

1978

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Proposal for
Follow up Study of I. C. Norcom High School Graduates

by

Robert B. Shirk

in

partial fulfillment of the requirements for
ECIMI 535 Research Methods in Vocational Education

submitted to

Dr. David I. Joyner

December 6, 1977

Chapter 1

INTRODUCTION

The trade and industrial education program of machine technology was initiated at I. C. Norcom High School in Portsmouth, Virginia in September, 1972. This program is one of many offered at I. C. Norcom where the school aims and objectives were structured around comprehensive career education. That is, the student could exercise one of three options - intensive job preparation for entry into the world of work immediately upon leaving high school, preparation for post secondary education, or preparation for four years of college.

The aims and objectives of machine technology programs at I. C. Norcom were to provide the skills, knowledge and attitudes necessary for job entry level employment. To ensure program success and to provide the students with meaning full training, a method of simulated on-the-job training environment was implemented to meet the school and program aims and objectives.

THE PROBLEM AREA

There is currently a high rate of un-employment throughout the United States which is of great concern

to the national congress as well as national educators. Federal funds have been allocated nationwide to state and local school systems to train young people for employment. If these funds were used as they were intended then the unemployment rate should not be at it's present level.

To ensure the proper implementation of previous Vocational Education Acts, congress has passed The Educational Amendments of 1976. To qualify for federal funds these amendments require each state to develop a five year plan for Vocational Education. (The Education Amendments of 1976, Section 107 (a), (P.L. 94-482.)

To comply with the federal requirements for funding, the State of Virginia has directed local school systems to submit a local plan for the implementation of the 1976 Educational Amendments. (Virginia State Plan for Vocational Education: 1978-82, 1.6, 1.71.) The five year plan of the Portsmouth City Schools requires that each graduating student have an employable skill. (Five year plan, Portsmouth City Schools, 1976)

Statement of the Problem

This followup-study was conducted to determine the success of machine technology students at I. C. Norcom

High School in their attaining gainful employment relative to the machine technology occupations and/or closely allied occupations.

Importance of the Study

The need for program and teacher accountability is being emphasized for the justification of funds allocated to Vocational Education programs. This follow-up study is required to assess the accountability of the machine technology program.

Purpose of the Study

This follow-up study will analyze information received from selected sources to provide an insight into the success of the program's aims and objectives.

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RESEARCH QUESTIONS

This study sought to identify the accountability of the machine technology program at I. C. Norcom High School. The perceptions of the program graduates and their employers were utilized in this study. Three basic questions are the subject of this study:

1. What percentage of the program graduates are now employed in occupations relating to machine technology and/or allied occupations?

2. What is the quality of the machine technology program as observed by the graduates of the program for the attainment of employment.

3. What is the quality of the machine technology program for preparing it's graduates for employment as observed by the employers of the graduates.

ASSUMPTIONS

This study was based on the following assumptions:

1. That a large percentage of machine technology program graduates are now employed in occupations relating to machine technology and/or an allied occupations.

2. The program graduates have a knowledge of their training and had a willingness to respond to questions about their training.

3. Employers of the program graduates have observed and will attest to the competencies of the graduates.

4. There will be sufficient responses from the program graduates and their employers to validate the findings of this ^{study} survey.

LIMITATIONS OF THE STUDY

An analysis of the returned questionnaires revealed ambiguity in some of the items. Some of the graduates were not available to participate in the study due to their leaving the tidewater area.

DEFINITION OF SIGNIFICANT TERMS

To clarify the meaning of terms associated with this study, the following definitions are provided:

1. vocational education - training dealing specifically with occupational preparation not requiring a baccalaureate or higher degree.
2. trade and industrial education - a phase of vocational education that provides instruction in the development of basic manipulative skills, safety judgment, technical knowledge, and related industrial information for the purpose of fitting persons for useful employment in trades and industrial pursuits.
3. occupational education - specific training for careers below the professional level.
4. career education - a comprehensive educational program which prepares all students for a successful life work.
5. machine technology - the study of the theory

and skills related to the processes of shaping and changing the structure of materials using a variety of machine tools and allied equipment.

6. machine technology occupations - those occupations related to machine technology.

a. tool & die maker - the worker who has attained the highest skill in measuring and operation of machine tools.

b. machinist - a skilled worker who sets up and operates all machine tools used for shaping material according to blueprint specifications, with the use of precision measuring tools.

c. apprentice machinist - one who signs a contract to work for a specific period of time under the supervision of a machinist usually associated with some type of institutional training.

d. machine tool operator - a semi-skilled worker who is qualified to operate specific machine tools.

7. allied occupations - those occupations which require a knowledge of the methodology of machine technology.

a. outside machinist - one who disassembles machinery inspects and recommends repair procedures to the machinist.

b. estimators - one who estimates cost and time to complete a machining function.

c. quality control inspector - one who insures that the machined product is completed in accordance with blueprint specifications.

d. heat treater - one who changes the physical properties of a material after shaping, with the use of high temperatures.

8. on-the-job-training - that training a worker would receive working on different machine tools on several different jobs.

9. machine trades - encompasses the total occupations in the manufacturing and machine industries.

10. job entry level employment - employment based upon minimum skills, knowledge and attitudes required to gain employment in a specific occupation area.

PREVIEW

This study is presented in four chapters. Chapter 1 includes the introduction, statement of the problem, research questions, assumptions, sampling, limitations of the study, definition of significant terms and the preview. Chapter 2 contains a review of related literature. Chapter 3 delineates the methods and procedures of the investigation, the population and sampling used, development of the instrument and data collection and analysis.

Chapter 2

REVIEW OF LITERATURE

There are many reasons for the need of follow-up studies in vocational education programs such as to determine the effectiveness of services provided to students for job entry level employment. Annual surveys conducted by the George Gallup Organization for the past five years indicate clearly a widespread displeasure with public schools. The concept of tenure, the lack of results produced by new educational philosophies, and the costs of schooling are being attacked. The public is voting down more bond issues and cutting educational budgets. Moreover, many states are actively exploring ways to increase the accountability of teachers and administrators. Hirst and Childers: (1974:52.)

There exists a nationwide concern about accountability in vocational education programs. To ensure proper planning, implementation and accountability of these programs, current legislation on a national level has been enacted which affects these programs at all levels of their implementation. (Burkett:1975,9)

FEDERAL REQUIREMENT FOR
ACCOUNTABILITY IN VOCATIONAL EDUCATION

Although federal support for vocational education began with the Smith-Hughes Act of 1917, the Vocational Education Act of 1963 is the beginning point for the consideration of all recent federal efforts to expand and improve vocational education.

The purpose of the Educational Amendments of 1976 are to ensure compliance with the Vocational Education Act of 1963. The 1976 amendments also ensure compliance with new provisions which place the responsibility of planning and accountability upon the state and local school administration.

Reid (1976:33) gives a brief summary of the new legislation affecting administration which includes the following provisions:

1. A state agency designated by state law will be responsible for the administration of vocational education.
2. Administration costs at the state level are to be matched: 50 percent federal and 50 percent state.
3. Five-year plans as well as one-year operational plans will be required of each state.
4. State advisory councils as well as all educational and manpower delivery systems, business and industry, and

lay citizens are to be given the opportunity to contribute to state planning for vocational education. All interested parties must concur in the state plan.

5. Accountability reports will be required of each state annually.

Reid (1976:34) summarizes the new amendments of planning and evaluation by stating that:

1. The law mandates improved planning that will involve state, local and federal governments in the operation of extensive management information systems.

2. Provisions must be made for increased involvement of all interested parties in planning for vocational education at state and local levels.

3. Data management systems are to be established at state and national levels to assist in planning.

4. USOE evaluation of state performance required at five-year intervals.

5. Program evaluation is to be based on quality of instruction in terms of preparation for employment and placement in employment.

Federal legislation has been enacted to improve the quality of vocational education. This legislation places responsibility upon the state and local school administrators for the improvement of the quality of vocational education in their respective areas. Federal legislation requires program evaluation to be based upon

quality of instruction in terms of preparation for employment and placement in employment.

STATE PROVISIONS FOR ACCOUNTABILITY IN VOCATIONAL EDUCATION

To ensure compliance with the federal requirements the State of Virginia has developed the "Virginia State Plan for Vocational Education." This directive to the local school systems in the State of Virginia provides the local school systems with provisions to comply with the federal amendments.

The goals of the Virginia State Plan that are pertinent to this follow up study are as follows.

1. Consistent with their abilities, interest and educational needs;

1. Youth and adults will acquire the skills and knowledge needed for employment or self employment in occupations of their choice and for which there are employment opportunities.

2. Youth and adults will become aware of employment or self employment opportunities and requirements for use in making career choices and in determining their educational programs.

3. Youth and adults will exhibit pride in work well done; confidence in ability to perform in the

world of work, and develop leadership abilities, responsible citizenship, and a realistic self-image in relation to work in their chosen vocation.

4. Youth and adults will benefit from programs improved and updated through planning, evaluation, curriculum management, and develop personal preparation and development, research use of community resources and other ancillary activities.

(Virginia State Plan:1977)

The goals of the Virginia State Plan are congruent with the federal plan. The state plan directs local school systems to update and improve programs to provide skills and knowledge necessary for employment.

LOCAL PROVISIONS FOR ACCOUNTABILITY IN VOCATIONAL EDUCATION

In compliance with the Virginia State Plan, Portsmouth City School officials updated their "Five Year Plan For Program Improvement In Vocational Education For Portsmouth City Schools." This plan was distributed to all schools for implementation.

The goals of the Portsmouth Plan that are pertinent to this follow up study are:


1. Commensurate with their abilities, interests and ~~education~~ ^{educational} needs students enrolled in vocational education will, acquire the skills and knowledge

needed for employment in occupations of their choice and for which there are employment opportunities.

2. The objectives for accomplishing the goals are:

a. By June 30, 1980 at least 70% of the secondary students available for employment who complete occupational programs or leave school prior to completion with marketable skills will be employed in a field for which they are trained or in a related field as verified by annual ~~follow-up~~ ^{Follow-up} surveys.

b. By June 30 of each year through fiscal 1981 the Vocational Department will evaluate all Vocational and Technical programs in all schools.

(Portsmouth Plan:1976) 

The Portsmouth Plan puts into action the goals as outlined in the state plan. These goals include annual follow-up studies to evaluate occupational programs in terms of the percent of graduates employed in the field for which they were trained, or employment in a related field.

RESEARCH STUDIES RELATED TO FOLLOW UP STUDIES

Although no follow-up studies specifically identifying machine technology as the subject population could be found,

follow-up studies were found that relate to other areas of vocational education. Seven studies conducted during this period from 1967 to 1977 were selected as reference for this study. It is interesting to observe the close comparability of the objectives of these studies.

The most comprehensive research which has been accomplished on Vocational Education follow-up studies was conducted by the Virginia Department of Community Colleges, Richmond, Virginia, in 1973. (Williams and Snyder:1974, 40-43). The purpose of the study was to develop appropriate evaluation models for two year colleges. Of the 522 institutions that returned the questionnaire, 85 sent copies of follow-up study reports which were later analyzed for content emphasis. The following recommendations for improving follow-up studies appropriate to this study are:

1. Designers of follow-up studies should make use of consultants and texts on follow-up research as they plan their studies.
2. In planning follow-up research designers must give attention to identifying the population to be studied and selecting research samples.
3. Questionnaires should be designed carefully to elicit maximum student response.
4. Employers opinions of former students should be sought in evaluating employment outcomes of occupational

technical programs.

5. If follow^{up} research is to be credible and useful, researchers must provide careful descriptions of their research, including procedures, subjects and authorship.

6. If follow-up studies are to contribute to institutional evaluation and accountability, they must be designed to answer specific questions and the data must be interpreted for non-researchers at colleges and other interested agencies.

7. Educational goals must be clearly defined.

The Florida State University in cooperation with the Lewis M. Lively Area Vocational-Technical School undertook a study to develop a follow-up procedure in electrical and electronics programs. The objective was to use the follow-up information as a means of validating and improving the electronic and electricity curriculums. (Hunt: 1975, 28-29)

The follow-up ^{INSTRUMENTS} instruments were designed to compare the graduates and employers responses relating to ~~competencies skills and knowledge~~ the graduates gained from each of the courses. A six category rating scale was used on both graduate and employer questionnaires to evaluate the programs in terms of program preparation for employment and attitudes important to successful employment. Some observations concluded from this study are:

1. Instructors are receptive to follow-up efforts when they know the results will be used for accountability and not for the purpose of administrative manipulation or censorship.

2. Craft advisory committees are a good source of information in developing follow-up strategies, procedures and even instruments.

3. Use of the craft advisory committee is of value to the school's instructional program.

4. The process of follow-up conveys to the employer a seriousness of purpose on the part of the school.

Paul (1975) conducted a study in which he field tested procedures to collect follow-up data on former students of vocational education by use of questionnaires. The responses were analyzed using the chi square test of significance method. The follow up procedures were designed to facilitate the collection, analysis, and reporting of information on the post-schooling experiences of graduates of vocational programs.

The overall objectives of the follow-up procedures are as follows:

1. To provide information for product evaluation (e.g., percent of graduates placed on jobs, level of salaries and wages earned by graduates, percent who are satisfied on the job, etc.)

2. To provide some process evaluation information on training programs (e.g., how graduates rate their training programs and other school facilities, etc.)

3. To provide comparable information on graduates from various vocational and technical training programs within a state (private school, adult education, and academic education programs) ^{so as to set up norms against which future programs} can be evaluated.

4. To provide information on placement and geographic mobility trends for manpower planning purposes.

5. To provide placement, job satisfaction, and wage information to guidance personnel for counseling purposes.

6. To provide relevant information for accountability and for building up the image of vocational education in the community.

7. To provide information to fulfill placement related USOE reporting requirements by the states. (Paul:1975, 1)

Kruck (1975) conducted a study to determine the most effective data collection method by examining the rate and nature of responses and the cost of three methods; personal interview, mailed questionnaire, and telephone survey. From the evaluation of cost, data analysis, findings and interpretation, it was found that telephone surveys combined with mailed questionnaires elicited a higher and more critical response rate at less cost. For best results,

recommended basis procedures are; accurate identification of the student population, careful use of clerical personnel, and goal oriented instrumentation. (Kruck: 1975, 26)

Hurlock and Perry (1975) conducted a study to evaluate the Nursing Curriculum at the University of North Colorado School of Nursing. A questionnaire was sent to the 1972 and 1973 graduates. The questionnaire identified 58 role behaviors as outlined by the Department of Health, Education and Welfare. Graduates were asked to respond to each item regarding the 1) Extent of Use in Present Jobs, 2) Future Use Expectation, 3) Competency Now, and 4) Importance of This Area, using a scale of 1 (none) to 5 (very much). (Hurlock and Perry: 1975, 22)

The data provided a means for graduates to identify strengths and weaknesses in the program, and it provided data to expand the nursing curriculum. The faculty feel that graduate feedback is an essential component in the evaluation of a program, and that graduates are in a unique position to make suggestions about their educational programs since they are faced with the on going responsibilities and functions of nursing practitioners. (Hurlock and Perry: 1975, 24)

Gilli 1975 reports that several studies of the graduates of two-year technical programs in Pennsylvania have been conducted by the Department of Vocational Education

at Pennsylvania State University, for use in program assessment and improvement. These studies compared recent graduate response with those graduates randomly selected during a 17-year period by using a questionnaire. Comparisons of responses indicated areas of discrepancy in curriculum that need further study.

Follow-up studies can solicit and obtain data and information that could be used to improve the quality of teaching and policy decision making. Important data and information that can be obtained include the following:

1. Graduate's assessment of curricular relevancy and the overall value of their programs.
2. Employers job performance assessments.
3. Determination of dominant job activity characteristics.
4. Job satisfaction ratings of former students and graduates.
5. Continuing education characteristics of former students and graduates.
6. Determination of job-geographic mobility characteristics of graduates.
7. Determination of other demographic characteristics needed for long-term policy making. (Gilli: 1975, 807)

Reich (1973) conducted a survey of graduates from two different groups. One group consisted of educable mentally retarded students with I Q scores below 89 and

special two-year high schools for students of limited academic ability with I Q scores up to 106. The evaluation instrument was a set of questions answered by the sample in the presence of an interviewer. The questions were based upon the occupational classification of the U. S. Labor Departments Dictionary of Occupational Titles.

Of 813 employed students, 204 had not stayed in school long enough to specialize and 26 had given incomplete job information. Omitting these lowered the sample to 609. Questions were rated on a 9 point scale 8=no significant data skill required to 0=highest degree of data skill required. Data analysis was computed with the chi square test of significance method.

The author states two significant findings of his study:

Because of the variety of specific jobs for which different courses prepare students and the different ability that various students may demonstrate in learning the material in a course, it is impossible to classify courses according to the DOT skill dimension. ~~(H. L. L. 1973,~~

~~28)~~
The lack of a strong relationship between training and placement means that it is inappropriate to view vocational education as preparing these students for

particular jobs or even for particular clusters of jobs. (Reich: 1973, 287)

SUMMARY

This chapter has presented a review of the literature related to follow up studies in vocational education. On the basis that no follow up studies could be located that specifically studied machine technology programs, the seven follow up studies selected are considered applicable to this study.

The close comparison of the studies have produced the following conclusions:

1. Former graduates of the programs are the primary source of data.

2. Employers of the graduates provide an un-biased opinion for evaluating employment ^{preparation} of programs.

3. The most used survey instrument is the questionnaire.

4. The survey instrument must be goal oriented and designed to answer specific questions.

5. The chi square method of data analysis is the most common method to determine variation in ratings among respondents.

6. Follow-up studies is an effective method to evaluate vocational education programs for program and teacher accountability.

Chapter 3

METHODS AND PROCEDURES

Follow up studies are designed to evaluate the product of career-programs, the graduate. The primary goal of such education, the preparation of individuals for employment, can best be assessed by examining the placement records of graduates and gathering job performance data from employers. In addition, very important information regarding the strengths and weaknesses of a program may be gathered from the former students, who are in the best position to judge such characteristics. (Wentling and Lawson:1975, 124)

Program evaluation is to be based on quality of instruction in terms of preparation for employment and placement in employment. (The Educational Amendments: 1976)

POPULATION AND SAMPLING

The first population for this study was selected from the graduates of the I. C. Norcom Machine Technology programs for the graduating classes of 1973, 1974, 1975, 1976 and 1977. The students graduating during these years represent students this author trained since the conversion of I. C. Norcom High School to a philosophy of

comprehensive career education. A list of graduates were made available to this author for the survey by the Guidance Department at I. C. Norcom High School. Although the 1973 graduating class did not receive the minimum two years of training, their input into this survey is considered necessary for a valid follow-up study.

The second population for this study were the employers of the graduates who were employed in occupations relating to machine technology and/or allied occupations. The responses of the employers will be compared to the responses of the graduates to compare continuity of the responses.

The sampling size of the populations were determined by the number of respondees from each population. The comparison of responses from each population will provide input relative to the statement of the problem.

INSTRUMENT DEVELOPMENT

Hirst & Childers (1974) discusses a new concept in program and teacher accountability. A multi-state effort has been developed to meet these ends and is titled Vocational-Technical Education Consortium of States, (V-TECS). The State of Virginia is a member of this consortium.

V-TECS had and has as its primary goal the development of catalogs containing performance objectives and "criterion-referenced" measures in occupational education. (A "criterion-referenced measure is a rigorously tested exercise to determine whether or not a learner has accomplished a given objective.)

To develop performance objectives for students in an occupational program, a project in a state ~~program~~ ^{celebrate} surveys workers in the occupation and ^{with} their immediate supervisors. These individuals are assumed to be the best source of reliable descriptive information concerning the content and context of an occupation. From this survey a state obtains data on the tools and equipment used in the occupation, the tasks performed on the job, time spent on the tasks, the difficulty of the tasks, and some information about the job setting. The occupation is then analyzed so that performance objectives and criterion referenced measures of student learning can be developed. The objectives and measures are computerized according to a format common to all the states so that each catalog can be used by ~~each~~ ^{each} state. (Hirst and Childers: 1974, 54)

Research studies indicate a preference for the questionnaire as the instrument for data collection. The questionnaire form of instrument was used in this survey

with follow up contact by telephone when there was no response to the questionnaires with-in a three week period.

Two questionnaires were designed for input into the study. One questionnaire was designed for the program graduates, and the other questionnaire was designed for the employers ~~and~~ the graduates.

The graduate questionnaire was divided into the following headings:

1. Personal Data
2. Training at I. C. Norcom High School
3. Present Employment
4. Identifying competencies required for successful job entry employment in the machine trades.

The graduates employer questionnaire was divided into the following headings:

1. Student data
2. Evaluation of students present employment
3. Evaluation of student's training
4. Identifying competencies required for successful job entry employment in the machine trades.

Competencies required for successful job entry level employment was selected from the task list as listed in the V-TECS catalog. A maximum of 50 tasks was selected to prevent excessive time to complete the items, and the possible lack of respondee participation.

The 50 task items selected for the questionnaires are all representative of the aims and objectives of the machine technology curriculum that was taught at I. C. Norcom High School.

DATA COLLECTION

All questionnaires were mailed to each resposdee along with a cover letter and a stamped, self-addressed envelope for return to the author. The cover letter explained the reason for the follow-up study and how the responses were to be used. Telephone follow-up was initiated to those resposdees not responding within a three week period.

DATA ANALYSIS

The three research questions raised in Chapter 1 were as follows:

1. What percentage of the program graduates are now employed in occupations relating to machine technology and/or allied occupations?
2. What is the quality of the machine technology program as observed by the graduates of the programs for the attainment of employment?
3. What is the quality of the machine tech-

nology program for preparing it's graduates for employment as observed by the employers of the graduates?

In answering research question number one the percentage of those graduates now employed in occupations relating to machine technology and/or allied occupations were compared to the total number of graduates who completed the program.

Research question number two was answered by summarizing the answers on the graduate's questionnaire number (1) and tallying the responses to the (3) categories for each task as listed on the graduates questionnaire number (2).

Research question number three was answered by summarizing the answers on the employer's questionnaire number (1) and tallying the responses to the three categories for each task as listed on the employers questionnaire number (2).

To obtain a significant correlation between the answers of the two groups the tasks were ranked by groups, and the Spearman rho method to find the rank difference correlation coefficient was used.