code 17)

Wages--Monetary compensation for a given unit of time or output, exclusive of premium payments for overtime or other extras.[22]

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[21] Educational Amendments of 1976, (Washington, D.C.: U.S. Congress, P.L. 94-482, 1976), Sec 195(1).

[22] Glossary of Current Industrial Relations and Wage Terms, (Washington, D.C.: U.S. Department of Labor, Bulletin 1438, May, 1965).

Chapter II

REVIEW OF THE LITERATURE

This study compared two methods of measuring the relatedness of the jobs of former vocational students to their vocational programs. One method used student self-assessment; the other method involved matching job titles and program titles using cross-code indexes. The conduct of this study, therefore, drew upon literature and research in several different areas including:

1. Vocational Education Follow-Up Studies
2. Student Characteristics, Program Characteristics and Outcome Measures
3. Occupational and Educational Code Systems
4. Occupational Coding of Job Titles
5. Cross-Code Indexes Relating Occupations and Educational Programs

Of these five areas, "vocational education follow-up studies" is the broadest subject area, covering hundreds of research studies. The next four areas, in the order listed above, are progressively more specialized research areas. They are described in some detail in this chapter because of their importance to the job title-program title

measure of relatedness examined in this study. This chapter discusses some of the important literature in each of the above areas.

Vocational Education Follow-Up Studies

Darcy[1] described vocational education follow-up studies as a type of analysis that seeks to identify the input, process, and outcome of vocational education. This concept was very important to the design of this study. Data on the vocational education input (the student), process (the program) and outcome (job-relatedness measure) were analyzed. Two outcome (job-relatedness) measures were compared in one research question. In the other research question, the importance of selected student and program characteristics to these outcome measures was assessed.

Outcome analysis is important to vocational education as a basic method of assessing program performance. Wentling and Lawson observed that "...inherent in all follow-up objectives is an emphasis on the primary objective of occupational education - the preparation of individuals for a productive career."[2]

The use of vocational follow-up analysis as a tool for program planning has been of growing national interest. The recent national

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[1]Robert L. Darcy, Vocational Education Outcomes: Perspective for Evaluation, (Columbus: The National Center for Research in Vocational Education, The Ohio State University, Research and Development Series No. 163, 1979), p. 22.

[2]Tim L. Wentling and Tom E. Lawson, Evaluating Occupational Education and Training Programs, (Boston: Allyn and Bacon, Inc., 1975), p. 127.

Vocational Education Study, commissioned by the National Institute of Education, reported that:

> The connection between program evaluation and more effective state and local program planning in the light of needed skills and present and future job opportunities, on the one hand, and improvement in the quality of educational programs, on the other, had been registered in the legislation of 1963 and 1968. However, reports issued in the mid-1970s showed that the connection still was not being made.[3]

The 1976 vocational education legislation sought to relate labor market demand for occupational skills to program planning. The legislation specifically provided for ". . .(1) systematic evaluations, (2) labor market-oriented planning, (3) improved occupational information systems, and (4) the requirements for new data for accountability."[4]

The impact of the legislation on the literature concerning vocational follow-up had been dramatic. The 1982 edition of the Thesaurus of ERIC Descriptors[5] contains over 670 citations on the topic of "vocational follow-up," more than twice the number found only five years earlier. A national survey of vocational follow-up studies

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[3]The Vocational Education Study: The Final Report, (Washington D.C.: National Institute of Education, U.S. Department of Education, 1981), p. IV-2.

[4]Ibid.

[5]Thesaurus of ERIC Descriptors (Phoenix: Oryx Press, 1982, 9th Edition) p. 567.

conducted between 1970 and 1979 identified the following common features:[6]

1. Objectives--The most frequently cited purposes of the studies, in descending order, were (1) evaluation, (2) planning, and (3) compliance reporting.

2. Academic Level--The academic level was evenly divided between secondary and postsecondary.

3. Source of Information--Students were the primary source of information. Students were used as the source of information eight times more frequently than employers, the next most frequent source of information.

4. Completer Status--Most studies focused on students who had completed the instructional program.

5. Employment Status--More than 80% of the studies described the employment status of the former students.

6. Program Specific Data--Less than half of the studies reported the results by vocational program.

7. Sampling Procedure--More than 70% of the studies surveyed the entire population of former students.

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[6]Patrick A. O'Reilly and F. Marion Asche, Follow-Up Procedures: A National Review, (Blacksburg, VA: Virginia Polytechnic Institute and State University, 1979), p. 13.

8. Follow-up Period--Most of the studies were conducted within a year of graduation of the students. Most were not repeated for longitudinal analysis.

The advent of the 1976 legislation brought about a standardization of follow-up activities with both student and employer surveys being required. In a 1981 national evaluation study, Wentling[7] found that student follow-up surveys were the most frequently used local education evaluation activity. (Wentling's survey included over 200 local vocational administrators.)

The preceding discussion implies that the process of conducting student follow-up studies had become the most common type of local evaluation activity. Uses of the resulting data have focused on program assessment and improvement. Wentling[8] reported that the six most frequent uses of local evaluation activities were the following (in descending order of frequency):

1. Changing curricula
2. Informing administrators
3. Supporting staff development
4. Supporting equipment requests
5. Recruiting students
6. Discontinuing programs

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[7]Tim Wentling and William E. Pillard, op. cit., p. 47.

[8]Ibid., p. 44.

Student Characteristics, Program Characteristics, and Outcome Measures

The discussion of vocational education follow-up studies at the beginning of this chapter suggested that such studies required an identification of the educational input (student), the treatment (program) and the outcome (job). For this study of vocational follow-up data, it was similarly necessary to assess key characteristics of the student, the program, and the job.

Student Characteristics

Educational programs are not factories that receive homogeneous inputs of raw materials and produce, through educational processes, a standardized product. The student "input" to the system is variable. Educational reporting often specifies several different categories of student characteristics which may include racial/ethnic group, handicapping condition, and sex. The differential impact of these characteristics on vocational outcomes has been recognized. Somers[9] noted that independent of program, student race and sex affect the pay-off of vocational education. This assumed impact required that the conduct of this study include an assessment of different student characteristics vis-a-vis the measures of relatedness. Information on the race and sex of follow-up survey respondents were used for analysis.

[9]Gerald G. Somers, The Effectiveness of Vocational Education and Technical Programs: A National Follow-Up Survey, (Washington D.C.: U.S. Department of Health, Eduction and Welfare, 1971).

Program Characteristics

The "treatment" provided by vocational instruction varies by program not only in terms of content but also impact on student outcomes. The 1981 National Institute of Education study of vocational education reported that:

> Students in different occupational specialties (vocational programs) in secondary school were found to differ on outcomes pertaining to gainful employment.[10]

The importance of program-level variation in the relatedness of occupational outcomes was carefully assessed in this study.

Another program characteristic that can be measured is the student's participation in a cooperative education program with local employers. Asche and Vogler[11] have noted employers' preferences for students involved in this type of program.

Outcome Measures

The variety and importance of outcome measures available for student follow-up analysis was well summarized in Wulfsburg's 1981 report. Wulfsburg, the former Assistant Administrator of the National Center for Education Statistics, reported:

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[10] The Vocational Education Study: The Final Report, (Washington D.C.: National Institute for Education, U.S. Department of Education, 1981), p. VII-17.

[11] F. Marion Asche and Daniel E. Vogler, "Employer Satisfaction with Secondary Vocational Education Graduates," Journal of Vocational Education Research, Fall 1980, Vol. V., No. 4, p. 56.

> In order to answer the question, "What is being accomplished?" by vocational education programs, one needs an appropriate measure or "yardstick". . . including the extent to which students find related employment, employer satisfaction with the former student, wages, and job satisfaction and progress of the former student.[12]

O'Reilly's[13] national literature review contained a detailed assessment of the questions included in the follow-up studies. Table 1 presents the frequency of questions related to the outcome measures suggested by Wulfsburg in 56 student follow-up instruments analyzed by O'Reilly.

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[12]Ralph Wulfsburg, A Statistical Overview of Vocational Education, (Washington D.C.: National Center for Education Statistics, U.S. Department of Education, 1980), p. 64.

[13]Patrick A. O'Reilly, op. cit., p. 47.

Table 1 -- Frequency of Selected Outcome Questions Found in a National Study of Vocational Follow-Up Instruments[14]

Question/Data Element	Percent Frequency of Occurrence
Relatedness of Job to Training Program	82%
Salary/Wage-Present Job	64%
Hours Working-Present Job	64%
Job Satisfaction	23%

Three recent state studies focused on methods of identifying the relatedness of the job to the training programs. In a Texas study, Reed[15] found that ". . .program-to-occupation matching can be performed by analyzing and classifying the program according to three classifications. . ." of occupational outcomes. Vocational programs were placed in one of these three classifications depending on the pattern of occupational outcomes.

1. Class I - Occupation Specific--This type of program resulted in more than 75% of the students being employed in the same group of occupations.

[14]Ibid., p. 48.

[15]James Reed, Relating Follow-Up Data to Career Education and Occupational Information Systems (Corsicana, Texas: Navarro College, 1980) p. 12.

2. Class II - Occupation Related--This type of program resulted in 50-75% of the students being employed in the same group of occupations.

3. Class III - Occupation General--This type of program resulted in less than 50% of the students being employed in the same group of occupations.

In a Minnesota study, Rossman[16] compared four methods of measuring the relatedness of the employment of vocational graduates to their training. The methods included:

1. Graduate Self Report--A measurement system in which graduates use their judgment to rate the relatedness of their training to their employment.

2. Researcher Classification of Skills--A classification system in which a researcher uses reported job titles and duties to analyze the relationship of jobs obtained to the instructional program.

3. Prestige Level--A system in which a researcher rates job and program titles using a prestige scale reflecting socioeconomic status (professional is the highest rating, laborer is the lowest rating).

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[16]Marilyn Martin Rossman, "Job Relatedness As a Criterion for Assessing Vocational Education Program Effectiveness," (Ph.D. Dissertation, Minnesota, University of Minnesota, 1977), p. 44-47.

4. Dictionary of Occupational Titles (DOT)--A system in which a researcher determines the relationship of programs to DOT worker trait groups.

Rossman concluded that the Graduate Self Report was the most appropriate measure for evaluating vocational programs in her study, one of Minnesota post-secondary vocational graduates.

In a recent South Carolina study, Ollis[17] reported that the procedure used to measure relatedness critically affected the level of relatedness found. The study contrasted the following measures of relatedness:

1. Graduate Self Report--Graduates used their judgment to assess the relatedness of their training to their employment.

2. Job Title-Program Title Match--Responding students reported their job title. The investigator assigned an occupational code to the title and assessed, using a cross-code index, the relationship of the program to occupation. Three independent code structures were used; the 9-digit Dictionary of Occupational Titles codes (12,000 titles), the 4-digit Standard Occupational Classification (SOC) codes (500 titles) and the 2-digit (SOC codes (26 titles).

[17]Harvey Ollis, Alternative Methods for Collecting Follow-Up Information About Secondary Vocational Education Students, (Columbia, South Carolina: South Carolina Occupational Information Coordinating Committee, 1982), p. I-2.

Ollis[18] concluded that the level of detail in the occupational classification structure affects the measurement of relatedness. The study's findings of relatedness varied by measure from 54% for the 2-digit SOC codes, 48% for graduate self report, 33% 4-digit SOC codes, and 16% using the 9-digit Dictionary of Occupational Titles codes.

Occupational and Educational Code Systems

The problem that was addressed in this study involved relating vocational instructional programs to the titles of job obtained by former vocational students. The possible relationships between the instructional programs and the job titles could have been understood only within the context of classification systems used to codify occupations and educational programs. This section summarizes the relevant code systems.

A variety of different code or classification systems were used to organize information about occupations and educational programs. Many of these classification systems were developed by federal agencies to carry out specific regulatory or administrative mandates. The classification systems were used to efficiently collect, process, aggregate, and/or report data about specific programs. Some of the

[18] Ibid., p. IV-7.

classification systems were agency-unique and applied to a specific program within an agency. As a result, the classification systems were each fundamentally different in structure, coverage, and function. Some of the classification systems, such as the Dictionary of Occupational Titles (DOT) codes, are used by a wide variety of users.[19]

The essential features of these occupational and educational classifications systems can best be described using a series of figures presented in the Occupational Information System (OIS) Handbook published by the National Occupational Information Coordinating Committee.[20]

Figure 1 presents the features of seven major occupational classification systems. Further it describes the coverage of each system and lists the responsible federal agency and source publication. Of special relevance to this study are the Dictionary of Occupational Titles (DOT) code and Standard Occupational Classification (SOC) code systems.

Figure 2 describes two major educational classification systems; the U.S. Office of Education code and the Higher Education General

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[19]Occupational Information System Handbook, Vol. I (Washington, D.C.: National Occupational Information Coordinating Committee, 1981), p. 4.1.1.

[20]The author of this dissertation was the principal researcher in the development of the OIS Handbook.

Figure 1 -- Occupational Classification Systems

Classification System	Responsible Federal Agency	Brief Description	Source Publication
1. OES Survey	Bureau of Labor Statistics, U.S. Department of Labor	The OES Survey uses approximately 1,700 unique occupational titles and codes, derived from the DOT to survey occupational employment staffing patterns in different industries.	OES Dictionary of Occupations
2. OES Survey-based Matrix	Bureau of Labor Statistics, U.S. Department of Labor	The OES Survey-based industry-occupation matrix uses approximately 1,500 occupational titles and codes that are either identical to or aggregations of the OES Survey codes.	The VPO, 1980 Edition, presents this classification system, and information can be obtained from BLS (forthcoming, early 1981)
3. 1970 Census	Bureau of the Census, U.S. Department of Commerce	The 1970 Census summarized employment into 441 occupational categories. There is no description or definition of these occupational categories.	1970 Census of Population Classified Index of Industries and Occupations.
4. Census-based Matrix	Bureau of Labor Statistics, U.S. Department of Labor	The Census-based industry-occupation matrix uses 377 occupational titles and codes which are either identical to or aggregations of the Census occupational classifications. Like the Census, these titles have no descriptions or definitions.	The VPO, 1980 Edition, presents this classification system, and information can be obtained from BLS (forthcoming, early 1981)
5. Dictionary of Occupational Titles (DOT), 3rd Edition and 4th Edition	Employment and Training Administration, U.S. Department of Labor	The DOT with more than 20,000 titles, is the most detailed occupational classification system. It describes the type, level, and environment of work performed in more than 12,000 occupations.	Dictionary of Occupational Titles, Third Edition Dictionary of Occupational Titles, Fourth Edition

Source: Occupational Information System Handbook, Vol. I (Washington, D.C.: National Occupational Information Coordinating Committee, 1981) p. 4.1-6

Figure 1 -- Occupational Classification Systems

Classification System	Responsible Federal Agency	Brief Description	Source Publication
6. Standard Occupational Classification (SOC)	Office of Federal Statistical Policy and Standards, U.S. Department of Commerce	The SOC groups occupations based on the work performed. SOC occupations are homogeneous groups of Fourth Edition DOT occupations. The SOC has approximately 660 occupational classifications.	Standard Occupational Classification Manual, 1977
7. Military Occupations	U.S. Department of Defense	Although each military service has its own unique occupational classification system, a common DOD occupational classification system is used for developing total military manpower needs. The military occupational classification system encompasses the unique classifications of the individual military services.	Occupational Conversion Manual Enlisted/Officers/ Civilian, December 1977

Figure 2 - Educational Classification Systems

Classification System	Responsible Federal Agency	Brief Description	Source Publication
1. U.S. Office of Education (USOE) program codes	National Center for Education Statistics, U.S. Department of Education	The instructional programs in the USOE classification system are intended to assist State and local education agencies in organizing and classifying information about subject matter and curriculum activities. Seven subject matter areas traditionally are associated with vocational education. . Agriculture/Agribusiness Education . Distributive Education . Health Occupations Education . Home Economics . Business and Office Education . Technical Education . Trade and Industrial Education The descriptions of the instructional programs are composites of subject matter rather than well-defined courses.	U.S. Office of Education, Standard Terminology for Curriculum and Instruction in Local and State School Systems, State Education Records and Reports Series, Handbook VI
2. Higher Education General Information Survey (HEGIS) Taxonomy	National Center for Education Statistics, U.S. Department of Education	This classification is used to report the graduates and enrollments of institutions of higher education in academic disciplines. The taxonomy contains no program definitions or descriptions. Generally, HEGIS offers few intermediary levels of aggregation and less detail than USOE codes for classifying vocational programs.	A Taxonomy of Instructional Programs in Higher Education

Source: Occupational Information System Handbook, Vol. I (Washington, D.C.: National Occupational Information Coordinating Committee, 1981) p. 4.1-6

Information Survey code systems. Also, it identifies the responsible federal agency, system features, and source publication of each classification system. (The U.S. Office of Education program codes, used nationally in the Vocational Education Data System, were used to report vocational program information in Michigan.)

Occupational and educational classification systems are used by different federal, state and local agencies for various administrative and regulatory purposes. Data reported on these code systems is often included in manpower planning as representing either occupational supply or occupational demand. These two factors, defined below, are important to planning for vocational education and employment and training programs.

Occupational Supply

Occupational supply is defined as the sum of workers employed in an occupation plus the number of persons who are not employed but are available for and actively seeking employment in an occupation.[21] In vocational education, the most important occupational supply consideration is not the number of persons employed, but rather the number of persons available and seeking employment, including vocational graduates.

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[21] Occupational Information System Handbook, op. cit., p. 1-11.

Occupational Demand

Occupational demand is defined as the number of persons who are employed in an occupation plus the number of new job openings occurring over time.[22] In vocational education, the most important occupational demand consideration is the number of job openings that are or will be available. These openings represent potential employment opportunities for former vocational students.

Figure 3 presents the major classification systems and data sources that are used in occupational supply and occupational demand analysis.

Occupational Coding of Job Titles

The assignment of occupational classification system codes to job titles is a complex and time-consuming process. Of relevance to this study were two large national data collection activities that have assigned occupational codes to job titles. These were the U.S. Census of Population and the Vocational Education Data System. The methods used to assign occupational codes in both systems are described in the next two sections.

U.S. Census of Population

Every ten years the Census of Population is taken. Information on every U.S. household is obtained, including the number of indivi-

[22] Ibid., p. 2-11.

Figure 3 -- Classification Systems Used in Major Occupational Demand and Supply Data Sources

Occupational Demand		Occupational Supply	
Data Source	Classification System	Data Source	Classification System
1. OES Program--Employment Estimates and Projections	. Census-based matrix classifications . OES Survey-based matrix classifications	1. VEDS	USOE
		2. HEGIS	HEGIS
		3. NCES Survey	USOE
		4. CETA MIS	DOT or SOC
2. Employment Service Job Orders	. DOT	5. SNAPS	DOT
		6. Vocational Rehabilitation MIS	DOT
3. Job Vacancies	. SOC, OES Survey, or DOT	7. State Education MIS	Varies by State
		8. WIN	DOT
		9. Job Corps	DOT
		10. UI	DOT
		11. ESARS	DOT
		12. Veterans	MOS

Key:

OES	-	Occupational Employment Statistics
DOT	-	Dictionary of Occupational Titles
SOC	-	Standard Occupational Classification
VEDS	-	Vocational Education Data System
HEGIS	-	Higher Education General Information Survey
CETA	-	Comprehensive Employment and Training Act
MIS	-	Management Information System
SNAPS	-	State and National Apprenticeship Programs
WIN	-	Work Incentive Program
UI	-	Unemployment Insurance
ESARS	-	Employment Service Automated Reporting System
USOE	-	U.S. Office of Education
MOS	-	Military Occupational Specialty

Source: Occupational Information System Handbook, Vol. II (Washington, D.C.: National Occupational Information Coordinating Committee 1981) p. 4.1-6.

duals residing in the household, their sex, race, labor force participation, income, and geographic mobility. The 1970 and 1980 Censuses included questions on occupational status that were to be answered by a sample of the respondents (approximately one in five). Figure 4 presents a comparison of related questions contained in the two survey years. In both surveys, respondents were asked to identify the type of work done and important duties associated with the job.

Completed census forms were collected by the Bureau of the Census and assigned an occupational code. In 1970, the code assignments were made using the Alphabetical Index of Industries and Occupations.[23] This index provided an alphabetical listing of approximately 23,000 job titles groups within 441 separate occupational categories. Coders used the index and its occupational code designation for each respondent in the sample.

The 1980 Census was occupationally coded in a similar manner using a revised 1980 index.[24] The revised index contained a revised occupational code system based on the 1980 Standard Occupational Classification Manual.[25]

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[23]Alphabetical Index of Industries and Occupations: 1970 Census of Population, (Washington D.C.: U.S., Bureau of the Census, Department of the Census, 1971).

[24]Alphabetical Index of Industries and Occupations: 1980 Census of Population, (Washington D.C.: U.S., Bureau of the Census, Department of the Census, 1980).

[25]Standard Occupational Classification (SOC) Manual, (Washington D.C.: U.S., Executive Office of the President, Office of Management and Budget, 1980).

Figure 4 -- Industry and Occupation Questions Used in the 1970 and 1980 Census of Population

1970 Census

33–35. Current or most recent job activity

Describe clearly this person's chief job activity or business last week, if any. If he had more than one job, describe the one at which he worked the most hours.
If this person had no job or business last week, give information for last job or business since 1960.

33. Industry

a. **For whom did he work?** *If now on active duty in the Armed Forces, print "AF" and skip to question 37.*

(Name of employer, business, organization, or other employer)

b. **What kind of business or industry was this?**
Describe activity at location where employed.

(For example: cotton logging camp, retail supermarket, dairy farm, TV and radio service, auto assembly plant, road construction)

c. **Is this mainly—** *(Fill one circle)*

- ○ Manufacturing
- ○ Wholesale trade
- ○ Retail trade
- ○ Other *(agriculture, construction, service, government, etc.)*

34. Occupation

a. **What kind of work was he doing?**

(For example: TV repairman, sewing machine operator, sheet metal worker, coal engineer, farm operator, farm hand, junior high English teacher)

b. **What were his most important activities or duties?**

(For example: Types, keeps account books, files, sells cars, operates printing press, cleans buildings, teaches courses)

c. **What was his job title?**

35. Was this person— *(Fill one circle)*

- Employee of private company, business, or individual, for wages, salary, or commissions... ○
- Federal government employee ..... ○
- State government employee..... ○
- Local government employee *(city, county, etc.)*... ○
- Self-employed in own business, professional practice, or farm—
  - Own business not incorporated ..... ○
  - Own business incorporated ..... ○
- Working without pay in family business or farm ○

1980 Census

28–30. Current or most recent job activity

Describe clearly this person's chief job activity or business last week. If this person had more than one job, describe the one at which this person worked the most hours.
If this person had no job or business last week, give information for last job or business since 1975.

28. Industry

a. **For whom did this person work?** *If now on active duty in the Armed Forces, print "AF" and skip to question 31.*

(Name of company, business, organization or other employer)

b. **What kind of business or industry was this?**
Describe the activity at location where employed.

(For example: Hospital, newspaper publishing, mail order house, auto engine manufacturing, breakfast cereal manufacturing)

c. **Is this mainly** — *(Fill one circle)*

- ■ Manufacturing
- Wholesale trade
- Retail trade
- Other — *(agriculture, construction, service, government, etc.)*

29. Occupation

a. **What kind of work was this person doing?**

(For example: Registered nurse, personnel manager, supervisor of order department, gasoline engine assembler, grinder operator)

b. **What were this person's most important activities or duties?**

(For example: Patient care, directing hiring policies, supervising order clerks, assembling engines, operating grinding mill)

30. Was this person — *(Fill one circle)*

- Employee of private company, business, or individual, for wages, salary, or commissions ■
- Federal government employee
- State government employee
- Local government employee *(city, county, etc.)*
- Self-employed in own business, professional practice, or farm —
  - Own business not incorporated
  - Own business incorporated
- Working without pay in family business or farm

Source: Occupational Information System Handbook, Vol. I (Washington, D.C.: National Occupational Information Coordinating Committee 1981) p. 2.1.1. 0-4

In both 1970 and 1980, groups of the Bureau of Census coders, read the reported job title and duties and assign the most closely related census occupational category. Given the size of the census data collection, even the one-in-five sample represents the largest occupational coding of job titles undertaken in this country.

Vocational Education Data System

Following the passage of the 1976 federal legislation (1976 Education Amendments), the reporting requirements for state educational agencies were standardized by the Vocational Education Data System (VEDS) program developed by the National Center for Education Statistics (NCES). One component of VEDS is the completer/leaver follow-up report that provided information on vocational program completers, including:[26]

1. Employment Status--The employment status (e.g., employed in a field related to training, pursuing additional education) of program completers is to be provided by individual six-digit Instructional Program codes. Figure 5 provides a sample format of this report.

2. Field of Employment--Another type of data to be provided in the VEDS follow-up report was the type of job held by the program completers. Figure 6 provides a sample

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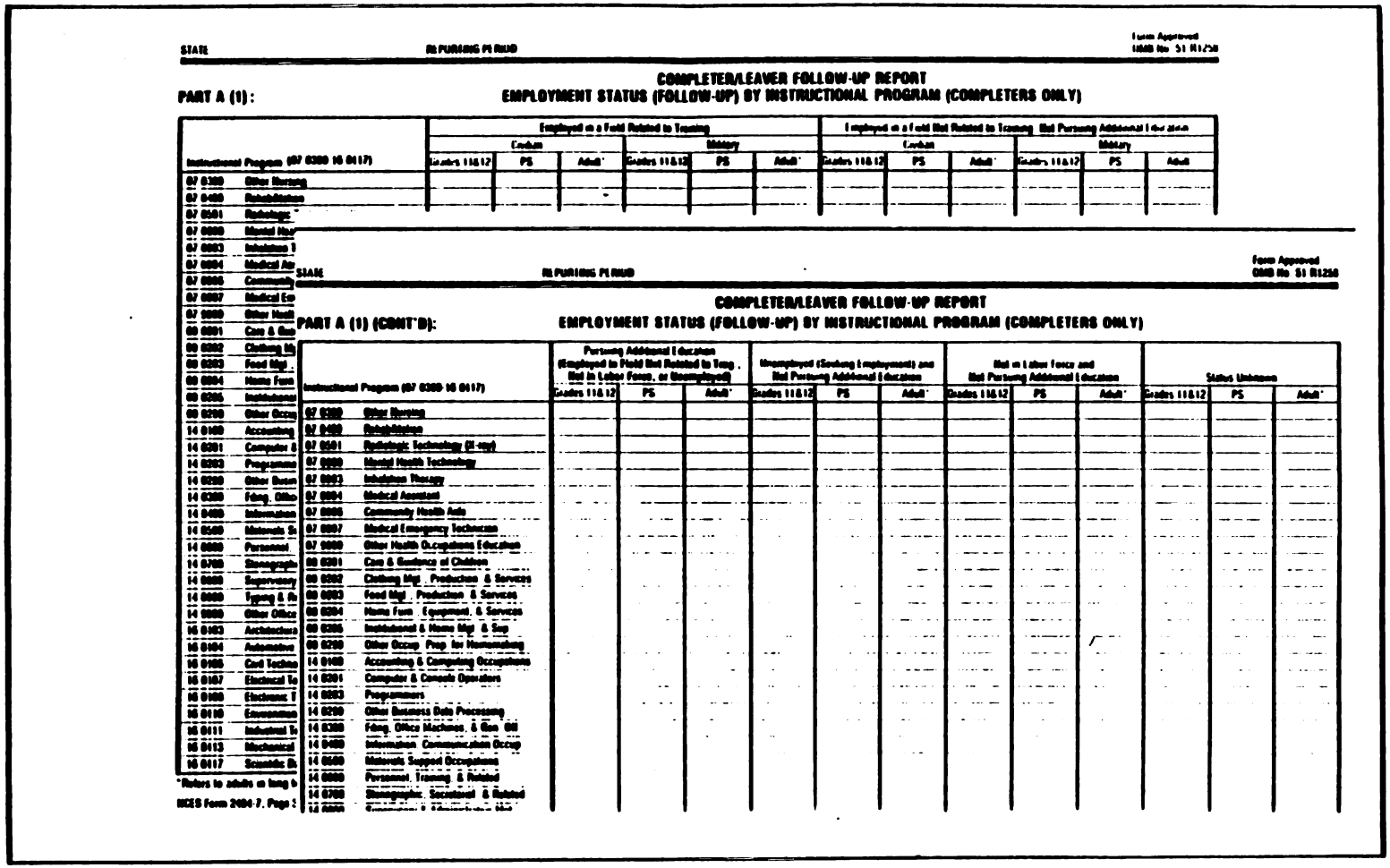
[26] Vocational Education Data System (VEDS) Technical Assistance Handbook (Washington D.C.: National Center for Education Statistics, U.S. Department of Education, 1979) section 2404-5, p. 4.

Figure 5 -- Vocational Education Data System (VEDS) Follow-Up Report -- Employment Status



COMPLETER/LEAVER FOLLOW-UP REPORT

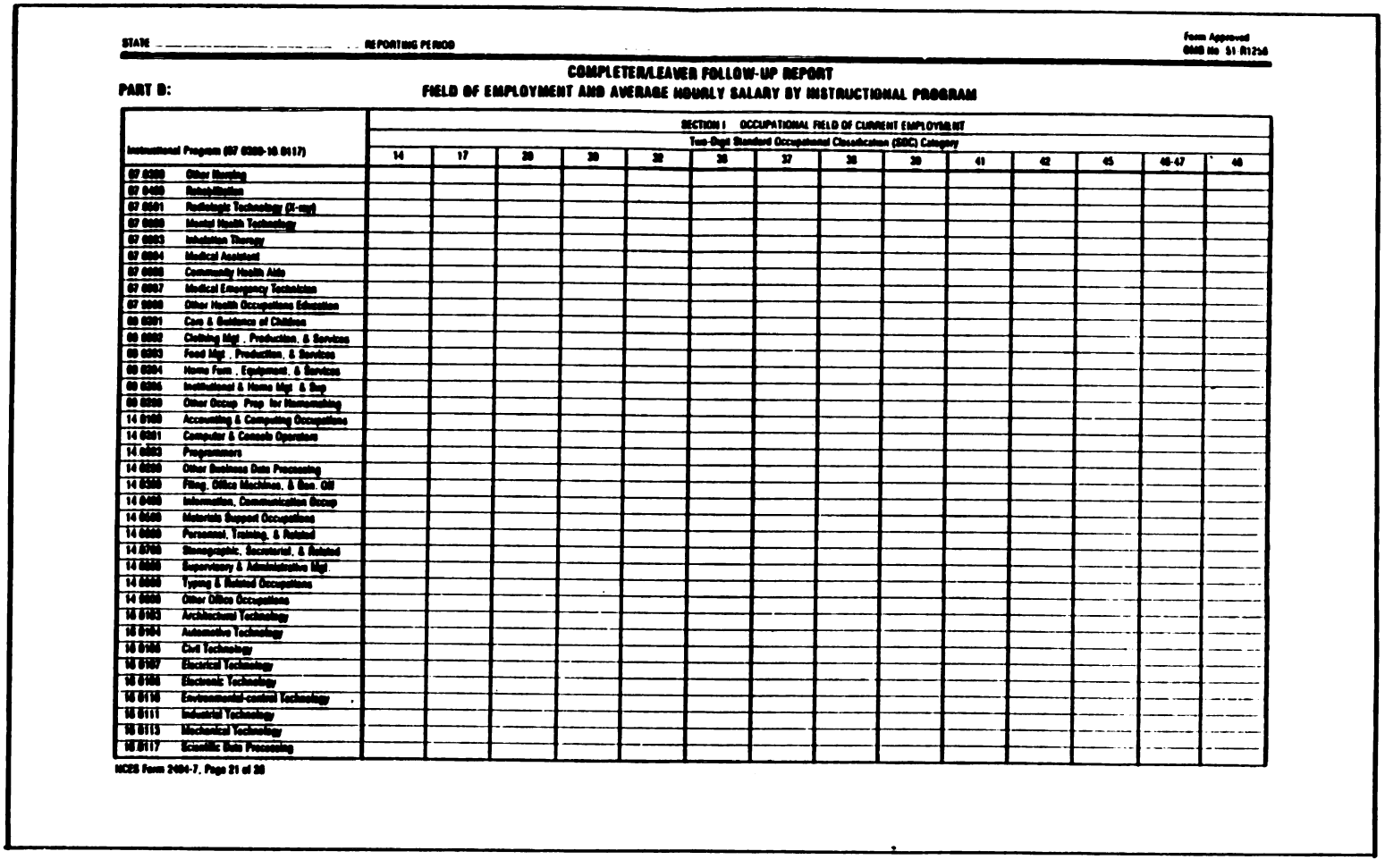
PART A (1): EMPLOYMENT STATUS (FOLLOW-UP) BY INSTRUCTIONAL PROGRAM (COMPLETERS ONLY)

COMPLETER/LEAVER FOLLOW-UP REPORT

PART A (1) (CONT'D): EMPLOYMENT STATUS (FOLLOW-UP) BY INSTRUCTIONAL PROGRAM (COMPLETERS ONLY)

Source: Vocational Education Data System (VEDS) Technical Assistance Handbook (Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 1979) Section 2404-7.

Figure 6 -- Vocational Education Data System (VEDS) Follow-Up Report -- Field of Employment



STATE _____ REPORTING PERIOD

Form Approved
OMB No. 51-R1256

COMPLETER/LEAVER FOLLOW-UP REPORT

PART B: FIELD OF EMPLOYMENT AND AVERAGE HOURLY SALARY BY INSTRUCTIONAL PROGRAM

Instructional Program (07 0300-16 0117)	SECTION I OCCUPATIONAL FIELD OF CURRENT EMPLOYMENT Two-Digit Standard Occupational Classification (SOC) Category													
	14	17	20	30	32	35	37	38	39	41	42	45	46-47	48
07 0300 Other Nursing														
07 0400 Rehabilitation														
07 0501 Radiologic Technology (X-ray)														
07 0600 Mental Health Technology														
07 0803 Inhalation Therapy														
07 0804 Medical Assistant														
07 0805 Community Health Aide														
07 0807 Medical Emergency Technician														
07 0900 Other Health Occupations Education														
09 0201 Care & Guidance of Children														
09 0302 Clothing Mgt., Production, & Services														
09 0303 Food Mgt., Production, & Services														
09 0304 Home Furn., Equipment, & Services														
09 0305 Institutional & Home Mgt. & Sup.														
09 0309 Other Occup. Prep. for Homemaking														
14 0100 Accounting & Computing Occupations														
14 0301 Computer & Console Operators														
14 0302 Programmers														
14 0309 Other Business Data Processing														
14 0500 Filing, Office Machines, & Gen. Off.														
14 0400 Information, Communication Occup.														
14 0600 Materials Support Occupations														
14 0800 Personnel, Training, & Related														
14 0700 Stenographic, Secretarial, & Related														
14 0200 Supervisory & Administrative Mgt.														
14 0900 Typing & Related Occupations														
14 0900 Other Office Occupations														
16 0103 Architectural Technology														
16 0104 Automotive Technology														
16 0105 Civil Technology														
16 0107 Electrical Technology														
16 0108 Electronic Technology														
16 0110 Environmental-control Technology														
16 0111 Industrial Technology														
16 0113 Mechanical Technology														
16 0117 Scientific Data Processing														

NCES Form 2404-7, Page 21 of 28

Source: Vocational Education Data System (VEDS) Technical Assistance Handbook (Washington, D.C.: National Center for Education Statistics, U.S. Department of Education, 1979) Section 2404-7.

report. As can be seen on the sample, the "occupational field of current employment" is to be identified using the two-digit Standard Occupational Classification codes. States completing the VEDS reports were to identify the appropriate two-digit code by collecting job titles of the program completers on the follow-up summary and then, using the Standard Occupational Classification Manual, assigning the appropriate code. The NCES had not provided a methodology for making such code assignments.[27]

Cross-Code Indexes Relating Occupations and Educational Programs

The growing interest in the employment status of vocational education students has stimulated the development of resource materials detailing the occupations related to specific vocational training programs. This section describes four major references that have been developed for this purpose.

Vocational Education and Occupations

The Vocational Education and Occupations[28] (VEO) was developed in response to the Vocational Education Amendments of 1968. This

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[27]Ibid., p. 10.

[28]Vocational Education and Occupations (Washington D.C.: U.S., Department of Labor, Manpower Administration) 1969.

publication was designed to link vocational-technical education programs and occupations, and provide a means for evaluating, comparing, and improving the results of occupational education. The publication had several uses for vocational education. It could be used to design curriculum content and to plan education facilities in relation to labor market needs in various occupations. It was useful for summarizing information on occupational manpower resources and requirements. The VEO also could assist in guidance counseling youth and adults in making appropriate career and vocational choices. It was designed to make possible more realistic matching of the numbers of training program graduates with the labor market needs for graduates. The document related the six-digit U.S. Office of Education (USOE) codes to nine-digit Dictionary of Occupational Titles (DOT) codes. The data was presented in tables in sequence by DOT codes within USOE codes as well as a separate cross-reference in sequence by DOT codes.

Although additional cross-code indexes (described below) had been developed that cover other occupational and educational classification systems, the importance of the USOE-DOT cross-reference in the VEO should not be overlooked. As a recent national study noted,

> Despite the use of USOE program codes for vocational education, students are actually being prepared and trained for DOT occupations, and program planners and instructors must therefore rely heavily on the DOT to describe the occupations for which the students are being prepared.[29]

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[29]National Research Council, Work, Jobs, and Occupations: A Critical Review of the "Dictionary of Occupational Titles," (Washington D.C.: National Academy Press, 1980), p. 75.

Matching Occupational Classifications to Vocational Education Program Codes

The Matching Occupational Classifications to Vocational Education Program Codes[30] built on the earlier VEO by adding the Occupational Employment Statistics (OES) code. This classification system is used by the Bureau of Labor Statistics (BLS) in producing occupational projections for the states and nation. The report was designed to bridge the Bureau of Labor Statistics OES system and the USOE system used to classify instructional programs. The report noted the limitations inherent in such a cross-code index, stating:

> Unfortunately, the classification systems as they are presently constructed do not permit a clear-cut matching of categories on a one-to-one basis. Perhaps the fundamental barrier to a perfect matching of manpower projections and instructional programs is that the various classification systems were developed for different purposes. The vocational education instruction codes were created primarily to facilitate educational planning, to standardize terminology, and to simplify reporting of educational statistics. On the other hand, the occupational classification schemes incorporated in manpower projections were designed primarily to enumerate jobs which require extensive formal or specialized training or in which large numbers of people are employed. However, the conversion table presented in this report should enable innovative planners to solve many of these matching problems.[31]

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[30] Matching Occupational Classifications to Vocational Education Program Codes, (Washington D.C.: U.S. Bureau of Labor Statistics, Department of Labor, 1975).

[31] Ibid., p. 1.

Vocational Preparation and Occupations

Vocational Preparation and Occupations[32] (VPO) is a comprehensive technical reference document that brings together the information on the interrelationships of occupational and educational classification systems. It covers the classification systems used for federal and state reporting of vocational education, Comprehensive Employment and Training Act (CETA), vocational rehabilitation, employment service, and apprenticeship programs. The specific classification systems presented in VPO include:

1. U.S. Office of Education (USOE)
2. Dictionary of Occupational Titles (DOT)
3. Standard Occupational Classification (SOC)
4. Occupational Employment Statistics (OES) Program

The Vocational Preparation and Occupations (VPO) describes each classification system and lists its codes and titles. The VPO appendix contains a crosswalk of USOE codes to other classification codes.

The VPO is intended to assist administrators and planners of education and training programs to compare and use information obtained under various classification systems in order to report occupational supply and demand information.

The inclusion of the Standard Occupational Classification (SOC)

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[32]Vocational Preparation and Occupations: Educational and Occupational Code Crosswalk (Washington D.C.: National Occupational Information Coordinating Committee, 1980).

codes in the VPO is an important addition to relating occupations to training programs. The SOC codes provide a mechanism for cross-referencing and aggregating occupation-related data. The SOC covers all occupations in which work is performed for pay or profit.[33]

Michigan Interim OE-DOT Crosswalk

The Michigan Interim OE-DOT Crosswalk[34] represents a state adaptation of the earlier VPO document. A group of Michigan vocational educators and labor market analysts reviewed the occupations related to vocational education programs and revised the VPO crosswalk to reflect the Michigan labor market.[35] References were also added, as appropriate, included the titles in the Michigan Occupational Information System.

The preceding four documents represent the historical development in the area of relating code systems for occupations and vocational education programs. This study used the Michigan cross-code index (Interim OE-DOT Crosswalk) to match programs to related job titles.

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[33]Standard Occupational Classification Manual, op. cit., p. 7.

[34]Michigan Interim OE-DOT Crosswalk (Lansing, Michigan: Michigan Occupational Information Coordinating Committee, 1980).

[35]The author of this dissertation initiated and directed the development of the Michigan Interim OE-DOT Crosswalk in his capacity as the Director of the Michigan Occupational Information Coordinating Committee.

Chapter III

RESEARCH PROCEDURES

The main purpose of this study was to compare two different measures of the relatedness of the jobs of former students to their vocational education programs. These measures were graduate self-assessment of relatedness and matching of the titles of the job outcome and the vocational education program. This study analyzed these measures of relatedness for a group of former Michigan secondary vocational education students. The study also assessed the impact of selected student and program characteristics on these relatedness measures.

It was the intent of the investigator that the results of this study would assist vocational education data analysts in their future work. Prior to the 1976 Educational Amendments, analysts suffered from limitations in educational outcome and manpower data bases.[1] The accountability reporting required by the Vocational Education Data System (VEDS)--resulting from the 1976 Educational Amendments--had changed that situation. The VEDS data system, including the program completer follow-up component, greatly expanded available data on occupational preparation programs. The problem then facing analysts became how to extract the meaning and implications from the volumes of

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[1]The Vocational Education Study: The Final Report, (Washington D.C.: National Institute for Education, U.S. Department of Education, 1981) p. VII 17.

data available. It was for this reason that the investigator designed this study to use the existing VEDS follow-up information rather than collect new data.

This chapter describes the procedures that were followed in this study, and the following elements are discussed: instrumentation, population, sample, independent variables, dependent variables, research questions, and data analysis.

Instrumentation

The study analyzed data collected by the Michigan Department of Education as a part of that agency's evaluation responsibilities in administering federal funds. The data collection instrument used was the 1980 "Follow-Up Survey of Former Students" (Form number VE-4045-A), developed by the Michigan Department of Education. The instrument was distributed by local educational agencies to 1980 graduates in the early spring of 1981, as the eighth annual follow-up survey of former students conducted in Michigan. A copy of the 1980 "Follow-Up Survey of Former Students" and the accompanying "Instructions for Conducting the 1980 Follow-Up Survey " are included as Appendix A of this study. The purpose and mandate for the 1980 survey were described by the Michigan Department of Education as follows:[2]

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[2]Instructions for Conducting the 1980 Follow-Up Survey, (Lansing, Michigan: Vocational-Technical Education Services, Michigan Department of Education, 1981), p. 1.

> The purpose of the 1980 Follow-Up Survey is to gather information needed to help people make decision about vocational education programs.
>
> Program fiscal agents (local districts) that receive Federal or State funds for conducting (vocational education) programs are required to report follow-up data about program completers and leavers, including information needed for the State to do the follow-up with the employers of a sample of former students. In turn, we in the State office are required to report the results of the surveys to the National Center for Education Statistics for inclusion in reports to the U.S. Department of Education and Congress.

The 1980 "Follow-Up Survey of Former Students" contains 14 questions, most of which include a list of optional answers from which the students are to choose the answer that best represents the student's situation six months after graduation. The topics covered in the survey are noted below.

1. Attending School (question 1)
    - A. Use of vocational training (question 2)
    - B. Type of school (question 3)
2. Working
    - A. Hours per week employment (question 4)
    - B. Use of vocational training (question 5)
    - C. Job satisfaction (question 6)
    - D. Wages (question 7)
    - E. Job title and duties (question 8)
    - F. Employer information (question 9)
3. Not working

A. Looking for job (question 10)

B. In military service (question 11)

C. Homemaker (question 12)

4. Student demographics

A. Sex (question 13)

B. Racial/ethnic group (question 14)

The survey also contained several questions that were to be answered by school personnel rather than students. The two school questions important to this study identified the vocational education instructional code of the program the student completed and the student's participation, or non-participation, in a cooperative education program.

Population

The population for this study consisted of the 1980 graduates of Michigan secondary schools who had completed vocational education occupational preparation programs and were employed in March, 1981. All 1980 vocational education graduates were sent a mail survey, entitled "Follow-Up Survey of Former Students," in March of 1981. The survey (form VE 4045-A) was developed by the Michigan Department of Education and was described in the preceding section. A total of 47,768 former vocational students were surveyed in the 1980 survey. A total of 33,618 surveys were completed and returned for a response rate of 70.38%. Of the students responding, 20,484 indicated they

were employed full-time or part-time. The population of this study was therefore 20,484.[3]

Sample

Two levels of sampling were used in the conduct of this study. The first level of sampling involved selecting the population subgroup that had occupational codes assigned to the graduate jobs. The second level of sampling involved selecting a subgroup of vocational education instructional programs for analysis. Both sampling methods are described below.

Occupational Coding Sample

The purpose of this study was to compare two different measures of the relatedness of job outcomes of former students of vocational education programs. One measure (self-assessment of former students) was recorded on the 1980 survey for every survey in the population. The second measure expressed the relationship between the vocational program and the job title reported on the survey. It was obtained by first assigning occupational codes to the reported job title and then "matching" this code to the instructional program by the use of a cross-code index. Not all of the completed surveys with job titles were assigned occupational codes. The Michigan Department of Education, as a part of its coordination of the 1980 survey, assigned

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[3]Placement Summary of Completers by Program, (Lansing, Michigan: Vocational-Technical Education Services, Michigan Department of Education, Report X0607, 1981), p. 7.

occupational codes to a sample of the returned surveys. Table 2 identifies the sampling plan used. The sampling plan was inversely related to the size of the program, with a small share (1/19th) of the largest program occupationally coded and all (1/1) of the smallest programs coded.

Vocational Program Sample

The second level of sampling involved the selection of a group of vocational instructional programs for analysis. Program-level analysis has been common in Michigan vocational education; the Annual State Plan for Vocational Education in Michigan and the analysis reports of the follow-up survey feature program-level data presentation. The appropriateness of this approach was supported by two recent national studies. In 1981, Wood and Haney reported that employment in jobs related to training varies considerably from one vocational education program area to another, with the highest proportion of job-to-training matches in trade and industry programs and in business programs.[4] The 1981 National Institute of Education study of vocational education, mandated by the 1976 Educational Amendments, reported that:

> Students in different occupational specialties (vocational programs) in secondary school were found to

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[4]E. Woods and H. Haney, Does Vocational Education Make a Difference? A Review of Previous Research and Re-Analysis of National Longitudinal Data Sets (Cambridge, Massachusetts: The Huron Institute, 1981), p. 4.5.

Table 2 -- Sampling Plan Used by the Michigan Department of Education to Assign Occupational Codes

Category	Job Titles Occupationally Coded	Vocational Programs	
		Code	Title
1	1/19	04.0800*	General Merchandise
2	1/10	17.0302*	Auto Mechanics
3	1/9	14.0700*	Steno/Secretarial
		14.0901	Clerk-Typist
		14.9700	ClericaL Lab
		14.9800	Steno/Clerical Lab
4	1/6	17.1000	Construction & Maint. In-School
		17.1098	Construction & Maint. On-Site
5	1/4	01.0100*	Agricultural Production
		07.0303*	Nurse Aide
		09.0203*	Food Management
		17.2302	Machine Shop
		17.2306	Welding & Cutting
6	1/3	01.0300	Agriculture Mechanics
		01.0301	Ag Power and Machinery
		01.0500	Ornamental Horticulture
		01.0502	Floriculture
		01.0503	Greenhouse Operation & Mgt
		01.0504	Landscaping
		07.9802	Health Occupations Cluster
		09.0201	Child Care & Guidance Serv.
		14.0102	Bookkeepers
		14.0104	Machine Operators
		14.0105	Tellers
		14.0200	Business Data Processing
		14.0201	Computer Operations
		17.0301	Body and Fender
		17.1300	Drafting Occupations
		17.1398	Architectural Drafting

Table 2--Continued

Category	Job Titles Occupationally Coded	Vocational Programs	
		Code	Title
6 (Cont'd)	1/3	17.1500	Electronics Occupations
		17.1501	Communications
		17.1502	Industrial Electronics
		17.1503	Radio and Television
		17.1598	Radio and TV Broadcasting
		17.1900	Graphic Arts Occupations
		17.1903	Lith. Photo Platemaking
		17.2602	Cosmetology
		17.3100	Small Engine Repair
7	1/2	01.0600	Agricultural Resources
		07.0101	Dental Assistant
		07.0904	Medical Office Assistant
		07.9801	Ward Clerk/Ward Secretary
		14.0203	Programmers
		17.0100	Air Conditioning
		17.0700	Commercial Art Occ.
		17.1100	Custodial Services
		17.1400	Electrical Occupations
		17.1401	Industrial Electrician
8	1/1	All Remaining Programs	

differ on outcomes pertaining to gainful employment.[5]

The six vocational programs selected for analysis in this study were the largest programs--in terms of enrollment--in each of the vocational education program areas. They were selected based on their size, so that a large segment of vocational programming could be efficiently analyzed and tested for relatedness measures.

Table 3 presents the six vocational programs selected for inclusion in this study and the program areas associated with each.

Table 3-- Sample Vocational Programs and Their Program Areas

Sample Vocational Programs		Program Areas	
Code	Title	Code	Title
01.0100	Agricultural Prod.	01.	Agriculture
04.0800	General Merchandise	04.	Distribution
07.0303	Nurse Aide	07.	Health
09.0203	Food Management	09.02	Home Economics-Occupational Preparation
14.0700	Steno/Secretarial	14.	Office
17.0302	Auto Mechanics	17.	Trades and Industry

The population and sample of these six vocational programs for the

[5]The Vocational Education Study: The Final Report, op. cit., p. VII-17.

1980 survey are presented in Table 4. The population of the six programs included 8,343 of the 20,483 survey respondents for all programs, a 40.73% coverage. The sample reflected more than 16 percent of the population in the six programs.

Table 4 -- 1980 Survey Respondent Population and Sample

Vocational Program		1980 Survey Respondents		
Code	Title	Population	Sample	Percent Sample of Population
01.0100	Agricultural Prod.	495	136	27.47%
04.0800	General Merchandise	3,434	261	7.60%
07.0303	Nurse Aide	553	185	33.45%
09.0203	Food Management	727	261	35.90%
14.0700	Steno/Secretarial	1,031	175	16.97%
17.0302	Auto Mechanics	2,103	318	15.12%
	Total	8,343	1,336	16.01%

Independent Variables

This study compared two different measures of the relatedness of the jobs of former vocational education students. Four independent variables covering student and program characteristics were analyzed in this study to help describe and explain any differences between

these measures. This section describes the data sources used in this study for these independent variables.

Sex of Student

The sex of the student was a self-reported variable on the Follow-up Survey. The survey item for the sex of the student is shown in Figure 7.

Figure 7 -- 1980 Follow-Up Survey of Former Students (VE-4045-A) Student Sex Item

What is your sex? ☐ Male ☐ Female

Race of Student

The race of the student was a self-reported variable on the Follow-Up Survey. The survey item for the race of the student is illustrated in Figure 8.

Figure 8 -- 1980 Follow-Up Survey of Former Students (VE-4045-A)
Student Race Item

Please identify yourself as a member of one of the groups of people listed below. (Check ONLY ONE)	☐ American Indian or Alaskan Native ☐ Asian or Pacific Islander ☐ Black, not of Hispanic Origin ☐ Hispanic ☐ White, not of Hispanic Origin

Cooperative Education

Cooperative education is a program option involving both in-school and on the job learning experiences. Students who had participated in such a program were identified by school staff after the student returned the completed survey. The staff identified the cooperative education status by checking a yes or no category, as appropriate.

Vocational Program

The vocational education instructional program that the student completed was recorded by school staff after the student returned the completed survey. The appropriate six-digit U.S. Office of Education code was used to designate the specific instructional program. Table 3 identified the instructional programs analyzed in this study.

Dependent Variables

Two dependent variables were analyzed in this study. These variables were the two different outcome measures of job relatedness. Described below are the sources used for these variables.

Job Relatedness Measured by Job Title Matched to Program Title

Identifying this measure of job relatedness involved completing two procedures, occupational coding and cross-code matching. Given the importance of this factor to the first research question, these procedures are described below in some detail.

The first procedure involved assigning an occupational code for each reported job title. As described in the "Occupational Coding of Job Titles" section of Chapter II in this study, the Vocational Education Data System required the identification of former student jobs by the codes contained in the Standard Occupational Classification (SOC) Manual. Michigan Department of Education staff assigned four-digit SOC codes to the survey records using a procedure[6] developed by the National Occupational Information Coordinating Committee (NOICC).

The procedure contained the following steps:

1. Step 1--Review the title and job duties reported on the

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[6]"Training Materials for SOC Coding of Occupational Information in the VEDS Follow Up Of Completers and Leavers", (Washington D.C.: National Occupational Information Coordinating Committee, 1980).

returned survey.

2. Step 2--Look-up the reported title in the SOC Index for possible SOC titles.

3. Step 3--Read the description and job titles for each relevant SOC code found in the Index.

4. Step 4--Select and record the SOC code that best matches the reported title and duties.

This procedure was repeated for each of the 1,336 returned responses included in the sample (see Table 4). The accuracy of the SOC coding was not tested in this study. The coding procedure was assumed reasonable and the coding staff competent.[7]

The second procedure involved using a "cross-code index" to identify if the four-digit SOC code was related to the instructional program. The procedure used to determine the relatedness of the occupational coding was established by the investigator, using a cross-code methodology that he tested in the state of South Carolina.[8] The

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[7]The author of this dissertation was responsible for training the coders on the use of the SOC in his capacity as the Director of the Michigan Occupational Information Coordinating Committee.

[8]Harvey Ollis, Alternative Methods for Collecting Follow-Up Information About Secondary Vocational Education Students (Columbia, S. Carolina: South Carolina Occupational Information Coordinating Committee, 1982) p. I-2.

Michigan Interim OE-DOT Crosswalk[9] described in this study, Chapter II, was used as the cross-code index. Figure 9 presents the six vocational instruction programs from that document. The last column in Figure 9 is the "SOC Code." The identification of the job relatedness involved matching the four-digit SOC codes in this column with the four-digit SOC code assigned to the reported job title. If the SOC code of the reported job title matched any of the listed SOC codes, the job was considered "related." If it did not match, it was considered "not related." An example of this can be seen for Auto Mechanics (USOE program code 17.0302) on the second page of Figure 9. If the reported job title were coded 6711 (Automobile Mechanics), 7281 (Automobile Mechanic Helper), or 6792 (Automobile Tester), then it was coded as related; otherwise not related. To assist readers to better understand the related SOC, the SOC title of each related occupation's SOC code is presented in Appendix B.

Job Relatedness Measured By Student Assessment

The second relatedness measure was simpler to assess; this was a self-reported variable on the Follow-Up Survey. The survey item is listed in Figure 10.

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[9]Michigan Interim OE-DOT Crosswalk, (Lansing, Michigan: Michigan Occupational Information Coordinating Committee, 1980).

Figure 9-- Related SOC Codes for Sample Insructional Programs

MICHIGAN INTERIM OE-DOT CROSSWALK OCT 1, 1980

USOE PROGRAM 01.010000 AGRICULTURAL PRODUCTION

SUBJECT MATTER AND LEARNING EXPERIENCES WHICH ARE CONCERNED WITH THE PRINCIPLES AND PROCESSES INVOLVED IN THE PLANNING RELATED TO AND THE ECONOMIC USE OF FACILITIES, LAND, WATER, MACHINERY, CHEMICALS, FINANCE, AND LABOR IN THE PRODUCTION OF PLANT AND ANIMAL PRODUCTS. IN PRACTICE, ACTIVITIES INCLUDE CLASSROOM INSTRUCTION AND LABORATORY EXPERIENCES, IN AND OUT OF SCHOOL, INCLUDING FARMS, RANCHES, AND OTHER AGRICULTURALLY RELATED ESTABLISHMENTS.

DICTIONARY OF OCCUPATIONAL TITLES 4TH CODE	3RD CODE	4TH EDITION TITLE	GED R	M	L	S V P	PHYSICAL DEMANDS	WORKING CONDITIONS	DOT INDUSTRY CODES				SOC CODE
162.117-022	180.118-010	FIELD CONTRACTOR	5	3	5	7	L5	B	130	---	---	---	1440
180.167-022	180.168-026	GROUP LEADER	3	2	2	7	L3456	O	116	---	---	---	5611
180.167-050	180.168-034	MIGRANT LEADER	3	2	2	7	L3456	O	116	---	---	---	5611
409.683-010	409.883-010	FARM-MACHINE OPERATOR	3	2	2	5	H246	0567	116	---	---	---	5616
409.685-010	404.885-010	FARM-MACHINE TENDER	2	1	2	2	H4	B5	116	---	---	---	5616
409.686-010	424.886-010	FARMWORKER; MACHINE	1	1	1	1	H2346	B56	116	---	---	---	5616
421.161-010	421.181-010	FARMER; GENERAL	4	4	4	7	H2346	B67	116	---	---	---	5512
421.683-010	421.883-010	FARMWORKER; GENERAL 1	3	2	3	5	H2346	0567	116	---	---	---	5612
624.684-010	624.884-010	GREASER	2	1	2	4	H34	B	121	---	---	---	6720

USOE PROGRAM 04.080000 GENERAL MERCHANDISE

ORGANIZED SUBJECT MATTER AND LEARNING EXPERIENCES RELATED TO A VARIETY OF SALES AND SALES-SUPPORTING TASKS PERFORMED BY DISTRIBUTIVE EMPLOYEES AND MANAGEMENT PERSONNEL ENGAGED PRIMARILY IN SELLING VARIOUS TYPES OF MERCHANDISE AT RETAIL IN DEPARTMENT STORES, JUNIOR DEPARTMENT STORES, VARIETY STORES, GENERAL MERCHANDISE STORES, DISCOUNT STORES AND CATALOG HOUSES.

DICTIONARY OF OCCUPATIONAL TITLES 4TH CODE	3RD CODE	4TH EDITION TITLE	GED R	M	L	V P	PHYSICAL DEMANDS	WORKING CONDITIONS	DOT INDUSTRY CODES				SOC CODE
003.151-014	ADD: MOAFC	SALES-ENGINEER; ELECTRONICS PR	5	5	5	8	L456	B	705	O	O	O	1633
162.157-018	162.158-050	BUYER	4	3	4	6	L456	I	705	---	---	---	4320
162.157-022	162.158-030	BUYER; ASSISTANT	4	3	3	6	L5	I	741	---	---	---	4320
185.167-034	185.168-046	MANAGER; MERCHANDISE	4	3	4	7	S45	I	741	948	---	---	1240
185.167-046	185.168-054	MANAGER; RETAIL STORE	4	4	3	7	S5	I	741	---	---	---	4011
189.167-014	189.168-010	DIRECTOR; SERVICE	5	4	4	7	S5	I	741	---	---	---	1390
189.167-018	189.168-018	MANAGEMENT TRAINEE	4	4	4	5	L56	I	138	---	---	---	1390
205.367-014	249.368-062	CHARGE-ACCOUNT CLERK	3	2	3	2	S5	I	249	---	---	---	4642
209.587-034	209.588-046	MARKER	2	1	1	2	L46	I	741	948	---	---	4749
211.482-010	211.468-010	CASHIER; TUBE ROOM	3	2	1	2	S46	I	741	---	---	---	4683
230.667-010	919.883-014	MESSENGER	2	1	2	2	L4	O	249	---	---	---	4732
241.367-010	240.368-010	OUTSIDE COLLECTOR	3	3	3	4	L6	B	249	---	---	---	4786
241.367-014	241.368-010	CUSTOMER-COMPLAINT CLERK	4	3	4	5	S56	I	249	---	---	---	4783
261.357-070	263.458-026	SALESPERSON; YARD GOODS	4	3	4	3	L456	I7	741	---	---	---	4159
262.357-018	266.358-014	SALESPERSON; COSMETICS AND TOI	3	3	3	4	L456	I	741	---	---	---	4154
270.357-018	274.358-026	SALESPERSON; CHINA AND SILVERW	4	3	4	4	L45	I	741	948	---	---	4148
279.357-046	289.458-010	SALESPERSON; FLYING SQUAD	4	3	4	6	L45	I	741	---	---	---	4159
279.357-054	289.458-014	SALESPERSON; GENERAL MERCHANDI	4	3	4	4	L45	I	741	948	---	---	4159
290.477-010	ADD: MOAFC	COUPON-REDEMPTION CLERK	3	2	2	2	L456	I	741	O	O	O	4162
290.477-014	290.478-014	SALES CLERK	3	3	2	3	L45	I	741	---	---	---	4162
294.257-010	294.258-010	AUCTIONEER	3	2	3	6	L456	I	741	948	---	---	4390
296.357-010	296.358-010	PERSONAL SHOPPER	4	3	3	5	L5	I	741	---	---	---	4360
296.367-014	296.388-010	COMPARISON SHOPPER	4	2	3	3	L6	I	741	948	---	---	4360
297.354-010	297.458-010	DEMONSTRATOR	3	3	3	3	L45	I	741	948	---	---	4350
299.137-010	299.138-022	MANAGER; DEPARTMENT	4	3	4	6	L6	I	741	---	---	---	4011
299.357-018	299.358-010	WEDDING CONSULTANT	4	3	4	6	L456	I	741	---	---	---	4390
299.677-010	290.468-018	SALES ATTENDANT	3	1	2	2	M345	I	741	---	---	---	4162

USOE PROGRAM 07.030300 NURSING ASSISTANCE (AIDE)

A COMBINATION OF SUBJECT MATTER AND EXPERIENCES DESIGNED TO PREPARE A PERSON TO PERFORM SIMPLE TASKS INVOLVED IN THE PERSONAL CARE OF INDIVIDUALS RECEIVING NURSING SERVICES. THESE TASKS ARE PERFORMED UNDER THE SUPERVISION OF A NURSE.

DICTIONARY OF OCCUPATIONAL TITLES 4TH CODE	3RD CODE	4TH EDITION TITLE	GED R	M	L	S V P	PHYSICAL DEMANDS	WORKING CONDITIONS	DOT INDUSTRY CODES				SOC CODE
355.674-014	355.878-034	NURSE AIDE	3	2	2	4	M3456	I67	573	---	---	---	5236
"	"	NURSE AIDE; CENTRAL SUPPLY	3	2	2	4	M3456	I67	573	---	---	---	5236
"	"	NURSE AIDE; DELIVERY	3	2	2	4	M3456	I67	573	---	---	---	5236
"	"	NURSE AIDE; NURSERY	3	2	2	4	M3456	I67	573	---	---	---	5236
"	"	NURSE AIDE; SURGERY	3	2	2	4	M3456	I67	573	---	---	---	5236
355.674-018	355.878-038	ORDERLY	3	2	3	3	V3456	I6	573	---	---	---	5236

Figure 9--Continued

USOE PROGRAM 09.020300 FOOD MANAGEMENT, PRODUCTION AND SERVICES

PREPARATION FOR VARIOUS KINDS OF EMPLOYMENT RELATED TO INSTITUTIONAL AND COMMERCIAL FOOD SERVICES. EMPLOYMENT MAY INCLUDE WORKERS AND SUPERVISORS IN HOSPITALS, CHILD DAY-CARE CENTERS, HOMES FOR THE ELDERLY, AND SCHOOL LUNCH PROGRAMS, AND DEMONSTRATORS AND TECHNICIANS IN FOOD INDUSTRIES.

DICTIONARY OF OCCUPATIONAL TITLES 4TH CODE	3RD CODE	4TH EDITION TITLE	GED R-M-L	S P	V DEMANDS	PHYSICAL CONDITIONS	WORKING	DOT CODES	INDUSTRY			SOC CODE
187.167-026	ADD: MOAFC	MANAGER; SCHOOL LUNCH PROGRAM	5	4	4 7	L56	1	453	0	0	0	5021
222.387-058	ADD: MOICC	STOCK CLERK	3	3	2 4	H34	1	249	0	0	0	4744
310.137-010	"	HOST/HOSTESS; RESTAURANT	4	3	4 6	L45	1	453	0	0	0	5021
310.137-014	310.138-010	KITCHEN SUPERVISOR	4	3	4 7	L456	148	453	---	---	---	5021
311.477-026	ADD: MOICC	WAITER/WAITRESS; FORMAL	3	2	3 3	L45	1	453	0	0	0	5215
311.677-018	"	DINING ROOM ATTENDANT	2	1	1 2	M345	1	453	0	0	0	5218
313.131-018	313.138-014	COOK; HEAD; SCHOOL CAFETERIA	4	3	3 6	M4	1	453	---	---	---	5021
313.361-014	ADD: MOICC	COOK	4	3	3 7	M46	1	453	0	0	0	5214
313.361-022	"	COOK; SHORT ORDER I	3	2	3 4	M3456	13467	453	0	0	0	5215
313.381-010	"	BAKER	3	2	2 6	M46	13	453	0	0	0	5214
317.684-014	"	PANTRY GOODS MAKER	3	2	3 3	L46	156	453	0	0	0	5217
317.687-010	"	COOK HELPER	2	1	1 2	M4	1	453	0	0	0	5219
318.687-010	"	KITCHEN HELPER	2	1	1 2	M4	1346	453	0	0	0	5219
319.137-010	319.138-010	FOOD-SERVICE SUPERVISOR	4	3	3 6	L45	1	453	573	---	---	5021
319.677-010	319.874-010	CATERER HELPER	3	2	2 3	L45	1	674	---	---	---	5217
526.381-014	ADD: MOICC	BAKER APPRENTICE	3	2	2 7	M346	1	164	0	0	0	7272

USOE PROGRAM 14.070000 STENOGRAPHIC, SECRETARIAL, AND RELATED OCCUPATIONS

PLANNED LEARNING ACTIVITIES WHICH INCLUDE A COMBINATION OF COURSES AND PRACTICAL EXPERIENCES CONCERNED WITH MAKING, CLASSIFYING, AND FILING RECORDS, INCLUDING WRITTEN COMMUNICATIONS.

DICTIONARY OF OCCUPATIONAL TITLES 4TH CODE	3RD CODE	4TH EDITION TITLE	GED R-M-L	S P	V DEMANDS	PHYSICAL CONDITIONS	WORKING	DOT CODES	INDUSTRY			SOC CODE
169.167-014	169.168-018	ADMINISTRATIVE SECRETARY	5	4	5 8	S5	1	138	---	---	---	1480
202.362-010	202.388-010	SHORTHAND REPORTER	3	2	3 6	S456	1	249	---	---	---	4613
202.362-014	202.388-014	STENOGRAPHER	3	2	3 5	S456	1	249	---	---	---	4613
"	"	TECHNICAL STENOGRAPHER	3	2	3 5	S456	1	249	---	---	---	4613
202.362-018	202.388-018	STENOGRAPHER; PRINT SHOP	3	2	3 5	S456	1	699	---	---	---	4613
202.362-022	202.388-022	STENOTYPE OPERATOR	4	2	4 5	S456	1	249	---	---	---	4613
201.162-010	201.268-010	SOCIAL SECRETARY	4	2	4 6	S456	1	249	---	---	---	4612
201.362-010	201.368-010	LEGAL SECRETARY	4	2	4 6	S456	1	249	---	---	---	4612
201.362-014	201.368-014	MEDICAL SECRETARY	4	3	4 7	S456	1	573	---	---	---	4612
201.362-030	201.368-018	SECRETARY	4	3	4 6	S456	1	249	---	---	---	4612

USOE PROGRAM 17.030200 AUTO MECHANICS

LEARNING EXPERIENCES CONCERNED WITH THE COMPONENTS OF THE VEHICLE, INCLUDING ENGINE, POWER TRANSMISSION, STEERING, BRAKES, AND ELECTRICAL SYSTEMS. INCLUDED IS TRAINING IN THE USE OF DIAGNOSTIC AND TESTING EQUIPMENT AND TOOLS USED IN THE REPAIR PROCESS.

DICTIONARY OF OCCUPATIONAL TITLES 4TH CODE	3RD CODE	4TH EDITION TITLE	GED R-M-L	S P	V DEMANDS	PHYSICAL CONDITIONS	WORKING	DOT CODES	INDUSTRY			SOC CODE
620.261-010	620.281-014	AUTOMOBILE MECHANIC	4	3	3 7	M3456	157	154	---	---	---	6711
"	"	BUS MECHANIC	4	3	3 7	M3456	157	154	---	---	---	6711
"	"	TRUCK MECHANIC	4	3	3 7	M3456	157	154	---	---	---	6711
620.261-014	620.281-018	AUTOMOBILE TESTER	4	3	3 7	L3456	1	154	---	---	---	7281
620.684-014	620.884-010	AUTOMOBILE-MECHANIC HELPER	2	1	2 3	M346	14	154	---	---	---	6792

Source: Michigan Interim OE-DOT Crosswalk (lansing,Michigan: Michigan Occupational Information Coordinating Committee,1980)

Figure 10 -- 1980 Follow-Up Survey of Former Vocational Students (VE-4045-A) Job Relatedness

On your present job, how much do you use the vocational training you received in your high school or area vocational education center?	☐ A lot ☐ Some ☐ Hardly Any ☐ None

The researcher re-coded the responses into dichotomous categories for comparison with the job title-program title measure of relatedness. Responses "a lot" and "some" were considered to indicate relatedness and responses "hardly any" and "none" were considered to indicate non-relatedness.

This is the same procedure used by Michigan Department of Education staff in the administrative reports of the follow-up studies. Appendix C presents the Michigan Department of Education "Placement Summary of Completers By Program" (Report X0607, 10/29/81). This report identifies the number of employed respondents (part-time and full-time) who were in jobs "related" or "unrelated" to their program. The criteria used in this report was the same as the dichotomous, self-assessment categories described in the preceding paragraph.

Research Questions

The purpose of this study was to compare two different measures of the relatedness of occupational outcomes of vocational program graduates. A comparison was made of the response pattern of the following items:

1. Student Self-Assessment of Relatedness--Student responses detailing how much they used their vocational training on their present job provided one measure of relatedness.

2. Job Title Matched to Program Title--Another measure of relatedness matched the job title, as reported by the student, to the program title, using a cross-code index which identified the related occupations for each program.

One research question asked whether any of the student or program characteristics helped predict the two measures of job relatedness. This questions was analyzed using the following data from the 1980 "Follow-Up Survey of Former Students":

1. Student characteristics
   - A. Sex
   - B. Race
2. Program characteristics
   - A. Cooperative education
   - B. Instructional program

The second research question tested the relationship between the relatedness measures. This research question was tested by conducting contingency table analysis of independence and relationship.

The two research questions analyzed in this study are listed below:

1. Do the student and program characteristics predict variation in the two measures of job relatedness?

2. Are the two measures of job relatedness independent or related? If they are not independent, what is the strength of their relationship?

Data Analysis

Data Analysis Techniques

In the first research question, the relationship between the dependent variables of job relatedness and the independent variables of student, program and job characteristics was tested with a multiple regression statistic. The primary advantage of the multiple regression method is that it allows simultaneous analysis of the effects of a large number of variables on a given outcome.[10] The multiple regression analysis was used to identify the portion of the

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[10]Sampit, Chatterjee and Bertram Price, Regression Analysis by Example (New York: John Wiley and Sons, 1977), p. 1.

variation in the dependent variables that could be explained by the variation in independent variables.

The second research question had to do with measurement of independence or relatedness between the two dependent variables. The chi-square test, used in contingency tables, provides an appropriate test of the independence of two sample distributions.[11] Chi-square statistics comparing the two job relatedness measures were developed for all of the respondents and for sub-groups by student and program characteristics.

By itself, chi-square can be used to identify the independence or relatedness of two variables. It does not identify the strength of a relationship.[12] Several measures of the strength of the association between the two variables are available.[13] The second research question involved comparing the two sub-categories (related, not related) of each of the two measures of job relatedness in a 2 x 2 contingency table. For a 2 x 2 table, the phi statistic was a suitable measure of the association or strength of the relationship.[14]

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[11]William Hays, Statistics for the Social Sciences (New York: Holt, Rinehart and Winston, Inc., 1973), p. 718.

[12]Norman H. Nie, et. al., Statistical Package for the Social Sciences, second edition, (New York: McGraw-Hill Book Co., 1975), p. 224.

[13]B.S. Everitt, The Analysis of Contingency Tables (London: Chapman and Hall, 1977), p. 56.

[14]Norman H. Nie, op. cit.

The chi-square and phi statistics were employed to test for a relationship between the two independent variables and the strength, if any, of their association.

Data Analysis Operation

The data from the sample survey responses was received by the investigator from the Michigan Department of Education in computer card format. After the investigator added the rating of relatedness for the occupational code to each card, the data were ready for analysis, comparing the two measures of job relatedness.

The Statistical Package for the Social Sciences (SPSS) was used to analyze the data. SPSS Version 8.0 was used at the computer center at Michigan State University. The specific subprograms used were FREQUENCIES, MULTIPLE REGRESSION, and CROSSTABS which provided both descriptive and statistical results.

Chapter IV

FINDINGS

This chapter presents the data gathered on former students of six selected vocational education instructional programs. These students graduated or left school in 1980 and responded to a follow-up survey distributed by their local educational agency in the winter of 1981.

This chapter presents data analyses of the independent variables, which included the student characteristics (sex and race) and the program characteristics (cooperative education and instructional program), along with the dependent variables that measured job relatedness (self-assessment and job title-program title match). The data is presented in the following three sections: the frequency of responses for each of the independent and dependent variables, multiple regression analysis predicting the importance of the independent variables to the dependent measures of job relatedness, and measurement of the independence and association between the measures of job relatedness.

Frequency of Response

Sex of the Respondents

The sample consisted of 1,336 program completers who responded to the 1980 Michigan Follow-Up Survey. A slight majority of the respon-

dents were female (52.2%). Table 5 presents the sex profile of the respondents.

Table 5 -- Sex of the Respondents (n=1,336)

Sex Category	Number of Respondents	Percent (%) of Total
Male	639	47.8
Female	697	52.2
TOTAL	1,336	100.0

Race of the Respondents

Five racial categories were represented in the sample. However, the number of respondents in all categories except white and black was very small. Almost ninety-three percent of all sample respondents were identified as white. Approximately five percent of the survey population were identified as black. Table 6 presents the racial profile of the sample.

Table 6 -- Race of the Respondents (n=1,336)

Racial Category	Number of Respondents	Percent (%) of Total
Indian	16	1.2
Asian	5	0.4
Black	64	4.8
Hispanic	7	0.5
White	1,239	92.7
Not Identified	5	0.4
TOTAL	1,336	100.0

Cooperative Education

Cooperative education was a dichotomous variable, with respondents either participants or non-participants. Almost two-thirds of the respondents (64.4%) did not participate in a cooperative education program. Table 7 presents the profile of the sample for this variable.

Table 7 -- Participation Status of the Respondents Cooperative Education (n=1,336)

Cooperative Education Participation Category	Number of Respondents	Percent (%) of Total
Yes	425	31.8
No	860	64.4
Not Identified	51	3.8
TOTAL	1,336	100.0

Instructional Program

This study covered six large vocational education instructional programs. The sample included all the respondents in these six instructional programs who had been assigned occupational codes, as described in Chapter III. Auto Mechanics, Food Management and General Merchandise were the instructional programs having the largest number of respondents, while Agricultural Production had the fewest. The response pattern by instructional programs is presented in Table 8.

Table 8 -- Instructional Program of the Respondents (n=1,336)

Program Code and Title		Number of Respondents	Percent (%) of Total
01.0100	Agricultural Production	136	10.2
04.0800	General Merchandise	261	19.5
07.0303	Nurse Aide	185	13.9
09.0203	Food Management	261	19.5
14.0700	Steno/Secretarial	175	13.1
17.0302	Auto Mechanics	318	23.8
	TOTAL	1,336	100.0

Job Relatedness--Student Self Assessment

This measure of job relatedness was based on the students' self-assessment. Respondents were asked "On your present job, how much do you use the vocational training you received?" The three most frequently cited choices were: "A Lot" (34.7 percent), and "None" (24.9 percent) and "Some" (24.6 percent). Table 9 presents the responses to this item.

Table 9 -- Student Self-Assessment of Job Relatedness Survey Item and Sample Responses (n=1,336)

Job Relatedness Survey Item	Number of Respondents	Percent (%) of Total
A Lot	467	35.0
Some	328	24.6
Hardly Any	154	11.5
None	333	24.9
Not Identified	54	4.0
TOTAL	1,336	100.0

Job Relatedness--Job Title Matched to Program Title

The second measure of job relatedness in this study was the cross-code matching of the instructional program and the respondent job title. Based on the cross-code index procedure described in Chapter III, three-quarters (75%) of all respondents were identified as having jobs that were not related to their training. The response pattern of this outcome measure is contained on the right side of Table 10, along with other data.

This survey item was recoded, as a dichotomous variable, for direct comparison with the cross-code index job relatedness measure. The recoding involved assigning responses "A Lot" and "Some" as

related and "Hardly Any" and "None" as unrelated. This same procedure has been used by the Michigan Department of Education in reporting follow-up results. (See Appendix C). The recoded self-assessment measure is presented on the left side of Table 10.

There is a major difference between the two measures of job relatedness shown on Table 10. Based on the self-assessment measure, more than 60 percent of all respondents identified their job as being related to their instructional program. For the same sample, only 25 percent of the jobs were related based on the job title-program title measure of relatedness. The significance and association of the relationship between these factors is described in the sections following Table 10.

Table 10 -- Comparison of Two Measures of Job Relatedness and Sample Responses (n=1,336)

	Self-Assessment		Job Title - Program Title	
Related Status	Respondents	Percent	Respondents	Percent
Related	795	62.0	334	25.0
Not Related	487	38.0	1,002	75.0
TOTAL	1,282*	100.0	1,336	100.0

* Note: 54 respondents did not answer this question

Multiple Regression Analysis

Multiple regression is a statistical technique through which one can analyze the relationships between a dependent variable and a set of independent variables.[1] In this study, a forced multiple regression analysis was performed. In this approach, the independent variables were entered into the regression equation one at a time. The variable that explained the greatest amount of the variance in the dependent variable was entered first, followed by the next most important independent variable. This provided a listing of the independent variables ranked in order of their predictive value in explaining the variation of the dependent variable.

In this study, multiple regression analyses were performed with the student and program characteristics data as the independent variables. Separate regression equations were run with each of the job relatedness measures (self-assessment and job title-program title match) as the dependent variables. Tables 11 and 12 present the data from the regression analyses.

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[1]Norman H. Nie, op. cit., p. 321.

Table 11 -- Multiple Regression Data for the Student Self-Assessment Measure of Job Relatedness (n=1,009)

Independent Variable	F to Enter or Remove	Significance	R Square
Cooperative Education	18.8290	.0000*	.0188
Sex	11.8606	.001*	.0370
Race	4.1852	.041*	.0408
Instructional Program	.1940	.660	.0410

* significant at the .05 level

Table 11 lists the independent variables affecting variation in the self-assessment measure of job relatedness. The independent variables are listed in the order in which they explain or can predict the variance in the self-assessment measure. The second column of Table 11 presents the "F to Enter or Remove." The "F" is a statistical test of relationship, which, in conjunction with the next column ("Significance"), identifies the relationship between the independent variable and the dependent variable. The last column of Table 11 ("R Square"), identifies the percent of the variation explained by all of the independent variables listed to that row on the table.

Based on the data in Table 11, cooperative education, sex, and race were all significantly related with self-assessment (at the .05 level). Instructional program was not statistically related. The combined predictive value of the first three independent variables, as

presented in the "R Square" column, explained 4.08 percent of the variation in the self-assessment measure of job relatedness.

Table 12 -- Multiple Regression Data for the Job Title-Program Title Measure of Job Relatedness (n=1,009)

Independent Variable	F to Enter or Remove	Significance	R Square
Instructional Program	33.6513	.000*	.0318
Cooperative Education	3.0375	.082	.0424
Sex	2.9000	.089	.0430
Race	1.8638	.172	.0432

* significant at the .05 level

Table 12 presents the multiple regression data for the job title-program title measure of job relatedness. The independent variables, in the order of their contribution, included: instructional program, cooperative education, sex and race. Only the instructional program was significantly related. The instructional program explained 3.18 percent of the variation in the job title-program title measure of job relatedness.

As shown by these tables, the sequence of the independent variables, which reflects their contribution to explaining variation in the dependent variable, was different for the two measures of relatedness. The student self-assessment of job relatedness was best pre-

dicted by cooperative education, followed by sex, race, and instructional program. The sequence of the prediction variables for the job title-program title measure of relatedness was instructional program followed by cooperative education, sex and race.

The instructional program was the only significantly related variable (at the $p < .05$ level) for the job title-program title measure of job relatedness, whereas the other three independent variables were significantly related for the student self-assessment measure.

The final column on Tables 11 and 12 is "R Square," which identifies the portion of the variation in the dependent variable (job relatedness) that could be predicted or explained by the independent variables presented up to that row on the table. On Table 11 three independent variables were significantly related to the self-assessment measure of job relatedness. The "R Square" for these three variables combined indicated that less than 5% (.0408) of the variation in this job relatedness could be explained by them.

Table 12 presented the "R Square" for the independent variables to the job title-program title measure of job relatedness. Only one independent variable, instructional program, was significantly related on Table 12. Its "R Square" was .0318--less than 4%.

The overall findings of the multiple regression analysis indicated that several of the student and program characteristics were signifi-

cantly related to the dependent variables. However, none of these characteristics, individually or in combination, explained as much as 5% of the variation in the job related measures, leaving more than 95% unexplained.

Measurement of Independence and Association

A contingency table was used to measure the independence or relatedness of the two dependent variables. Table 13 presents the number and percent of "related" and "not related" responses for both the self-assessment measure (left side of table) and the job title - program title match measure (top of table). As noted previously, a majority (62%) of the self-assessment ratings were related, compared to only 25 percent related for the other measure. For some "cells" in Table 13, the responses are very consistent--for example, of the 487 respondents identified as not related using self assessment all but 19 were also not related based on code matching. Also, of the 321 rated as related (title matching), all but 19 were related (self-assessment).

Table 13 -- Number and Percent of Respondents by Job Related Categories as Measured by Student Self-Assessment and Job Title-Program Title Match

Student Self-Assessment Category	Job Title - Program Title Match				Total	
	Related		Not Related			
	N	%	N	%	N	%
Related	302	23.6	493	38.5	795	62.0
Not Related	19	1.5	468	36.5	487	38.0
TOTALS	321	25.0	961	75.0	1282	100.0

Chi-Square = 185.13; Significant at the .05 level; Missing Data = 54

The major discrepancy between the two job relatedness measures was found elsewhere on Table 13; specifically, of the 795 related respondents (self-assessment) only 302 were considered related (title matching). Also, more than half (493 of 961) of those coded not related (title matching) were related (self-assessment).

The meaning of differing response patterns between these two measures of job relatedness was analyzed in tests measuring statistical independence (chi-square) and association (phi). Independence is described first.

Measurement of Independence

The chi-square is a test of statistical significance. The significance of the chi-square statistic is a function of the number of columns and rows in the contingency table. The chi-square test statistic listed at the bottom of Table 13 was significant at the .05 level. This meant that the two measures of job relatedness were not independent, but, rather, were significantly related.

A separate chi-square assessment of the independence of the two relatedness measures was conducted for each of the sub-groups (e.g., male, female) within each of the independent variables (e.g., sex). A total of fifteen contingency tables were produced, each having the same format as Table 13, but covering only a selected sub-group. The statistical tests of these contingency tables are presented on Table 14. In this table, the independent variables are listed in the first column, the number of cases are listed in the second column and the chi-square statistic in the third column.

There are fifteen sub-groups on Table 14. For the independent variable "race," three of the five sub-groups were too small for analysis. Of the twelve other sub-groups, all but one had a chi-square statistic that was significant at the .05 level. As noted earlier, the chi-square statistic for the entire sample indicated a significant relationship between the dependent variables. In testing the same relationship for the sub-groups of student and program characteristic, all but one of these sub-groups demonstrated a significant relationship.

Table 14 -- Chi-Square and Phi Statistics for the Two Measures of Job Relatedness by Independent Variables (n=1282)

Independent Variable	Number of Cases	Chi-Square	Phi Statistic
All Respondents	1,282	185.13*	.3819
Student Characteristics			
Sex			
Male	610	77.91*	.3615
Female	672	100.21*	.3897
Race			
Indian	13	**	***
Asian	5	**	***
Black	62	10.95*	.4578
Hispanic	6	**	***
White	1,191	167.14*	.3766
Program Characteristics			
Cooperative Education			
Participant	404	38.85*	.3163
Non-Participant	832	126.60*	.3930
Instructional Program			
Agriculture Production	133	11.88*	.3179
General Merchandise	248	18.87*	.2854
Nurse Aide	177	70.66*	.6437
Food Management	247	75.19*	.5602
Steno/Secretarial	168	2.57	***
Auto Mechanics	309	24.90*	.2957

* Significant at the .05 level
** Cell size too small to test
*** Not applicable, since chi-square was not significant

Measurement of Association

Having found evidence of relatedness between the dependent variables, a phi statistic test was conducted to assess the strength of that relationship. Phi ranges from 0 (weakest relationship) to 1 (strongest relationship). The fourth column on Table 14 presents the phi statistic for the respondents by related sub-group and total.

Overall, phi was .3819 for all respondents. This suggests a moderate level of association between the dependent variables. Looking at the characteristic sub-groups, females evidenced a stronger relationship between the variables than males. Blacks, the only non-white racial sub-group with significant responses, had a stronger relationship between the two variables than did whites. The two job relatedness measures were more strongly associated for respondents who did not participate in cooperative education than for those who did.

Assessing the results by instructional program reveals that respondents in Nurse Aide and Food Management programs had very strong association between the two variables while Steno/Secretarial had the lowest association of any large sub-group.

Table 15 lists the related sub-groups and total respondents ranked by the strength of their association (size of the phi statistic). Instructional programs had the greatest range in the strength of their association, with the two highest and lowest rated sub-groups being from this variable. Blacks, females and cooperative

education non-participants were three other sub-groups with above average associations.

Table 15 -- Independent Variables (From Table 14) Ranked by the Strength of Association (Size of Phi Statistic)

Independent Variable Sub-Group	Number	Phi
Nurse Aide	177	.6437
Food Management	247	.5602
Black	62	.4578
Cooperative Education Non-Participants	832	.3930
Female	672	.3897
Total (All Respondents)	1,282	.3819
White	1,191	.3766
Male	610	.3615
Agricultural Production	133	.3179
Cooperative Education Participants	404	.3163
Auto Mechanics	309	.2957
General Merchandise	248	.2854

This chapter has described the frequency of responses by variable, multiple regression analyses, and the independence and association between the two measures of job relatedness.

Chapter V

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Historically, vocational education has had a special responsibility for the employment of its graduates because these programs purport to impart entry-level job skills. Since the 1976 Educational Amendments, and its increased emphasis on the outcomes of former students, vocational education had been evaluated on the extent to which its graduates find employment in related occupations.

The Problem

The problem addressed in this study was to compare two different methods of measuring whether the jobs obtained by vocational graduates were related to their instructional program. One measure of job relatedness was graduate self-assessment. The other relatedness measure was based on matching job titles and instructional program titles using a cross-code index.

Another aspect of the study was to identify the predictive nature (if any) of selected student and program characteristics on the two measures of job relatedness.

Research Procedures

The population of this study consisted of a sample of 1,336 program completers who responded to the 1980 Follow-Up Survey from six

vocational education instructional programs. The Statistical Package for the Social Sciences (SPSS) was used to analyze the sample data. Descriptive statistics were prepared for each of the student and program characteristics (independent variables) and the job relatedness measures (dependent variables).

The sample data for all the variables were analyzed in multiple regression equations with student and program characteristics serving as independent variables and the job relatedness measure serving as dependent variables. The variability of the job relatedness measures explained by each of the independent variables was identified.

The two measures of job relatedness were tested for independence and association using contingency table analysis and chi-square and phi statistics. Tests for independence and association between the job relatedness measures were made for the entire sample and for fifteen sub-groups of student and program characteristics. These tests provided information on the nature of the relationship, its significance and its strength.

Findings

Description of the Sample

The study used a sample of 1,336 program completers who responded to the 1980 Michigan Follow-Up Survey. The sample was limited to respondents who had reported they were employed (full or part-time)

and had provided the title of their job. These job titles were assigned occupational codes by Michigan Department of Education staff. The sample was limited to respondents in six large instructional programs. The student, program, and employment characteristics of the survey respondents were as follows:

1. A majority or (52.2%) of the respondents were female.

2. Most (92.7%) of the respondents were white. Blacks were the next largest group (4.8 %), followed by American Indians (1.2 %)

3. A majority (64.4%) of the respondents were non-participants in cooperative education programs.

4. The respondents represented six instructional programs. The individual programs ranged from 10.2 percent to 23.8 percent of the sample.

   The instructional programs (and their relative share of the sample) were as follows: Auto Mechanics (23.8%), General Merchandise (19.5%), Food Management (19.5%), Nurse Aide (13.8%), Steno/Secretarial (13.1%), and Agricultural Production (10.2%)

5. A majority (62.0%) of the respondents reported their jobs were related to their instructional program. This was the <u>self-assessment</u> measure of job relatedness.

6. Three-quarters (75.0%) of the respondents were in jobs that were not related to their instructional program based on the job title-program title measure of job relatedness.

Research Questions

The sample data was analyzed using multiple regression analyses and statistical tests of independence and association. The findings for the study research questions for sample respondents from the 1980 Michigan Follow-Up Survey were as follows:

1. Do the student and program characteristics predict variation in the two measures of job relatedness?

   The instructional program was the only student or program characteristic (independent variable) that was significantly related (at the .05 level) to the job title-program title matching measure of job relatedness.

   For the other measure of job relatedness (self-assessment), cooperative education participation, respondent sex, and respondent race were all significantly related (at the .05 level).

   Neither of these groups of significantly related independent variables explained as much as 5 percent of the variation within either of the two measures of job related-

ness. This means that more than 95% of the measures of job relatedness could not be explained or predicted by the student or program characteristics; thus, they were of very limited predictive value.

2. Are the two measures of job relatedness independent or related? If they are not independent, what is the strength of the relationship?

For all respondents, the two measures of job relatedness were significantly related (at the .05 level). Sub-groups of student and program characteristics were analyzed. For eleven out of the twelve largest sub-groups, the two measures of job relatedness were significantly related (at the .05 level).

A moderate (phi = .3819) measure of association was found for all respondents. This reflects the strength of the relationship described in the preceding paragraph. Student and program sub-groups varied considerably with Nurse Aide (.6437), Food Management (.5602) and black respondents (.4578) evidencing much stronger than average measures of association.

Sub-groups from General Merchandise (.2854), Auto Mechanics (.2957), Cooperative Education Participants (.3163), and Agricultural Production (.3179) had weaker

than average measures of association between the two measures of job relatedness.

Conclusions

This study found that the two measures of job relatedness were significantly related to different student and program characteristics. The self-assessment measure was significantly related to cooperative education, sex and race. The job title-program title measure was significantly related to the instructional program.

The overall findings of the multiple regression analysis indicated that although several of the student and program characteristics were related to the job relatedness measure, they predicted less than 5% of the variation in the dependent variable, leaving over 95% of the job relatedness unexplained.

The two measures of job relatedness did not produce similar ratings for the same group of respondents. Overall, more than sixty percent of the self-assessment respondents indicated that their job was related to their training. The job title-program title matching produced a related result in only twenty-five percent of the cases.

The two measures of job relatedness were found not to be independent, but rather, significantly related. The strength of the association between the measures was moderate.

When the two measures were compared for sub-groups of student and

program characteristics, they were found to be significantly related in eleven of the twelve sub-groups. The strength of the relationship varied between sub-groups, with instructional program sub-groups having the greatest variation.

Implications and Concluding Statements

The present research has done little to clarify the ambiguous concept of job relatedness. The two measures of job relatedness produced widely divergent results from the same sample data. If a related job is equated to program success, the success rate for the study sample was either 62% or 25%, depending on the measure used.

The two measures of job relatedness were found, however, not to be independent, but rather significantly related with a moderate strength of association. These measures were significantly related for most of the student and program characteristic sub-groups, but with varying degrees of association. The instructional programs were the characteristics with the greatest range in the strength of the association.

The program and student characteristics were found to explain little (less than 5%) of the variation in either measure of job relatedness. This was true even though each of the three characteristics were significantly related to one relatedness measure (self-assessment) and the fourth characteristic was significantly related to the other measure of relatedness (job title-program title match).

The two measures of job relatedness are not simply theoretical approaches--they have been used in administrative reporting and evaluation. The Michigan Department of Education reported "related" job outcomes based on follow-up respondent self-assessment. The Vocational Education Data System follow-up form (see Figure 5, Chapter III), encouraged the use of job title-program title matching. Job title-program title matching were also used by the Michigan Department of Education to establish State "Added Cost" funding priorities. Although related job outcomes represents only one criterion for evaluation, it is an important one and administrative uses of this factor should be based on a consistent measure.

It is recommended that additional research be done on the measurement of the relationship between vocational education instructional programs and the employment outcomes of former students. Student and program characteristics should be assessed, including a wider range of instructional programs and a larger student sample than covered by this study. This would allow for the identification of variables that better predict successful vocational education outcomes.

Recommendations

As a result of this study, the following recommendations are made:

1. That further research can be conducted on assessing the relatedness of job outcomes to vocational programming, including the role of student and program characteristics on these outcomes.

2. That the National Institute of Education, the National Center for Research in Vocational Education, and the U.S. Department of Education conduct research studies to operationally define appropriate measures of job relatedness.

3. That the Michigan Department of Education operationally define the concept of "related employment" in the State Plan and consistently use this definition for administrative purposes.

4. That the Michigan Department of Education add a prominant explanation on the job placement reports describing the source of the relatedness data (student self-assessment).

5. That the Michigan Department of Education Vocational-Technical Education Service conduct a study of available follow-up data to analyze the pattern of job relatedness in the nine years of state follow-up surveys in Michigan.

6. That vocational education research personnel in Michigan, including the Michigan Department of Education staff and university-based investigators, conduct further research on alternate measures of job relatedness and the predictive power of student and program characteristics to explain variation in these job relatedness measures.

APPENDIX A

1980 FOLLOW-UP SURVEY OF FORMER STUDENTS (VE-40 45-A)

VE 4045-A
2/80

Michigan Department of Education

SCHOOL DISTRICT LABEL

FOLLOW-UP SURVEY OF FORMER STUDENTS

We are writing you, as a former high school student, to ask your help in improving some of the courses you took in school. By answering a few questions about what you are doing now and giving us your opinions, you can help us plan to make the courses better for students in the future.

The courses we are writing you about are those that you took in "vocational education" in order to get ready for a job after high school. The courses you took might have been in auto mechanics, office work, marketing and selling, agricultural production, welding and cutting, data processing, child care, small engine repair, electronics, food management, cosmetology, or one of many others possible.

Please take a few minutes to answer the questions and mail back your answers and opinions. We're counting on your help.

Thank you very much.

Please answer the questions by putting an "x" in the box next to the answer of YOUR CHOICE or by filling in the blank.

1. Are you now attending a school or college, or enrolled in a training program, or working as an apprentice?
(Check ONLY ONE.)

Yes 15 [1] No 15 [2]

If you answered "no", please turn the page and go to Question 4.

If you answered "yes", please go on to Question 2 below.

2. In your major area of study (or training), how much do you use the vocational training you received in your high school or area vocational education center?
(Check ONLY ONE.)

16 [1] A lot
[2] Some
[3] Hardly any
[4] None

3. Check the type of school or program you are now attending.
(Check ONLY ONE.)

17 [1] High school
[2] 1-year college vocational-technical program
[3] 2-year college vocational-technical program
[4] 2-year college liberal arts program
[5] 4-year college or university
[6] Business or trade school
[7] Apprentice Program
[8] Other _____

Please go to Question 4 on the next page.

4. If you are working for pay, about how many HOURS PER WEEK do you work? Write the number of hours per week in the box.

18 ☐

If you are not working for pay, please go to Question 10 on the next page.

If you are working for pay, please go to Question 5 below.

5. On your present job, how much do you use the vocational training you received in your high school or area vocational education center? (Check ONLY ONE.)

20 ☐ 1 A lot
☐ 2 Some
☐ 3 Hardly any
☐ 4 None

6. Overall, how satisfied are you with your present job? (Check ONLY ONE.)

21 ☐ 1 Very satisfied
☐ 2 Somewhat satisfied
☐ 3 Not very satisfied
☐ 4 Not at all satisfied

7. On my present job I am paid about

22 $ _____ per hour.

8.

Please fill in the name of the company where you work		
Company's Street Address		
City	State	Zip Code
Please fill in the name of your job		
Please list the three most important things you do on your job 1.	26	LEAVE BLANK
2.	31	
3.		
Please fill in the name of your job supervisor		

9. The high school job training that you and other former students received usually gets good ratings when we ask supervisors. We may need to ask your supervisor about the training you received in high school. Is that OK with you?

Please go on to Question 10.

Yes 36 ☐ 1 **Please fill in your supervisor's work phone number** (Area Code) _____

No ☐ 2

10. Are you looking for a job?
(Check ONLY ONE.)

Yes [1] No [2]

11. Are you in the military service?
(Check ONLY ONE.)

Yes [1] No [2]

12. Are you a homemaker?
(Check ONLY ONE.)

Yes [1] No [2]

13. What is your sex?

[1] Male
[2] Female

14. Please identify yourself as a member of one of the groups of people listed below.
(Check ONLY ONE.)

[1] American Indian or Alaskan Native
[2] Asian or Pacific Islander
[3] Black, not of Hispanic Origin
[4] Hispanic
[5] White, not of Hispanic Origin

Please go to Question 15.

15. COMMENTS

Please make any comments and/or suggestions you believe are needed to improve some of the courses you took or services you received while in high school. Also, add any general comments or suggestions you have about your school experience.

(SCHOOL USE ONLY)

1. Yes [1] C [1] or L [2]

   No [2]

2. Yes [1] No [2] 3. Co-op Yes [1] No [2]

4. Yes [1] H [1] or LEP [1] or D [1]
   No [2]

5. Yes [1] H [1] or LEP [2] or D [3]
   No [2]

6. OE [ ][ ] . [ ][ ][ ][ ] 7. PSN [ ][ ][ ][ ][ ][ ]

   Name of Program _____

8. If an AREA CENTER or SHARED TIME program, report respondent's home district identification. CSPD [ ][ ] CODE [ ][ ][ ][ ]

9. Telephone [1] Mail [2]

PART 5 COMMENTS

Please make any comments and/or suggestions you believe are needed to improve some of the courses you took or services you received while in high school. Also, add any general comments or suggestions you have about your school experience.

(SCHOOL USE ONLY)

1. A. [75] ☐1 ☐2 [76] ☐1 ☐2 ☐3

B. [77] ☐1 ☐2

C.O.E. Code [78] ____ ____ . ____ ____ ____ ____

Name of Program _____

PSN [84] ____ ____ ____ ____ ____

D. [89] ☐1 ☐2

2. [90] ☐1 ☐2 [91] ☐1 ☐2 ☐3

Information obtained by telephone. ☐1 [92]

If an AREA CENTER, report respondent's home district identification.

CSPD [93] CODE [98]

3. _____

THE 1980 VOCATIONAL EDUCATION FOLLOW-UP SURVEY*

Introduction

The purpose of the 1980 Follow-Up Survey is to gather information needed to help people make decisions about vocational education programs.

Program fiscal agents (local districts) that receive Federal or State funds for conducting programs are required to report follow-up data about program completers and leavers, including information needed for the State to do the follow-up with the employers of a sample of former students. In turn, we in the State office are required to report the results of the surveys to the National Center for Education Statistics for inclusion in reports to the U.S. Department of Education and Congress.

The follow-up of completers and leavers of 1980 continues the series of annual surveys begun in 1973. This year, as in all previous years, we have considered recommendations from an Ad Hoc Follow-up Advisory Committee,** professionals in local districts, and technical advisors in making changes in both the survey form and process.

This year, we have made four changes in the study:

1. You, as representative of a local program fiscal agency, will need to survey ALL completers and ALL leavers of reimbursed wage-earning programs that your agency reported last July on Form VE-4301, "Secondary Vocational Enrollment and Termination Report for School Year Ending June 30, 1980". (Please remember that you are not required to survey completers and leavers of Consumer and Homemaking programs, those with the OE Code 09.011. You may follow them up as part of the optional non-vocational student survey.

2. We will base your survey response rates on the number of completers and leavers your school reported on Form VE-4301 last July. That means we will calculate the rate, for each Program Serial Number (PSN) on the VE-4301, by dividing the number of your completers and leavers who respond to the survey by the number reported on the VE-4301.

3. You will need to report whether a former student fits one or more of the definitions of handicapped, disadvantaged, or limited English proficiency and, if so, whether the student received reimbursed services as part of an approved state special needs project.

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* See Appendix A for definition of terms.
** See Appendix I for members of the committee.

4. A total of seven questions for the former students has been removed from the questionnaire.

5. Students will be asked to supply their supervisor's name and phone number on the student follow-up form to aid in completing the employer follow-up. If a student omits this information and the LEA can supply it, please do so.

While we have no choice about following up completers and leavers of reimbursed programs, you have the option, as in previous years, of also surveying non-vocational graduates. You may use added cost funds to cover the expense of surveying the former VOCATIONAL student.

In conducting the survey, we recommend that you make administrators, counselors, teachers, placement coordinators, students, and the community aware that:

1. You are conducting the survey; and

2. The school and community can benefit from using the results.

And, finally, please remember that fiscal agencies, not "home schools," are responsible for actually collecting data from completers and leavers of their programs. That means, in no case, should a school follow-up a former vocational student who was not counted on its Form VE-4301.

In summary, the data gathered from the follow-up survey provides educators at the Federal, State, and Local levels with the information needed to make decisions about students' needs and what schools can do to address those needs.

Services in Support of Your Survey

We provide a Survey Support Center during the entire time of the survey to assist you in conducting a successful survey and to handle some of the mechanics for us. During the survey, the Center will:

1. Supply additional needed materials;

2. Answer questions related to the survey; and

3. Offer suggestions for solving problems you may have in conducting your survey.

In addition, we provide a statewide series of workshops in the Fall for local staffs who will actually be conducting the survey and the instructions and suggestions on the following pages. They are:

1. A suggested schedule for conducting the survey;

2. A definition of terms (Appendix A);

3. A sample cover letter to mail with questionnaires (Appendix B);

4. A worksheet for coding survey forms and keeping control of the survey as you conduct it (Appendix C);

5. Tentative instructions for selecting a sample of former students whose employers will be followed up, including a tentative form for listing them (Appendix D);

6. Some recommendations for publicizing the survey to help to improve response (Appendix E);

7. A sample cover letter to mail to those who do not respond to the first mailing (Appendix F);

8. An explanation of the information needed in the "school use" part of the questionnaire (Appendix G);

9. A sample of the transmittal sheet used to send the questionnaire and some additional information to the Survey Support Center (Appendix H); and

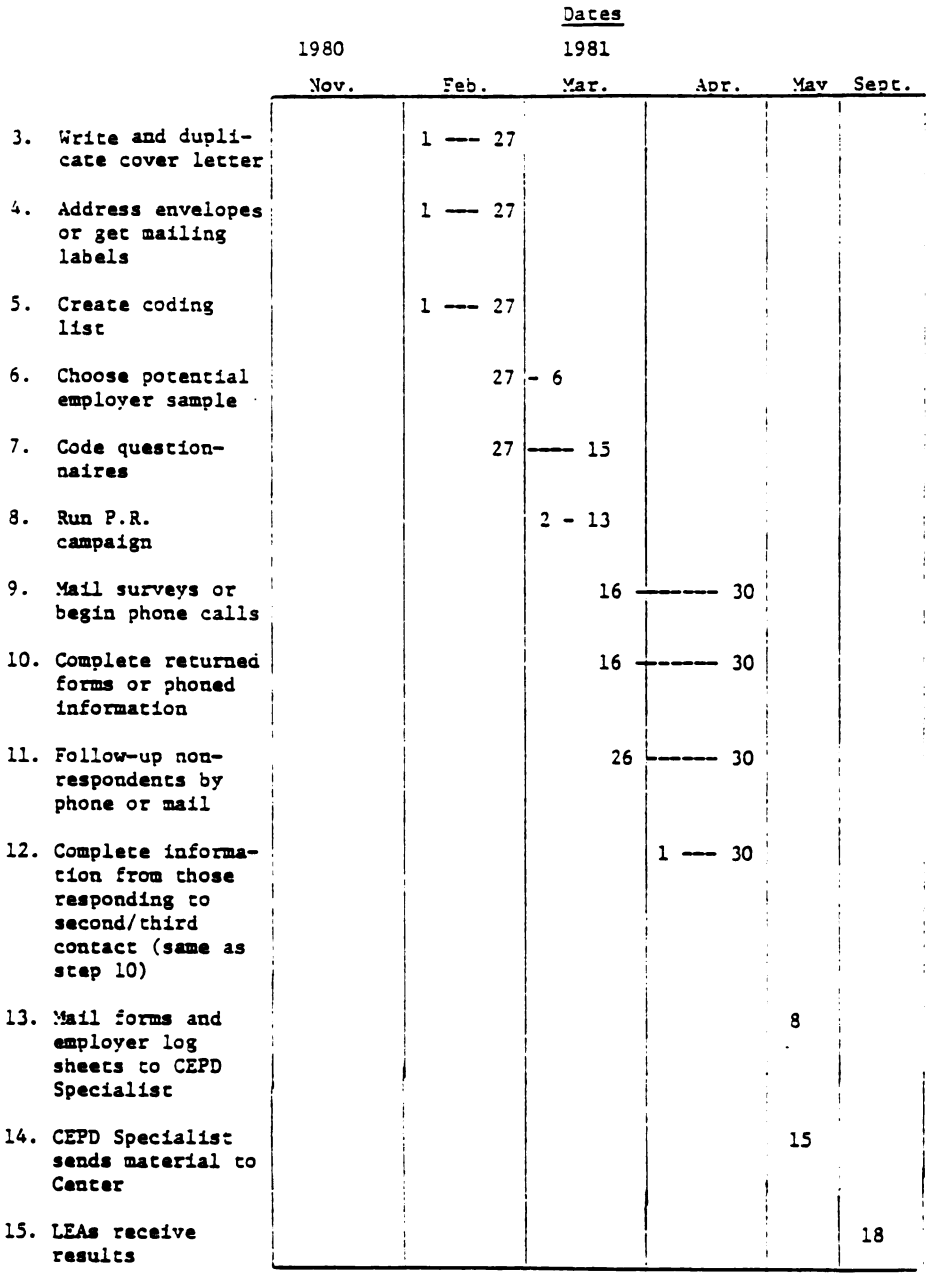
10. The membership of the Ad Hoc Advisory Committee (Appendix I).

Suggested Schedule

The chart below depicts the steps you can use in planning and conducting the student and employer follow-up. An explanation of each step appears on succeeding pages.

	Dates					
	1980		1981			
	Nov.	Feb.	Mar.	Apr.	May	Sept.
1. Attend Inservice Program	4 -- 21					
2. Gather mailing and "school use" information:		1 ---- 27				
--student name --address and/or phone number --O.E. Code --PSN --Program name --Graduate --Completer or leaver --Handicapped, LEP, disadvantaged --Participation in special needs project: if so, handicapped, LEP or disadvantaged						

You need not wait until the dates shown to do Steps 1-5. They may be done as convenient, so long as they are completed by February 27.


Dates
1980
1981
Nov.
Feb.
Mar.
Apr.
May
Sept.
3. Write and duplicate cover letter
1 — 27
4. Address envelopes or get mailing labels
1 — 27
5. Create coding list
1 — 27
6. Choose potential employer sample
27 - 6
7. Code questionnaires
27 — 15
8. Run P.R. campaign
2 - 13
9. Mail surveys or begin phone calls
16 — 30
10. Complete returned forms or phoned information
16 — 30
11. Follow-up non-respondents by phone or mail
26 — 30
12. Complete information from those responding to second/third contact (same as step 10)
1 — 30
13. Mail forms and employer log sheets to CEPD Specialist
8
14. CEPD Specialist sends material to Center
15
15. LEAs receive results
18

APPENDIX B

SOC CODES AND TITLES

APPENDIX B

SOC CODES AND TITLES

Listed below are 39 Standard Occupational Classification (SOC) codes and titles. The codes and titles are related to the six instructional programs included in this study. The SOC codes were presented on Figure 9.

Instructional Program	SOC Code	SOC Title
Agricultural Production	1440	Purchasing Agents and Buyers
	5512	General Farmers
	5611	Supervisors; Farm Workers
	5612	General Farm Workers
	6720	Garage and Service Station Related Occupations
General Merchandise	1240	Purchasing Managers
	1390	Officials and Administrators; NEC*
	1633	Electrical and Electronic Engineers
	4011	Wholesale and Retail Trade Supervisors
	4148	Salespersons; Furniture and Home Furnishings
	4154	Salespersons; Cosmetics, Toiletries and Allied Products
	4159	Salespersons; NEC*
	4162	Sales Clerks
	4320	Buyers; Wholesale and Retail Trade
	4350	Demonstrators, Models, and Sales Promoters
	4360	Shoppers
	4390	Sales Occupations, NEC*
	4642	Interviewing Clerks
	4683	Cashiers
	4732	Messengers
	4749	Material Recordings, Scheduling and Distributing Clerks, NEC*
	4783	Investigators and Adjusters, Except Insurance
	4786	Collectors

SOC CODES AND TITLES

Instructional Program	SOC Code	SOC Title
Nurse Aide	5236	Nursing Aides, Orderlies, and Attendants
Food Management	4744	Stock and Inventory Clerks
	5021	Supervisors; Food and Beverage Preparation and Service Occupations
	5213	Waiters and Waitresses
	5214	Cooks, Except Short Order
	5215	Short-order Cooks
	5217	Kitchen Workers, Food Preparation
	5218	Waiters'/Waitresses' Assistants
	5219	Misc. Food and Beverage Preparation Occupations
	7272	Bakers
Steno/Secretarial	1490	Management Related Occupations, NEC*
	4612	Secretaries
	4613	Stenographers
Auto Mechanics	6711	Automobile Mechanics
	6792	Helpers; Vehicle and Mobile Equipment Mechanics and Repairers
	7281	Precision Inspectors, Testers, and Graders

* NEC--Not Elsewhere Classified

APPENDIX C

1980 FOLLOW-UP REPORT "PLACEMENT SUMMARY OF COMPLETERS BY PROGRAM" (X0607)

STATE VOCATIONAL EDUCATION CONTINUING EDUCATION, JOB SATISFACTION, AND HOURLY WAGE SUMMARY

PROGRAM NUMBER AND NAME	SURVEYS RETURNED	CONT ED TOTAL	CONTINUING RELATED EDUCATION: TOTAL	1-2 YR RELATED	2-4 YR COLLEGE	COLLEGE SCHOOL	TRADE &APPRENT PROGRAM	OTHER	JOB SATISFACT. RELATED	UNRELATED	HOURLY WAGES RELATED	UNRELATED
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
01.0100	790	318	158	68	60	7	6	17	283	130	4.20	4.13
PRODUCTION AGRICULTURE		40.3%	49.7%	43.0%	38.0%	4.4%	3.8%	10.8%	56.0%	26.1%	218	134
01.0200	35	22	0	0	0	0	0	0	5	2	4.17	3.62
AGRICULTURAL SUPPLIES		62.9%	.0%	.0%	.0%	.0%	.0%	.0%	55.6%	22.2%	3	3
01.0300	264	62	41	19	13	3	1	5	91	32	4.22	4.38
AGRICULTURE MECHANICS		23.5%	66.1%	46.3%	31.7%	7.3%	2.4%	12.2%	52.9%	18.6%	74	39
01.0301	38	13	9	5	0	1	1	2	20	7	4.59	3.63
AG POWER AND MACHINERY		22.4%	69.2%	55.6%	.0%	11.1%	11.1%	22.2%	48.8%	17.1%	16	9
01.0400	16	2	1	0	0	0	1	0	1	1	0.00	0.00
AGRICULTURAL PRODUCTS		36.3%	111.1%	.0%	.0%	.0%	100.0%	.0%	50.0%	50.0%	0	0
01.0500	339	98	37	13	17	2	4	1	71	94	3.88	4.20
ORNAMENTAL HORTICULTURE		28.9%	37.8%	35.1%	45.9%	5.4%	10.8%	2.7%	32.1%	42.5%	70	104
01.0502	74	18	6	2	4	0	0	0	21	17	3.98	3.54
FLORICULTURE		24.3%	33.3%	33.3%	66.7%	.0%	.0%	.0%	33.6%	32.1%	19	25
01.0504	24	5	1	1	0	0	0	0	5	6	4.00	4.14
LANDSCAPING		20.8%	20.0%	100.0%	.0%	.0%	.0%	.0%	35.7%	42.9%	5	5
01.0600	74	28	13	4	8	0	0	1	17	19	4.59	4.24
AGRICULTURAL RESOURCES		37.8%	46.4%	30.8%	61.5%	.0%	.0%	7.7%	36.2%	40.4%	12	21
01.0700	31	15	7	5	2	0	0	0	4	9	4.50	3.84
FORESTRY		48.4%	46.7%	71.4%	28.6%	.0%	.0%	.0%	22.2%	50.0%	3	9
04.0000	3	2	1	1	0	0	0	0	1	0	3.95	0.00
DE COOP COMPONENT		66.7%	50.0%	100.0%	.0%	.0%	.0%	.0%	50.0%	.0%	1	0
04.0100	16	10	6	1	5	0	0	0	7	4	3.67	4.24
ADVERTISING SERVICES		62.5%	60.0%	16.7%	83.3%	.0%	.0%	.0%	50.0%	28.6%	7	7
04.0200	51	22	9	4	2	3	0	0	10	5	4.35	3.78
APPAREL AND ACCESSORIES		43.1%	40.9%	44.4%	22.2%	33.3%	.0%	.0%	38.5%	19.2%	9	12

STATE VOCATIONAL EDUCATION CONTINUING EDUCATION, JOB SATISFACTION, AND HOURLY WAGE SUMMARY

PROGRAM NUMBER AND NAME	SURVEYS RETURNED	CONT ED TOTAL	CONTINUING RELATED EDUCATION 1-2 YR TOTAL	1-2 YR RELATED	2-4 YR COLLEGE	2-4 YR COLLEGE	TRADE SCHOOL	APPRENTI PROGRAM	OTHER	JOB SATISFACT. RELATED	JOB SATISFACT. UN-RELATED	HOURLY WAGES RELATED	HOURLY WAGES UN-RELATED
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
04.0600 FOOD DISTRIBUTION	4	1	0	0	0	0	0	0	1	0	4.50	0.00
		25.0%	.0%	.0%	.0%	.0%	.0%	.0%	50.0%	.0%	1	0
04.0800 GENERAL MERCHANDISE	5,605	2,544	1,448	324	904	117	30	73	1,790	936	4.03	4.12
		45.4%	56.9%	22.4%	62.4%	8.1%	2.1%	5.0%	91.4%	24.0%	1,741	957
04.1800 RECREATION AND TOURISM	18	9	1	1	0	0	0	0	3	8	3.35	3.25
		27.8%	20.0%	100.0%	.0%	.0%	.0%	.0%	75.0%	66.7%	2	5
04.1905 WAREHOUSING	25	8	6	1	3	0	0	2	1	0	6.34	3.51
		32.0%	75.0%	16.7%	50.0%	.0%	.0%	33.3%	16.7%	.0%	1	4
07.0101 DENTAL ASSISTANT	236	113	56	22	29	0	0	3	89	43	4.18	3.61
		47.9%	49.6%	39.3%	51.8%	.0%	.0%	8.9%	56.9%	27.2%	74	55
07.0202 HISTOLOGY	5	2	1	1	0	0	0	0	2	0	5.16	3.00
		40.0%	50.0%	100.0%	.0%	.0%	.0%	.0%	50.0%	.0%	2	1
07.0203 MEDICAL LAB ASSISTANT	27	22	17	2	13	0	0	2	5	4	4.28	3.73
		81.5%	77.3%	11.8%	76.5%	.0%	.0%	11.8%	41.7%	33.3%	5	5
07.0302 PRACTICAL NURSING	44	30	28	13	12	1	0	2	11	10	4.76	3.44
		68.2%	93.3%	46.4%	42.9%	3.6%	.0%	7.1%	42.3%	38.5%	11	12
07.0303 NURSING ASSISTANT AIDE	1,068	368	391	121	230	3	3	34	310	112	4.04	3.60
		93.2%	68.8%	30.9%	58.8%	.8%	.8%	8.7%	55.6%	20.1%	280	152
07.0904 MEDICAL OFFICE ASSISTANT	122	71	44	13	26	0	0	3	36	19	4.07	3.71
		58.2%	62.0%	29.5%	59.1%	.0%	.0%	11.4%	46.8%	24.7%	38	32
07.9801 WARD CLERK/WARD SECRETARY	25	12	5	2	3	0	0	0	8	5	4.48	3.10
		48.0%	41.7%	40.0%	60.0%	.0%	.0%	.0%	47.1%	29.4%	6	6
07.9802 HEALTH OCCUPATIONS CLUSTER	701	399	277	107	138	7	2	23	190	108	3.84	3.63
		56.9%	69.4%	38.6%	49.8%	2.5%	.7%	8.3%	48.8%	27.8%	180	136
07.9803 PHARMACY ASSISTANT	5	2	1	0	1	0	0	0	0	0	0.00	3.75
		40.0%	50.0%	.0%	100.0%	.0%	.0%	.0%	.0%	.0%	0	1

STATE VOCATIONAL EDUCATION CONTINUING EDUCATION, JOB SATISFACTION, AND HOURLY WAGE SUMMARY

PROGRAM NUMBER AND NAME	SURVEYS RETURNED	CONT ED TOTAL	CONTINUING RELATED EDUCATION: 1-2 YR COLLEGE	2-4 YR COLLEGE	TRADE SCHOOL	APPRENT PROGRAMS	OTHER	JOB SATISFACT. RELATED	JOB SATISFACT. UN-RELATED	HOURLY WAGES RELATED	HOURLY WAGES UN-RELATED
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
09.0201	741	229	133	43	74	5	2	9	126	150	3.35	3.62
CHILD CARE + GUIDANCE SERVIC		30.9%	58.1%	32.3%	55.6%	3.8%	1.5%	6.9%	33.2%	39.6%	128	186
09.0202	107	42	24	4	12	4	1	3	18	18	3.73	3.62
CLOTH MGT PROD SERVICE		39.3%	57.1%	16.7%	50.0%	16.7%	4.2%	12.5%	40.0%	40.0%	13	21
09.0203	1,295	407	194	81	81	15	3	14	351	189	3.84	4.00
FOOD MGT PRODUCTION +SERVICE		31.4%	47.7%	41.8%	41.8%	7.7%	1.5%	7.2%	47.9%	25.8%	336	207
09.0204	16	8	3	0	3	0	0	0	1	6	3.75	3.41
HOME FURN EQUIP + SERVICES		50.0%	37.5%	.0%	100.0%	.0%	.0%	.0%	10.0%	60.0%	1	7
09.0205	43	10	5	0	2	0	1	2	16	2	3.42	3.78
INSTIT HOME MGT + SERVICES		23.3%	50.0%	.0%	40.0%	.0%	20.0%	40.0%	72.7%	9.1%	14	2
14.0102	520	319	237	63	151	18	0	5	117	90	3.83	3.90
BOOKKEEPERS		61.3%	74.3%	26.6%	63.7%	7.6%	.0%	2.1%	39.8%	30.6%	101	122
14.0104	13	4	3	0	3	0	0	0	2	4	3.55	3.75
MACHINE OPERATORS		30.8%	75.0%	.0%	100.0%	.0%	.0%	.0%	28.6%	57.1%	1	3
14.0105	67	14	7	0	3	4	0	0	26	12	4.12	3.44
TELLERS		20.9%	50.0%	.0%	42.9%	57.1%	.0%	.0%	57.8%	26.7%	19	11
14.0200	108	54	37	9	19	1	0	8	29	17	4.05	3.75
BUSINESS DATA PROCESSING		50.0%	68.5%	24.3%	51.4%	2.7%	.0%	21.6%	44.6%	26.2%	22	26
14.0201	724	437	281	79	171	16	0	15	154	115	4.12	3.91
COMPUTER OPERATIONS		60.4%	64.3%	28.1%	60.9%	5.7%	.0%	5.3%	39.3%	29.3%	145	149
14.0202	24	10	3	2	0	1	0	0	4	5	4.97	3.62
DATA ENTRY/PREPARATION		41.7%	30.0%	66.7%	.0%	33.3%	.0%	.0%	26.7%	33.3%	4	11
14.0203	201	161	123	27	84	8	0	4	34	34	5.27	4.29
PROGRAMMERS		80.1%	76.4%	22.0%	68.3%	6.5%	.0%	3.3%	32.1%	32.1%	34	91
14.0303	166	67	46	19	12	13	0	2	62	30	4.32	3.86
GENERAL OFFICE CLERKS		40.4%	68.7%	41.3%	26.1%	28.3%	.0%	4.3%	54.4%	26.3%	56	39

STATE VOCATIONAL EDUCATION CONTINUING EDUCATION, JOB SATISFACTION, AND HOURLY WAGE SUMMARY

PROGRAM NUMBER AND NAME	SURVEYS RETURNED	CONT ED TOTAL	CONTINUING RELATED EDUCATION: 1-2 YR RELATED	2-4 YR COLLEGE RELATED	TRADE SCHOOL	APPRENTICE PROGRAM	OTHER	JOB SATISFACT. RELATED	JOB SATISFACT. UNRELATED	HOURLY WAGES RELATED	HOURLY WAGES UNRELATED
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
14.0504	7	2	0	0	0	0	0	1	2	0.00	3.35
STOCK & INVENTORY CLERK	28.6%	.0%	.0%	.0%	.0%	.0%	.0%	16.7%	33.3%	0	1
14.0703	1,624	777	558	188	261	76	3	30	666	176	4.20	3.74
STENOGRAPHERS	47.8%	71.8%	33.7%	46.8%	13.6%	.5%	5.4%	69.9%	16.9%	622	237
14.0797	22	9	8	3	3	1	0	1	9	3	4.50	3.51
MEDICAL SECRETARY	40.9%	88.9%	37.5%	37.5%	12.5%	.0%	12.5%	90.0%	20.0%	7	4
14.0798	56	24	19	10	4	2	0	1	29	6	4.40	3.70
LEGAL SECRETARY	42.9%	79.2%	52.6%	31.6%	10.5%	.0%	5.3%	87.4%	14.0%	27	7
14.0901	1,023	467	312	98	130	46	3	14	328	113	3.89	3.77
CLERK-TYPIST	45.6%	66.8%	31.7%	48.1%	14.7%	1.0%	4.5%	59.6%	20.5%	308	147
14.0700	428	204	149	40	83	17	1	8	149	53	4.08	3.88
CLERICAL LAB	47.7%	73.0%	26.8%	55.7%	11.4%	.7%	5.4%	61.9%	22.0%	137	68
14.9800	3,636	1,731	1,252	408	606	177	5	36	1,352	463	4.01	3.64
STENO/CLERICAL LAB	47.6%	72.3%	32.6%	48.4%	14.1%	.4%	4.3%	60.5%	20.7%	1,226	617
17.0100	174	61	45	17	9	3	3	11	31	35	5.14	4.65
AIR CONDITIONING	35.1%	73.8%	37.8%	20.0%	11.1%	6.7%	24.4%	27.0%	30.4%	29	43
17.0102	13	7	5	1	1	1	1	1	2	5	4.68	4.68
HEATING	53.8%	71.4%	20.0%	20.0%	20.0%	20.0%	20.0%	20.0%	50.0%	2	5
17.0200	78	33	17	11	1	3	0	0	12	14	4.86	4.63
APPLIANCE REPAIR	42.3%	51.5%	64.7%	3.0%	9.1%	.0%	.0%	36.4%	42.9%	12	21
17.0301	663	188	81	42	10	10	8	11	112	150	4.53	4.20
BODY AND FENDER	28.4%	43.1%	51.9%	12.3%	12.3%	9.9%	15.0%	26.7%	39.8%	91	196
17.0302	3,238	1,265	748	305	151	92	39	71	825	630	4.55	4.43
AUTO MECHANICS	39.1%	59.1%	52.8%	20.2%	12.3%	5.2%	9.5%	39.0%	29.8%	721	720
17.0400	9	5	3	2	0	0	0	1	1	0	3.35	0.00
AVIATIONS OCCUPATIONS	55.6%	60.0%	66.7%	.0%	.0%	.0%	33.3%	50.0%	.0%	1	0

STATE VOCATIONAL EDUCATION CONTINUING EDUCATION, JOB SATISFACTION, AND HOURLY WAGE SUMMARY

PROGRAM NUMBER AND NAME	SURVEYS RETURNED	CONT ED TOTAL	CONTINUING RELATED EDUCATION: TOTAL RELATED	1-2 YR COLLEGE	2-4 YR COLLEGE	TRADE SCHOOL	APPRENT PROGRAM	OTHER	JOB SATISFACT. RELATED	JOB SATISFACT. UN-RELATED	HOURLY WAGES RELATED	HOURLY WAGES UN-RELATED
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
17.0401	12	8	8	4	3	0	0	1	1	3	4.28	3.20
AIRCRAFT MAINTENANCE		66.7%	100.0%	50.0%	37.5%	.0%	.0%	12.5%	11.1%	33.3%	1	5
17.0402	7	5	2	0	2	0	0	0	4	0	5.08	0.00
BUSINESS MACH MAINTENANCE		71.4%	40.0%	.0%	100.0%	.0%	.0%	.0%	80.0%	.0%	3	0
17.0498	12	4	1	0	0	0	0	1	0	4	0.00	4.49
VENDING MACHINE REPAIR		33.3%	25.0%	.0%	.0%	.0%	.0%	100.0%	.0%	80.0%	0	4
17.0700	247	133	90	19	60	2	2	7	30	52	3.99	3.78
COMMERCIAL ART OCCUPATIONS		53.8%	67.7%	21.1%	66.7%	2.2%	2.2%	7.8%	21.9%	38.0%	27	77
17.0800	32	14	6	2	4	0	0	0	4	11	3.96	3.29
COMMERCIAL PHOTOGRAPHY		43.8%	42.9%	33.3%	66.7%	.0%	.0%	.0%	22.2%	61.1%	4	12
17.1000	318	120	47	24	12	2	6	3	79	58	5.46	4.30
CONSTR & MAINTEN IN-SCHOOL		37.7%	39.2%	51.1%	25.5%	4.3%	12.8%	6.4%	36.9%	27.1%	60	84
17.1001	9	8	3	2	0	0	1	0	3	1	4.12	3.50
CARPENTRY		88.9%	60.0%	66.7%	.0%	.0%	33.3%	.0%	60.0%	20.0%	3	1
17.1002	12	8	7	3	0	0	2	0	3	1	4.33	3.75
ELECTRICITY		66.7%	87.5%	71.4%	.0%	.0%	28.6%	.0%	37.5%	12.5%	3	2
17.1005	14	3	2	1	0	0	0	1	0	0	0.00	3.35
PAINTING AND DECORATING		21.4%	66.7%	50.0%	.0%	.0%	.0%	50.0%	.0%	.0%	0	1
17.1007	6	1	1	1	0	0	0	0	0	1	0.00	8.00
PLUMBING AND PIPEFITTING		16.7%	100.0%	100.0%	.0%	.0%	.0%	.0%	.0%	20.0%	0	1
17.1098	1,206	474	239	123	51	11	29	24	400	203	4.80	4.14
CONSTR AND MAINT ON-SITE		50.0%	50.0%	51.7%	21.4%	4.6%	12.2%	10.1%	36.9%	26.3%	372	391
17.1100	157	26	7	2	0	2	0	3	35	25	4.09	4.81
CUSTODIAL SERVICES		16.6%	26.9%	28.6%	.0%	28.6%	.0%	42.9%	46.1%	32.9%	31	22
17.1200	54	18	15	10	1	3	1	0	13	7	5.29	5.11
DIESEL MECHANIC		33.3%	83.3%	66.7%	6.7%	20.0%	6.7%	.0%	32.5%	17.5%	15	12

STATE

VOCATIONAL EDUCATION CONTINUING EDUCATION, JOB SATISFACTION, AND HOURLY WAGE SUMMARY

PROGRAM NUMBER AND NAME	SURVEYS RETURNED	CONTINUING EDUCATION TOTAL	CONTINUING EDUCATION 1-2 YR.	CONTINUING EDUCATION 2-4 YR.	CONTINUING EDUCATION TRADE & INDUST.	CONTINUING EDUCATION APPRENTICE	CONTINUING EDUCATION OTHER	JOB SATISFACTION RELATED	JOB SATISFACTION UNRELATED	HOURLY WAGES RELATED	HOURLY WAGES UNRELATED
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
17.1300	944	548	249	93	129	5	9	9	191	96	5.21	4.35
DRAFTING OCCUPATIONS	58.05%	67.99%	71.66%	38.08%	52.78%	2.04%	3.78%	3.78%	67.38%	30.18%	121	113
17.1398	125	89	68	22	43	0	0	3	23	22	4.66	4.37
ENG/ARCHITECTURAL DRAFTING	71.20%	76.44%	32.44%	83.22%	.0%	.0%	.0%	4.4%	32.4%	35.2%	21	27
17.1400	221	116	83	30	37	1	5	10	45	43	5.35	4.30
ELECTRICAL OCCUPATIONS	52.5%	71.05%	36.1%	44.6%	1.2%	6.0%	12.0%	32.4%	30.9%	34	58
17.1401	54	21	19	6	3	3	5	2	11	13	5.32	4.41
INDUSTRIAL ELECTRICIAN	38.9%	90.5%	31.6%	15.8%	15.8%	26.3%	10.5%	30.6%	36.1%	7	14
17.1500	467	268	211	100	69	14	9	19	81	79	4.29	4.13
ELECTRONICS OCCUPATIONS	57.4%	78.7%	47.4%	32.7%	6.6%	4.3%	9.0%	29.2%	28.5%	72	120
17.1501	27	16	13	7	2	2	0	2	1	6	4.50	3.94
COMMUNICATIONS	59.3%	81.3%	53.8%	15.4%	15.4%	.0%	15.4%	5.9%	35.3%	1	8
17.1502	39	25	20	9	7	4	0	0	14	3	4.58	3.69
INDUSTRIAL ELECTRONICS	64.1%	80.0%	45.0%	35.0%	20.0%	.0%	.0%	56.0%	12.0%	17	4
17.1503	148	97	72	33	24	4	0	11	28	16	4.82	3.97
RADIO AND TELEVISION	65.5%	74.2%	45.8%	33.3%	5.6%	.0%	15.3%	35.9%	20.5%	29	30
17.1598	107	76	46	11	33	0	0	2	12	16	3.79	4.27
RADIO AND TV BROADCASTING	71.0%	60.5%	23.9%	71.7%	.0%	.0%	4.3%	25.5%	34.0%	10	19
17.1900	828	320	162	46	90	10	8	8	168	172	4.40	3.80
GRAPHIC ARTS OCCUPATIONS	38.6%	50.6%	28.4%	55.6%	6.2%	4.9%	4.9%	33.2%	34.0%	166	211
17.1903	44	26	4	1	2	0	1	0	10	11	3.61	3.50
LITH PHOTO PLATEMAKING	59.1%	15.4%	25.0%	50.0%	.0%	25.0%	.0%	43.5%	47.8%	6	13
17.2101	13	11	4	1	2	1	0	0	8	0	4.20	4.00
INSTRU-NOT WATCHES OR CLOCKS	84.6%	36.4%	25.0%	50.0%	25.0%	.0%	.0%	80.0%	.0%	5	1
17.2301	5	0	0	0	0	0	0	0	0	3	0.00	3.35
FOUNDRY	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	75.0%	0	4

STATE VOCATIONAL EDUCATION CONTINUING EDUCATION, JOB SATISFACTION, AND HOURLY WAGE SUMMARY

PROGRAM NUMBER AND NAME	SURVEYS RETURNED	CONT ED TOTAL	CONTINUING RELATED EDUCATION 1-2 YR RELATED	1-2 YR COLLEGE	2-4 YR COLLEGE	TRADE SCHOOL	APPRENT PROGRAM	OTHER	JOB SATISFACT. RELATED	UN- RELATED	HOURLY WAGES RELATED	UN- RELATED
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
17.2302	1,179	414	274	97	73	13	65	26	448	158	5.08	4.29
MACHINE SHOP		35.1%	66.2%	35.4%	26.6%	4.7%	23.7%	9.5%	52.7%	18.7%	395	216
17.2305	6	1	1	0	0	0	1	0	2	2	5.75	4.88
SHEET METAL		16.7%	100.0%	.0%	.0%	.0%	100.0%	.0%	33.3%	33.3%	2	2
17.2306	1,152	345	185	87	33	20	18	27	314	104	5.58	4.69
WELDING AND CUTTING		29.9%	53.6%	47.0%	17.8%	10.8%	9.7%	14.6%	41.3%	25.5%	277	263
17.2602	970	274	123	14	26	16	36	31	314	163	3.78	3.64
COSMETOLOGY		28.2%	44.9%	11.4%	21.1%	13.0%	29.3%	25.2%	52.2%	27.1%	157	193
17.2700	17	3	1	0	0	1	0	0	4	1	4.79	3.35
PLASTICS OCCUPATIONS		17.6%	33.3%	.0%	.0%	100.0%	.0%	.0%	50.0%	12.5%	3	2
17.2802	85	51	18	7	9	0	1	1	18	19	3.68	4.48
LAW ENFORCEMENT		60.0%	35.3%	38.9%	50.0%	.0%	5.6%	5.6%	34.6%	36.5%	20	24
17.3000	7	2	0	0	0	0	0	0	3	2	4.95	3.68
REFRIGERATION		28.6%	.0%	.0%	.0%	.0%	.0%	.0%	50.0%	33.3%	3	2
17.3100	369	102	44	23	8	4	2	7	72	24	4.55	4.13
SMALL ENGINE REPAIR		27.6%	43.1%	52.3%	18.2%	9.1%	4.5%	15.9%	32.9%	30.8%	58	90
17.3500	5	1	0	0	0	0	0	0	1	1	5.80	4.20
UPHOLSTERING		20.0%	.0%	.0%	.0%	.0%	.0%	.0%	50.0%	50.0%	1	1
17.3600	23	4	2	0	0	1	1	0	10	6	5.03	3.59
WOODWORKING		17.5%	50.0%	.0%	.0%	50.0%	50.0%	.0%	50.0%	30.0%	9	7
17.3601	45	30	6	1	5	0	0	0	6	6	4.50	4.78
MILLWORK-CABINET MAKING		66.7%	20.0%	16.7%	83.3%	.0%	.0%	.0%	37.5%	37.5%	4	8
17.9800	13	1	0	0	0	0	0	0	4	0	5.14	3.35
HYDRAULICS AND PNEUMATICS		7.7%	.0%	.0%	.0%	.0%	.0%	.0%	80.0%	.0%	4	1
99.9999	1	0	0	0	0	0	0	0	0	0	0.00	0.00
PROGRAM NAME UNKNOWN		.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	.0%	0	0

STATE VOCATIONAL EDUCATION CONTINUING EDUCATION, JOB SATISFACTION, AND HOURLY WAGE SUMMARY

PROGRAM NUMBER AND NAME	SURVEYS RETURNED	CONT ED TOTAL	CONTINUING RELATED EDUCATION: 1-2 YR RELATED	2-4 YR COLLEGE RELATED	GRAD COLLEGE RELATED	TRADE SCHOOL	APPRENT PROGRAM	OTHER	JOB SATISFACT. RELATED	JOB SATISFACT. UN-RELATED	HOURLY WAGES RELATED	HOURLY WAGES UN-RELATED
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
******* STATE TOTALS ***	33,618	14,393	8,885	3,054	1,094	780	320	637	9,763	2,350	4.28	4.03
	42.8%	61.7%	34.4%	46.1%	8.8%	3.6%	7.2%	47.3%	25.9%	8.77%	6.702	

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