DOCUMENT RESUME

ED 021 976 VT 003 548

By- Quirk, Cathleen, Ed; Sheehan, Carol, Ed.

RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION. (PROCEEDINGS OF A CONFERENCE, JUNE 10-11, 1966).

Wisconsin Univ., Madison. Center for Studies in Vocational and Technical Education.

Pub Date 67

Note- 287p.

Available from- The Center for Studies in Vocational and Technical Education, Social Science Building, University of Wisconsin, 1180 Observatory Drive, Madison. ($6.00)

EDRS Price MF-$1.25 HC Not Available from EDRS.

Descriptors- *CONFERENCES, CURRICULUM DEVELOPMENT, DISADVANTAGED GROUPS, DROPOUTS, *EDUCATIONAL RESEARCH, JOB PLACEMENT, OCCUPATIONAL CHOICE, OCCUPATIONAL CLUSTERS, PRETECHNOLOGY PROGRAMS, REHABILITATION, SCHOOL INDUSTRY RELATIONSHIP, SOCIOECONOMIC INFLUENCES, *TECHNICAL EDUCATION, *VOCATIONAL EDUCATION, VOCATIONAL INTERESTS

Selected high school, vocational school, community college, university, and industry personnel attended a conference to encourage research and dissemination of research findings in vocational and technical education. Studies reported are--(1) "Vocational Interests and Personality Patterns of High School Dropouts of High Ability," (2) "The Prediction of Outcomes of MDTA Programs," (3) "Retraining the Disadvantaged," (4) "General Vocational Skills and the Secondary Curriculum," (5) "The Cluster Concept," (6) "Job Placement and Employment Experience of Vocational Graduates," (7) "School and Community Factors in Placement of Vocational Graduates," (8) "Some Misconceptions about Occupational Choice," (9) "Rehabilitation and Training of School Dropouts," (10) "Job Stimulation as a Means of Encouraging Career Interests," (11) "A Study of Recommendations for Technical Education Curricula," (12) "When Should Vocational Training Begin?" (13) "An Exploratory Socio-Economic Study of Private Vocational Schools," (14) "Industry Participation in Local Vocational and Technical Education," (15) "Pre-Technology Programs in the San Francisco Bay Area," (16) "Common Elements in Paramedical Education," and (17) "Project FEAST: A Preparatory Program for Employment in Hotels and Restaurants." A report of participant discussion follows each major section. (DM)

Cd

RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION

Proceedings of a Conference

The University of Wisconsin
Center for Studies in Vocational and Technical Education
1967

RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION.

(Proceedings of a Conference, June 10-11, 1966).

EDITED BY CATHLEEN QUIRK AND CAROL SHEEHAN

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
OFFICE OF EDUCATION

The University of Wisconsin

Center for Studies in Vocational and Technical Education

1967

The Center for Studies in Vocational and Technical Education is affiliated with the Industrial Relations Research Institute, University of Wisconsin.

PREFACE

The conference on Research in Vocational and Technical Education, held at The University of Wisconsin, Madison, on June 10-11, 1966, was the third in a series of meetings sponsored by the Center for Studies in Vocational and Technical Education. These conferences have been designed to encourage research and the dissemination of research findings in the field of Vocational and Technical Education.

This conference concentrated upon reports and critical discussion of research and experimentation recently completed or near completion. A selected group of administrators and instructional staff members from high schools, vocational schools, and community colleges were invited to participate as Conference Fellows. The purpose of the conference was to provide opportunity for both research workers and practitioners to learn about the types of research activities and school experimentation that are in progress over the country and to know the findings or trends in research discovery.

The research and experimentation is wide-ranging in content, including studies of job counseling, occupational choice, job cluster concepts, curriculum innovations, cost-benefit analysis, and problems of disadvantaged groups. Research was reported by investigators from universities, foundations, government agencies, and private research organizations from various parts of the Nation.

It is the intention of the Center to use conferences and research seminars to bring research workers together in ways fruitful to the furtherance of their research interests in vocational and technical education, and to assist in making their work better known to those having administrative or instructional responsibilities in this field. The staff of the Center invites your suggestions about useful future topics for research seminars of conferences.

Conferences now scheduled include:

Curriculum Programs in Action: Their Administration and Evaluation. (In collaboration with San Francisco State College). San Francisco State College Campus, February 15-17, 1967.

The Encouragement of Cooperative Research in Vocational Education and Training by Predominantly Negro and Predominantly White Universities. Durham, North Carolina, February 23, 1967.

Education and Training of Racial Minorities. The Wisconsin Center, University of Wisconsin, Madison, May 10-11, 1967.

Research in Curriculum Development. (tentative) The Wisconsin Center, University of Wisconsin, Madison, August 14-18, 1967.

J. Kenneth Little
Gerald G. Somers
Co-Directors,
Center for Studies in
Vocational and Technical
Education

Madison, Wisconsin
February 1967

PARTICIPANTS

James W. Altman
Director, Institute for Performance Technology
American Institutes for Research

Joseph P. Arnold
Assistant Professor of Industrial Education
Purdue University

Louis F. Batmale
Coordinator, Technical-Terminal Education
City College of San Francisco

Samuel M. Burt
Managing Director
Education Council of the Graphic Arts Industry, Inc.

Glen G. Cain
Assistant Professor of Economics
The University of Wisconsin

Bartell W. Cardon
Assistant Professor of School Psychology
Pennsylvania State University

George Champion
Director, Center for Technological Education
San Francisco State College

Arthur J. Corazzini
Assistant Professor of Economics
Dartmouth College

Harold A. Edgerton
President
Performance Research, Inc.

Robert A. Ellis
Director, Center for Research in Occupation Planning
The University of Oregon

Max U. Eninger
Head, Educational Systems Research Institute, Inc.

Wesley J. Face
Co-Director, American Industry Project
Stout State University

Marvin J. Feldman
Program Associate
The Ford Foundation

William M. Fetterhoff
Assistant Professor of Education
Arizona State University

Nevin R. Frantz
Project Coordinator, Department of Industrial Education
The University of Maryland

W. Lee Hansen
Associate Professor of Economics and Education Policy
The University of Wisconsin

Victor O. Hornbostel
Associate Director, School Dropout Project
Oklahoma State University

Russell J. Hosler
Professor of Business and Curriculum, and Instruction
The University of Wisconsin

Loren A. Ihnen
Associate Professor of Economics
North Carolina State University at Raleigh

Jacob J. Kaufman
Director, Institute for Research on Human Resources
Pennsylvania State University

Harry V. Kincaid
Manager, Behavioral Sciences Research
Stanford Research Institute

John D. Krumboltz
Associate Professor of Education and Psychology
Stanford University

J. Kenneth Little
Co-Director, Center for Studies in Vocational and Technical Education
The University of Wisconsin

Donald E. Maurer
Coordinator, Trades and Industries
Southern Illinois University

Sylvia G. McCollum
Program Planning Officer, Division of Adult and Vocational Research
U.S. Office of Education

Graeme H. McKechnie
Project Associate
Center for Studies in Vocational and Technical Education
The University of Wisconsin

Bernard Michael
Program Evaluation Officer
Division of Vocational and Technical Education
U.S. Office of Education

William B. Micheels
President
Stout State University

Edward J. Morrison
Director, Vocational Research Program
American Institutes for Research

Jerome Moss, Jr.
Associate Professor of Industrial Education
The University of Minnesota

Philip A. Perrone
Associate Professor of Counseling and Behavioral Studies
The University of Wisconsin

Edward A. Podesta
Stanford Research Institute

Robert A. Ristau
Program Administrator, Vocational Education
Wisconsin State Department of Public Instruction

Howard Rosen
Assistant Director for Manpower Research
U.S. Department of Labor

T. Antoinette Ryan
Director, Research Coordinating Unit
Oregon State University

Harland E. Samson
Associate Professor of Curriculum and Instruction
The University of Wisconsin

Carl J. Schaefer
Chairman, Department of Vocational-Technical Education
Rutgers University

Laure M. Sharp
Senior Research Associate
Bureau of Social Science Research, Inc.

Gerald G. Somers
Co-Director, Center for Studies in Vocational and Technical Education
The University of Wisconsin

Ralph C. Wenrich
Professor of Vocational Education and Practical Arts
The University of Michigan

Richard W. Whinfield
Administrative Associate
Center for Studies in Vocational and Technical Education
The University of Wisconsin

CONTENTS

		Page
Preface		iii
I		
VOCATIONAL EDUCATION AND THE DISADVANTAGED		
Howard Rosen, Chairman		
Vocational Interests and Personality Patterns of School Dropouts of High Ability	Bartell W. Cardon	3
The Prediction of Outcomes of MDTA Programs	Harold A. Edgerton	17
Retraining the Disadvantaged	Glen G. Cain and Gerald G. Somers	27
Discussion:	Graeme H. McKechnie	45
	Laure M. Sharp	48
II		
JOB CLUSTERS AND GENERAL VOCATIONAL SKILLS		
J. Kenneth Little, Chairman		
General Vocational Skills and the Secondary Curriculum	Edward J. Morrison	57
The Cluster Concept	Nevin R. Frantz	83
Discussion:	Richard W. Whinfield	95
	Donald E. Maurer	95
	Wesley J. Face	98
III		
OCCUPATIONAL CHOICE, JOB PLACEMENT, AND EMPLOYMENT EXPERIENCE		
Max U. Eninger, Chairman		
Job Placement and Employment Experience of Vocational Graduates	Jacob J. Kaufman	105
School and Community Factors in Placement of Vocational Graduates	James W. Altman	113
Some Misconceptions About Occupational Choice	Robert A. Ellis	121
Discussion:	Sylvia McCollum	129
	Carl J. Schaefer	131

IV
EXPERIMENTS IN COUNSELING, CURRICULUM, AND TRAINING
William B. Micheels, Chairman

Rehabilitation and Training of School Dropouts — Victor O. Hornbostel — 135

Job Simulation as a Means of Encouraging Career Interests — John D. Krumboltz — 148

A Study of Recommendations for Technical Education Curricula — Joseph P. Arnold — 162

Discussion: — Philip A. Perrone — 174
T. Antoinette Ryan — 176

V
RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION
Ralph C. Wenrich, Dinner Speaker — 183

VI
SOME ECONOMIC CONSIDERATIONS IN VOCATIONAL EDUCATION PLANNING
W. Lee Hansen, Chairman

When Should Vocational Training Begin ? (A Cost-Benefit Analysis) — Arthur J. Corazzini — 193

An Exploratory Socio-Economic Study of Private Vocational Schools — Harry V. Kincaid — 202

Industry Participation in Local Vocational and Technical Education — Samuel M. Burt — 223

Discussion: — Bernard Michael — 235
Loren A. Ihnen — 237

VII
CURRICULUM DEVELOPMENTS IN VOCATIONAL EDUCATION PROGRAMS
J. Kenneth Little, Chairman

Pre-Technology Programs in the San Francisco Bay Area — George Champion — 243

Common Elements in Paramedical Education — W. M. Fetterhoff — 251

Project FEAST: A Preparatory Program for Employment in Hotels and Restaurants — Louis F. Batmale — 265

Discussion: — Robert A. Ristau — 276
Jerome Moss, Jr. — 279
Harland E. Samson — 282

I

VOCATIONAL EDUCATION AND THE DISADVANTAGED

VOCATIONAL INTERESTS AND PERSONALITY PATTERNS OF SCHCOL DROPOUTS OF HIGH ABILITY*

BARTELL W. CARDON, JR.
THE PENNSYLVANIA STATE UNIVERSITY

Much has been written about school dropouts. An article published in 1872 and entitled "The Early Withdrawal of Pupils from School: Its Cause and Its Remedies" was probably the first on this particular topic.[1] Since that time there has been a constantly increasing flow of reports. In fact, T. B. Blough, in his doctoral dissertation analyzing selected research literature on the dropout problem, listed nearly one thousand articles written between 1872 and 1956.[2] And there have been numerous additional reports since then. In the face of this formidable mountain of research, why another study of dropouts?

For years, and in spite of research findings (or perhaps because of them), the stereotype generally held of a dropout has been that of a nonwhite male of low intellectual ability who flunked out of school. He was further characterized as the product of a broken, lower-class home, and believed to be either emotionally disturbed or socially maladjusted. Research findings of the last few years have shed much light upon this misconception. It is now general knowledge among the well informed, for example, that dropouts vary widely in regard to such characteristics as intelligence, academic performance, race,. socio-economic status, and so forth. Awareness that such individual differences do exist leads naturally to investigations of dropouts grouped along various dimensions — no longer are dropouts to be studied as a group. Renewed interest in early school withdrawal is especially appropriate at present in light of changing educational goals and values, improved research techniques, and a society which is rapidly becoming more and more complex.

Surprisingly little research concern has been directed toward dropouts of high intellectual capacity. The Pennsylvania study of dropouts of high ability was designed to seek answers to a number

* The research reported herein was supported by a grant from the U.S. Office of Education, Department of Health, Education, and Welfare, under the auspices of Section 4 (c) of the Vocational Education Act of 1963.

1. W. T. Harris, "The Early Withdrawal of Pupils from School: Its Cause and Its Remedies," *J. Proc.* XII (National Education Association, 1872), pp. 260–73.

2. T. B. Blough, "A Critical Analysis of Selected Research Literature on the Problem of School Dropouts," unpublished doctoral disseration, University of Pittsburgh, 1956.

of questions related to this particular segment of the dropout population. Some of the questions asked were: Why do bright students leave school? How do these boys and girls differ with respect to personality and attitudes from students of equal ability who remain to graduate ("persisters")? What are the vocational interests and aspirations of high-ability dropouts and how do their interest patterns and aspirations differ from those of persisters? And, is the employment situation as bleak for the bright dropout as it is for dropouts in general? This paper is an attempt to present the highlights of the data obtained in the search for answers to these and other questions.

METHOD

Subjects

The subjects were 125 male and 81 female dropouts, and a like number of male and female persisters of comparable IQ, neighborhood, and grade at the time of withdrawal. The dropout sample was drawn from all Pennsylvania boys and girls known to have discontinued school before graduation during the 1964-65 school year. The persisters were selected by counselors and school psychologists located in the schools at which the dropouts had previously been enrolled.

The mean IQ of both the dropouts and the persisters was 115. The two groups did not differ significantly with regard to occupation of father, occupation of mother, educational attainment of father, and educational attainment of mother. The dropout group averaged approximately sixteen and a half years of age; the persisters averaged approximately nine months younger.

The bias of the dropout sample is unknown as a result of (1) the voluntary nature of involvement in the study, and (2) the less than proportional representation of males in the dropout population having been drafted into the armed forces. The possible biasing influences of these two factors must be kept in mind in the interpretation of the findings.

Procedure and Instruments

Originally, each Pennsylvania public and private school housing grades nine, ten, eleven, and twelve was contacted and requested to supply a list of dropouts meeting the criteria of IQ and year of withdrawal. Approximately 95 percent of the school responded and slightly more than 1,700 names were submitted. Of these, 55 percent were females. Fifty field representatives (counselors and school psychologists) spread across the state contacted, interviewed,

and tested the dropouts and persisters.

The instruments used were the High School Personality Questionnaire (HSPQ), the 1965 revision of the Minnesota Vocational Interest Inventory (MVII), the Student Information Blank (SIB) based on Project Talent items, and a battery of attitude scales specifically designed for the present investigation.

The interview was semi-structured and covered many areas, some of which overlapped the formal test material. It was anticipated that the interviews would provide a measure of intensity of feeling as well as a description of the circumstances leading to school withdrawal.

RESULTS

Personality

The HSPQ was used as the primary measure of personality. It is a self-rating questionnaire consisting of 142 multiple choice items, and measures 14 factors or independent dimensions of personality. One of the advantages of this instrument is that the responses are readily converted into profile form, such as those seen in Figure 1, which represent a comparison of the mean HSPQ profiles of the 125 male dropouts and the 125 male persisters. For purposes of plotting the profile, raw scores are converted to *stens*. Scores which are "normal" or "average" fall within the *sten* range from 5 to 6. Only as scores approach and extend beyond 4 and 7 are they considered to represent definite departures from the average. The factors have been ordered according to their contribution to a person's total behavior. Factor A, then, has a more pervading influence upon behavior than does Factor B. Factor B is more influential than Factor C, and so on.

The dropout and persister groups both scored above the mean on Factors A, B, and C. Factor A represents the aloof-sociable (Schizothymia-Cyclothymia) dimension. Individuals scoring high along this dimension would tend to be good-natured, not prone to sulk or cry, easy-going, interested in other people, warm-hearted, and cooperative.

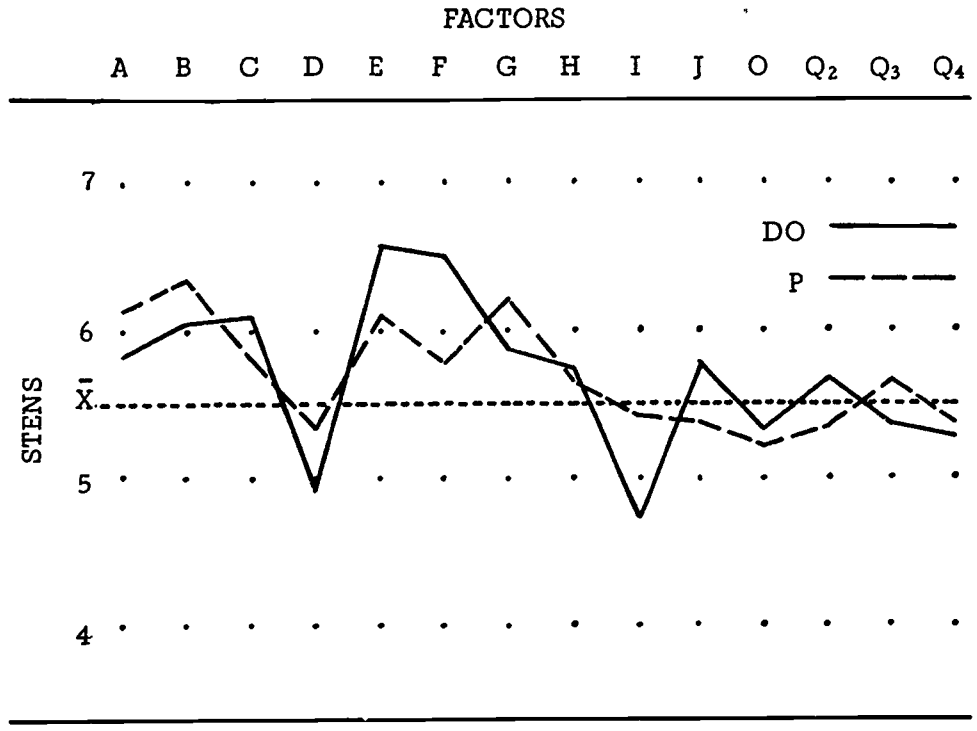
The primary purpose of Factor B is to provide a quick measure of general ability. The performance of both groups of subjects is in basic agreement with findings on the longer and more reliable measures of intelligence used for original selection purposes.

Factor C is the immature-mature (Ego weakness-Ego strength) dimension. High scores here are associated with emotional maturity, stability, adjustment to facts, and placidity.

Both dropouts and persisters scored below the mean on Factor D

FIGURE I

Mean HSPQ Profiles of 125 Male High School Dropouts and 125 Matched Male High School Persisters



(Phlegmatic–Excitability), suggesting that they tend to be constant, self-sufficient, and deliberate. Referring to the score of the male dropouts on this dimension, R. B. Cattell has suggested that "If anything . . . they would be a bit oversecure."[3]

Factors E and F are dispositional traits. Here are found the greatest discrepancies between the dropouts and persisters. The Submissiveness–Dominance dimension is measured by Factor E. The dropout boys are significantly more assertive, independent, unconventional, self-assured, rebellious, and competitive than are the persisters ($p < .05$). "Adventuresomeness" might best describe the dimension.

Factor F is the Desurgency–Surgency dimension. The dropout boys are significantly more cheerful, expressive, frank, happy-go-lucky, and talkative than are the persisters ($p < .01$). And, as a group, they would appear to espouse the "playboy philosophy." Cattell has suggested that this dimension is associated with home rearing practices. Individuals having a high F tend to come from

3. R. B. Cattell, personal communication, May 9, 1966.

homes characterized by permissiveness and nonchalance. It follows, then, that high F individuals would be expected to have had few serious restrictions placed upon them in early life.

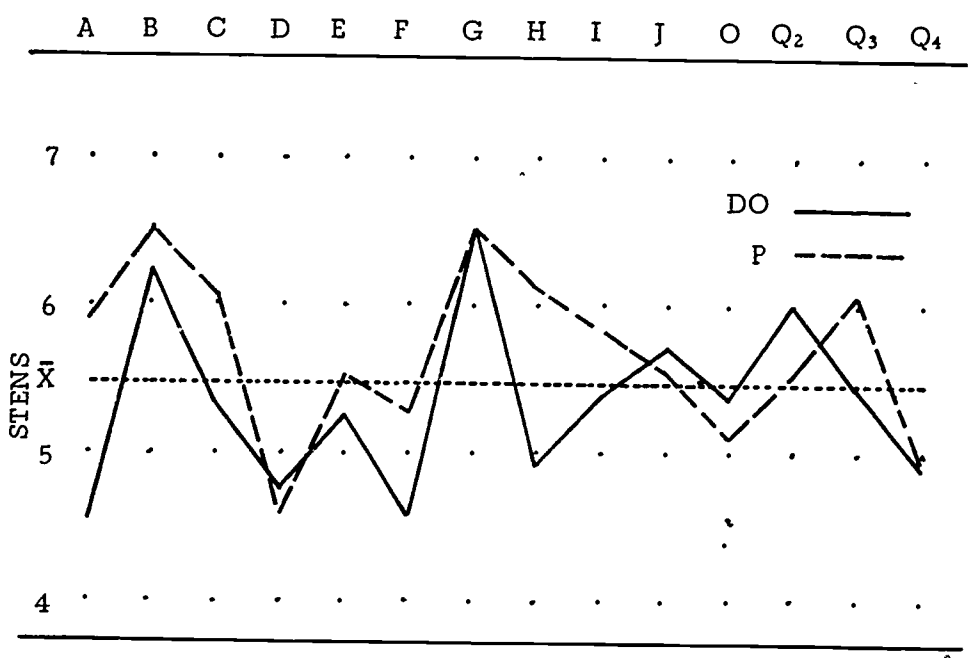
The only other difference which need be commented on is that found for Factor I (Realistic-Sensitive). This is the "tender vs. tough" or "soft-headed vs. hard-headed" dimension, especially as it relates to social attitudes. Individuals scoring low on I would be expected to have little aesthetic or dramatic inclination. The dropout boys are found to be more realistic, more prone to act on practical, logical evidence, and more self-reliant ($p < .01$). As in the case of Factor F, Factor I is also considered to be associated with environmental determinants. Low I tends to reflect a home not protective of or concerned with the child. This may partially explain why dropouts, when asked whom they most admired, responded less often with the names of family members (and particularly father) than did the persisters. The hypothesis that male dropouts of high ability tend to come from homes which are permissive and lack concern for the child warrants further investigation.

Looking at the over-all profile, then, the male dropout of high ability could be described in the following terms. He is a happy-go-lucky fellow who is interested in people. Although he tends to be easy-going, his actions are marked with deliberateness and his speech with frankness. It appears that his home, in comparison with that of the persister, is far more permissive and far less protective. His profile does not suggest disinterest in school and much that school represents, but it does indicate that the conforming nature of the school setting might create a stumbling block for him. Thus, his over-all response pattern indicates that he falls well within normal limits in regard to his mental health (neuroticism, anxiety, etc.). He is, from all indications, a fairly sound individual.

The female dropouts have been divided into two groups for comparative purposes: those who left school because of pregnancy and/or marriage (N = 55) and those leaving school for other reasons (N = 26). The girls withdrawing because of marriage (see Figure 2) differ significantly from the female persisters only on Factors A and H ($p < .001$). The dropout girls are far less socially oriented than are the persisters; they are less prone to seek social recognition. Also, they are more inclined to work alone, preferring things or words to people. Low A is generally associated, therefore, with poor social adjustment in junior and senior high school. The married dropouts are far more restrained and withdrawn than are the persisters. They tend to be less prone to seek out new and unknown social situations. These girls, then, could be described as tending to be shy and retiring; they are more introspective and less extroverted than the persisters.

FIGURE 2

Mean HSPQ Profiles of 55 Female High School Dropouts (Married) and 81 Matched Female High School Persisters



The girls dropping out of school for reasons other than marriage are compared with the male dropouts in Figure 3. What is noteworthy is the similarity between the two groups. The differences are slight and usually sex-appropriate. The description of the male dropouts would basically apply to the non-married female dropouts.

Attitudes

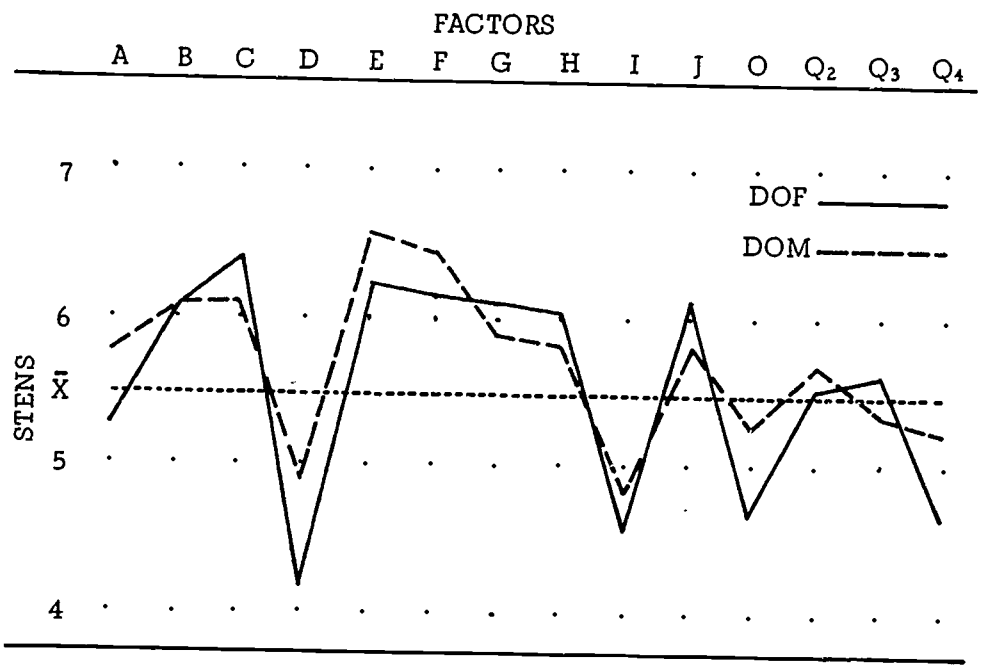
Personality is to a great extent reflected in attitudes. The attitudes toward school and related topics held by both dropouts and persisters were explored by means of a semi-structured interview, a written interview, and several attitude scales.

How did the male dropouts feel about school? Why did they leave? As might be expected, the dropouts, when compared with the persisters: did not like school ($p < .001$), considered it a bore ($p < .001$), and felt that school had little of value to offer them ($p < .001$). They expressed four major reasons for feeling as they did.

First of all, the dropouts felt that school didn't prepare them for the real world ($p < .001$). Although a large percentage of this group

FIGURE 3

Mean HSPQ Profiles of 125 Male High School Dropouts and 26 Non-married Female High School Dropouts



had been enrolled in vocational, as opposed to academic programs, there was general discontent with the particular vocational courses which were offered. Either the content was considered too basic or there wasn't sufficient variety of courses offered.

A second reason for not being content with school, related to the first, was the level of student involvement in the planning of curriculum. The dropout boys felt that they had too little say in the selection of the courses they were required to take. They often felt that course selection was in conflict with their own desires and best interests.

A third reason concerns teachers. There seems to have been an emotional gap between the dropout boys and their teachers. Teachers were considered to be cold ($p < .001$), and to lack understanding of students' needs ($p < .001$). And the single most often mentioned concern of the dropouts was that teachers play favorites ($p < .001$). According to Thomas, a boy with an IQ of 131:

> Most teachers have no time for you, even when you do come up with a bright idea. . . . When you try to be an individual, they think it's a big joke and they have a good laugh. Don't

> get me wrong, I'm not against teachers, it's just some of them are real idiots as far as human nature is concerned. Anybody can be educated, but if all you have is education and have no fun, forget it.

And Gary put it this way:

> In our school the teachers were very friendly with the students who belonged to the football or basketball team or who were on the honor roll. They didn't bother with the student who was too shy to openly discuss matters in class or who weren't popular and in all of the activities.

Or, as a third dropout put it:

> If the teachers would take a little more time and interest, and show the students that someone cares about them and how they are getting along, the students would try a lot harder and get better grades. Some people just don't have the ability, but many more have it and don't use it. What's the use of trying if no one notices or cares about your efforts? I know I never would have left school if my teachers and principal had listened to me and tried to understand why I found a subject so difficult. If they had helped me instead of lecturing, I would be a graduate today. I only had four weeks to go.

A fourth reason for withdrawal relates to an incompatibility of the dropout with the "system" or educational approach of the school. Several of the dropouts were able to verbalize this in very descriptive terms. The situation, as seen by Charles, is as follows:

> The present high school system is set up to accommodate the majority of the students. When your personality traits do not agree with this system, the best thing to do is leave and get your education your own way. This is what I am doing and the only thing I am sorry for is that I did not fit.

John, a boy with an IQ of 120, commented:

> Schools are run too much on a formal or military basis. . . . I could never relax in school and really talk with any teacher because of this tense uneasy feeling.

A variation of this theme, occurring time and time again, relates to conflict with the ultimate goals of the school. As William expressed it:

> My personal opinion is that schools are being run more like factories with the end product a person designed like the school thinks he should be. If a student doesn't match up to what the school wants, he is not given half the chance of a student who

is making the grades and is conforming.

Few of the male dropouts were openly critical of teachers and other school personnel as individuals. They were generally frank, however, in stating that the quality of instruction leaves much to be desired, that there is a serious lack of vocational training of the kinds best suited to meet their felt needs and interests, and that the communication between students and their teachers and counselors needs improvement. They often commented that they should have had a more active role in determining the coursework in which they were to be involved. And many expressed the concern that students are being pushed through school at a pace too rapid for their own good.

The attitudes of the girls who withdrew from school for reasons other than marriage were similar to those of the boys. They also said that they didn't like school ($p < .001$). They felt that school didn't prepare them for real life ($p < .01$), and that, consequently, there wasn't anything in school for them ($p < .001$). They apparently related to teachers in much the same way as did the boys, but their expressed dissatisfaction was less. Although they saw teachers as being cold ($p < .001$), they did not see them as being unfair nor as having favorites. The girls who left school for marriage also felt that school held nothing for them ($p < .001$), although they admitted to having enjoyed school. These girls appear not to have experienced the feelings of estrangement from teachers.

How did the dropouts feel about not having graduated? Many did not appear to be overly concerned. As John put it:

> I don't even think of it. I have a good job and I enjoy life more than some of my friends who did graduate. A diploma is a good thing to have I grant you, but I have had everything and earned it myself without one. Someday I shall get one just to ease my mind a bit and to please both parents.

Many of the girls who withdrew from school to marry expressed feelings not unlike those of Linda:

> It doesn't bother me at all. I'm happily married, and I have a darling baby boy. I think what I have now is much more rewarding than having a little piece of paper — a diploma.

On the other hand, several of the dropouts were very concerned. Ronald, who left because of failing grades, put it this way:

> I feel as though I have failed in more ways than one. I have failed myself, my teachers, my parents, everyone.

The majority, however, appeared to agree with Ruth, who said:

> I feel as though I have missed something. However, I do not

think dropping out is as great a tragedy as it is made out to be.

And, finally, how did the dropouts feel about finding work? Interestingly, they felt that finding work was not difficult. The persisters, however, were of the opinion that dropouts experience great difficulty in locating employment ($p < .001$).

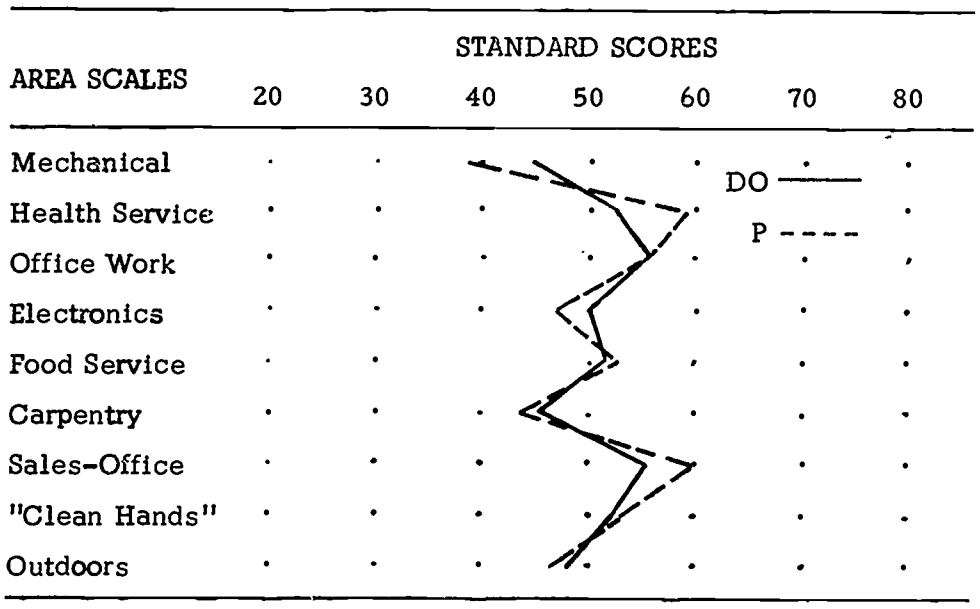
Vocational Interests

The 1965 revision of the MVII was used as the measure of vocational interests. On this inventory, interests are customarily reported in the form of 21 occupational scales and nine area scales. Comparisons between groups will be presented on the basis of the area data.

Figure 4 shows the mean MVII area scale scores for male dropouts

FIGURE 4

Mean MVII Standard Scores of 125 Male High School Dropouts and 125 Matched Male High School Persisters



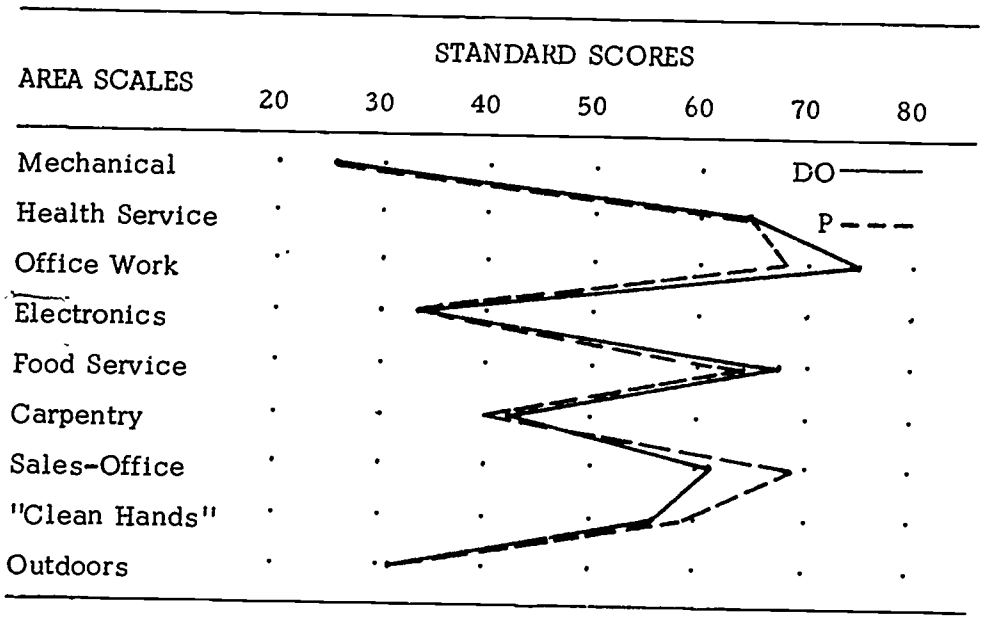
and persisters. These two groups differ significantly in three of the nine areas: mechanical, health services, and sales-office. The dropouts expressed greater interest in mechanical activities, such as machine operation and design, home repairs of mechanical and electronical gadgets, and so forth. The persisters, on the other

hand, demonstrated greater interest in medical-related activities, such as working in medical or chemical laboratories. They also expressed greater interest in sales-office activities. D. P. Campbell suggests that this scale might better be referred to as "Cultural-Aesthetic," for the items which form it deal with activities related to speaking and writing, art and music, and other socially accepted, "highly thought of" activities.[4]

Both the girls who left school because of marriage and the female persisters (see Figure 5) showed interest patterns which are low in

FIGURE 5

Mean MVII Standard Scores of 55 Married Female High School Dropouts and 81 Female High School Persisters



the more typically masculine areas (mechanics, electronics, carpentry, and outdoors activities), and high in the more feminine areas (office work, food service, and sales-office activities). Significant differences were found between the two groups in two areas. The married dropout girls were more interested in office work. These interests are related to such activities as clerical work, bookkeeping and accounting, and so forth. The persisters had a higher level of interest in the "Cultural-Aesthetic" area.

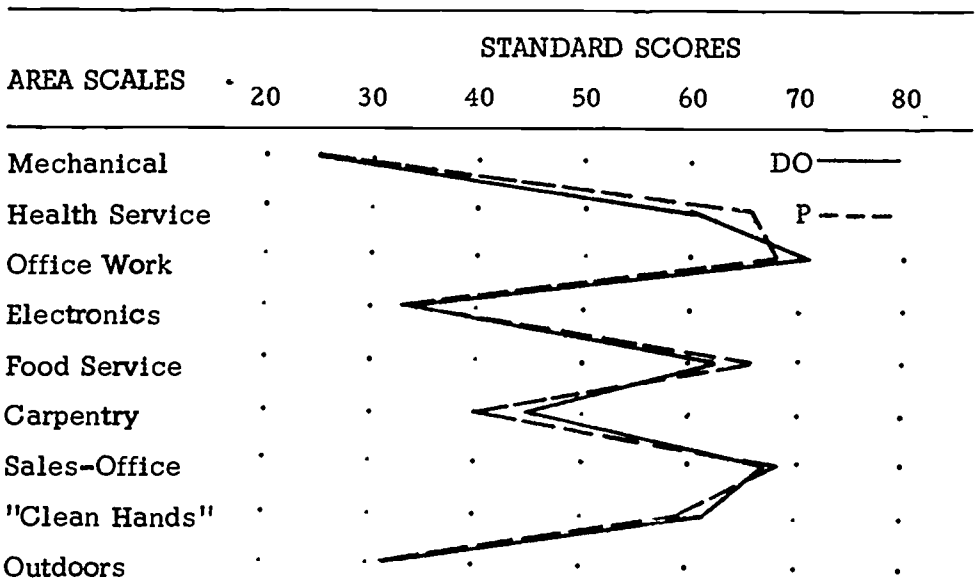
The persisters and non-married girls present interest patterns

4. D. P. Campbell, personal communication, May 27, 1966.

(see Figure 6) which are highly similar to that of the married female dropouts, and which do not differ significantly from each other. It is noteworthy that the non-married dropout girls were much more interested in "Cultural-Aesthetic" activities than were the married female dropouts.

FIGURE 6

Mean MVII Standard Scores of 26 Non-married Female High School Dropouts and 81 Female High School Persisters



Present Employment and Educational Status

What has happened to the dropouts? What have they been doing? Since leaving school a year ago, all but three of the boys have been employed at least once. Forty-one percent have gone into the labor market (as assembly mechanics, waiters, stock clerks, etc.); 51 percent have gone into the trades (as apprentices in carpentry, welding, shoe repair, etc.); and eight percent have gone into the professions (specialized sales work, program director for radio station, police force, etc.). The majority (62 percent) found employment within a week of leaving school; most (87 percent) had work within one month. The boys have averaged slightly more than two jobs each during the past year. The girls, in the main, have been more home-centered in their daily activities. Approximately one-third have worked outside of the home since leaving school.

One of the more encouraging findings of the study is found in Table 1, which presents current educational status. Of the 175

TABLE I

Present Educational Status of 175 Dropouts
One Year After Leaving School

Status	Boys	Girls	Total
Graduated	8	4	12
Equivalency diploma	16	16	32
Attending high school	0	3	3
Attending night school	21	11	32
Armed forces school	3	0	3
Police academy	1	0	1
Trade school	7	2	9
Beautician school	0	5	5
Correspondence courses	7	1	8
Plans for returning	21	21	42
No plans for returning	16	12	28
Totals	100	75	175

dropouts for which educational information was available, 25 percent have graduated or earned equivalency diplomas. Another 30 percent are presently enrolled in schools of one kind or another, many anticipating graduation in June 1966. Of the remaining 78 boys and girls, eight were taking correspondence courses, and 42 others expressed their intention to return for more training in the near future. Only 28 dropouts showed no interest in further education.

SUMMARY AND CONCLUSIONS

The dropout groups have been found to differ from the persister groups in a variety of ways and along several dimensions. At this point, it would appear as if these 206 dropouts of high ability have

fared far better than might have been anticipated. As far as basic personality is concerned, the dropouts do not present an unhappy picture; indeed, they appear to be rather sound individuals blessed (?) with a somewhat more adventuresome and individualistic spirit than the persisters. For some reason, possibly early home environment, the dropouts do not seem to form as close nor as warm a relationship with school personnel as do persisters.

What is to be done to increase the holding power of schools upon this particular segment of the dropout population? Preliminary analysis of attitudinal information suggests that teachers, school psychologists, counselors, and other school personnel are all in an especially critical position with regard to assisting the potential dropout in overcoming, or at least in living with, feelings of estrangement and discomfort within the school setting. A good starting point on the road to helping the potential dropout may well be an honest and penetrating appraisal of the basic complaints given by dropouts regarding school. We might ask such questions as: To what extent does favoritism exist in the classroom? Could students be more meaningfully involved in planning their own educational programs? And, how can the nonconforming student be helped to feel part of an educational system which must demand a relatively high degree of conformity to exist? Answers to these and related questions might well suggest that there is much more need for change in the educational "system" than in the attitudes of the dropouts.

THE PREDICTION OF OUTCOMES OF MDTA PROGRAMS

HAROLD A. EDGERTON

PERFORMANCE RESEARCH, Inc.

THE PROBLEM

In reviewing the various programs operating under the Manpower Development and Training Act (MDTA), we have heard many stories about why one or another program was having differing degrees and kinds of success. The success of such training programs as these may be expressed in many ways: by how they were liked, for example, or by the smoothness of their operations. We may even point to such factors as improvement in the attitude of trainees, or attainment of the cooperation of local industry. Yet the real success of the programs must be measured by what happens to the persons who are trained. And for this reason we must define "success" in terms of two basic questions:

(1) Of those who begin training, how many complete the course?
(2) To what extent are graduates placed in jobs for which their training fitted them?

One of the simpler and more direct methods of evaluating a program in terms of these criteria is the one we have employed in this study: to attempt to predict, statistically, the retention or dropout rate and the job placement rate of MDTA programs, using certain identifiable characteristics of the training programs and their participants as predictors.

If it is possible to predict on this basis either the percentage of trainees who will complete the program, or the percentage who will get jobs in the occupation for which they were trained, it may then be possible to improve both retention and placement in similar programs. Whenever the characteristics of either the program or the trainees are changed by some action of the program director, for example, corresponding changes may occur in the retention or placement rates of the program. If these changes could be predicted, the gains in trainee satisfaction, in training effectiveness, and in the amount of training per dollar could be considerable.

Although a number of studies have been made of the reasons for leaving school, almost all of these have involved public school dropouts. They have little to offer for such new training programs as those under the MDTA, because of differences in the age, experience, and motivation of students, and in the purpose and operation of the programs.

For the purposes of this study, two useful measures directly related to the problem were available through the follow-up data on MDTA programs which have been collected by the Office of Manpower Policy, Evaluation and Research (OMPER). First was the *retention criterion:* the percent of enrollees who completed the course; and second was the *placement criterion:* the percent of those completing the course who obtained a job for which the course trained them. It is doubtful that other criteria as simple and as valid could be devised. Both measures reflect important evidences of program effectiveness, and both were available for each of the 312 MDTA program sections included in the sample.

THE SAMPLE

Since MDTA is growing and changing, it was necessary to draw data from programs as recent as possible, and from as narrow a time-span as possible. The following limitations were therefore adopted:

(1) To use only MDTA programs approved during fiscal year 1964. (At the time this study was initiated these were the most recent programs for which OMPER had follow-up data.)
(2) To include only MDTA programs for which OMPER had follow-up data.
(3) To include institutional programs, but not "on-the-job" programs.
(4) To exclude refresher training programs (e.g., nursing).

In addition, to facilitate both communications with program directors and handling of the data, it seemed advisable to concentrate on a few geographic locations. The programs selected were in the following metropolitan areas: Boston, Chicago, Detroit, Los Angeles, New York City, and San Francisco. These contained the largest numbers of programs meeting the above restrictions. In addition, OMPER had received complete follow-up data for 312 program sections in these areas.

DATA COLLECTION

Data for the study were derived from two sources: from the follow-up data obtained and organized by OMPER for each MDTA program, and from a questionnaire answered by program directors. Follow-up data which had been reported to OMPER by the program directors was made available by the Division of Statistical Studies and Systems of the Office of Manpower Evaluation. In addition to providing retention and placement criteria, the data were descriptive

of the training group in each program section.

In developing the questionnaire for program directors, we first made a list of all of the information which seemed to have any relation to either of the two criteria. This list was shortened by eliminating the items of information already available from OMPER records, and by dropping those items which we would not be likely to find available, and those questions which would require considerable effort for the program director to answer. The final form of the questionnaire contained 22 questions.

Questionnaires were mailed to the directors of all 312 MDTA program sections in the sample. One follow-up letter was mailed six weeks later. Considering the fact that the questionnaires were addressed by title and not by name, the response (of 222 sections, or 71 percent) was unusually good by survey standards. In any event, the basic analysis for this study relates to the 222 sections which responded. Our efforts to avoid duplication of available data, and to include only those questions which were readily answerable may have played some part in this.

STATISTICAL EVIDENCE

The statistical evidence produced for the study is of two kinds: (1) correlations of each of the 93 independent variables (from the questionnaire and from the OMPER files) with the retention and placement criteria; and (2) the combination of independent or predictor variables to produce the best possible prediction of each criterion.

Table 1 shows the correlation of each of the variables obtained from the MDTA director questionnaire with each criterion. To help in reading the table, every coefficient which differs significantly from zero is identified. For these variables, 21 have been starred for their significant correlations with percent retention, and 12 for their significant correlation with percent placement. It will be noted that the average percent retention of the 222 MDTA program sections encompassed by the study is 83.5, and, for those completing the course, the average percent placement is 76.2. For the entire 312 sections the average values are 83.2 and 75.1 percent respectively.

What we learn from Table 1 is that the application of simple, sound, common sense, educational principles is borne out by the statistical evidence. The important — even startling — thing is the ease with which such principles may be overlooked.

The correlations in Table 2 show that factors of ability, previous history, and socio-economic status are related to both retention and placement. In addition, the correlations permit us to assume that

TABLE I

Correlations of Questionnaire Responses
With Retention and Placement

(N = 222 Sections of MDTA Programs)

Variables: Directors' Questionnaire	Correlations With % Retention	% Placement
1. How were the trainees selected for this course?		
1.1 all selection was done by the State Employment Service	-.02	-.06
1.2 had no marketable skill	-.13*	-.07
1.3 had no employment except casual labor	-.10	.03
1.4 victims of automation	.01	.01
1.5 physically handicapped	-.04	-.07
1.6 needed upgrading to meet employer needs	.00	.07
1.7 had no employment for preceding 3 months	-.18**	-.08
1.8 high school graduate	.03	.06
2. Aptitude and ability tests were		
2.1 used to improve the selection of trainees	-.09	.08
2.2 used to aid in placement in the proper classes	-.11	.08
2.3 used to help in counseling of trainees	-.12	-.04
2.4 used as a part of the program evaluation procedure	.03	.08
2.5 not used	-.05	-.27**
3. (Pertains to the course as it relates to trainees)		
3 answers (replies to questions 1-5)	-.12	-.13*
3 others (written in by MDTA respondees)	-.16*	-.18**
3 NA (no answer)	.22**	.23**
4. The course organization and content		
4.1 were the instructor's responsibility	-.17**	.01
4.2 were carefully planned before the course started	.01	.09
4.3 followed one given in high schools in the area	-.09	.10
5. (Pertains to instructor to trainee ratio)	-.21**	-.09
6. (Pertains to attendance for entire course)	-.35**	.09
7. (Pertains to subsistence allowance for trainees)	-.07	-.01

8. Discipline among trainees		
8.1 was a serious problem	-.08	-.17*
8.2 required careful watching, but little action	-.18**	.03
8.3 was not a major problem	.23**	.10
8.4 rarely came to the director's attention	.16*	.00
9. (Pertains to condition of training room)		
9.9 adequate	.02	.06
9 other (replies written in by MDTA respondees)	.01	.01
10. (Pertains to convenience of transportation; i.e., time needed)	-.09	.03
11. (Pertains to time demands of the course)		
11.9 the time demands were reasonable	-.06	.18**
11 other (responses written in by MDTA respondees)	-.06	-.04
12. What kind of objections were made by the neighbors about having a training program in the neighborhood?		
12.6 no objections were raised	.23**	.18**
12.7 the program was welcomed	-.17**	-.01
12 other (responses written in by MDTA respondees)	-.02	.00
13. What was the condition of the equipment available for the training?		
13.5 adequate supply and maintenance of equipment	.06	.09
13 other (response written in by MDTA respondees)	.08	.01
13 NA (no answer)	-.06	-.17**
14. Were the financial allowances given to the trainees		
14.1 inadequate for transportation	-.22**	-.12
14.2 inadequate for subsistence	-.08	-.05
14 NA	.18**	.08
15. What were the qualifications of the instructor for teaching this course?		
15.1 experience as a worker but not as a teacher	.00	.13*
15.2 experience as a teacher but not as a worker	-.10	-.06
15.3 experience both as a teacher and a worker	-.10	.03
15.4 had to have a teacher's certificate or license	.00	-.12
15.5 no previous experience either as a teacher or as a worker	.00	.00

16. How was the teaching performance of the instructor judged?		
16.1 by direct observation by program director	.03	.10
16.2 by reports from trainees in the class	.01	-.12
16.3 by amount learned by trainees	-.06	.05
16.4 by the instructor's reports on the performance of his class	.02	-.04
16.5 by other methods	-.08	-.15*
16.6 no assessment of the instructor's performance was made	.00	.00
17. What was the average reading skill level of the trainees?	-.12	.10

* Significant at the 5% level
** Significant at the 1% level

the sample of 222 programs for which questionnaire responses were obtained is quite similar to the larger sample of 312 programs.

Table 3 shows how the prediction of retention can be accomplished. The predictors were selected in the order of their net contribution to the prediction. An iterative test selection program quite similar to Wherry-Doolittle was used, and a substantial multiple correlation coefficient was obtained.

The data offering maximum prediction of percent placement are shown in Table 4. Prediction of placement (.511) is lower, however, than prediction of retention (.719), perhaps because many factors affecting placement are outside the scope of the training program and its operation.

A SUMMARY

Both retention and placement show enough correlation with characteristics of program organization and program management so that efforts to improve the standing of an MDTA program in terms of either its retention or its placement should be fruitful. While there is no difficulty in understanding why the selected factors correlate with retention and placement rates, the real problem is that of making the programs fit the trainees rather than trying to select trainees to fit the training.

If trainees were selected to show a high retention rate, they would have education at the twelfth-grade level or higher, would not be receiving public assistance, would have marketable skills, and would have been employed within the three months preceding the

TABLE 2

Correlations of Data of Record (OMAT)
With Retention and Placement

Variables: OMAT follow-up data	N = 312 Sections of MDTA Programs Correlations With % Retention	N = 312 Sections of MDTA Programs Correlations With % Placement	N = 222 Sections of MDTA Programs Correlations With % Retention	N = 222 Sections of MDTA Programs Correlations With % Placement	Mean Value
% Female	.05	-.13*	.01	-.19**	43.9
% Head of household	-.05	.11*	.00	.14*	58.5
% Education 12th grade or more	.11*	.18**	.14*	.19**	61.1
% Education 8th grade or less	-.06	-.12*	.06	-.10	6.7
% Gainful employment 3 years or less	.08	.00	.04	.02	21.4
% Gainful employment 10 years or more	.06	.05	.10	.07	30.4
% Having no dependents	.08	-.05	.02	-.06	38.5
% Primary wage earner	-.04	.06	.01	.11	69.7
% Eligible for allowance	.01	-.07	.01	-.08	95.2
% Unemployment claimant	-.03	.07	.03	.10	25.6
% Receiving public assistance	-.14*	-.18**	-.15*	-.19**	9.6
% Prior employment 14 weeks or less	-.03	-.02	-.04	-.02	41.1
% Prior employment 52 weeks or more	-.02	-.12*	-.03	-.15*	16.2
% Male veteran	-.05	.04	-.01	.08	18.3
% Handicapped	-.06	-.08	-.03	-.05	3.6
% White	.09	.11*	.02	.16*	69.9
% 21 or younger	.03	.07	.00	.07	20.5
Number in section	-.28**	-.06	-.28**	-.11	25
Length of Training	---	---	-.32**	.15*	19.9 weeks
Occupational rating	---	---	-.15*	.22**	2.5

* Significant at the 5% level
** Significant at the 1% level

TABLE 3

Data Offering Maximum Prediction of Percent of Retention of Trainees

(N = 222 Sections of MDTA Programs)

	Predictor Variables	r	W	R
6.	Absenteeism	-.354	- 6.77	.354
	Duration of programs	-.315	- .43	.437
12.6	Neighbors had no objections to programs	.226	12.29	.507
19.5	No counseling program	-.227	-27.41	.541
	Number of trainees per section	-.278	- 2.74	.575
19.4	Counseling done by instructor in class	.187	14.06	.595
10.	Convenience of transportation	-.089	4.92	.620
18.5	Had no estimate of average IQ of class	-.137	- 5.31	.637
	% Had education of 12th grade or higher	.139	2.90	.656
5.	Trainee: instructor ratio	-.210	- 6.17	.674
15.3	Instructors had experience both as teacher and worker	-.095	- 8.96	.684
	% Had been gainfully employed 10 or more years	.104	3.20	.698
	% 21 years of age or younger	-.003	2.24	.710
16.3	Used amount learned to evaluate instruction	-.063	- 6.45	.719

TABLE 4

Data Offering Maximum Prediction of Percent of Placement of Trainees

(N = 222 Sections of MDTA Programs)

	Predictor Variables	r	W	R
2.5	Aptitude tests not used	-.271	-17.95	.271
3	NA (no answers regarding course as it relates to trainees)	.234	10.62	.352
6	Absenteeism	-.093	4.53	.395
	% Education 12th grade or higher	.195	2.87	.438
	% Female	-.195	- 1.20	.495
	% White	.157	1.18	.511

training program. These are not the people for whom the MDTA programs were primarily designed. On the contrary, the programs were designed to train those with inadequate education, who are on public assistance, who lack marketable skills, and who have a record of unemployment.

This being so, the appropriateness or suitability of the program, both in structure and in execution, becomes paramount. It follows that if one wants to improve retention or raise the percent who are placed in jobs, it is a good idea to review the data relating to program organization and program management. (While many items of these data do show significant correlation with either retention or placement, the study does not demonstrate that these are causes; however, it should be noted that the data of this study are consistent with the judgments and experiences of many educators.) To improve the retention or to minimize dropouts in an MDTA program, the "significant variables" indicate that certain actions (outlined below) might be taken. Those steps showing the highest relationship to retention appear first, and those with less, but still significant, relationship follow. The program characteristics showing significant relationship to both retention and placement are starred.

(1) Reduce absenteeism. There is no one best way to improve attendance; but an improvement results from recognition for good attendance, a program of home calls on those absent for three or more consecutive days, and an emphasis on the necessity of regular attendance for effective training.

(2) Keep the number of trainees per instructor low. MDTA trainees need the benefit of individualized instruction, and recognition of their individual achievements.

(3) *Promote a sensible counseling program for the trainees, taking special advantage of the instructor in his classroom relationship to the trainees. Making counseling seem artificial is almost as ineffective as no counseling.

(4) *Take measures before the program starts to insure that the neighbors of the training program do not object to its presence. This is an important initial step.

(5) *Anticipate and prevent disciplinary problems. Programs in which discipline is not a major problem and rarely comes to the director's attention have better retention than those in which discipline requires careful watching.

(6) Measure trainee progress carefully, and not by instructors' over-all judgments, or other expedients.

(7) *Adjust the training to the level and energies of the trainees. In MDTA programs, the training must fit the trainee, rather than the converse.

(8) Pre-plan course organization and content. This important task should not be left to the instructor, who is not equipped for it.

(9) Take care to see that the trainees' financial allowances are adequate.

(10) While the IQ level of trainees is negatively related to retention, lack of any such estimate of learning ability suggests lack of realism in program planning and execution.

On the same basis, placement of "graduates" might be enhanced by the following steps:

(1) Make use of aptitude tests as aids in assignment and in performance evaluation. Having pertinent information about the talents of trainees enables the director and his staff to make the training more effective.

(2) *Take care to see that the difficulty level and amount of work undertaken are appropriate to the trainees. Be sure that the time demands on trainees are reasonable. Training must fit the trainees as they are. When this does not happen, the trainees feel that the program is just another chapter in the same old story of being up against an educational task that promises only failure.

RETRAINING THE DISADVANTAGED WORKER*

GLEN CAIN AND GERALD SOMERS
THE UNIVERSITY OF WISCONSIN

GENERAL DISCUSSION

In the last two or three years there has been a noticeable change in the emphasis of the federal retraining programs toward aiding, not just the unemployed, but the specially disadvantaged among the unemployed, and others with low income. Two developments are primarily responsible for this change: (1) the conscious effort of public policy to seek out the hard-core unemployed and the poverty groups and to find ways of enabling them to become self-supporting; and (2) the sustained high-level performance of the economy, which has been generating jobs for the ablest among the unemployed, leaving the most disadvantaged — somewhat by default — to fill the openings in our expanding training programs.

The numerous programs of the war on poverty are, of course, the most obvious illustration of the new emphasis. Another example is found in the composition of trainees enrolled in the recent experimental and demonstration programs sponsored under the Manpower Development and Training Act (MDTA). The proportions of trainees in these programs — made up of young workers (under 25), the less educated, and non-white workers — are relatively high compared with the initial enrollments in regular MDTA courses.[1] In addition, an increasing number of communities are establishing retraining programs for welfare recipients. Moreover, the Manpower Administrator has announced that a substantially larger proportion of the total MDTA training budget — perhaps as much as 65 percent — will be concentrated on the disadvantaged in coming years.

Only a modest amount of research has been directed toward a thorough evaluation of the earlier training programs—programs administered for the most part under the Area Redevelopment Act and the MDTA.[2] Completed and published evaluations of the newer

* This paper stems from a larger research project supported by the Ford Foundation for an evaluation of retraining programs for the unemployed. We are grateful for the able research assistance of Leonard Hausman, Winston Tillery, Graeme McKechnie, and Michael Rich.

1 U.S. Department of Labor, *Report of the Secretary of Labor on Manpower Research and Training Under the Manpower Development and Training Act of 1962* (Washington, 1966), pp. 11–15; 35–44.

2 See Gerald G. Somers, ed., *Retraining the Unemployed* (to be published by the University of Wisconsin Press), especially the chapters by H. A. Gibbard and G. G. Somers, and Glen Cain and Ernst Stromsdorfer. See also Gerald G. Somers and Ernst Stromsdorfer,

programs for the disadvantaged are very rare. When reports on the demonstration training projects are forthcoming, they are usually very general, providing only limited data on the job placement and earnings of trainees. These evaluations have not included comparisons with control groups in order to isolate the effects of training. Similarly, such controlled comparisons have been lacking in the only evaluative data presented by the Department of Labor concerning disadvantaged workers in regular MDTA institutional programs.[3]

The general MDTA data shown in Table 1 indicate that those in the least advantageous categories of age, education, previous unemployment, and race had lower post-training employment ratios than trainees with more favorable labor market characteristics. This was true in both 1964 and 1965. The most disheartening finding in this comparison, however, is that, in spite of the improvement in national employment between 1964 and 1965, the employment ratio of the disadvantaged trainees actually suffered a slight decline. Whereas the percentage improvement in the employment position of disadvantaged workers can usually be expected to increase more than average in a national employment expansion, this was not true amond the disadvantaged MDTA trainees relative to other trainees. The sharp decline in the employment position of non-white trainees is especially discouraging. It seems clear that, at the 1965 stage of the employment expansion, employers were still able to by-pass many of the disadvantaged trainees.

The picture is much less disappointing, however, if one compares the post-training and pre-training experience of the disadvantaged, or if one compares the labor market experience of disadvantaged trainees with that of disadvantaged non-trainees. Government agencies have now performed the first comparison, but it is necessary to fall back on our own studies (with their limitations of sample size and data acquisition) for controlled comparison of the second type.

A special study reported by MDTA of a sample of trainees finds that employment rates, job retention, and earnings are all lower for Negro trainees. At the time of the follow-up interviews, only 61 percent of the Negroes had jobs, compared with 77 percent of the other trainees. Negro trainees earned $11 per week less than others, largely in low-paying service occupations. However, when viewed from another vantage point, there is evidence of *greater*

"A Benefit-Cost Analysis of Manpower Retraining," *Proceedings of the Industrial Relations Research Association, December 1964;* Michael E. Borus, "The Economic Effectiveness of Retraining the Unemployed," Yale Economic Essays (1964); David A. Page, "Retraining under the Manpower Development Act: A Cost-Benefit Analysis," Studies of Government Finance, Reprint 86 (Brookings Institution, 1964); and the article by A. J. Corazzini in this volume.

3 *Report of the Secretary of Labor . . . , op. cit.*, pp. 53–58.

TABLE I

Employment Experience of Persons Completing MDTA Institutional Training, by Age, Education, Race, and Duration of Unemployment, 1964, 1965

Characteristic	Percent Employed	
	1965	1964
Total	71.3%	71.7%
Age:		
under 22 years	69.8	71.0
22 to 44 years	73.5	72.2
45 years and over	66.8	66.9
Education:		
under 8th grade	67.9	68.2
8th grade	67.8	69.6
9th to 11th grade	69.2	71.0
12th grade and over	73.6	72.5
Duration of unemployment prior to training:		
under 5 weeks	82.5	76.0
5 to 14 weeks	78.0	73.7
15 to 26 weeks	75.4	69.5
27 to 52 weeks	67.8	66.0
over 52 weeks	57.1	64.2
Non-whites	63.2	70.1

Source: *Manpower Research and Training*, Report of the Secretary of Labor, March 1965; *1966 Report of the Secretary of Labor.*

benefits accruing to Negro retraining, as compared with that of whites. The post-training weekly earnings of Negroes were, on the average, $13 higher than their earnings on pre-training jobs, whereas for whites the differential between post-training and pre-training earnings was only $4 per week.[4]

A similar picture is presented in a study just released on "The Training of Public Assistance Recipients Under MDTA."[5] The employment rate of 14,000 public assistance trainees who had completed MDTA institutional programs through October 1964 was 64 percent — significantly lower than the 75 percent rate for all MDTA trainees. The median hourly post-training earnings of the former

4 *Ibid.*, pp. 55–56.

5 U.S. Department of Labor, *Manpower Evaluation Report No. 6* (Washington, April 1966).

welfare recipients were $1.60, as compared with $1.66 for all MDTA trainees. In view of the fact that almost half of the welfare trainees were non-white and represented the most disadvantaged among the unemployed prior to their training, these post-training employment and earnings results are encouraging; but the absence of a more carefully controlled comparison still leaves important evaluative questions unanswered.

A number of reports on demonstration projects are even more general in their follow-up evaluations. They customarily show an improvement in education levels, skills, and/or attitudes — pointing toward potential economic benefits — but they seldom provide details on post-training employment and earnings.[6]

EVALUATION PROCEDURES

One question concerning evaluation is whether the new programs aimed at the hard-core, disadvantaged groups may be analyzed with the same benefit-cost procedures as those applied to the regular MDTA programs. Our answer is "yes," but with some important qualifications. In the remainder of this section we will make some over-all comments about the techniques of evaluating the newer training programs, and then in the second section of the paper we will apply these ideas to two cases that we have studied.

Economic analyses of retraining programs have commonly used a cost-benefit approach: the program is viewed as an investment that requires resource costs and that, hopefully, yields subsequent benefits. Sometimes a simple summary measure, like a rate of return or capital value, can be computed and used for making comparisons with alternative programs. This general framework remains appropriate for the recent retraining programs, but using it is almost sure to be more difficult.

The first difficulty encountered is that the nature of the benefits accruing from the newer programs is likely to be more complex. For example, the improvement in employment and earnings derived from a course in welding was an acceptable measure of the benefits to an unemployed ex-coalminer; but this emphasis on the labor market may be too narrow for evaluating, say, a literacy course given to someone on the welfare rolls. It is not too far-fetched to consider reductions in crime rates and rates of family break-ups, or improvements in mental health, as potential outcomes of a successful program of retraining the disadvantaged groups.

6 See, for example, U.S. Department of Health, Education, and Welfare, *Training the Hard-Core Unemployed: A Demonstration Research Project at Virginia State College, Norfolk Division* (Washington, 1964); and, U.S. Department of Labor (OMPER), *No Longer Superfluous: The Educational Rehabilitation of the Hard-Core Unemployed* (Washington, June 1965).

To the extent that we use the customary measures of changes in employment and earnings, we should not be surprised at low performance scores — perhaps much lower than those achieved by previous programs. Indeed, it was probably never correct to point to absolute employment or placement rates among the trainees as indicators of the success of the program, even though this appeared to be the primary criterion established by Congress. The critical issue is how the trainees fared compared to what their experience would have been without the training. Even by this standard, however, the new programs aimed at the hard-core and poverty groups may well have a lower success score in terms of labor market performance than the earlier programs.

The task of making the "what-is" and the "what-would-have-been" comparison is, of course, the major hurdle in all cost-benefit studies of retraining programs. The third general comment about evaluating the newer programs is that the data problems are likely to be acute — specifically, selecting study groups and control groups and obtaining sufficient and accurate information about them over a period of time.

To strike a more positive note, we suggest that often the costs of the retraining programs are low enough so that relatively moderate improvement in the trainee's labor market performance alone is all that is necessary for a reasonable rate of return on the investment. As an example consider the Job Corps program, which has gained notoriety as a result of the high costs per enrollee — making it the most expensive (per capita) major program under the Economic Opportunity Act. A recent article about the program at Camp Kilmer, New Jersey, along with some supplementary information, permits several rough-and-ready measures of the costs, which indicate a target for the commensurate benefits of the program.[7]

The contract between the federal government and the private company (Federal Electric Corporation) that is administering the Camp Kilmer program calls for housing, counseling, and training 2,100 boys (average age, $17\frac{1}{2}$) from poor backgrounds for a two-year period. The actual number of trainees on a man-year equivalent basis was only 840, however, because of problems encountered in starting the program, and the dropouts and turnover once it was underway.[8]

With different assumptions about the measurements of costs, we estimate that the program's total investment costs per trainee are

7 For an excellent report on the Camp Kilmer program, see, John Bainbridge, "Job Corps," *New Yorker*, May 21, 1966, pp. 112–158. This article provided useful data on costs, which we corroborated and supplemented with the testimony of Secretary of Defense Robert McNamara in *Hearings Before the Committee on Armed Services, 89th Congress, 1st Session, June 7–15, 1965, Military Pay Bills*, Number 13, pp. 2567–2568.

8 We are indebted to James Robinson of the Office of Economic Opportunity for this information.

between $6,412 and $18,750 (see "Costs per Trainee" in the Appendix). Thus, if we assume that the benefits are measured by increased labor earnings, and if we demand a five percent return, then an annual improvement of between $356 and $1,042 (or about $7 to $20 per week) will make the investment "pay."[9] The upper limit of cost estimates requires, then, an improvement in earnings of $20 per week. This would certainly present a challenge to the program; but it is not an unattainable goal.

Perhaps a three percent return would be considered adequate if we take account of: (1) the equity aspects of aiding the underprivileged, and (2) the emphasis of the program on improving the health, mental outlook, and civic participation of the youth — real benefits that will not be reflected completely in their performance in the labor market. At three percent, the increase in earnings must be between $256 and $750 a year (or only about $5 to $14 per week) to make the investment worthwhile.

The attainment of the incremental increases in earnings could result from a larger number of weeks worked by the trainee (or lower unemployment rates), or from a higher wage while working the same number of weeks. The high incidence of unemployment (90%) and low earnings of the youth ($23 per week among the workers) prior to their training indicate that a low level of earnings during their adult life could be expected. This, taken together with the relatively high-paying jobs for which they are being trained, places the objective of earnings increase — $5-$14 a week — well within the bounds of feasibility.

TWO CASE STUDIES

The two studies we have made (one of which is still in progress) illustrate all too well the problems noted in our preceding general discussion. However, in spite of their limitations of data and sample size, they attempt a more carefully controlled analysis of retraining for the disadvantaged than earlier studies. The first study focuses on the experience of Negro workers, a small subgroup among the larger group of unemployed workers in West Virginia whose experiences with the governmental retraining programs we have reported elsewhere.[10] The second study concerns a group of welfare recipients in Milwaukee who received various types of training, ranging from literacy courses to auto mechanics.

9 Based on the annuity that has the present values listed above for a 47-year period (from 18½ years of age to 65½—the period in which the investment would yield a return).

10 Gibbard and Sommers, *op. cit.*

The Retraining of Unemployed Negroes in West Virginia

During the period 1960-1962, retraining courses were conducted in West Virginia under the Area Vocational Training Program, the Area Redevelopment Act, and the MDTA. Our larger study surveyed about 1,400 persons, most of whom were unemployed at the time the training programs were established. Those surveyed were either connected with the training programs by virtue of being admitted to or rejected from the programs, or were part of the control group — workers on the lists of the Employment Service who were unemployed at the time of the training but who had no contact with the training programs. The most important finding of our evaluation was that the programs yielded a high rate of return — measured by a comparison of the higher earnings of those who completed a training course (36 percent of the total number of whites surveyed) with their counterparts in the control group (32 percent), over a post-training period of about two years. (The remaining 32 percent included "dropouts," "rejects," and those who were accepted for training but who did not begin a course.)

The 1,400 persons in this sample included 116 Negroes, of whom only 32 (27 percent) completed a training course. (See Table 2 for

TABLE 2

Distribution of Negro Workers in West Virginia Study, by Sex and Training Status

Training Status	Male	Female	Total
(1) Completed a course	25	7	32
(2) Started, but dropped out before completion	10	0	10
(3) Accepted for training but did not report	9	3	12
(4) Applied for training but were rejected	9	6	15
(5) Non-trainee control group*	41	6	47
TOTALS	94	22	116

Source: Ford Foundation Retraining Study in West Virginia, 1962-65.

*Workers who had not applied for training and who were unemployed at roughly the same time as the trainees prior to their training. Workers meeting these criteria were selected at random from the Employment Service office in the five West Virginia counties where training was conducted.

the distribution of Negro workers by sex and training status.) This is a small sample on which to base any generalizations, but a few points stand out rather clearly and are worth reporting.

The simple cross-tabulation by race and employment status, one and two years after the average completion date of the training programs, shows that the Negro trainees fared as well as or better than the white trainees. Furthermore, the performance of the Negro trainees relative to the Negro control group was far superior to that of the white trainees relative to the white control group (see Table 3).

These tabulations would be even more impressive if the Negro trainees achieved this record in spite of an expected lower educational attainment. On the contrary, however, the Negro trainees had slightly more years of schooling, on the average, and also represented a slightly more selective age group. (Only one Negro of the 28 who reported their education had less than 8 years of schooling completed. This amounts to only four percent. Among the white trainees there were 14 percent, 56 in number, who had 0 to 8 years of schooling. Only three, or 10 percent, of the Negro trainees were under 21 or over 55 years of age, whereas 72, or 15 percent, of the white trainees were in these younger and older age groups.) The control groups for both races, on the other hand, were similar to each other in age and educational attainment, but both were "inferior" compared to the trainee groups. We attempted to control for these factors in our larger study.

Obviously, the small number of observations we have for the Negro workers does not permit a close control over the economic and demographic factors which are important in determining performance in the labor market, and which differ for the various categories of training status shown in Table 1. In one test, race was included as an independent variable in multiple regressions explaining the post-training labor market experiences of all the workers in the sample. Two different dependent variables were used: (1) the percent of time employed in an 18-month post-training period, and (2) the total 18-month earnings. The sign of the coefficient of the variable denoting a Negro worker was negative, but insignificantly different from zero.[11] However, this result may be attributable to the apparent positive effect of the Negro trainees cancelling out the apparent negative effect of the Negro non-trainees.

Perhaps the most that should be said of the West Virginia study, with regard to the impact of training on Negro workers, is that Negro trainees fared at least as well as the white trainees, and that both groups fared substantially better than the non-trainees. The importance of training is further emphasized in our previous findings that, for the white workers, training resulted in a significant improvement in their economic well-being.

11 Ernst Stromsdorfer, "An Evaluation of Retraining in West Virginia," unpublished, 1966.

TABLE 3

Labor Force Status of Surveyed Workers, Summer 1962 and Summer 1963, by Race and Training Status[a]

Race and Training Status		1962 Labor Force Status[b]			1963 Labor Force Status[c]		
White		Employed	Unemployed	Total	Employed	Unemployed	Total
Completed training	%	60	40	100	80	20	100
	No.	(253)	(169)	(422)	(308)	(78)	(386)
Non-trainees (Control group)	%	35	65	100	72	28	100
	No.	(133)	(243)	(376)	(213)	(82)	(295)
Negro							
Completed training	%	65	35	100	92	8	100
	No.	(17)	(9)	(26)	(23)	(2)	(25)
Non-trainees (Control group)	%	33	67	100	40	60	100
	No.	(13)	(30)	(43)	(16)	(24)	(40)

Source: Ford Foundation Retraining Study in West Virginia, 1962-65.

[a] Three categories of training status are not included: the "dropouts," the "rejects," and those who did not report. In the summer of 1962, about 50% of the whites and 50% of the Negroes in these three groups combined were employed, not including a small number who were not in the labor force. In the summer of 1963 about 66% of the whites and 66% of the Negroes in these three groups combined were employed, not including those who were not in the labor force. For either year, therefore, adding these three groups would not change the over-all picture given by Table 2 above.

[b] Between 7% and 11% of both white and Negro groups for both status categories, trainees and non-trainees, were not in the labor force in the summer of 1962. These were omitted from the numbers and percentages shown in Table 2.

[c] Between 7% and 14% of both white and Negro groups for both categories, trainees and non-trainees, were not in the labor force in the summer of 1963. These were omitted from the numbers and percentages shown in Table 2.

Three different training programs for about 300 men on welfare were conducted between 1960 and 1963 by the Department of Public Welfare of Milwaukee County. Another program was established by the MDTA in Milwaukee to train custodial workers. This latter program was included in our study since the trainees were an older group of Negroes with little formal education or previous training, and since many of them had been on welfare at some point in their adult life. The four programs are described in a summary manner in Table 4. It is notable both that the percentage of Negroes in the four programs ranged from over 50 percent to 100 percent, and that their average education ranged from 4.19 to 9.9 years.

The numbers in the last six columns of Table 4 reveal two lamentable ratios: (1) the pitifully low response rate achieved despite a costly survey that was aimed at the entire population of trainees; and (2) the relatively high dropout rate discovered among those we were able to find and interview. In view of these attrition rates, some discussion of the selection procedures and sample biases seems necessary.

The original selection of trainees from the welfare rolls required only that the trainees be "employable;" and the recruitment stopped when the courses were filled. Some were eager to enroll, and others were reluctant. The director of the program stated that those selected were representative of the larger group who could be considered employable. Certainly, the records of those we interviewed indicate that they had a great number of personal problems, and it is by no means clear that our sample is biased favorably. Some of our respondents were eventually located for interview in the county jail. The fact remains, however, that we are unable to judge how the 157 respondents of our study compare to the larger group originally selected.

The outcome of the training programs may be assessed by two methods, neither of which turns out to be fully satisfactory. The first described the employment experience of the trainees and makes a comparison (when possible) of their post-training earnings with the earnings they made before training. The second method uses a sample of men who were on the welfare rolls at the time of the training. They are matched with the trainees on the basis of several characteristics; and, in the final step, a limited comparison of the experiences of both groups in the post-training period is made.

The employment record of three groups of trainees is shown in Table 5. Interpreting these results is difficult, because the various bases for comparison are all inadequate for one reason or another. Those who completed courses fared less well than those who dropped out to take a job, but this is not an unusual situation in any training

TABLE 4

Summary of Training Programs in Milwaukee

Training Program and Sponsor	Purpose of Program	Year of Program and Duration	Characteristics of Trainees				Number Initially Enrolled	Number of Trainees Who Were Successfully Interviewed				
			Average age	Average education	Percent Negro	Average % of time on welfare in 6-year period before training		Total	Who completed course	Those who Dropped Out: For a job	Those who Dropped Out: For other reason	Those who Dropped Out: Not ascertained
Operation Alphabet (Welfare Department)	Achieve basic literacy	1962 (15 weeks 120 hours)	44	4.2	81	48[a]	51	37	.27	0	9	1
Remedial Education (Welfare Department)	Achieve equiv. of 8th grade education	1961 – 1963	34	9.2	100	36	23	15	6	5	4	0
Vocational Training (Welfare Department)	welding, auto repair, mach. op., indus., cooking & baking, other	1959 – 1964[b] (24 weeks)	32	9.9	70	19[c]	187[d]	90	27[e]	29[e]	33	2
Training for Custodial Work (MDTA)	custodial (or janitorial) work	1963 – 1964 (16 weeks)	45	6.5	53	25	72	45	79	16	31	1

Source: Ford Foundation Retraining Study in Milwaukee, 1964-66.

[a] No information was available for 2 respondents.

[b] Only 1 course was started in 1964.

[c] No information was available for 13 respondents.

[d] Limitations of our data make this figure an approximation.

[e] One observation was double counted between these two categories.

TABLE 5

Employment Experience of Milwaukee Trainees and Improvement in Average Wage Earnings of Trainees in the Post-Training Period Compared to the Pre-Training Period

Course	Training Status	Number of Persons by Percent of Time Employed After Training				Average Duration of Post-Training Period under Study (Months)	Average Gain in Weekly Earnings Per Trainee [a]
		0-25	26-50	51-75	76-100		
Operation Alphabet	Completed	15	2	1	2	21.5	$7
	Dropped out	4	-	-	1		
	Dropped out for a job	1	-	-	1		
Remedial Education	Completed	2	-	-	2		
	Dropped out	2	-	1	1	24.0	$24
	Dropped out for a job	1	-	1	1		
Vocational Training	Completed	6	-	2	12		
	Dropped out	12	2	2	10	39.5	$21
	Dropped out for a job	1	3	4	17		
MDTA Training for Custodial Work	Completed	10	6	-	11		
	Dropped out	3	-	1	4	14.0	$36
	Dropped out for a job	-	1	2	6		

Source: Ford Foundation Retraining Study in Milwaukee, 1964-66.

[a] The gain is estimated from the average post-training earnings in the indicated period minus the earnings on the last job held within the pre-training period — a period that is equal in length to the post-training period studied for each individual. When the individual was unemployed in any period his earnings were recorded as zero. If the post-training average is compared with the last job held before training, regardless of the period in which this occurred, the differences in earnings are zero for the first two types of courses, and $13 for the welfare vocational training and $1 for the MDTA training.

program. The completes did somewhat better than those who dropped out for reasons other than to take a job, but these dropouts are probably an unfavorably biased group. Vocational training among the welfare trainees yielded the best employment record, but the trainees in this program were the younger and better educated group who were being trained in the most advanced skills (see Table 4). An additional *caveat* here is that only about half (we estimate) got jobs that seemed to be related to their training.

The earnings comparison shown in the last column of Table 5 appears to offer a relevant measure for evaluating the training programs; but there are a number of shortcomings that limit the usefulness of this measure. First, as in all questionnaire surveys of low-income workers, some of the data are probably inaccurately reported. Second, the labor market conditions were different in the pre- and post-training periods. Specifically, the over-all unemployment rate in Milwaukee declined somewhat from 1961 on,[12] so the earnings of the trainees would be expected to improve for this reason. On the other hand, the history of the welfare recipient often shows that his last job was a moderately well paying one, but that he could not hold it for reasons that were usually related to personal handicaps and problems. Thus, our earnings figure overstates their real earning ability at the time of training. This situation is even more true of the MDTA trainees. They were often permanently displaced from fairly high-paying jobs; and, with their old skills now obsolete, their wage-earning ability was considerably below that indicated by their last job.

The earnings increase is calculated by comparing the post-training earnings to the earnings in the job held *during the same interval of time before training as we have for the period after training*. Unemployment in both pre- and post-training periods is assigned zero earnings, and the prevalence of unemployment among the trainees for rather long periods of time before training makes the earnings improvement look quite impressive. But this overstates the improvement attributable to training, because the assumption of zero earnings ability is not a realistic long-term measure, since the condition of unemployment that gives rise to zero earnings is not, realistically, a permanent condition. In summary, given all of our qualifications, the comparison showing an earnings improvement can only be construed as a partial indicator of the success of the training program.

The second method of evaluating the Milwaukee program compared the trainees to a randomly selected panel of men from the welfare rolls who had no connection with the training program. They were

12 Over the entire period in which some courses were begun, up until the time when our surveys ended (1957–1964), the unemployment rates for Milwaukee reported by the Wisconsin Industrial Commission were as follows: 1957, 2.9%; 1958, 6.4%; 1959, 3.3%; 1960, 3.8%; 1961, 5.4%; 1962, 4.0%; 1963, 3.9%; and 1964, 3.4%.

matched against the trainees on the basis of the following characteristics: (1) race; (2) age (falling in the same five-year cohort); (3) educational attainment (three categories); (4) employability (that is, all were employable); (5) percent of time of adult life spent on welfare (four categories: 0-25 percent, 26-50 percent, etc.); (6) ever arrested (yes or no).

Any random selections who did not possess these characteristics in a way that matched with any trainee were discarded, and the selection went on — and, in fact, is still going on. We have at present only 57 matches with our trainees, and we will report on our preliminary testing with this sample. Because of the limited size of our sample, we have pooled the observations we have from all four of the training programs. Our goal is to isolate the net effect of training by the paired-sampling technique. Variability in the labor market performance that was attributable to important personal factors would be minimized, and the variation that remained might then be attributed to having or not having training.[13]

An unfortunate drawback in this comparison is that we do not have available from the records at the welfare department the employment experience of the control group. Instead, we will compare the two groups with respect to the percent of time they were "off welfare" in the post-training period. We assume, therefore, that this measure represents the over-all success of the training program, insofar as it represents the extent to which the welfare recipient was returned to economic and social independence.

The results of the paired-sample test are summarized in Table 6. There are several test statistics available that differ according to the assumptions made about the underlying shape of the population distribution, or according to the handling of "zero differences" and "ties." All, however, show a significantly better performance in the post-training period on the part of the trainees in comparison with the control group. This is evident from a casual inspection of Table 6. Of 32 differences in performance, 30 are in favor of the trainees. There is, then, little doubt about the significance of the conclusion that the trainees fared better than non-trainees. But we still cannot be fully confident that they differ solely because one received training and the other did not.

13 The paired-sample method sacrifices degrees of freedom in the statistical test procedures by treating the *difference* in the behavior of the pair of respondents as a single observation. Twice as many degrees of freedom would be provided with the use of the individual records in such tests as the differences in means of the two groups of regression analyses. The loss in degrees of freedom by the paired-sample technique will, we suspect, be more than offset by reductions in the variability of labor market performance attributed to such extraneous causes as the personal characteristics of the respondents. Reducing this source of variability permits a much sharper and more efficient test of the hypothesis that *training* determines different labor market behavior. Multiple regression techniques might enable a control over these extraneous sources of variability, but only if we can assume that the factors do not interact significantly. Building all the interactions into the multiple regression is an alternative approach, but a cumbersome one. The paired-sample method appears to offer the simplest test that makes the least restrictive assumptions.

TABLE 6

Paired-Sample Tests of Percent of Time on Welfare
in Post-Training Period, Trainees and Non-Trainees

Result of Comparison of 57 Paired Samples	Average Percentage Difference [a]	Average Rank [b]	Number of Cases
Matches in which the trainees were off welfare more than the non-trainees	27.5	42.2	30
Matches in which the non-trainees were off welfare more than the trainees	-46.0	-30.5	2
Ties	0	0	25
Total			57

[a] The average is $\frac{\Sigma d_i}{n_i}$ where the d's of the positive and negative differences are summed separately and n_i is either 30 (for positive differences: trainees — non-trainees) or 2 (for negative differences). The t-statistic for the percentage difference is about 6, which is highly significant. Under the null hypothesis that there is no difference we have the test statistic: $\frac{\bar{d} - E[d]}{\sqrt{VAR[d]}}$ where the expected difference $E[d] = 0$, and the variance of d, VAR[d], is $\frac{\Sigma d^2 - \frac{(\Sigma d)^2}{n}}{n-1}$. Since $\bar{d} = 28.6$ and $VAR[d] = 4.9$, the test statistic for the t-test is about 6. This test assumes an underlying normal distribution of the percentage differences. Without the assumption we need non-parametric tests much as that described in footnote b below.

[b] The average rank is r/n_i where r is the rank value of the absolute magnitude of the percentage differences — postive percentage differences yield positive rank values. The 25 zero differences were ties that were ranked 1 to 25, and then the values of the ranks were divided between positive and negative values, so that the sum was zero. The n_i are 30, 2, and 25 for positive, negative, and zero differences, respectively. The non-parametric test for the rank sums is the Wilcoxon test, and the appropriate statistic is: $\frac{\text{Sum} - \text{Expected Value of Sum}}{\sqrt{\text{Variance of the Sum}}} = \frac{\text{Sum} - \frac{N(N+1)}{4}}{\sqrt{\frac{N(N+1)(2N+1)}{24}}} = \frac{1267 - 826.5}{120}$

$= 3.67$. The t-test applies, and 3.67 is highly significant.

CONCLUSION

Government-sponsored retraining programs for the disadvantaged are relatively new, and little effort has been made, as yet, to evaluate them in terms of costs and economic benefits. The general data released under the regular and demonstrations programs of the MDTA — as well as estimates derived from data on the Job Corps program — provide some evidence of the benefits, and potential benefits, accruing to these retraining programs.

In each of our own case studies the training of relatively disadvantaged workers resulted in a recorded improvement in their labor market status. "Improvement" is, of course, a relative term that in our studies refers to a comparison with either the labor market experiences of other, "similar" workers or the experiences of the same workers in the pre-training period. More specifically, the labor market behavior is examined with regard to the employment experience, earnings, or time-not-on-relief of our respondents.

The measures are crude and the data are skimpy, and consequently our results are highly tentative. However, the findings are based on somewhat more sophisticated methodological techniques than have been utilized in the existing evaluations of retraining programs for the disadvantaged. Needless to say, considerable additional work will be required before conclusive findings are possible. It is encouraging to note, however, that the results of our case studies — indicating a positive benefit accruing to the trainees — are not inconsistent with the more general evaluations published elsewhere.[14]

14 *Report of the Secretary of Labor . . . , op. cit.*, pp. 53–58.

Estimated Cost Calculations of the Job Corps Program at Camp Kilmer

Cost Classification	Type of Cost				
	(1) Unadjusted Direct Costs	(2) Additional Direct Costs [d, e]	(3) Per Capita Opportunity Costs (Indirect Costs) [f]	(4a) Adjusted Direct Cost (Minus Transfer Payments) [g] for 2,100 trainees	(4b) Adjusted Direct Cost (Minus Transfer Payments) [g] for 840 trainees
1. Total original amount allocated	$11,520,000 [a]	$200,000	---	$4,424,238	$8,681,657
2. Discount factor [b] (5% for 1 year)	576,000	10,000	---	221,212	434,083
3. Sum of 1. and 2.	12,096,000	210,000	---	4,645,450	9,115,740
4. Per Trainee [c]					
(a) ÷ 2100	5,760	100	$4,100	2,212	
(b) ÷ 840	14,400	250	4,100		10,852

Summary: Cost Per Trainee

Estimate One (a) Sum of (1), (2), and (3) on line 4a: $ 9,960
Estimate One (b) Sum of (1), (2), and (3) on line 4b: $18,750
Estimate Two (a) Sum of (2), (3), and (4) on line 4a: $ 6,412
Estimate Two (b) Sum of (2), (3), and (4) on line 4b: $15,202

[a] The amount of the government grant to Federal Electric Corporation to administer the program (Source: Bainbridge, *op. cit.*, p. 114).

[b] The five percent discount rate will approximate the costs attributable to the earlier payment of the program's costs compared to the later returns from the program. (The costs occur, on average, one year earlier than the returns.)

[c] Two estimates are given: (1) There were 2,100 trainees scheduled for the 22-month program (Source: Bainbridge, *op. cit.*, p. 114). This may be interpreted as the "full capacity" cost estimate of the program. (2) The second estimate uses the actual man-year-equivalent number of trainees enrolled (in 1965), which is 840 (Source: James Robinson, Office of Economic Opportunity). Note that both these cost figures are overstated in their own terms because of the inappropriate allocation of *all* the costs — fixed and variable — on the single, first class of trainees. Some of these costs are fixed and should be allocated to future classes. In short, either the correct average cost or the marginal cost per trainee would be less than cited in this table.

[d] Assume that it takes ten government employees working full time for two years (at an average salary of $10,000 per year) to handle the limited amount of governmental participation in the program.

[e] Assume that the rental value of the Camp Kilmer property is zero over the two-year period. One justification for this assumption is that the Army wants to hold various bases in reserve and would not convert the property to other uses. However, all maintenance costs borne by Federal Electric Corporation in their use of the property are included as costs.

[f] $4,100 is probably an "upper estimate" of the average foregone earnings of the trainees for the 22-month period. Bainbridge reports that among those selected for the program only one in ten was employed, and that among those who worked the average weekly earnings was $23 per week—or $1,196 per year if employed for all 52 weeks) (Source: Bainbridge, *op. cit.*, p. 116.

[g] The transfer payments made to the trainees for ordinary consumption do not represent an increase in resource costs from the point of view of the nation as a whole. For example, the costs of room and board are in part simply a transfer of costs from the families of the trainees to the tax-paying public. This column shows the total direct costs of the program with the following estimated transfer items subtracted (the source, unless otherwise noted, is the Congressional testimony of Secretary of Defense, Robert McNamara, in *Hearings Before the Committee on Armed Services, 89th Congress, 1st Session, June 7-15, 1965, Military Pay Bills*, Number 13, pp. 2567-2568):

(1) room ($18 per month; $396 per trainee for 22 months)
(2) meals ($31 per month ... $682 for 22 months)
(3) medical and dental care ($220 for 22 months)
(4) work clothing, mostly army and navy surplus, plus a $75 allowance for street clothes
(5) living allowance ($30 per month; $660 for 22 months)
(6) exchange and recreation ($40 for 22 months)
(7) family allowance ($15 paid to the families of the trainees in those cases where the trainee sends half of his $30 allowance home to his family). According to Bainbridge, about 75 percent of the trainees send money home and enable their families to qualify for this allowance (Bainbridge, *op. cit.*, p. 118). This averages $225 per trainee for the 22-month period.
(8) terminal allowance paid to trainees who complete their course: $50 per month or a maximum of $1,100 per trainee for the 22-month period.

DISCUSSION

GRAEME H. MC KECHNIE

THE UNIVERSITY OF WISCONSIN

The emphasis which is now being placed on training and re-training the disadvantaged worker has led to a re-examination of the programs which are now in operation. The disadvantaged worker is the one who, even in times of high employment, cannot find a job. Statistics show that included among the disadvantaged are the poorly educated, the non-white, the low-skilled, youth, and the hard-core unemployed. Unfortunately, these characteristics are often combined, and the worker who combines them is in an unenviable position in today's labor market.

The three papers just presented provide excellent insights into some of the problems that must be faced in training the disadvantaged. They also indicate some of the benefits which accrue from training. And, despite the different samples investigated in each paper, they all point out the various courses of action that must be followed in educating the disadvantaged.

Dr. Cardon's paper presents an interesting profile of the high school dropout. The high-ability dropout poses educational problems which are very different from those we face with dropouts who fit the usual stereotype. Dr. Cardon's paper really examines the plight of the advantaged dropouts rather than the disadvantaged, for their continued interest in school and their ability to return to school are characteristics not found in the more disadvantaged dropout.

The employment experience of the dropouts appears at first glance to be very good. Yet the act of finding a job is not a sufficient measure of success in the labor market. The concept of work is a crucial one which is only partly explained in the paper. On the average, the dropouts had more than two jobs in the year after they left school. The reasons for this are not specified. If they left the jobs voluntarily and found other employment which was superior, then the job changing may lead to stable, rewarding employment. If the jobs ended and the boys were laid off or displaced by technological changes, then the pattern for a future of difficulty in the labor market may be beginning. Even though they have high ability, these advantaged dropouts can become the disadvantaged of the future.

The nature of the jobs they found, with respect to wages and number of hours worked, must also be considered. If the dropouts face a series-of low-wage jobs, or jobs which provide only part-time

work, their decisions to drop out have been foolhardy. The large number of dropouts who returned to complete their schooling indicates that they realized the need for more education. Whether this is a result of difficulties in finding suitable jobs, or in finding any job, is not known, since there is little indication given of the amount of unemployment experienced in the year.

Dr. Edgerton's paper deals with a very different group of people, but its emphasis — on the methods needed to keep people in the educational process — is similar. The analyses presented, however, do not go far enough in trying to answer some of the pressing problems of educating the disadvantaged. They concern only a small, though important, part of the training process.

The rate of retention and the rate of placement in training-related employment both involve more variables than are presented in the paper. The need for good management and proper program organization cannot be over-emphasized, and, as the author points out, the educational principles which are significantly related to retention and placement are often overlooked.

There are two important variables in the retention and placement of trainees which are not discussed in the paper. The first of these is the area or region of the country in which training is located, and the economic climate of the area. If the area is one which has suffered from low income and high unemployment — for example, a distressed area — then the success of training may not appear to be very high. The trainees may be discouraged about the lack of employment opportunities and/or the low wages of available jobs, and may prefer to remain on welfare, where, in some cases, they will earn a steadier income. If the trainees drop out under these conditions, it should not be considered a fault of the program.

The second variable, which is related to the first, is the availability of training-related jobs and the amount of job development carried out in connection with the training. If no job development is undertaken, trainees may feel that once they finish training they will remain unemployed, and so will drop out rather than waste time learning a skill that will not benefit them. Many trainees drop out to accept jobs, some in areas in which they have been training.

In these cases the decision may be quite rational and the program itself cannot be blamed. The trainee may feel that he should take a job while he can, rather than wait and perhaps have difficulty later. As Dr. Edgerton said, program management is a poor predictor of placement, but placement is the crucial measure of success.

The Cain and Somers paper presents a still different group of workers for analysis. Here, groups of workers who are the ones usually thought of when disadvantaged workers are discussed come under investigation. This paper affords an excellent conclusion to the other two by presenting data on the benefits of training.

In the West Virginia survey, the percent who are employed in the post-training period is only one of the measures which should be used. Another measure which would be interesting, and which would serve as an even better yardstick of success, is the earnings of the trainee groups in the post-training period. A comparison should be made showing the differentials in wages received between trainees and non-trainees and between whites and non-whites. For example, if the non-white workers are employed at very low-wage jobs, then, even though they are working, the training has not succeeded in raising their incomes above the poverty level. A second measure which would be useful is the differences in the percent of time the various groups are employed after training. As the authors point out, some analyses were performed using these variables; however, the results of the regression analysis were not significant. More research is needed in this type of analysis, but in order to do this larger samples will be needed.

With respect to the Milwaukee study, it is unfortunate that no employment or earnings comparison can be made between the trainees and the control group. This type of analysis would be preferred to the measure of time off welfare which is used, since many workers might be employed even though they are collecting welfare. If this occurs, the use of the welfare measure could understate the benefits of training, since some workers would appear to have no change, although in reality they have employment.

The data presented in Table 6 of the Cain and Somers paper indicate the wide differences between the trainees and non-trainees. However, the average percentage differences shown mask some information which is important. The absolute magnitudes of the percent of time off welfare are not shown. These are important, since there is a distinction between the case where a trainee is off welfare 27.5% of the time and a non-trainee is not off welfare — thus yielding a difference of 27.5% and the situation where the trainee is off welfare 100% of the time and the non-trainee 72.5% — a difference of 27.5%. The latter case could be attributed to a general improvement in employment such that although trainees have more success, non-trainees also have good experience. The former case could indicate poor employment conditions where neither group has much success or good conditions where the training did not appear to be of much help. Some estimate of the percent of time the trainees were employed after training would be of some help here.

The foregoing discussion has concentrated on some of the criticisms of the three studies. A word should be said about their significant contribution. The three papers point out a number of routes to follow in training the disadvantaged. It is obvious that the educational system faces serious problems in its struggle to retain students of both high and low ability. Special emphasis will be

required on the problems and motivations of these students. It is the task of persons in gatherings like this one to attempt to draw together the research on these students so that appropriate policies may be established which will provide them with the training they will need in the labor market.

The time has come when training programs will have to be geared more to employability than to employment. When the disadvantaged worker is brought into training, courses in literacy as well as occupational training will be necessary. This will lengthen the training process which as the authors of the second paper point out, will probably increase the rate of drop out. It appears obvious then that a system of counselling and training must take place early in a student's life, so that at a later date this student does not become one of the disadvantaged and have to be retrained which is always more difficult than training early in life.

Our entire educational system will have to become aware of the problems of dropouts so that they can be induced to remain in school. We should provide as much training as possible in early life so that the necessity of retraining programs becomes less important.

LAURE M. SHARP

BUREAU OF SOCIAL SCIENCE RESEARCH

In general, one thing struck me about all the sessions that we are going to be attending at this meeting, and the three papers which we heard this morning in particular. The papers are indicative of a general revolution in our thinking about educating the disadvantaged, and about finding ways to integrate the disadvantaged population successfully into the labor market. Many here today probably lived through the early stages of the new programs and the early thinking that went with them. We were told that large numbers of people are unskilled, do not know how to behave in work situations, are poorly socialized to the labor market, appear to be unmotivated, and are in the habit of living on welfare handouts instead of being ambitious and really eager to get a job and earn a living. Therefore, the task to be accomplished was to educate these people, train them, and give them some marketable skills so that they would join the labor force and, hopefully, earn their keep like the rest of us.

Some people objected to this approach from the very beginning, I think; but now the dissenters include large numbers of people in all disciplines. Not only sociologists, who are in the habit of looking

at social problems from the underside, but psychologists and economists as well, who are presumably more level-headed or hard-nosed about these matters, have come to a very different definition of what the problems of educationally disadvantaged persons are. To a great extent, we have all come to the conclusion that our institutions have failed a large portion of our population from the time they first came in contact with them — sometimes from the time children first entered school, and sometimes even earlier, in the children's very early neighborhood experiences — and that this failure has been very consistent and very serious at many crucial periods in their lives. For example, the Armed Forces, which might have done so, did not act as a substitute for other institutions which should have served these people earlier. The Employment Service, more or less systematically over the years, has avoided dealing with people who were difficult to place. The police, for one reason or another, have created further handicaps. But this is not the subject we are to discuss here today. What we have learned from the studies presented here is that even the institutions which were specially designed to train and prepare people — young or old — who need special training, have not always performed their functions successfully. And, in looking at these failures, we have each in our own way come to the conclusion that what we need, perhaps, is not so much to change the people — quite apart from the fact that there are some things we simply cannot change, such as their sex and their race, and, to some extent, their family background and early childhood experiences — but to restructure some of the programs we are now designing for these people, so that they will be more useful to the disadvantaged who come to us with certain problems.

From the point of view of the interaction between the individual and the educational institution, I found Dr. Cardon's paper most fascinating. It is the first time I have really seen a systematic study pertaining to a group of students who have always fascinated me — namely, the high-ability dropout. Dr. Cardon's paper does not indicate his students' social background, but it is my suspicion that a great many of these high-ability dropouts are not disadvantaged. We don't have any data here on either race or father's occupation, other than the statement that dropouts and persisters came from pretty much the same background. So, I assume — and this is the only assumption I can make — that they represent a cross-section. But I don't know anything about race, and that's one of the things which bothered me about this study.

I would also like very much to know whether a relatively small number of schools were responsible for the 1,700 high-ability dropouts identified, or whether these students were randomly distributed in the state of Pennsylvania. I think that makes quite a difference. I have a feeling from what Dr. Cardon says, and from what his

tables show, that a few of the schools may have been particularly rigid, or not very adept at handling difficult cases, and that these may have accounted for an unusually large number of dropouts. This is one of the things we ought to look at, since we are particularly interested in environmental factors which may account for some of the dropping out.

But let us assume for a moment that the dropouts were randomly distributed, and that the personality characteristics which are shown here, plus some particular institutional characteristic of a given school, had a lot to do with the dropping out process. The conclusion one reaches, then, from Dr. Cardon's findings is an almost revolutionary one, and one which I don't think the author of the paper has faced. His conclusion was that we should counsel these students better and more effectively, at an earlier time, so that they would adapt to these schools which they found unsatisfactory, and which did not give them either the instruction or the personal attention they wanted. Thus, in some way, if we counsel them, advise them, and talk them into it, we might get them to stay.

My own conclusion would have been very different. I would like to ask what in the world is wrong with schools that cannot retain young people when their profiles here look excellent. In terms of the old American ideal of an autonomous, independent, hardworking, and optimistic person, these students seem to be almost perfect candidates. They are not submissive, which usually turns out to be a very good thing later in life; they are intelligent; and they are somewhat critical of their environment. In other words, they have all the qualifications which you might pick in trying to portray an ideal type. The only thing that stood in the way of their graduating was that they found a number of things that go on in school very hard to take. They do not become teacher's pets, because obviously they seem to ask embarrassing questions. They tend not to do assignments which do not interest them and for which they fail to see a rationale. As a result, we see the onset of the alienation process which we hear about so much in schools attended predominantly by lower-class children. The student does not perform well, the teacher does not like him, and the more he is disliked, the less he performs, etc. This is the well known syndrome that seems to be so characteristic of the elementary schools; but, as we see from this study, it happens at times with brighter and presumably middle-class youngsters too. So this is the one point at which I take exception with the author. I think the changes, the adaptations, should be made by the school systems.

Another finding which interested me very much was the experience of this group in the labor market. The successful employment experience of these dropouts may seem to fly in the face of what we hear about the placement difficulties of dropouts; but I don't think

one needs to look very far beyond the data which were shown in the paper. I suspect, perhaps because this fits my own prejudices, that these young people obtained rather rapidly a good slot in the job market, for the simple reason that they do have outstanding personality characteristics. These were largely middle-class youngsters seeking work in Pennsylvania, where the employment situation is rather good. And, I don't believe what we have been told by the Labor Department and by some experts is true: namely, that young people absolutely must have a high school degree these days to get a job. The high school degree is used as a screening device; it is a quick way to turn down applicants — particularly Negroes, but others, too, if for one reason or another they seem undesirable. It is the easiest way to screen out people about whom you're not certain. This is something I suspect many of you have run across in interviews with employers or others, or have found yourselves doing when dealing with job applicants. The high school diploma is just a simple substitute for a more systematic evaluation. It is always simplest to set up a few initial categories of unacceptable people; this cuts down the number of interviews. Obviously, however, with these youngsters, a high school degree was not so crucial, because they had other recognizable qualities which they were able to get across, and which cancelled out their formal handicap.

Nevertheless, it would be a shame if their high school experiences were to keep these youngsters from reaching the higher occupational level which they would seem to be capable of mastering, and which a permanent high school dropout status would clearly preclude. The most exciting findings from the study, therefore, are the data showing that these students did go back to complete their schooling at one time or another, and that they are very much interested in further education, and found alternative ways of obtaining either high school degrees or other schooling which suited their personality and their needs better than the classical pattern of high school education. This, of course, is something that is happening in other segments of our society. We have found that many of the so-called college dropouts actually obtain a degree over a ten-year period, either by going back to their original college at a later time or by transferring elsewhere. And, in our own studies on graduate students, we find the graduate study process becoming increasingly slow. A great number of people are coming back to school at various points in their lives in order to complete their education, often on a part-time basis. Thus, the other conclusion suggested by Dr. Cardon's provocative paper is that we have to make our education system less rigid, and that we have to provide alternative educational methods for people who are not ready to go through school according to the time schedule which we prescribe

for high school completion.

I can only comment briefly at this point on the two other papers. In both of them, the authors have to come to grips with the problem of judging the success of recent innovations in the training and retraining of the disadvantaged. This is a difficult task, because we have not yet a sufficient accumulation of knowledge about these programs to set up valid criteria for success or failure. Retention and placement in related occupations are the criteria most commonly used, as a result of the original Congressional directives; but they are not necessarily appropriate under all conditions. If retention rates are low because the trainees find jobs and switch from training to full-time employment prior to completing a training program, is this in all cases an unfavorable outcome? As Cain and Somers point out, it is not unusual to find that those who complete the courses ultimately fare less well than early dropouts who took jobs. On the other hand, if placement in an occupation related to training does not take place — because of changing labor market conditions, or because placements in a given occupation are governed by non-rational criteria such as race, or recruitment through informal channels — is this really proof that the training was unsuccessful? Using less stringent criteria — and I would certainly agree with Cain and Somers that these are more appropriate — it would appear from their data that, even in purely economic terms, training programs for the disadvantaged do pay off. And, it is only sensible to assume that less tangible effects — the removal of disadvantaged workers from a relief-centered to a work-centered life space — will have real benefits both for the workers themselves and, perhaps more important, for the children who model themselves after their parents.

Methodologically, the Cain and Somers paper is most exciting in its report on the Milwaukee study. Comparisons between groups participating in various programs are more useful than the classical treatment of control groups. The paired-sampling technique looks like a promising and sophisticated device to replace the crude measurements of success which earlier studies have relied upon, and which have yielded few useful conclusions to guide subsequent programs.

Dr. Edgerton's paper has the great virtue of looking at training variables rather than at trainees, and of demonstrating that some of these matter as much as trainee variables. And, since we cannot change the trainees — especially with regard to the variables which affect placement most crucially, namely, sex, race, and having completed high school prior to training — it is all the more important to take into account his recommendations for programs. Much of his evaluation centers on improving retention, but he does not distinguish between dropping out to take up employment and dropping out because of lack of motivation or interest. Assuming,

however, that low retention is more often than not undesirable, it is good to see him spell out specific suggestions for program improvement. As he says, these are by and large sound educational, common-sense-type recommendations, such as small classes, not leaving course content to instructors, etc. It is, indeed, likely that better programs will improve retention to some degree.

His correlations, however, which are very low throughout, are much less convincing when it comes to placement, where trainee characteristics seem more important.

The other problem with Dr. Edgerton's paper is the suspicion that in lieu of the items he used — which were available from the directors of the training programs — others which could only have been obtained from the trainees themselves might have yielded higher correlations and more important or novel insights. This is, of course, the eternal suggestion that the investigator should have studied something else; but the correlations shown in this paper are so low that it is just possible that other items not investigated here — for example, the trainees' family situation, interaction with other trainees, trainees' perception of their progress, etc. — were more crucial. Yet the findings of this study, as far as they go, should still be useful to policy planners concerned with the retention problem. The evaluation of factors affecting placement must be approached through other research techniques.

II

JOB CLUSTERS AND GENERAL VOCATIONAL SKILLS

GENERAL VOCATIONAL SKILLS AND THE SECONDARY CURRICULUM

EDWARD J. MORRISON

AMERICAN INSTITUTES FOR RESEARCH

There is good reason for the currently expanding interest in general vocational capabilities. For years, observers have been reporting an accelerating rate of technological innovation that has been producing changes in the demand pattern for human capabilities. It is evident now that the demand pattern will change repeatedly over an average working lifetime, and that many individuals can expect to shift their specific occupations several times.[1] It is important both to the individual and to society that a worker acquire skills and knowledges which are useful in a variety of occupations, and which can therefore provide a reasonable basis for occupational versatility.

J. W. Gardner, in his essay on excellence, argues eloquently that general capabilities are essential in a world of change:

> In a world that is rocking with change, we need more than anything else a high capacity for adjustment to changed circumstances, a capacity for innovation. The solutions we hit on today will be outmoded tomorrow. Only high ability and sound education equip a man for the continuous seeking of new solutions. We don't even know what skills may be needed in the years ahead. That is why we must train our ablest young men and women in the fundamental fields of knowledge, and equip them to understand and cope with change. That is why we must give them the critical qualities of mind and the durable qualities of character which will serve them in circumstances we cannot now even predict.[2]

It is relatively easy to agree that general capabilities, if they can be found, should be objectives of education, because they would be useful to graduates in meeting the opportunities and demands of a changing world, and in accommodating changes in their own interests, skills, and aspirations. The problem is to be specific first, about the identity of the capabilities, second, about

1 U.S. Department of Labor, *A Report on Manpower Requirements, Resources, Utilization, and Training* (Washington: U.S. Government Printing Office, 1965); and G. Venn, *Man, Education and Work* (Washington: American Council on Education, 1964).

2 J. W. Gardner, *Excellence* (New York: Harper and Row, 1961), p. 35.

methods for identifying and updating them, and, third, about the curriculum through which they are acquired. The remainder of this report is devoted to a description of two studies intended to make some initial steps toward the sort of specificity which can result in an effective curriculum.

GENERAL VOCATIONAL CAPABILITIES (Skills and Knowledges)

This study,[3] conducted under a grant from the Ford Foundation and completed in March of this year, had three objectives: (1) to develop and verify methods for deriving general capabilities from job information; (2) to describe the structure of the domain of general vocational capabilities as it exists among high school students, and to describe the relations between this domain and intellectual aptitudes and educational experience; and (3) to derive implications for education from the analysis of general vocational capabilities.

Two major limitations were accepted at the outset. First, it was not possible to measure manual manipulations in this study, so this aspect of skill is omitted from the description. Second, the number of occupations studied was relatively small, so that generalization from our results to all occupations would be hazardous. A particularly noteworthy limitation is imposed by the exclusion of occupations for which a college degree is required.

METHODS AND PROCEDURES

The strategy in this study was to look for general capabilities in the relations between scores made by students on tests of job knowledge for which the items were derived explicitly from the behaviors required for successful job performance. The procedure was to: (1) select a set of occupations, (2) describe their component jobs and tasks, (3) select measurable performances from among the tasks, (4) translate these behaviors into test items, (5) administer the tests to a large sample of students, and (6) analyze the relations among measured performances to identify general capabilities.

Selection of Occupations. A preliminary set of 76 occupations was selected from the *Occupational Outlook Handbook*,[4] so as to provide a sample of occupations which collectively would: (1) include a wide variety of performance requirements; (2) cover a range of performance levels and include occupations requiring substantial formal training as well as occupations requiring little or no specialized formal training; (3) emphasize occupations for which

3 J. W. Altman, *Research on General Vocational Capabilities (Skills and Knowledges)* (Pittsburgh: American Institutes for Research, 1966).

4 U.S. Department of Labor, *Occupational Outlook Handbook* (Washington: U.S. Government Printing Office, 1963–1964).

new personnel will be needed over the next 10 to 15 years; (4) represent a variety of industries; and (5) include only those occupations for which it would be reasonable to provide specialized vocational training at the high school level.

The 76 selected occupations then were ranked and rated by personnel of the Bureau of Labor Statistics in terms of the number of openings likely to occur during the next decade. Twenty-seven occupations rated as having "relatively few" opportunities were eliminated from further consideration. Thirty-one occupations then were selected from the remaining 49 in accordance with the objectives stated above. Tables 1 and 2 list the 49 occupations having "many" and a "moderate number" of opportunities. The tables also identify the worker functions required in each, the industries which they serve, and the 31 occupations selected for the study.

Occupational Description. Each selected occupation was described in a three-step procedure. The first step, a general occupational description, placed each occupation in context and made explicit the basis for selecting content for the more detailed analyses. The general description included five kinds of information about each job: a definition of the population of jobs under consideration; a statement of the mission or objectives; an identification of the segments or major sub-operations; a list of the functions required of the incumbent; and a description of the contexts and contingencies under which the job is performed. The second step was an enumeration of the tasks-required-of-the incumbent for each job. The tasks were identified by reviewing Department of Labor, union, association, industry, training, and guidance documents, by observing job operations, and by interviewing experts. The third step in describing each job was to describe its basic tasks, using methods similar to those prescribed by Miller.[5] A basic task was defined as one closely related to the central purposes of the occupation and typically performed by new incumbents and/or most journeymen. Specialty, advanced, and ancillary tasks were enumerated, but not described in detail. Each description provided information about the object(s) acted upon, the information or signals which guide action, tools, actions by which the goals and sub-goals are achieved, and indications of completion of the task.

Development of Test Items. Having identified and described the tasks required in a variety of jobs, the next step was to derive test items which reflected a representative sample of on-the-job behaviors. The procedure was to make a random selection of actions from the task descriptions, identify and describe the measurable behaviors involved in each action, and prepare test items to measure

5 R. B. Miller, *A Suggested Guide to Position-Task Description,* ASPRL TM 56–6 (Lowry Air Force Base, Colorado: Armament Systems Personnel Research Laboratory, April 1956); and R. B. Miller, "Task Description and Analysis," in R. M. Gagne, ed., *Psychological Principles in System Development* (New York: Holt, Rinehart, and Winston, 1962).

TABLE I

Occupations Rated as Having Many and a Moderate Number of Opportunities over the Next Decade,
with Worker Functions Contained in Each
(listed according to the estimated number of opportunities anticipated)

NUMBER OF OPPORTUNITIES	OCCUPATION	THINGS							DATA						PEOPLE							
		Tending	Feeding	Manipulating	Operating-Controlling	Driving-Operating	Precision Working	Setting Up	Comparing	Copying	Computing	Compiling	Analyzing	Coordinating	Synthesizing	Taking Instructions-Helping	Serving	Exchanging Information-Persuading	Diverting	Instructing	Consulting	Supervising	Negotiating	Mentoring
MANY	Secretary, Typist, & Stenographer	✓			✓		✓		✓	✓	✓	✓				✓	✓	✓						
	Salesman & Saleswoman, Manufacturers' Salesman, Wholesale	✓	✓	✓	✓				✓		✓	✓	✓				✓	✓	✓				✓	
	Waiter and Waitress	✓			✓												✓							
	Gen. Bookkeeper, & Bookkeeping & Accounting Clerk	✓		✓	✓					✓	✓													
	Over-the-Road Truck Driver and Local Truck Driver	✓				✓					✓	✓				✓								
	Machine Tool Operator, & Inspector	✓			✓		✓			✓		✓	✓								✓			
	Sewing Machine Oprtr, Dressmkr, Tailor, Inspctr & Chkr	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓			✓								
	Automobile Mechanic and Diesel Mechanic	✓		✓	✓		✓				✓	✓	✓					✓						
	Real Estate Salesman and Broker	✓							✓	✓	✓						✓	✓	✓				✓	
	Beauty Operator	✓	✓	✓			✓					✓	✓			✓								
	Carpenter	✓		✓	✓		✓					✓	✓					✓						
	Life Ins. Agent and Property & Cas Ins Agt & Brkr	✓							✓	✓	✓							✓	✓				✓	
	Practical Nurse	✓		✓			✓		✓	✓	✓	✓					✓	✓						
	Cook and Chef	✓		✓			✓				✓				✓			✓						
	Painter (Const.)	✓		✓					✓	✓	✓	✓						✓						
	Electrician, & Maintenance Electrician			✓	✓		✓				✓	✓	✓					✓						
	Plumber and Pipefitter	✓			✓		✓					✓	✓					✓						
	Teller (Bank)		✓	✓	✓					✓	✓	✓						✓						
	Welder and Oxygen Arc Cutter	✓		✓	✓				✓	✓	✓	✓						✓						
	Draftsman	✓					✓			✓	✓							✓						
	Postal Clerk	✓			✓		✓		✓	✓								✓						
	Stationary Engineer, & Stationary Fireman		✓		✓		✓	✓			✓	✓	✓					✓						
	Appliance Serviceman		✓	✓	✓		✓		✓	✓		✓	✓					✓						
	Mail Carrier	✓				✓												✓						

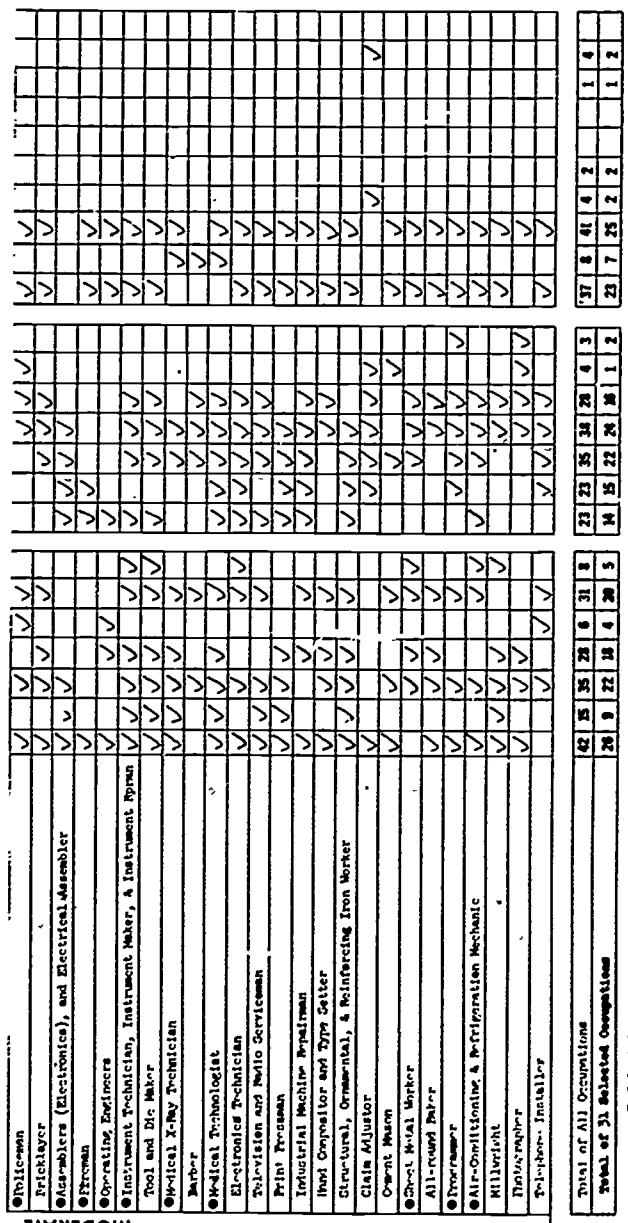

MODERATE
●Policeman
Bricklayer
●Assemblers (Electronics), and Electrical Assembler
●Firemen
●Operating Engineers
●Instrument Technician, Instrument Maker, & Instrument Fitter
Tool and Die Maker
●Medical X-Ray Technician
Barber
●Medical Technologist
Electronics Technician
Television and Radio Serviceman
Print Pressman
Industrial Machine Repairman
Hoist Operator and Type Setter
Structural, Ornamental, & Reinforcing Iron Worker
Claim Adjustor
Cement Mason
●Sheet Metal Worker
All-round Baker
●Pharmacist
●Air-Conditioning & Refrigeration Mechanic
Millwright
Photographer
Telephone Installer
Total of All Occupations
Total of 31 Selected Occupations
● Selected occupations

TABLE 2

Occupations Rated as Having Many and a Moderate Number of Opportunities over the Next Decade, with the Major Industries to which Each Pertains

(listed according to the estimated number of opportunities anticipated)

NUMBER OF OPPORTUNITIES	OCCUPATION	Apparel	Communication	Construction	Electric Light and Power	Equipment Manufacturing	Finance, Insurance, Real Estate	Food and Lodging	Government	Health and Welfare	Maintenance and Repair	Materials Manufacturing	Merchandising and Related Trade	Metal Production	Personal and Protective Services	Printing & Graphic Arts	Transportation
MANY	●Secretary, Typist, & Stenographer	✓	✓	✓	✓	✓	✓		✓	✓			✓	✓			✓
	●Salesman & Saleswoman, Manufacturers' Salesman, Wholesale	✓		✓	✓	✓		✓				✓	✓	✓			
	●Waiter and Waitress							✓									
	●Gen. Bookkeeper, & Bookkeeping & Accounting Clerk	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓
	●Over-the-Road Truck Driver and Local Truck Driver					✓							✓				✓
	●Machine Tool Operator, & Inspector					✓					✓			✓			
	●Sewing Machine Oprtr, Dressmkr, Tailor, Inspctr & Chkr	✓															
	●Automobile Mechanic and Diesel Mechanic					✓			✓		✓						✓
	●Real Estate Salesman and Broker			✓			✓										
	●Beauty Operator														✓		
	●Carpenter			✓		✓			✓		✓						
MODERATE	Life Insurance Agent and Property & Cas. Ins. Agt & Brkr						✓										
	●Practical Nurse									✓					✓		
	●Cook and Chef							✓									
	●Painter (Const.)			✓							✓						
	●Electrician, & Maintenance Electrician			✓	✓						✓						
	●Plumber and Pipefitter			✓							✓						
	●Teller (Bank)						✓										
	●Welder and Oxygen Arc Cutter			✓		✓					✓	✓		✓			
	●Draftsman			✓		✓								✓		✓	
	Postal Clerk								✓								
	●Stationary Engineer, & Stationary Fireman				✓			✓	✓	✓							
	●Appliance Serviceman				✓						✓		✓				
	Mail Carrier								✓								
	●Policeman								✓						✓		
	Bricklayer			✓													
	●Assemblers (Electronics), and Electrical Assembler					✓											
	●Fireman								✓						✓		
	●Operating Engineers			✓					✓								
	●Instrument Technician, Instrument Maker, & Instrument Rprmn					✓					✓	✓					
	Tool and Die Maker					✓								✓			
	●Medical X-Ray Technician									✓							
	Barber								✓						✓		
	●Medical Technologist									✓							
	Electronics Technician				✓	✓					✓						
	Television and Radio Serviceman		✓			✓					✓						
	Print Pressman															✓	
	Industrial Machine Repairman					✓					✓	✓		✓			
	Hand Compositor and Type Setter															✓	
	Structural, Ornamental, & Reinforcing Iron Worker			✓							✓						
	Claim Adjustor						✓										
	Cement Mason			✓													
	●Sheet Metal Worker			✓		✓					✓			✓			
	All-round Baker							✓									
	●Programmer																
	●Air-Conditioning & Refrigeration Mechanic				✓	✓					✓						
	Millwright					✓				✓	✓	✓		✓			
	Photographer															✓	
	Telephone Installer		✓														
	Total of All Occupations	4	4	15	6	18	6	6	11	6	17	6	5	10	5	4	4
	Total of 31 Selected Occupations	4	2	12	7	13	4	5	6	6	12	4	5	7	4	1	4

● Selected Occupations

the behaviors. A selected action was rejected and replaced by another randomly selected action if the behaviors it required were in the repertoire of all grammar school graduates or of all 18-year olds, if they could be acquired quickly without special training or practice, or if they were highly specific to a given job context. Forty measurable behaviors were described for each job. Each behavior was analyzed to identify the psychological processes and kinds of responses it required. Finally, behaviors were identified which were both suitable and feasible for testing. Test items were written for behaviors in each of the 31 occupations. Each occupation was represented by 19 or 20 five-alternative, multiple-choice questions. The entire battery consisted of 600 items assigned randomly to four test booklets of 150 items each. (Sample items are shown in Table 3.)

Test Administration. The battery was administered to approximately 10,000 students from grade nine through junior college at Woods County (Parkersburg), West Virginia, and Quincy, Massachusetts. Verbal and numerical aptitude scores were obtained for each student from the SRA Verbal Form.[6] In addition, each student supplied certain biographical and interest data about himself.

RESULTS

The analysis which produced the most promising results began with the computation of a total score for each student on each of the 31 occupations. The score for each occupation was the sum of scores obtained on the 19 or 20 items developed for that occupation. Table 4 presents mean scores obtained in each occupation by boys and girls.

When the occupations were listed in order from greatest male superiority in mean score to greatest female superiority (as shown in Figure 1), it seemed that the apparent sex differences might be a reflection of a more basic dimension of capability for dealing with vocational content. This dimension was thought to range from hardware on the "male" side to human relations on the "female" side. Using this dimension as a working hypothesis, the 600 items were grouped into six major areas along the dimension and subdivided into 24 sub-sets according to the consensus of four judges as to the capability measured by each item, but without regard to the occupation for which the item was written originally. Table 5 lists these areas and sub-sets with the number of items for each, and the number of occupations represented by the items. A brief description of the capabilities included in each major area is appended to this report. Table 5 also shows that each area and sub-set of items,

6 Thelma G. Thurstone & L. L. Thurstone, *SRA Verbal Form* (Chicago: Science Research Associates, 1947).

TABLE 3

Examples of Kinds of Items which Appear in Tests to Establish General Vocational Capabilities

- *A police patrolman is being driven by another patrolman to the place where he is to start his patrol on foot. He spots a pickpocket. What should he do?*

  a. *call headquarters to send someone to handle the case and go on to his beat*

  b. *find the patrolman who covers that beat and report the crime to him*

  c. *go to his beat and send the driver back to handle the case*

  ▷d. *stop and deal with the crime*

  e. *catch the pickpocket and take him to the patrolman's beat*

- *Which one of the tools below should a carpenter use to smooth and straighten the edge of a board?*

- *From the picture below, select the correct measurement indicated on the micrometer caliper.*

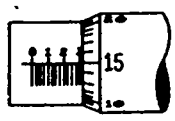
  ▷a. .315

  b. .340

  c. .345

  d. .350

  e. .355



- *A firefighting company wants to lay hose from the fire hydrant to the fire. What should they do first after the fire truck stops at the fire hydrant?*

  a. *estimate the amount of hose needed to fight the fire*

  b. *start stretching the hose toward the building on fire*

  c. *put the hose clamp on the hose behind truck*

  ▷d. *pull some of the hose off the truck*

  e. *attach the nozzle to the hose*

- *A bookkeeper takes a trial balance and finds there is a difference of $50 between the debits and the credits. He checks each $50 entry in the accounts and does not find an error. What should he do next?*

  ▷a. *look for a $25 entry posted in the wrong column (for example, in the debit column instead of the credit column)*

  b. *look for a $100 entry incorrectly posted in the larger column*

  c. *subtract $50 from one of the accounts to make the books balance*

  d. *look for a $10 and a $15 entry posted in the credit column*

  e. *report the error to his supervisor*

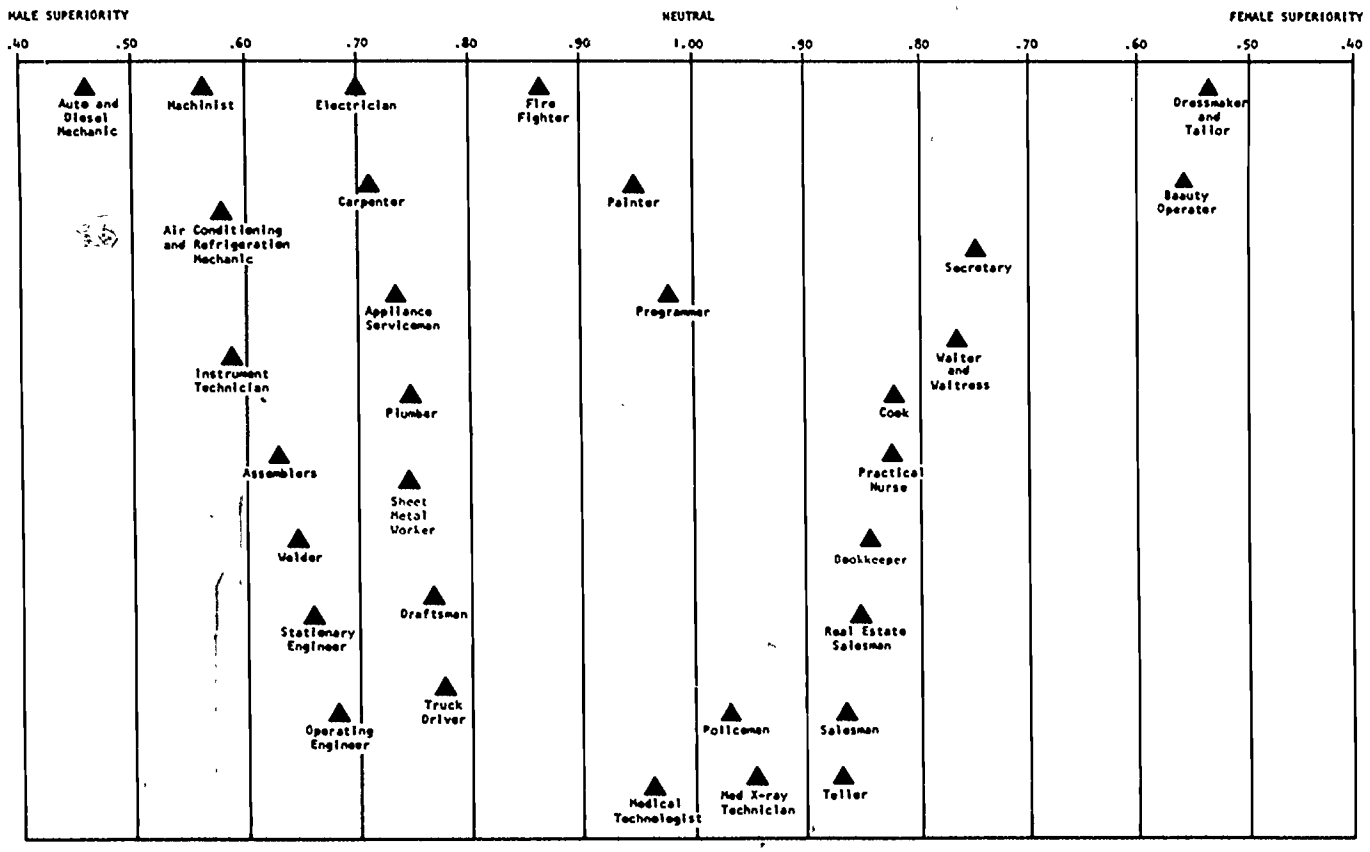


Figure 1. Male Versus Female Superiority for the 31 Occupations Tested—All Grades Combined (Example: .40 on the "Male Superiority" end of the scale would indicate that females did four-tenths as well as males.)

TABLE 4

Mean Sex Differences on Original Occupational Tests
(9th grade through junior college: 2662 males and 2610 females)

Job	Variable	Male Mean	Female Mean	Smaller/ Larger	Type	Male Reliability	Female Reliability
Air Conditioning and Refrigeration Mechanic	1	2.71	1.20	.44	M	.417	.051
	2	1.04	0.60	.58	M	.160	.057
	3	1.74	1.28	.74	M	.375	.351
	4	2.10	1.29	.61	M	.251	.244
	Σ	7.59	4.37	.58	M		
Appliance Serviceman	5	1.36	0.63	.46	M	.315	.210
	6	2.64	1.90	.72	M	.434	.095
	7	5.61	4.35	.78	M	.437	.341
	Σ	9.61	6.88	.72	M		
Assemblers	8	3.36	2.01	.60	M	.367	.293
	9	1.52	1.00	.66	M	.202	.132
	10	2.28	1.36	.60	M	.369	.280
	Σ	7.16	4.37	.61	M		
Auto and Diesel Mechanic	11	1.83	0.73	.40	M	.505	.184
	12	3.43	1.82	.53	M	.538	.375
	13	4.49	1.90	.42	M	.483	.301
	Σ	9.75	4.45	.46	M		
Beauty Operator	14	1.24	2.28	.54	F	.095	.316
	15	2.31	4.51	.51	F	.296	.098
	16	2.42	3.83	.63	F	.359	.182
	Σ	5.97	10.62	.56	F		
Bookkeeper	17	1.43	1.57	.91	F	.145	.196
	18	2.17	2.62	.83	F	.108	.001
	19	4.32	5.22	.83	F	.486	.455
	Σ	7.92	9.41	.84	F		
Carpenter	20	1.82	1.10	.60	M	.263	.231
	21	3.13	2.18	.70	M	.516	.345
	22	4.00	3.05	.76	M	.437	.390
	Σ	8.95	6.33	.71	M		
Cook and Chef	23	0.40	0.59	.68	F	.425	.439
	24	7.60	9.16	.83	F	.401	.430
	Σ	8.00	9.75	.82	F		

Job	Variable	Male Mean	Female Mean	Smaller/ Larger	Type	Male Reliability	Female Reliability
Draftsman	25	3.62	2.88	.80	M	.511	.496
	26	1.90	1.34	.71	M	.292	.156
	27	3.40	2.58	.76	M	.545	.455
	Σ	8.92	6.80	.76	M		
Electrician	28	0.88	0.64	.73	M	.295	.263
	29	2.51	2.02	.80	M	.362	.169
	30	3.07	2.07	.67	M	.552	.418
	31	1.61	0.94	.58	M	.396	.093
	Σ	8.07	5.67	.70	M		
Fire Fighter	32	3.70	3.18	.86	M	.314	.169
	33	2.36	2.09	.89	M	.249	.202
	34	3.13	2.60	.83	M	.273	.065
	Σ	9.19	7.87	.86	M		
Instrument Technician	35	2.06	1.03	.50	M	.418	.139
	36	2.32	1.66	.72	M	.222	.253
	37	1.57	0.92	.59	M	.127	.195
	38	2.55	1.43	.56	M	.376	.199
	Σ	8.50	5.04	.59	M		
Machine Tool Operator and Machinist	39	3.50	1.59	.45	M	.285	.141
	40	2.52	1.56	.62	M	.497	.419
	41	2.67	1.75	.66	M	.383	.220
	Σ	8.69	4.90	.56	M		
Medical Technologist	42	2.99	2.47	.83	M	.373	.338
	43	3.82	3.85	.99	F	.354	.250
	44	1.66	1.80	.92	F	.285	.256
	Σ	8.47	8.12	.96	M		
Medical X-Ray Technician	45	3.13	3.51	.89	F	.499	.355
	46	1.34	1.37	.98	F	.299	.165
	47	1.71	1.72	.99	F	.339	.246
	Σ	6.18	6.60	.94	F		
Operating Engineer	48	0.69	0.59	.86	M	.091	.042
	49	1.06	0.73	.69	M	.072	.022
	50	7.18	4.77	.66	M	.521	.346
	Σ	8.93	6.09	.68	M		

Painter	51	1.82	1.78	.98	M	.233	.368
	52	3.33	2.91	.87	M	.533	.380
	53	3.33	3.24	.97	M	.156	.300
	Σ	8.48	7.93	.94	M		
Plumber and Pipefitter	54	1.74	1.36	.78	M	.302	.343
	55	4.38	3.79	.87	M	.405	.291
	56	2.98	1.55	.52	M	.539	.143
	Σ	9.10	6.70	.74	M		
Policeman	57	1.84	1.92	.96	F	÷052	.020
	58	1.03	1.11	.93	F	.222	.226
	59	5.02	5.04	1.00	F	.137	.145
	Σ	7.89	8.07	.98	F		
Practical Nurse	60	2.54	2.87	.89	F	.080	.103
	61	2.33	3.09	.75	F	.426	.297
	62	1.68	2.00	.84	F	.222	÷110
	63	1.71	2.15	.80	F	.122	.137
	Σ	8.26	10.11	.82	F		
Programmer	64	3.59	3.43	.96	M	.622	.593
	65	0.78	0.70	.90	M	.467	.510
	66	1.43	1.48	.97	F	.396	.451
	67	1.03	1.00	.97	M	÷072	÷088
	Σ	6.83	6.61	.97	M		
Real Estate Salesman and Broker	68	1.36	1.56	.87	F	.101	÷242
	69	0.93	1.17	.79	F	.202	.010
	70	0.91	1.12	.81	F	.328	.271
	71	3.35	3.83	.87	F	.348	.362
	Σ	6.55	7.68	.85	F		
Salesman	72	5.49	6.32	.87	F	.373	.469
	73	1.89	2.24	.84	F	.282	.064
	Σ	7.38	8.56	.86	F		
Sheet Metal Worker	74	1.96	1.29	.66	M	.194	.159
	75	1.98	1.42	.72	M	.423	.286
	76	2.44	2.15	.88	M	.104	.220
	77	1.54	1.03	.67	M	.304	.154
	Σ	7.92	5.89	.74	M		
Secretary, Typist, Stenographer	78	1.97	2.44	.81	F	.259	.239
	79	2.76	3.77	.73	F	.171	.240
	80	1.95	2.68	.73	F	.336	.194
	Σ	6.68	8.89	.75	F		
Sewing Machine Operator, Dressmaker, Tailor	81	1.49	3.18	.47	F	.278	.400
	82	2.16	3.78	.57	F	.163	.169
	83	1.67	3.06	.55	F	.303	.123
	Σ	5.32	10.02	.53	F		
Stationary Engineer	84	3.49	2.29	.66	M	.357	.298
	85	1.46	0.68	.47	M	.052	÷004
	86	1.99	1.59	.80	M	.152	.281
	87	1.59	0.98	.62	M	.244	.049
	Σ	8.53	5.54	.65	M		
Teller	88	0.72	0.69	.96	M	÷030	.057
	89	5.81	6.62	.88	F	.525	.325
	90	1.94	2.38	.82	F	.338	.035
	Σ	8.47	9.69	.87	F		
Truck Driver	91	2.27	1.78	.78	M	.360	.096
	92	2.42	1.40	.58	M	.221	.208
	93	3.37	3.03	.90	M	.201	.113
	Σ	8.06	6.21	.77	M		
Waiter and Waitress	94	0.32	0.38	.84	F	.020	÷002
	95	0.24	0.39	.62	F	.334	.464
	96	5.48	7.17	.76	F	.462	.395
	Σ	6.04	7.94	.76	F		
Welder and Oxygen Arc Cutter	97	5.06	3.06	.60	M	.357	.385
	98	2.44	1.62	.66	M	.192	.087
	99	1.76	1.24	.70	M	.188	.063
	Σ	9.26	5.92	.64	M		

TABLE 5

Number of Items and Number of Occupations Represented in Each Major Area of General Vocational Capability and Each Subset of Items

Major Area Subset	Number of Test Items	Number of Occupations
Mechanical	167	21
Tools	57	17
Mechanical Systems	35	9
Stationary Equipment Operation	11	5
Vehicular Operation	28	2
Connections and Fittings	25	9
Operation of Cleaning, Service, & Light Garment Equipment	11	2
Electrical	34	8
Electricity	34	8
Spatial	43	8
Structures	21	4
Layout & Visualization	22	5
Chemical	81	14
Fluid Systems	11	3
Chemicals	21	9
Materials	22	11
Biological Systems	9	3
Foods & Cooking	18	2
Symbolic	127	27
Measuring Instruments & Measurement	28	16
Computing	41	16
Arithmetic Convention	38	4
Clerical	20	3
People	148	15
Medical & First Aid	37	7
Service	16	4
Sales	37	3
Dealing with Situations	26	3
Etiquette	10	3
Style and Grooming	22	3

defined in terms of common capabilities without regard for occupation, was reasonably comprehensive as to the sampling of specific behaviors and was general over at least several occupations.

The correlations among total scores on sub-sets of items are reported separately for boys and girls in Table 6, which also gives the mean, standard deviation, and reliability of each score. Table 7 gives the same data for area scores. These results exclude 41 computing items which were eliminated as being atypically elementary, and 11 garment equipment operation items which were eliminated as being unusually specific. Data are presented only for twelfth-grade students in order to simplify the discussion.

The reliability estimates in Table 7 for scores on each major area of general capability show that the scores have substantial dependability and internal consistency. In addition, the pattern of correlations among areas is exceptionally well structured for human behavioral data. Thus, the areas are listed from one to six in the table according to their positions on the hypothesized dimension of capability from hardware to human relations. There is a very strong tendency for correlations to be higher between areas close together on the dimension than between areas remote from each other. Area 1 (mechanical) has its highest correlation with Area 2 (electrical), its next highest correlation with Area 3 (spatial), etc. A similar pattern is seen, with only two specific reversals, in the rest of the correlation matrix.

Table 8 reports the correlations between area scores and the linguistic and quantitative aptitudes of students as measured by the SRA Verbal Form. Although reliabilities of the area scores are higher than the published reliabilities of the SRA tests, the correlations between the two aptitude tests are higher than the correlation of either test with a specific area. These data indicate that the area capabilities involve knowledge which is at least partially independent of quantitative and linguistic aptitudes as commonly measured.

Thus, the evidence is that an orderly domain of general vocational capabilities has been identified. Review of the behaviors included in each area strongly suggests that the capabilities identified in this study have wide applicability to occupations other than the 31 analyzed. However, the comprehensiveness of the array is subject to question. Inclusion of additional occupations would be expected to add other capabilities having general occupational relevance. Also absent from the present account are various basic or "universal" job capabilities such as are acquired in grammar school, and others which involve communications, work habits, safety, and getting along with others on the job.

As James Altman has observed,[7] nothing comparable to a basic job technology (such as is suggested by this study) appears now to

7 Altman, *op. cit.*

TABLE

Obtained Correlations between Tests,
(results for 757 male seniors above the diagonal

KEY:

1 Mechanical
2 Electrical
3 Spatial
4 Chemical-Biological
5 Symbolic
6 People

		Tools	Mechanical Systems	Measuring Instruments	Stationary Equipment Operation	Vehicular Operation	Connections and Fittings	Fluid Systems	Electricity	Layout and Visualization	Structures
		1							2	3	
1	Tools		.815	.744	.548	.679	.683	.629	.727	.565	.568
1	Mechanical Systems	.786		.732	.548	.683	.668	.644	.750	.584	.601
1	Measuring Instruments	.742	.725		.418	.665	.642	.547	.700	.672	.591
1	Stationary Equipment Operation	.576	.613	.476		.457	.532	.509	.500	.355	.400
1	Vehicular Operation	.665	.698	.672	.461		.636	.544	.617	.588	.601
1	Connections and Fittings	.712	.690	.630	.564	.615		.588	.682	.583	.588
1	Fluid Systems	.598	.619	.547	.487	.488	.567		.590	.424	.488
2	Electricity	.705	.753	.693	.548	.655	.707	.559		.605	.630
3	Layout and Visualization	.592	.618	.672	.420	.586	.584	.428	.640		.602
3	Structures	.561	.579	.609	.412	.571	.575	.422	.613	.632	
4	Materials	.560	.592	.609	.435	.560	.520	.475	.592	.577	.564
4	Chemicals	.482	.529	.548	.485	.476	.533	.469	.593	.506	.467
4	Foods and Cooking	-.014	.058	.101	.054	.106	.094	.082	.107	.164	.207
4	Biological Systems	-.023	.051	.089	.012	.065	.033	.022	.085	.174	.189
4	Medical and First Aid	.195	.250	.315	.219	.285	.237	.227	.307	.389	.394
5	Arithmetic Conventions	.041	.134	.185	.119	.249	.153	.112	.234	.276	.321
5	Clerical	-.104	-.048	.040	.014	.078	.000	-.020	.047	.170	.193
6	Sales	-.005	.066	.158	.037	.203	.071	.066	.165	.244	.281
6	Dealing with Situations	.195	.207	.295	.121	.343	.208	.152	.246	.303	.378
6	Service	-.090	.015	.059	.036	.139	.011	.004	.082	.196	.185
6	Etiquette	-.057	-.042	.043	-.002	.063	.018	-.088	.013	.142	.186
6	Style and Grooming	-.282	-.171	-.153	-.052	-.107	-.112	-.116	-.101	.023	.067
Female	Means	18.24	10.96	11.62	2.38	11.52	6.58	2.40	11.02	7.79	7.51
Female	Standard Deviations	7.66	5.19	4.52	1.58	4.08	3.14	1.59	5.28	3.77	2.81
Female	Split Half Reliabilities	.825	.775	.754	.405	.643	.570	.435	.789	.732	.583

Ordered by a Hardware-People Continuum
and for 681 female seniors below the diagonal)

					4			5		6			Male		
Materials	Chemicals	Foods and Cooking	Biological Systems	Medical and First Aid	Arithmetic Conventions	Clerical	Sales	Dealing with Situations	Service	Etiquette	Style and Grooming	Means	Standard Deviations	Split Half Reliabilities
.577	.494	.100	.010	.210	.156	.050	.082	.358	.006	.006	-.216	22.57	8.35	.853
.590	.551	.132	.077	.273	.229	.015	.143	.385	.047	.032	-.162	13.82	5.20	.732
.622	.512	.166	.095	.351	.267	.122	.202	.427	.156	.149	-.149	13.61	4.48	.733
.384	.412	.115	.078	.181	.177	.021	.100	.244	.043	.002	.015	2.89	1.68	.417
.559	.488	.210	.125	.370	.317	.161	.244	.474	.190	.163	-.027	13.06	3.88	.605
.575	.510	.175	.116	.310	.269	.125	.194	.353	.143	.114	-.043	7.90	3.42	.654
.504	.501	.176	.094	.291	.238	.071	.178	.353	.073	.091	-.043	3.09	1.71	.489
.631	.604	.218	.167	.375	.351	.159	.270	.402	.170	.134	-.087	13.90	5.57	.791
.618	.498	.254	.199	.427	.398	.245	.342	.429	.272	.285	.008	9.02	3.66	.690
.583	.516	.249	.209	.397	.376	.228	.347	.393	.224	.208	.035	8.45	2.87	.569
	.607	.404	.278	.539	.423	.311	.349	.504	.362	.323	.148	9.04	3.24	.579
.569		.354	.294	.511	.443	.318	.406	.375	.279	.282	.159	7.81	2.87	.570
.328	.290		.426	.539	.426	.479	.486	.407	.464	.437	.463	8.78	2.62	.458
.239	.226	.412		.472	.422	.413	.442	.197	.364	.336	.430	3.45	1.45	.256
.500	.454	.519	.477		.608	.547	.627	.516	.557	.488	.445	14.43	4.76	.708
.347	.328	.464	.335	.488		.616	.693	.451	.528	.428	.396	16.75	5.40	.655
.236	.218	.516	.375	.501	.611		.627	.356	.532	.434	.489	7.50	3.00	.575
.375	.318	.541	.403	.573	.662	.636		.474	.590	.515	.432	15.67	5.06	.728
.380	.327	.423	.286	.468	.405	.397	.511		.405	.418	.188	9.94	2.98	.499
.279	.249	.539	.408	.542	.537	.588	.631	.449		.470	.444	7.87	2.48	.434
.227	.163	.439	.280	.382	.409	.450	.497	.427	.476		.415	4.25	1.70	.442
.093	.131	.511	.460	.438	.436	.560	.507	.324	.542	.432		9.55	3.75	.670
8.13	7.02	9.18	3.64	14.27	16.92	7.52	16.02	9.86	8.59	4.36	10.64			
3.08	2.63	2.88	1.47	4.47	5.53	3.08	5.08	2.94	2.68	1.61	3.74			
.574	.486	.540	.151	.658	.632	.607	.758	.485	.524	.217	.643			

exist, or to be contemplated in the public school curriculum. Yet, such content seems to be an appropriate core for a vocational curriculum with general occupational relevance. Probably, the basic job technology should follow the acquisition of basic intellectual tools, and precede specific vocational training in the curriculum. In that position, the basic technology could provide vocationally relevant skills while also offering an improved basis for both career planning and the choice of specific vocational training. It would serve then as a bridge between traditionally academic subjects and vocational training.

We turn now from the research study to a development project which has identified additional kinds of general vocational capabilities and has begun to include them in the secondary school curriculum.

AN EXPERIMENTAL CURRICULUM

The second study I wish to discuss is a joint project of the American Institutes for Research and the Public Schools of Quincy, Massachusetts, supported in part by a contract with the U. S. Office of Education, Division of Adult and Vocational Research.[8] The principal goal of the project is to develop and evaluate the effectiveness of a curriculum for which the content is derived explicitly from the behavior desired of graduates, and in which new educational technology is applied to its design, conduct, and evaluation. Included in this technology are methods of defining educational objectives, deriving topical content for courses, preparing students in prerequisite knowledge and attitudes, individualizing instruction, measuring student achievement, and establishing a system for evaluating program results in terms of outcomes following graduation.

We are trying to build a comprehensive curriculum for all students who do not intend to enter a four-year college program. Goals for the graduate include responsible citizenship and effective self-fulfillment, as well as vocational satisfaction. We are concerned

8 American Institutes for Research and Quincy Public Schools, *Development and Evaluation of an Experimental Curriculum for the New Quincy (Mass.) Vocational-Technical School* (Pittsburgh: American Institutes for Research, November 1964); E. J. Morrison, *Development and Evaluation of an Experimental Curriculum for the New Quincy (Mass.) Vocational-Technical School: First Quarterly Technical Report* (Pittsburgh: American Institutes for Research, June 30, 1965); E. J. Morrison, *The Problem of Defining Objectives: Second Quarterly Technical Report* (Pittsburgh: American Institutes for Research, September 30, 1965); E. J. Morrison and R. M. Gagné, *Curriculum Implications of the Study of Objectives: Third Quarterly Technical Report* (Pittsburgh: American Institutes for Research, December 31, 1965); E. J. Morrison and Vivian M. Hudak, *A Vocational Guidance Plan for Junior High School: Fourth Quarterly Technical Report* (Pittsburgh: American Institutes for Research, March 31, 1966); E. J. Morrison and W. B. Lecznar, *The Roles, Characteristics, and Development Procedures for Measures of Individual Achievement: Fifth Quarterly Technical Report* (Pittsburgh: American Institutes for Research, June 30, 1966).

TABLE 7

Intercorrelations of Major Areas of General Vocational Capabilities
for 12th Grade Students
(results for 757 males shown above the diagonal and for 681 females below the diagonal)

		1	2	3	4	5	6	MALE MEANS	MALE STD. DEV.	MALE RELIA.*
1.	MECHANICAL		.796	.733	.671	.558	.275	66.54	20.06	.912
2.	ELECTRICAL	.801		.688	.647	.579	.297	13.90	5.57	.791
3.	SPATIAL	.745	.694		.661	.685	.430	18.26	5.95	.760
4.	CHEMICAL and BIOLOGICAL	.622	.582	.616		.704	.674	33.29	8.91	.809
5.	SYMBOLIC	.506	.508	.638	.688		.705	51.86	14.18	.888
6.	PEOPLE	.167	.179	.352	.633	.676		63.01	15.99	.898
FEMALE	MEANS	55.56	11.01	15.98	31.34	49.60	65.02			
FEMALE	STD. DEV.	19.26	5.27	6.11	8.36	13.99	16.01			
FEMALE	RELIA.*	.898	.789	.788	.789	.881	.890			

* split half

TABLE 8

Correlations between Aptitude Scores and Major Areas of General Vocational Capability
(757 male and 681 female high school seniors)

Area of Vocational Capability	Males (aptitude)		Females (aptitude)	
	Linguistic	Quantitative	Linguistic	Quantitative
Mechanical	.23	.27	.25	.24
Electrical	.27	.31	.26	.25
Spatial	.40	.45	.39	.40
Chemical-Biological	.49	.38	.49	.36
Symbolic	.58	.59	.57	.57
People	.52	.39	.52	.38
	Correlation of linguistic with quantitative is .69		Correlation of linguistic with quantitative is .71	

with much more than narrow training for a specific job; we are trying to develop competence and versatility in every student, to the extent that his capabilities and our time and facilities permit. The curriculum is being designed to be clearly relevant to the needs of graduates, and to be adaptable to the goals and needs of the individual student. The accompanying guidance program is intended not only to assist students and their parents in acquiring information systematically, but also to teach and give practice in the making of rational educational and vocational decisions.

Only a portion of this large and ambitious project is germane to the present discussion. Further, the project is still in progress, with several years to go before detailed curricula will be specified, tried out, and evaluated. This report can therefore present only a summary of interim results. These will include a brief review of the procedure for deriving curriculum objectives from generally stated goals, a description of several kinds of generalizable vocational capabilities identified as objectives, and an outline of current plans for including these capabilities in the curriculum.

DEFINING THE DOMAIN OF OBJECTIVES

However suitable "vocational satisfaction," "responsible citizenship," and "self-fulfillment" may be as broad goals, they are not adequate as working objectives for curriculum development. The design of learning units, learning sequences, and proficiency measures requires that objectives be defined in terms of the performance capabilities to be demonstrated by successful students. The first major task of the project was to translate the broad goals into a set of performance objectives for students both in their courses of study and in the learning units within each course. Our strategy was to develop a comprehensive map of the total domain of educational objectives in each of the three areas of concern to the project, to choose portions of the domain for emphasis, and to specify objectives for the curriculum within the selected portions.

Figure 2 illustrates the mapping procedure by charting the first levels of our analysis of the domain of vocational objectives. Thus, vocational satisfaction, our general goal, was defined to include those capabilities necessary to choose a career, to forge a career, and to demonstrate basic skills in an occupation. Each of these sub-classes of objectives was analyzed for its constituent capabilities. The process was continued until statements of performance capability were produced which would be suitable as objectives for learning units. The procedure and its rationale were described and illustrated in detail for all three areas of educational objectives in one of the project reports.[9] The advantages of this method were that

9 E. J. Morrison, *The Problem of Defining Objectives, op. cit.*

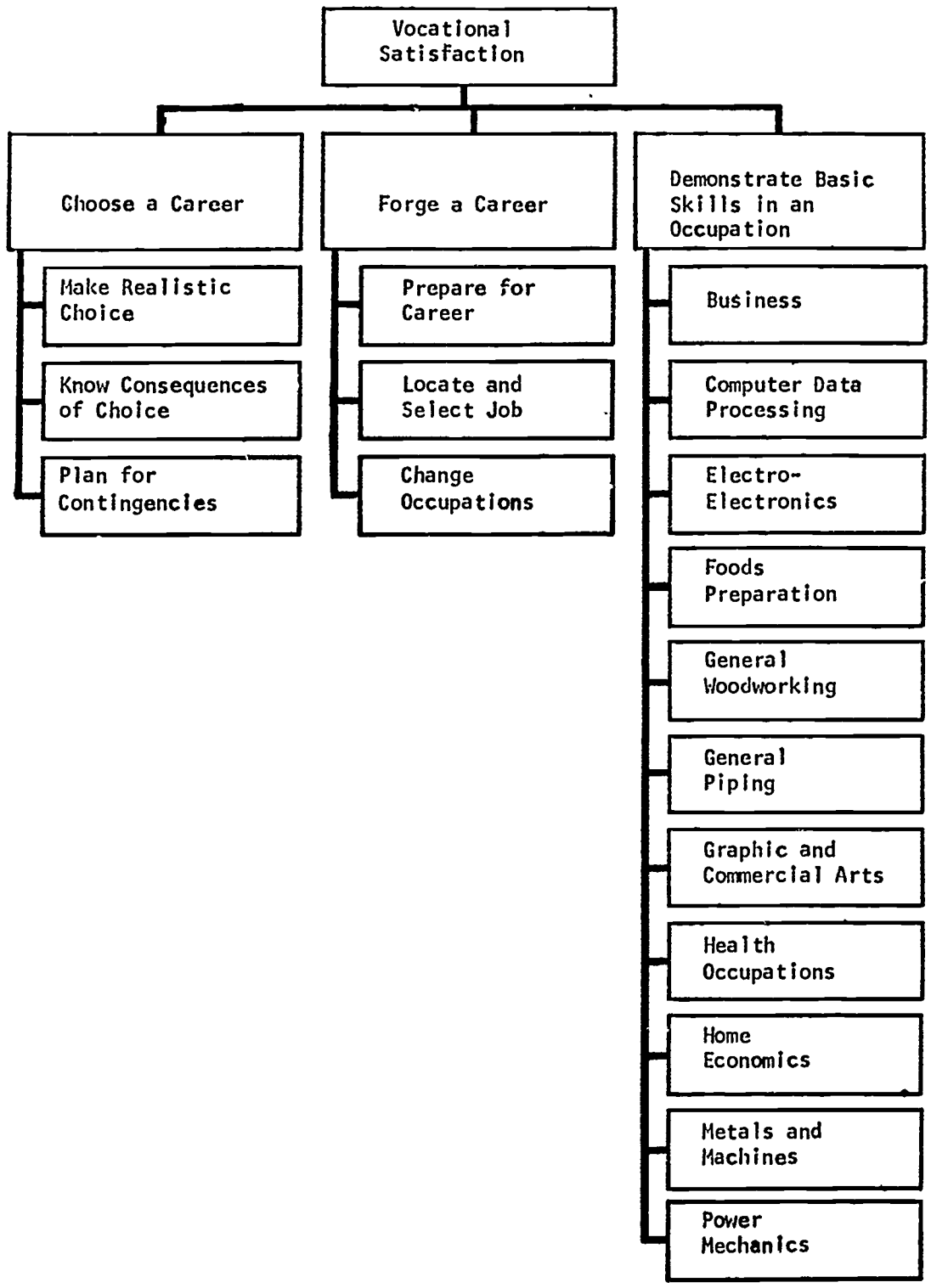


Figure 2. Summary of Vocational Objectives

(1) it permitted us to be complete in itemizing the kinds of performances we wished to consider; (2) it allowed us to select classes of objectives at the most general level as the analysis proceeded — so that many possible objectives were considered and eliminated implicitly rather than by the more laborious explicit procedures; and (3) it provided a chain of statements which was the rationale by which specific instructional objectives were related to the general goals.

VOCATIONAL OBJECTIVES

Several kinds of general capability have been identified in this analysis and specification process. As Figure 2 indicates, some types were defined which are generalizable (in the sense of being useful, even necessary) in a variety of occupations, but which are not required for the actual performance of tasks which make up a particular job. Thus, if choosing a career is a continuous process in which an individual must repeatedly review his aspirations and skills in view of current opportunities, then many of the capabilities required in making effective career choices are highly generalizable. The same is true of capabilities required in forging a career.

Other kinds of general capabilities were identified in the portion of the analysis directed to the requirements of particular jobs. Thus, in the portion derived from "Demonstrate Basic Skills in an Occupation," we selected and defined eleven occupational areas and over 200 specific jobs for which training would be designed. Each of these jobs was analyzed, its tasks were enumerated and described, and specific objectives were written for courses and topics of instruction. In this process, we identified some capabilities which are general for a number of occupations. Usually, these appeared as highly similar objectives written for different occupations. The proper use of certain classes of measuring instruments, for example, occurred repeatedly in the lists of objectives defined for jobs in the metals and machines area. Other examples are blueprint reading, and the use of standard symbols within a particular group of occupations (e.g., electronics).

A third group of generalizable capabilities appeared when the tasks required in each selected job were analyzed for necessary capabilities in "academic" areas. Thus, the development of objectives in mathematics began with the analysis of job tasks for the specific mathematical skills they require. Tabulation of data from all occupations led to the identification of a core of commonly required mathematical skills and several sub-cores of significant, but less pervasive, generality. These skills provide a structure for the essentials of mathematics courses. Other material may be added to this structure for pedagogical reasons or to increase the student's versatility.

Finally, in our study of occupations we are finding rather general vocational skills and knowledges which perhaps can be described best as work habits and attitudes. These have to do with such things as being systematic, keeping tools and work spaces clean and orderly, observing safety rules, adhering to procedures, being prompt, etc.

Our study of the requirements for vocational competence and satisfaction has led to the identification of a variety of capabilities which have significant generality and are important candidates for a curriculum which intends both to be relevant to the needs of graduates and to produce graduates who are vocationally versatile.

CURRICULUM PLANS

The project is, at the time of this writing, just beginning the task of defining and developing curriculum content. Consequently, I can only outline tentative plans for general vocational capabilities. However, it is clear that the capabilities defined under choosing and forging a career will be objectives for the guidance program beginning in seventh grade. Once during each junior high year, the student will go through a step-by-step procedure of data gathering, analysis, and tentative choice among educational programs and vocational goals. Each cycle of the process will be more thorough and specific than the preceding year's cycle. In grade nine, the procedure will lead naturally to the choice of a high school program, as required of every ninth-grade student. It is expected that this successive cycling plan will permit students to acquire a substantial amount of information about themselves, about occupations, about educational opportunities and requirements, and about sources of information. Perhaps more important is the opportunity to learn to apply a systematic procedure in career decision-making. In view of the large variety and range of individual differences expected in the abilities, interests, life situations, and goals of the students, guidance program activities will be substantially individualized so that each student may develop and plan for goals which are reasonable, relevant, and acceptable to him.

Technical skills and knowledge required over a number of occupations pose a rather different question. To understand our curriculum provisions for these capabilities, it is important to know that we selected jobs within each occupational area which form a skill and experience sequence. Thus, as the student progresses through training he qualifies for successively higher-skilled jobs. The plan is that he will be certifiable in some employable skill no matter when he leaves school, within rather broad limits. Under this arrangement, much of what the student learns during the early stages of his training is generalizable and prerequisite to jobs that are

higher in his occupational ladder. The curriculum provides simply that capabilities with this kind of generality occur early in the specific vocational learning sequence.

Some technical skills cut across occupational areas. A good example might be welding, which occurs in the piping, metals and machines, and electro-electronics areas. We have not decided how to handle such items. The identification of a capability which has general usefulness is a matter quite separate from the selection of an effective procedure for learning it. Presently, we tend to believe that general technical skills needed in several occupational areas should be sought as prime candidates for inclusion in the curriculum, although they are taught best in their natural place in each specific vocational sequence. We do plan to make students aware of the general value of the skills, and to make such modifications in the learning units for those skills as will enhance the students' ability to apply them in other occupations.

A similar plan is proposed for those skills earlier called work habits and attitudes. We expect that it will be necessary for students to acquire these through much practice, and that the best place for such practice is in the student's shop and laboratory work. The most important curricular provision is a clear statement of objectives and requirements in this area, demonstration and explanation by instructors, and objective assessment of the student's performance. No special learning unit or set of units is contemplated at this time for work habits and attitudes.

Finally, we are planning a course in basic technology founded substantially on the results and concepts developed in the previously described study. As we analyzed the job requirements in detail, the kinds of knowledge and skill described in the previous study appeared frequently to be basic or prerequisite capabilities. This was true in virtually all occupational areas, including such areas as business, computer data processing, and home economics, as well as the traditional trade areas. The basic technology course will include: (1) machines and mechanical principles; (2) electrical, electro-mechanical, and electronic principles; (3) applied geometry of solids and structures; (4) chemical components and reactions; and (5) human relations. Each of these will be both practical and applied, and thus not appropriately handled in science courses. However, they will provide a practical, experiential basis for the science courses which follow. The symbolic area identified in the previous study contains major verbal and numerical components. In our planning, the verbal portion is being included in the English curriculum, and the numerical portion is included in the mathematics curriculum.

We are well aware that the development of a curriculum in basic technology which adequately serves the apparent needs of secondary school graduates would require far more time and money than are

available in the Quincy project. Nevertheless, we plan to make a beginning, both because we expect to learn something about the problems of developing and integrating such a curriculum, and because we believe the material to be sufficiently important to demand our best effort to introduce it at an early date.

CONCLUSION

The two studies reported here are only first attempts at the identification of general vocational capabilities in specific terms. The results we have are tentative and subject to revision. There are, however, two things which experience with these projects leads me to emphasize.

First, when we speak of general vocational skills, we need to be careful to define the domain over which generality is sought. The two studies used different starting points and produced non-identical results. One began with the examination of specific, basic job requirements and found a number of capabilities which were general over numerous jobs and tasks. The other began with a general goal, "vocational satisfaction," and found additional sets of general capabilities which are important, but not required for actual performance of tasks. It is not difficult to foresee confusion if studies of general skills do not specify the kind of generality they are examining. A systematic description of the kinds of generalization available would be a significant contribution.

The second thing I would emphasize is the need for empirical work. We must not allow ourselves to fall into the trap of justifying curriculum content on the grounds that it provides the student with some vaguely defined "general background." People can learn facts, principles, concepts, skills, attitudes, etc., but no one can learn all of them in the time available. A basic problem in curriculum development is to provide for the organized learning of some of them. A set of specific objectives must be selected which best satisfies the needs of graduates. The best source of information about those needs is an examination of what graduates actually must be able to do. We need much better empirical definition than we have of the capabilities required of ordinary citizens if we are to produce really versatile graduates, let alone prepare them for a rapidly changing future.

APPENDIX

A Brief Description of Major Areas of General Vocational Capabilities

Mechanical

The mechanical area deals with machines and mechanical principles. It implies an organized body of knowledge concerning mechanical components and principles applied to a wide variety of industrial and home situations. The components and principles include (1) a set of elementary mechanical principles having application to a wide variety of jobs; (2) common types of mechanical systems (both stationary and vehicular), components, and functions, and their operation, maintenance, and design; (3) common types of tools, connectors, and fittings, and their appropriate uses; and (4) principles of safety as they relate to mechanical devices. In addition, fluid systems (although these have many generic ties to the physical chemistry area) and measurement and measuring instruments (which also have clear relationships to the quantitative symbolic area) seem to fit best within the mechanical area.

Electrical

The electrical area would seem to encompass concepts and principles of electricity, electro-mechanics, and electronics which are commonly applied in work and home situations. The sampling of occupations in the current study was such that only an incomplete scattering of such concepts and principles emerged. It was necessary, therefore, to combine all of the items having to do with things electrical into a single test. It is likely that a more complete analysis of the electrical area would define a useful set of sub-areas. A sub-area devoted to electro-mechanics, for example, might provide a convenient bridge between the mechanical area and the more purely electrical areas of electricity and electronics.

Spatial

The spatial area is concerned primarily with the application of geometric, numerical, and drawing techniques to problems of simple structural design and representation. It implies knowledge of drawing instruments, standards, and techniques, and includes layout, visualization, uses for building materials, and construction methods. A central focus is the application of the findings and methods of geometry to drawings and structures.

Chemical-Biological

This area encompasses the application of elementary concepts and principles of chemistry, biology, and physics to common problems found in a variety of occupations. Included are principles of hygiene, chemical dangers, and toxicity; and characteristics, properties, and uses of common materials (although these seem to have clear relationships to knowledge in the mechanical and spatial

areas as well). In addition, chemical components and reactions, biological and medical systems, and foods all seem to fit reasonably well into this area.

A great many of the chemical and biological principles would seem to draw upon computational and symbolic manipulation skills of the sort involved in the symbolic area for their full exposition and facility of application.

Symbolic

The symbolic area includes major verbal and numerical components. The numerical component deals with applications of symbol systems to work situations, facility in carrying out arithmetic operations, and arithmetic and bookkeeping conventions. The verbal component emphasizes aspects of spoken and written English which are commonly important to jobs. Elements derived from the jobs analyzed in the current study tend to emphasize clerical skills associated with the production, processing, and storage of written communications and records. A more extensive analysis probably would place added emphasis on giving and taking instructions, and on the preparation and presentation of reports.

People

This area is concerned primarily with aspects of human interaction and relations frequently encountered in jobs. It includes behavior relating to style, grooming, etiquette, and job conventions, as well as ethical, legal, and social criteria that govern behavior in emergencies and other non-routine situations. A sub-area of "sales" is concerned with facilitating persuasive interactions within established limits of propriety. A sub-area of "service" deals with appropriate interaction between workers and clients of all kinds. Although not explicitly included within the AIR study, aspects of effective supervision and subordinate behavior would seem logically to fall within this area.

THE CLUSTER CONCEPT AS A PROGRAM IN VOCATIONAL EDUCATION AT THE SECONDARY SCHOOL LEVEL

NEVIN R. FRANTZ, JR.
UNIVERSITY OF MARYLAND

THE PROBLEM

Individuals who are preparing curricula for vocational education programs face the perplexing dilemma of whether to prepare students for highly-skilled employment in a specific occupation, or to provide broad programs of general training for a wide variety of occupations. The cluster concept program now being developed at the University of Maryland, under the direction of Dr. Donald Maley, aims at a middle ground, with the purpose of developing specific job-entry skills for a cluster of occupations.

The cluster concept program will prepare a person to enter a family of occupations rather than a specific occupation. The program will not prove any single occupation in depth, but will instead provide job-entry skills and knowledge common to a number of related occupations.

RESEARCH OBJECTIVES AND PROCEDURES

The following objectives and research procedures have been outlined for investigating and developing the cluster concept as a program in vocational education at the secondary school level:

OBJECTIVE A: *To determine the appropriateness of the cluster concept as a program in vocational education at the secondary school level.*

(1) An extensive search was made of the literature in the areas of education, labor, economics, and industry to obtain an indication of the need for a cluster concept program.

(2) A series of interviews with individuals representing industry, education, and labor was conducted in order to obtain an indication of the acceptability and feasibility of a cluster concept program.

(3) The data obtained by the first two methods were analyzed to determine the need, acceptability, and feasibility of the cluster concept program.

OBJECTIVE B: *To identify the occupational families, and the*

specific occupations within each family, that are suitable for a cluster concept program at this level.

(1) A review and evaluation of research in the area of occupational grouping was conducted to determine possible application for the project.

(2) A method of research, based upon a sampling technique proposed by James Altman and Robert Gagne of the American Institutes for Research, was developed to determine occupational clusters.[1]

(3) A group of three occupational clusters with their respective selected occupations was identified for further analysis.

OBJECTIVE C: *To develop a series of course outlines.*

(1) A review of research was conducted to determine methods of analyzing the selected occupations in order to identify the common areas of human requirement needed for each occupational family.

(2) A method based upon a procedure proposed by Robert Smith of the Human Resources Research Office was developed to analyze each occupation in the cluster.[2]

(3) A list of tasks for each occupation was constructed by reviewing training manuals, courses of study, and textbooks, and by interviewing representatives from each occupation.

(4) A task identification inventory was developed and submitted to the group of individuals representing the selected occupations in order to determine job-entry tasks.

(5) The job-entry tasks thus identified were analyzed to determine the areas of human requirement (skills, mathematics measurement, science, communication, and information) which would be needed to successfully perform the tasks.

(6) An analysis technique, based on a study by Robert Miller and John Folley, was used to identify the common areas of human requirement within each occupational cluster.[3]

(7) Finally, a course of study for each occupational family was developed from the common areas of human requirement identified by the above method.

1 James W. Altman and Robert M. Gagne, *First Interim Report on Research on Vocational Skills* (Pittsburgh: American Institutes for Research, 1964).

2 Robert G. Smith, Jr., *The Development of Training Objectives,* Research Bulletin No. 11 (Alexandria, Virginia: Human Resources Research Office, 1964).

3 Robert B. Miller, John D. Folley, Jr., and Philip R. Smith, *A Comparison of Job Requirements for Line Maintenance of Two Sets of Electronics Equipment,* AFPTRC–TR–54–83 (Lackland AFB, Texas: Air Force Personnel and Training Research Center, December 1954).

THE NEED FOR A CLUSTER CONCEPT PROGRAM

The review and analysis of literature in the areas of education, labor, economics, and industry indicated a definite need for the cluster concept program in four major respects. In the first place, there is a need to provide students with a greater degree of mobility on a geographical basis. Second, there is a need for increased mobility within an industry or occupation. Third, students must be trained so that they can adapt to technological change. And finally, students must be given a greater flexibility in their occupational choice patterns. Let us elaborate now on the nature of these needs and the ways in which the cluster concept program could meet some of them.

Geographic Mobility

In 1965, the Bureau of the Census issued a report containing the following statement:

> Of the 185.3 million persons 1 year old and over living in the United States in March, 1964, 36.3 million, or 19.6 percent, had been living at a different address in the United States in March, 1963. . . . The peak mobility rate occurred among persons in their early twenties — the age at which most young people leave their parental home to find employment. . . .[4]

Kimball Wiles has suggested that such a high degree of geographic mobility might have serious implications for vocational education. He reports that:

> Vocational education can no longer be planned solely in terms of the community in which a high school exists. Over half of the average school's graduates will migrate to another community, and will go to another state. Seemingly the wisest step for curriculum planners to take, then, is to study industrial and commercial operations and plan in terms of clusters of competencies. When a student has developed a particular set of abilities he may enter a variety of related occupations.[5]

Mobility Within an Industry or Occupation

The Bureau of Labor Statistics has found that "during 1961, some 8 million workers — 10 percent of the number who worked — shifted

4 U.S. Department of Commerce, Bureau of the Census, "Mobility of the Population of the United States, March 1963 to March 1964," *Current Population Reports: Population Characteristics*, Census Publications Series P–20, No. 141 (Washington: U.S. Government Printing Office, September 7, 1965), p. 1.

5 Kimball Wiles, *The Changing Curriculum of the American High School* (Englewood Cliffs, New Jersey: Prentice Hall, Inc., 1963), p. 126.

from one employer to another. . . . "[6] The rate of job changing in that year was highest among men and women between the ages of 18 and 24 who were largely unskilled and had little education.[7]

Viewing this problem of job mobility in terms of vocational education, the National Education Association has made the following recommendation: ". . . to the extent that the school tries to develop employable skills, it should aim at transferable skills, and it should not attempt to train persons for specific jobs that are only temporarily open."[8]

Adaptation to Technological Change

The Department of Labor estimated in 1963 that about 200,000 non-agricultural workers per year will be displaced because of technological change during the next decade.[9] In addition, in each of five case studies on the effects of plant lay-offs and shut-downs, it was found that technological change was a factor in worker unemployment.[10]

The 1958 Rockefeller report on education summarizes the implications of this situation for vocational education as follows:

> In this day of technologies that become antiquated overnight, it is hazardous to predict a favorable future for any narrow occupational category. There will be economic advantage to the individual in acquiring the kind of fundamental training that will enable him to move back and forth over several occupational categories.[11]

Flexibility in Occupational Choice Patterns

Eli Ginzberg maintains that occupational decision-making can be divided into three distinct periods:

> The period during which the individual makes what can be described as a fantasy choice; the period during which he is making a tentative choice; and the period when he makes a

6 Gertrude Bancroft and Stuart Garfinkle, "Job Mobility in 1961," *Special Labor Force Report, No. 35* (Washington: U.S. Department of Labor, Bureau of Labor Statistics, 1963), p. 1.

7 *Ibid.*, p. 2.

8 National Education Association, *Automation and the Challenge to Education* (Washington: National Education Association, 1962), p. 41.

9 Bancroft and Garfinkle, *op. cit.*, p. 745.

10. Ewan Clague and Leo Greenberg, "Technological Change and Employment," *Monthly Labor Review* LXXXV (1962), p. 663.

11 Rockefeller Brothers Fund, Inc., *The Pursuit of Excellence: Education and the Future of America* (Garden City, New York: Doubleday, 1958), p. 10.

realistic choice. The first coincides in general with the latency period, between six and eleven, although residual elements of fantasy choices frequently carry over into the preadolescent years. The second coincides by and large with early and late adolescence with a few exceptions, realistic choices are made in early adulthood. To some degree the way in which a young person deals with his occupational choice is indicative of his general maturity, and conversely, in assessing the latter, consideration must be given to the way in which he is handling his occupational choice problem.[12]

Max Baer and Edward Roeber have commented as follows:

> Since most young people have a broad range of interests and capabilities, appropriate initial choices are facilitated by a knowledge of families of occupations. It is becoming more generally recognized that early training, even at the college level, should be broad enough to give the student the background for a group of related occupations. Thus he is not driven into a specific occupational choice before his interests have matured sufficiently for him to choose a field of work. When he is ready to enter the job market, his chances of successful placement are increased if he is prepared to begin at any one of several jobs in a given field of work. If this field happens to be commercial art, for example, he could become a poster artist, sign writer, catalog illustrator or layout man. Once hired, he has a better chance of promotion if he has been trained for a group of related occupations. Should he lose his job as a result of adverse business conditions or obsolescence of the occupation, he can switch to another job in the same occupational family.[13]

The final report of the panel of consultants on vocational education appointed by the Secretary of Health, Education, and Welfare contained the following recommendation:

> Basic vocational education programs should be designed to provide education in skills and concepts common to clusters of closely related occupations. The curriculum should be derived from analyses of the common features of the occupations included. These students should receive specialized or more advanced vocational training later in post-high school programs, apprenticeship, or on-the-job experiences.[14]

12 Eli Ginzberg, *Occupational Choice* (New York: Columbia University Press, 1963), p. 60.

13 Max Baer and Edward C. Roeber, *Occupational Information* (Chicago: Science Research Associates, 1964), p. 167.

14 U.S. Department of Health, Education and Welfare, Office of Education, *Education for a Changing World of Work* (Washington: U.S. Government Printing Office, 1963), p. 227.

In the light of this evidence, there is clearly a need for a cluster concept program in vocational education. We must now consider, however, the appropriateness of the cluster concept approach with respect to its acceptability and feasibility.

ACCEPTABILITY AND FEASIBILITY OF THE PROGRAM

A series of interviews with individuals representing industry, education, and labor was conducted in order to obtain an indication of the feasibility and acceptability of a cluster concept program. The interview survey was exploratory rather than definitive in nature, and no attempt was made either to randomly select the interviewees or to develop a highly structured interview instrument.

A group of 50 persons, including personnel managers, training directors, county superintendents of schools, industrial education supervisors, local union presidents, and business managers were contacted for an interview. Of these, 37 (74 percent) responded, and 31 (62 percent) were interviewed. Of the 31 persons interviewed, 29 (94 percent) indicated that the program was acceptable, when acceptability was defined as an interviewee being in favor of the cluster concept as a program in vocational education on the secondary school level.

The general reaction of those interviewed was that students with a cluster concept background would be excellent potential employees and would be less difficult to train because of their broad, fundamental background. A desire for employees to demonstrate a "good attitude" toward their job appeared to be the most important concern of management; and the opportunity for students to become acquainted with the requirements of several occupations was considered to play an important role in the formation of proper attitudes.

A total of 25 persons, representing 81 percent of the number interviewed, indicated that the cluster concept as a program in vocational education on the secondary school level was feasible — that is, capable of being implemented successfully. In fact, it was generally felt that such a program could be introduced into the schools with very little difficulty. In addition, both labor and industry indicated that students with a cluster concept background could obtain employment, and would be able to advance and specialize through on-the-job training and apprenticeship programs.

IDENTIFICATION OF OCCUPATIONAL CLUSTERS

On the basis of the preceding evidence, the project team then undertook the identification of specific occupational clusters. A

review and evaluation of existing research was made in order to determine possible direct applications to the project goals, or, in the event the results were not applicable, to see if the research techniques could be utilized.

The third edition of the *Dictionary of Occupational Titles (D. O. T.)* was carefully scanned for possible use of existing occupational groupings developed from observation and analysis of jobs over the last 25 years.[15] It seemed at first that the two-digit divisions, established on the basis of work fields, materials, and products, would represent the most feasible occupational families. However, a further examination of both the divisions and the three-digit classifications within the divisions revealed some occupational groupings that were too narrowly defined to encompass the wide range of jobs necessary in a cluster concept program (for example, Division 81: Welders, Flame Cutters, and Related Occupations). On the other hand, some occupations that are related on the basis of work fields were found in separate divisions (for example, Division 65: Printing Occupations; and Division 97: Occupations in Graphic Arts). For these reasons, the *D. O. T.* divisions, with the possible exception of construction, were rejected as unsuitable for our purposes.

The next source we referred to was the Altman and Gagne study of test items for measuring general vocational skills. Here we found the following statement concerning use of the *D. O. T.* and the general problem of developing occupational families:

> Given, then, that there is no known method for easily and directly deriving general skills and knowledges from information in the new D. O. T., some substantial effort is suggested which will study each job or family of closely related jobs. Unless one can mount a really monumental effort, the implication is that the derivation of general skills and knowledges will have to be based on a sampling of jobs.[16]

Since the project was limited in terms of time and financial support, it was considered necessary to provide a rational frame of reference to guide both the process of identifying occupational clusters and the selection of specific occupations within the cluster. Therefore, the following criteria for the occupational cluster were established:

(1) It should be in the area of vocational-industrial education.
(2) It should include occupations that are related on the basis of similar processes, materials, and products.

15 U.S. Department of Labor, Bureau of Employment Security, *Dictionary of Occupational Titles*, Third Edition (Washington: U.S. Government Printing Office, 1965).

16 Altman and Gagne, *op. cit.*, p. 7.

(3) It should be broad enough to include occupations with a wide variety of skills and knowledge.
(4) It should involve occupations that require no more than a high school education and/or two years beyond high school.
(5) It should provide mobility on a geographical and occupational basis.

Criteria were also established for selecting a sample of occupations for each cluster from a total list of possibilities. It was decided that each occupation chosen must have the following characteristics:

(1) A favorable employment outlook.
(2) The instructional capability of being implemented in a secondary school program.
(3) Opportunity for job entry upon graduation from high school.
(4) Numerous skills and knowledge in common with other occupations.
(5) Opportunities for advancement through further schooling, on-the-job training, or apprentice programs.

By applying the above criteria, first a group of possible occupational clusters was developed, and then a list of possible occupations. Those occupations having a favorable employment outlook according to the *Occupational Outlook Handbook* [17] were then analyzed with respect to the second, third, fourth, and fifth criteria, until a group of suitable occupations was finally identified. As a result of the analysis, three occupational clusters with their respective occupations were established, as shown in Figure 1.

IDENTIFICATION OF COMMON AREAS OF HUMAN REQUIREMENT

In fulfilling the final objective of the study, a review of literature was again conducted to determine methods of analyzing the selected occupations into common areas of human requirement necessary for successful job performance. Factor-analysis techniques were reviewed, but did not appear applicable to the problem, since it was not a goal of the project to explain the commonalities of occupations in terms of a minimum number of hypothetical factors.[18]

17 U.S. Department of Labor, Bureau of Labor Statistics, *Occupational Outlook Handbook* (Washington: U.S. Government Printing Office, 1966).

18 See C. H. Combs, "A Factor Analytical Approach to Job Families," *Psychological Bulletin* XXXIX (1942), p. 452; Benjamin Fruchter, *Introduction to Factor Analysis* (New York: D. Van Nostrand Company, Inc., 1954); George J. Palmer, Jr. and Ernest J. McCormick, "A Factor Analysis of Job Activities," *Journal of Applied Psychology* XLV (1961).

FIGURE I

Occupational Clusters

Metal Forming and Fabrication	Construction
1. Welder	1. Carpenter
2. Machinist	2. Mason
3. Sheet Metal Worker	3. Plumber
4. Assembler	4. Electrician
	5. Painter

Electro-Mechanical Installation and Repair

1. Business Machine Serviceman
2. Home Appliance Serviceman
3. Radio and Television Serviceman
4. Air Conditioning and Refrigeration Serviceman

A hierarchical clustering technique that classified mutually exclusive groups at different levels of specificity was also reviewed and rejected, because the systematic reduction of the groups was too rigorous for curriculum development in vocational education.[19]

Finally a research bulletin, entitled *The Development of Training Objectives,* by Robert G. Smith, Jr. of the Human Resources Research Office, was found applicable to the problem of analyzing the identified occupations in the cluster.[20] A modified procedure based on Smith's approach was developed to identify the areas of human requirement for each job. An analysis technique based on the Miller-Folley study was then developed to identify the characteristics shared by human requirement areas within each occupational cluster.[21]

The initial step involved developing a task inventory. This was done through a review of job descriptions, textbooks, courses of study, and training manuals, and through interviews with individuals representing the selected occupations. Each task was written in behavioral terms, using an action verb to describe the behavior, a noun to describe the object of the action, and adverbial or adjective phrases to describe the results of the action on the object. The format of task statements and an example of a task written in this manner are shown in Figure 3.

19 Joseph E. Morsh, *Identification of Job Types in the Personnel Career Field,* PRL-TR-65-9 (Lackland AFB, Texas: Personnel Research Laboratory, Aerospace Medical Division, 1965).

20 Robert G. Smith, *op. cit.*

21 Miller, Folley, and Smith, *op. cit.*

FIGURE 2

Research Model for Developing Course Outlines

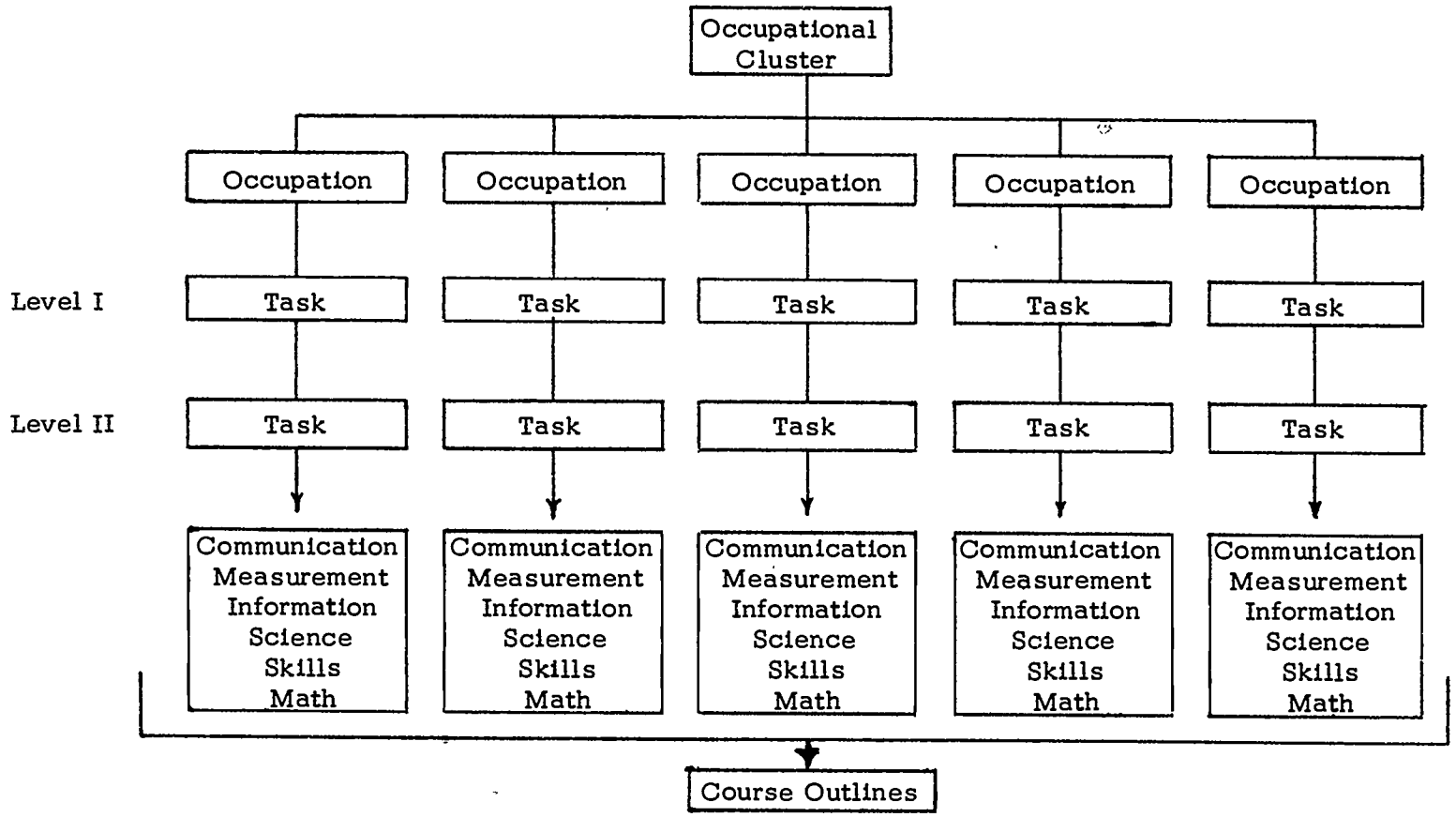
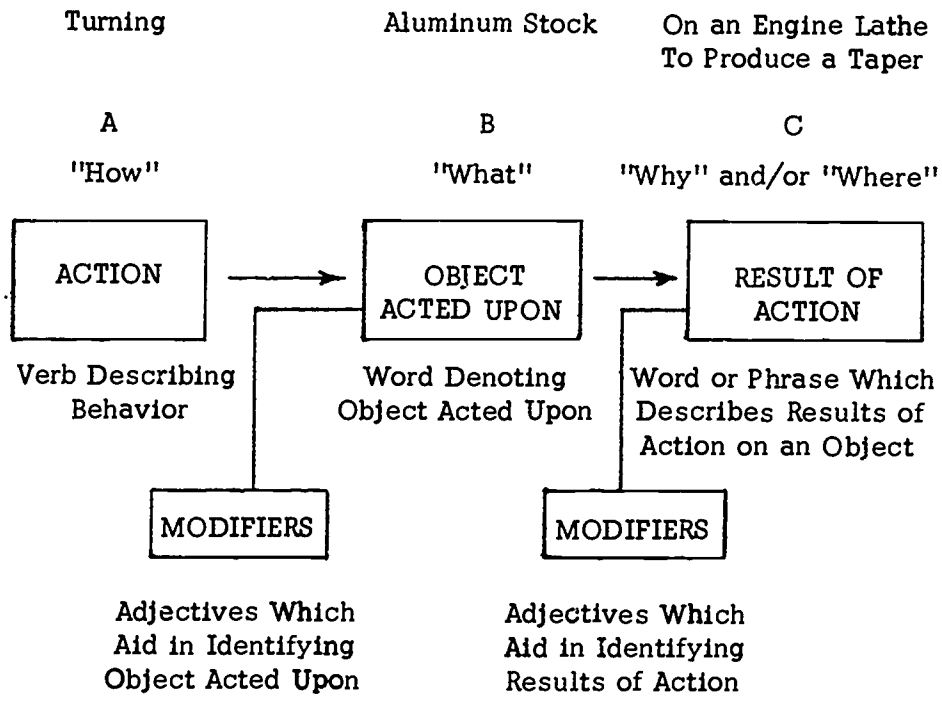


FIGURE 3

Task Statement Format



A panel of individuals representing each occupation was then asked to select from the task inventory those tasks that would be required for job entry. Each task was to be placed in one of the following three categories:

Level 0: The task is not needed for the occupation and would not be included for further analysis.
Level 1: The task is needed for entry into the occupation and will be included for further analysis.
Level 2: The task is not needed for entry into the occupation but will be needed soon after entry and will be included for further analysis.

After the job-entry tasks were determined, the areas of human requirement (skills, mathematics, measurement, science, communication, and information) needed for the performance of each task were identified, and stated in behavioral terms.

At the present time, the task analysis has been completed, and the areas of human requirement for each job-entry task in an occupation have been identified and written in behavioral statements. The next step in the research is to identify the areas of human

requirement that are common to each occupational cluster.

In accomplishing this step, we must first determine the frequency with which the tasks in each occupation are described in terms of similar human requirements. We will then compare these similar behavioral statements for one occupation with the descriptions of human requirement for each of the other occupations within the cluster. Finally, by determining the relative frequency with which each area of human requirement occurs within all the occupations in the cluster, we will arrive at a core of human requirements for the cluster. The common areas of human requirement thus identified will provide the basis for course outlines in the occupational clusters of construction, metal forming and fabrication, and electromechanical installation and repair.

The results of the research will provide the necessary content for establishing a cluster concept program in vocational education at the secondary school level. It is hoped that a second-year grant will be received to prepare teachers for the program, followed by a third-year grant to implement the program, so as to determine the value of a cluster concept approach to vocational education.

DISCUSSION

RICHARD W. WHINFIELD
THE UNIVERSITY OF WISCONSIN

Concerning Mr. Morrison's report, there doesn't seem to be a great difference between what is being done here and what is being done in industrial arts programs. But the basic difference should be that people taking these courses should be prepared to enter into employment — either a specific occupation or a cluster of occupations.

Thus, one question we must ask is, how well will individuals be prepared if they are only getting a small sampling of a number of occupations? How much additional preparation will be necessary for job entry, and when would they get such training? While it is true that there are two characteristics to be concerned with — skills and attitudes — we cannot depreciate the skills.

Another question worth our attention is whether this kind of training has any political impiications. Because labor unions in particular are concerned about skill, is it necessary to have their support of these programs before we get too deeply involved with them?

In regard to Mr. Frantz's paper, there seems to be a question of what students we are trying to reach. The questions we must ask are: (1) Are there skills that lend themselves to cluster-type occupations so that there can be some transfer of learning, or similar skills which can be applied to several occupations? (2) Isn't there a need for further training, perhaps in a specialty, after the high school experience? (3) Is this truly vocational education, in that young people are planning for jobs? Are the youth prepared for job entry? Again, it seems to me that Frantz's approach has an industrial arts flavor which is not vocational education, but general education.

DONALD E. MAURER
SOUTHERN ILLINOIS UNIVERSITY

The topic of job clusters and general vocational skills has received a great deal of attention in recent years. Much of this is undoubtedly due to the 1963 report of the Panel of Consultants on Vocational Education. Shortly after the Panel's report, endorsing the job family concept, was released into the mainstream of industrial-technical educators,

a research seminar at the University of Missouri reviewed, critiqued, and evaluated a research prospectus of one of its members concerning a job cluster of metalworking occupations. After several meetings, the seminar group reached the conclusion that research of the job cluster concept was very important and essential, but too huge and extensive an area for a one-man research project.

The two papers presented here represent a group or team approach to research of the basic job family idea. Research on this topic is too large an undertaking to be attempted by less than such a concentrated effort of many skilled educators and researchers.

The need for job cluster research is already well documented. It should also be noted that the job family concept is not entirely new and untried. Indeed, a perusal of the bibliographies attached to the reports reveals that work in "job families" was instigated over two decades ago; and other evidence would seem to indicate even earlier activities associated with this topic. A practical example of a type of job cluster training that has existed in our schools for some time is the one- to two-year building trades program. Though this may perhaps be stretching it somewhat, the technique of rotating students through selected short instructional units in a number of associated unit laboratories may be loosely const ued as general vocational skill training.

However, most previous activities have been admittedly rather haphazard approaches to the job family concept. The two reports presented here employ significantly different procedures for identifying the skill and knowledge content essential to this type of an educational program. Only through planned and scientific approaches can we hope to (1) consistently ascertain significant job cluster content and (2) evolve suitable methods for identifying content for many occupational job families.

Other efforts are being made to implement broad and basic occupational training. At a technical high school in St. Louis, a program based on these concepts was initiated in 1963. The objective of the program was to furnish this type of training for unemployed high school dropouts who had limited general educational capabilities and practically no useful skills. An investigation of the backgrounds, occupational aspirations, and attitudes of these youth was made by Dr. Jack A. Luy.[1] This particular project was an MDTA funded program. Other Manpower and Job Corps general vocational skill programs for youth and unemployed adults who have no marketable skills are presently under way.

At the U.S. Office of Education's Region 5 Vocational and Technical Education Conference held in Chicago March 21-25, 1966,

1 Jack A. Luy, "Backgrounds, Occupational Aspirations and Attitudes of Unemployed Youth in nMDTA Program in St. Louis, Missouri." unpublished doctoral dissertation, University of Missouri, Columbia, Missouri, 1964 .

Louis A. McElroy, Director of Adult and Vocational Education of the Gary, Indiana, public school system, reported on a project they are busily engaged in launching. They are building a multi-million dollar plant which is designed specifically for offering job cluster and general vocational skill curricula. The initial offering is composed of the following ten occupational areas: building construction and maintenance, business and commerce, communications, extractive industries, health and personal services, marine trades, mechanics and metalworking, protective services, technology, and textiles and leather. The selection of these was based on their occupational outlook, as ascertained by a community survey of the local employment area. A general expansion into other job cluster areas will be initiated as finances and needs arise.

The St. Louis and Gary programs may be called a form of "action research." They are mentioned as examples (and many others could be cited) to call attention to the wide appeal of the concept of job cluster and general vocational skill education, and also to establish a foundation for presenting a recommendation. It is suggested that some type of framework be established to identify *all* job family programs in the various states, to gather information about them, and to disseminate the data to all interested parties. This service should offer more than just a simple bibliographical name and address listing of projects involving the basic cluster concept.

Furthermore, measures should be taken to implement the results of the two research projects reported here, or of any other formally conceived related research previously completed or presently under way into the action research job cluster programs in the field. These measures should be implemented at the earliest possible date and even while various projects may be in progress and incomplete. Continuous liaison between researchers and practitioners is essential. Thus, re-evaluations of the research results can help modify both the action and the formal research projects so as to make them as effective as possible.

In summary, the following observations may be listed: (1) The job cluster-general vocational skill concept is a hugh project requiring the concentrated efforts of teams or groups of skilled educators and researchers. (2) The two project reports signify planned, systematic, and scientific procedures for (a) identifying significant content for the specific areas under study and (b) evolving suitable methods for ascertaining content for many job clusters. (3) It is imperative that a liaison framework for identifying, gathering, and disseminating detailed data about the nation's job cluster research and educational activities, projects, and programs be established.

WESLEY L. FACE
STOUT STATE UNIVERSITY

To predetermine some future occupation for which education is to be a strict preparation is to injure the possibilities of present development and thereby to reduce the adequacy of preparation for a future right employment . . . such training *may* develop a machine-like skill in routine lines . . ., but it will be at the expense of those qualities of alert observation and coherent and ingenious planning which make an occupation intellectually rewarding.[1]

These are not the words of a contemporary critic of vocational education. This statement was made by John Dewey in 1916. It was important then and seems equally appropriate for today's society. Mr. Frantz and Mr. Morrison both seem to be equally concerned that vocational education not become a highly specialized form of training. The two studies presented in this session differ in their approach, techniques, and their specific objectives. Yet they are alike in that they have attempted to determine the general capabilities which are necessary for future vocations.

Mr. Frantz describes the procedures being used to identify those skills and knowledges which are common to a cluster of related occupations. His study is presently limited to the three occupational clusters of metal forming and fabrication; construction; and electromechanical installation and repair. I assume that as this study continues other clusters will be identified. Is it possible that there are knowledges and skills that are more common to occupations between clusters than to those within clusters? For example, it would seem that the plumber's abilities are more like those represented by the metal forming and fabrication cluster than by the other occupations represented in the construction cluster.

The study presented by Mr. Morrison has resulted in the identification of six areas of vocational capability which may serve as the core for a general vocational curriculum. It has found that there are (a) generalizable capabilities involved in choosing and forging a career, and (b) skills which are basic to many occupations.

If vocational education is to make a significant contribution to the education of our youth, it must attempt to identify those generalizable knowledges and skills which are common to many different occupations. How else can we expect man to face a world where the ability to change and adapt is the most basic expectation? The idea that vocations are distributed in an exclusive way — one and only one to a person — is absurd; it restricts contemporary thinking about vocational education.

1 John Dewey, *Democracy and Education* (New York: Macmillan, 1964), p. 310.

Mr. Frantz establishes four needs which must be met in today's education. He states that there is a need to: (1) provide students with mobility on a geographical basis; (2) offer students mobility within an industry or occupation; (3) develop students who will be able to adapt to technical changes; and (4) provide students with greater flexibility and occupational choice patterns. These needs rather clearly express the guidelines that vocational educators must keep in mind as they develop new programs for the future. They cannot be met by specialized skill training which is appropriate for one and only one occupation. To spend valuable educational time in this manner may be of some immediate value to the student, but it places him in a very tenuous position as he faces the world of work.

Increasingly, we find in the literature that various leaders in industrial education have taken the position that specialized and more advanced vocational training must be provided by apprenticeship programs or on-the-job experience. It is very gratifying to hear of work which attempts to determine a core of knowledges and skills which will be applicable to many industries, instead of the highly specialized training that we have viewed as vocational education in the past.

In the American Industry Project currently under way at Stout State University, we have found that there are a body of concepts common to a variety of industries which can serve as the organizational elements for a curriculum designed to study industry. For example, we have discovered that there are over 600 specific methods of fastening material together. These can be studied in terms of three major ideas — adhesion, cohesion, and mechanical linkage — each having specific attributes which can be studied. Such study should result in knowledge which is transferable as new and different fastening methods are introduced. We have also found that, of the hundreds of specific ways of cutting materials with a prepared edge, all involve the use of a wedge. A thorough understanding of the problems involved in severing materials with a wedge can result in a type of understanding which may be applied to any cutting operations, regardless of the material. Many other examples could be sighted of concepts which are common to a variety of today's industrial occupations.

The search for general knowledge and concepts in industrial education is neither unique nor new to education. Practically all of the curriculum reform movements taking place in other disciplines today are based upon such an analysis. Even Plato and Aristotle spoke of identifying and studying universals which are not unlike the concepts being described today.

These are exciting times for vocational education. For the first time the necessary funds are available for the basic research that must be conducted.

Several concerns come to mind, however, in reviewing the many research projects in progress which are aimed at the development of

vocational education curricula for the secondary schools. First, can we clearly identify those subjects which are vocational and those which are general, and is it necessary to do so? In 1929 Alfred Whitehead made the following comment: "There can be no adequate technical education which is not liberal and no liberal education which is not technical."[2] A similar statement was made by Dewey in 1916 when he said that the only appropriate education was a vocational education, and the only appropriate vocational education was a general education. Why do we continue the dichotomy? What is our justification for saying that English literature is a liberalizing subject and general in scope, while a course in power mechanics is categorized as vocational and lacking in liberalizing effects?

A second question is: How do we determine which students should be involved in a general education curriculum and which should be enrolled in a vocational curriculum? Is this strictly a matter of student choice and/or student interest? If it is, are the students really prepared by the ninth grade to make such a choice? How many of us had made realistic vocational choices by that age?

Thirdly, we must not establish a type of education which is appropriate only to the less fortunate students that enter our schools. Here again this concern is evidenced when we force a child to make a vocational choice at an age when he does not have adequate knowledge. The student whose family members have a background of working as machinists will very likely select this curriculum if forced to make an early vocational choice. This is the only line of work about which he has adequate knowledge to form such a decision.

I will follow the work of the American Institutes for Research with great interest as they identify the general capabilities required in the selection of a career. It was Dewey's concern in 1916 that the schools not become an instrument of class stabilization: "To split the system," he says, "and give to others, less fortunately situated, education conceived mainly as specific trade preparation is to treat the school as an agency for transferring the older division of labor and leisure, culture and services, mind and body, directed and directive class into a society nominally democratic."

How can we claim our schools are democratic when they force the child to make a vocational choice which must be based primarily upon past experiences, and which may result in limited opportunities to improve his class standing?

My fourth concern is whether specific vocational education is the responsibility of the secondary schools. Many industrialists will be the first to admit that specific job training is the responsibility of industry and not public education. Can public schools ever afford to have the sophisticated equipment that is found in industry? Even if

2 Alfred Whitehead, *The Aims of Education* (New York: Macmillan, 1929).

we could afford it, would this be the type of training appropriate for today's world? Any program of vocational education which accepts today's industry as its point of departure will assume and perpetuate its divisions and weaknesses.

Fifth, what are we doing to produce the necessary attitudes in our students? Both Mr. Frantz and Mr. Morrison have indicated that many industrialists have stressed the importance of appropriate attitudes to job success. We consistently hear industrialists make the claim, "You send me a man with the proper attitude towards work and I'll train him." What are we doing with affective domain in the education of our students? Who decides which attitudes a man should hold? Can we study attitudes and values cognitively?

Sixth, is the work of Mr. Frantz and Mr. Morrison appropriate only for vocational education? It is highly conceivable that their work and the results of similar projects may be developing new curriculum areas for the secondary schools which are not only important for vocational education but should be studied by all children.

My seventh concern is that we do not allow traditional programs and facilities to limit the scope of our programs. Little more need be said on this subject; but we must not allow traditional facilities and methodologies to stand in the way of more effective programs.

Eighth, will vocational education in the secondary schools reduce the dropout problem? Most of our vocational programs start after age sixteen, which is the age at which many students drop out of high school. Do such programs discourage or encourage the student to leave school? Do they solve the real cause of dropouts?

Finally, we must not concern ourselves with only the technical aspects of vocational education. Here again, Dewey gives us advice which seems appropriate:

> Industrial occupations have infinitely greater intellectual content and infinitely larger cultural possibilities than they used to possess. The demand for such education as will acquaint workers with a scientific and social bases and as bearings of their pursuits becomes imperative, since those who are without it inevitably sink to the role of appendages to the machines they operate.[3]

I am very encouraged by the work of Mr. Frantz and Mr. Morrison. Psychologically and philosophically, this is the type of direction we must take if our vocational programs are to be effective.

3 Dewey, *op. cit.*, p. 314.

III

OCCUPATIONAL CHOICE, JOB PLACEMENT, AND EMPLOYMENT EXPERIENCE

JOB PLACEMENT AND EMPLOYMENT EXPERIENCE OF HIGH SCHOOL GRADUATES*

JACOB J. KAUFMAN
PENNSYLVANIA STATE UNIVERSITY

This paper, a preliminary report on the job placement and employment experience of high school graduates, is part of a larger study which is officially entitled "The Preparation of Youth for Effective Occupational Utilization." The larger study is concerned with four specific questions: (1) What are the employment experiences and attitudes of the graduates of the three curricula in the secondary high schools (academic, vocational, and general)? (2) How adequate and what is the quality of vocational education programs, particularly in terms of meeting the changes in the labor market? (3) How satisfactory have the education and training of graduates been, as viewed by employers in general and supervisors in particular? (4) What is the relationship of the unions to the vocational education programs, and how do the officials of these unions evaluate them?

To answer these and other questions, we surveyed nine communities, using a variety of techniques. These included: (1) personal interviews with approximately 5,300 graduates of the three curricula, as well as mail questionnaires involving approximately 3,000 graduates; (2) interviews with school officials in each community, visits to each community by vocational education experts; (3) the testing of about 1,600 teachers in various curricula and subjects by means of an attitude scale; (4) the preparation of an economic and social profile of each community; (5) personal interviews with over 600 employers, and mail questionnaires received from about 3,000 direct supervisors of the graduates of the various curricula; and (6) personal interviews with officials of about 90 unions.

This preliminary report is concerned primarily with the first question of the larger study: namely, the job placement and employment experience of the graduates of the vocational and academic curricula. The other questions, including an analysis of the general curriculum, will be discussed in our final report.

* This study was financed by the U. S. Office of Education, but the agency is in no way to be held responsible for the analysis and views stated herein. The author wishes to acknowledge the invaluable assistance of the project staff, which included Carl J. Schaefer, Professor of Education, and Head, Department of Vocational-Technical Education, Rutgers University; David W. Stevens, Assistant Professor of Economics, and Project Associate, Institute for Research on Human Resources, The Pennsylvania State University; and Research Assistants Morgan V. Lewis (Pennsylvania State University) and Elaine W. House (Rutgers University).

Before proceeding, however, it is necessary to explain briefly, and in general terms, several ways in which this study differs from others. First, it includes a follow-up of graduates of the general curriculum — a group which has usually been ignored by both schools and researchers. Second, it attempts to compare the experiences of the academic and vocational graduates and to hold ability constant. And, third, it contains an evaluation of these graduates by their immediate supervisors.

Since this preliminary report is concerned solely with graduates of the academic and vocational curricula, the number of persons in the sample is limited to 3,158. After a brief description of this group, we shall direct our attention to the following questions: (1) How mobile are the graduates of the schools, in terms of their first job? (2) How do they attain their first jobs? (3) In what industries have they found employment? (4) What occupations have they entered and how are these related to the programs in which they were enrolled? (5) What wage levels were achieved in their first jobs, both at the beginning and end (or at present, if they are still on their first job)? (6) How did the graduates evaluate their school experiences? (7) Why did the graduates leave their first jobs? (8) How did the supervisors rate the graduates? (9) What were the experiences of the non-white graduates?

CHARACTERISTICS OF THE GRADUATES

Some general characteristics of the graduates who are discussed in this report may be of interest. Two-thirds of the sample are vocational graduates, and the remaining one-third come from the academic curriculum. Slightly more than half of both the vocational and academic graduates are males, and slightly less than 20 percent of both groups are non-white. The family income and the education and occupation of the fathers of the academic graduates tend to be higher; for example, the percentage of academic program graduates whose fathers are in white-collar jobs is twice as large as the comparable percentage for vocational program graduates. This is true for both males and females. Conversely, the fathers of vocational program graduates are more heavily represented in unskilled trade and industrial occupations than their academic program counterparts. Roughly the same percentages are found in the skilled trades for each group. The mean family income of the academic graduates was about 15 percent higher than that of vocational program graduates.

LOCATION OF FIRST JOBS

Vocational educators should be particularly interested in the geographical location of a graduate's first full-time job. For if there is a tendency for vocational graduates to accept jobs within the county of school attendance, it will be clear what types of programs are necessary. Regardless of curriculum or sex, we find that approximately four-fifths of all graduates obtained their first jobs in the cities of graduation. We do find some differences, however, in the size of the city. The large cities retained over 90 percent of their graduates of the vocational curriculum of both sexes, while the medium-sized cities retained only 70 percent. This lower figure may be explained, in part, by the fact that two of the three medium-sized cities in the study were near a major urban center in another state. There was a greater tendency for graduates from the small cities to migrate for work to locations outside the immediate towns and environs. At the present time, however, we are reluctant to draw significant conclusions about the degree of mobility until we explore some of the data from our mail questionnaires.

METHODS OF PLACEMENT IN JOBS

There is always considerable interest in the placement function of the high schools. Our study reveals that more than one-half of each group in each curriculum got their jobs either through their own personal applications or through prior personal or family friendships. A slightly smaller percentage of vocational curriculum graduates obtained jobs through direct application than did their academic counterparts. What we did find significant is the fact that 23 percent of both male and female vocational graduates, as opposed to between six and nine percent of the academic graduates, were placed by the school.

Some effort was made, for purposes of this report, to analyze the means by which whites and non-whites obtain their first jobs. Preliminary data involving only males in an IQ range of 90-109 revealed that the proportions of whites and non-whites placed by their schools were 27 and 15 percent, respectively, for vocational graduates, and 8 and 0 percent, respectively, for academic graduates. Finally, we find that the school placement services in small cities are not as successful as those in large cities.

INDUSTRY CLASSIFICATION OF JOBS

The graduates of both programs were classified according to the

industry in which they held their first jobs. We find no major difference in distribution between academic and vocational students. This does not mean, of course, that the two groups secured the same kinds of jobs, but only that they worked for approximately the same kinds of companies. As one would expect, males far outnumber their female counterparts in durable manufacturing industries, and, conversely, females predominate in the service, finance, insurance, and real estate classifications. When the data are classified on the basis of color and curriculum, however, several interesting contrasts appear. Whereas 19 percent of the white academic graduates were employed in durable manufacturing industries, none of their non-white counterparts were in this category. Conversely, 27 percent of the non-white academic graduates fell into the service industries, as compared with 15 percent of white academic graduates. The white and non-white vocational graduates evidenced very similar distributions, although the non-white graduates were somewhat more heavily represented in the wholesale and retail trade areas.

The academic graduates, both male and female, were slightly more heavily represented in the skilled and white-collar jobs than the vocational graduates. More than 50 percent of all female graduates from both curricula, 32 percent of male academic graduates, and 13 percent of male vocational graduates were classified in the least skilled white-collar jobs. Twenty-two percent of the male vocational graduates were employed in the skilled blue-collar sector, as compared with 0 percent of male and female academic graduates, and 5 percent of the female vocational graduates. Approximately equal percentages of graduates from each curriculum are represented in the unskilled blue-collar area for each sex.

In determining what significance we can attach to these findings, we may conclude at this preliminary stage that the choice of curriculum generally predetermines the broad area of work into which students will go. It is not possible to say yet whether it is the program itself or the characteristics of the persons who choose that program which is the more important factor.

HOURLY PAY OF GRADUATES

Another basis on which one could make certain judgements with respect to different types of curricula is the gross hourly pay for the first job of the graduates. We find little difference in the median starting pay between students in the different curricula. However, we do find that the median pay for males is approximately 10 cents an hour more than the median pay for females. And, when we sort out the data on the basis of color, we find that the starting pay for

non-white vocational males is higher than for non-white academic males. White graduates of both the vocational and academic curricula tend to have higher starting rates when the data are adjusted for size of city. We can draw the general conclusion that the vocational graduate is not immediately rewarded by a salary substantially higher than that of the academic graduate and that the non-white starting pay is lower than the white, although he is relatively less disadvantaged in the vocational curriculum.

When we consider the salary at the end of the first job, however, we find that the male vocational graduate does realize a pay differential. Similarly, the non-white vocational graduate continues to exceed the average pay rate of the non-vocationally trained non-white youth. Thus, we find a significant gap developing in average pay rates between the non-white graduates from the two curricula. As one would expect, sex is also an important determinant of pay scales: males start at a higher level and continue to exceed the rates for females.

The question can well be asked as to what relevance this information has for the schools. Actually, these data can be useful in the counseling and guidance processes. It would seem, at least at this stage of our analysis, that the non-white students might be encouraged to move into the vocational education stream. Two problems, however, confront us here. One is a general tendency to exclude non-whites from vocational education programs because of the discriminatory practices of unions and management. The other is that non-whites tend to assume that if they go into the vocational education stream they are accepting a second-class education.

SCHOOL PREPARATION FOR JOBS

Each graduate who was interviewed was asked, "Did any of the courses you took at high school help to prepare you in any way for this job?" If an affirmative answer was received, the respondent was then asked how well these courses prepared him for his job, in each of five areas — equipment, skills, mathematics, science, and communication. With respect to their first job, all graduates rated their preparation in science very low and in communication quite high. The only major difference between the two curricula was in equipment preparation, with vocational graduates rating this area higher, as we would expect. We find no significant differences when we break the data down according to color and curriculum. These findings suggest that the graduates are generally satisfied with the relationship between the courses they took in school and the tasks they perform at work. The vocational schools are apparently doing a good job of preparing students in developing specific skills and in the use of specific equipment.

JOB SATISFACTION

We asked the graduates to rate the schools in terms of how well they prepared them for work and to rate their first job in terms of work, pay, promotion, supervision, and their co-workers. In general, the vocational graduates tended to rate their satisfaction with promotion higher than did the academic graduates, regardless of sex. This does not necessarily mean that vocational graduates get more or quicker promotions, for it is possible that the aspirational differences between the graduates of the two curricula could result in a similar finding. This qualification is mentioned because we find equal satisfaction with pay on the part of both white curriculum groups and the non-white vocational group. Only the non-white academic students are less satisfied with pay. As would be expected, one finds the academic non-white graduates less satisfied with their first jobs than any of the other groups. The whole question of job satisfaction will be explored in greater detail in our final report, taking into account broad occupacional and skill groupings.

WHY GRADUATES LEFT FIRST JOB

We were particularly interested in the question of why graduates left their first jobs. The percentage of academic graduates returning to school was four times greater than that of vocational graduates. This significant difference may be explained by the fact that the academic graduates discovered they did not have the appropriate skills to advance themselves in their jobs. It could also result from the lesser educational opportunities available to vocational graduates. A greater percentage of vocational graduates did move up to a better job, which may explain in part why they would not return to school. When the data were examined in terms of color, the percentage of white academic graduates moving up to better jobs was twice as large as that of their non-white counterparts. Exactly the opposite percentages were found in the "return to school" category. This would suggest that the non-white does less well, and thus feels he must return to school in order to succeed. Far more white vocational graduates, however, are "laid off, fired, and their jobs abolished," or leave because of "dissatisfaction," than any other group.

With respect to the current or last job, a separate instrument was administered, containing a series of words and phrases describing the same five aspects of a job discussed above. Here a different scoring system was applied about which we will not go into detail at this point. We found, however, that females are far more negative in their perceptions of promotional opportunity than their male

counterparts in both curricula. Similarly, perceptions of promotional opportunity by non-whites are far more negative than those of their white counterparts — with the academic non-whites being even more pessimistic than the vocational non-white graduates. In general, the utilization of this instrument with respect to the current or last job confirms the conclusions reached about the first job when another instrument was employed.

RATING OF GRADUATES BY SUPERVISORS

One phase of the study about which we want to do more detailed analysis is concerned with the supervisor's rating of the graduate in his last or current job. Here the supervisors were asked to rate each graduate in terms of occupational knowledge, manipulative skills, personal and social qualities, working qualities and habits, over-all performance, and over-all preparation.

The only significant difference found at this stage of our analysis was that the performance of academic graduates of both sexes is rated higher than that of the vocational graduates. The non-white vocational and white academic groups were also rated above average. In general, one could conclude that the schools have apparently been doing an acceptable job in terms of the expectations of employers, and that the vocational schools have a great deal to offer to non-whites.

SUMMARY AND PRELIMINARY CONCLUSIONS

This portion of the preliminary report has dealt with fourteen employment-related variables — one concerning the graduates' socio-economic status while in school, eleven describing various aspects of the first full-time job held after graduation, and two relevant to the current (or last) job held. The following findings have been emphasized:

(1) The percentage of academic graduates' fathers in white-collar occupations is twice as large as that of vocational graduates' fathers.

(2) A much larger percentage of vocational graduates' fathers are in unskilled trade and industrial occupations.

(3) Four-fifths of all graduates go to work in the city of graduation, but the size of the city affects this magnitude: 93 percent of graduates in large cities remain there, compared with 70 percent of those in medium-sized cities.

(4) Over one-half of all respondents obtained their first job through either personal application or prior friendship with the employer.

(5) Nearly one-fourth (23 percent) of vocational graduates of both sexes are placed in jobs by their schools, compared with 6 and 9 percent, respectively, for male and female academic graduates.
(6) A larger percentage of whites in each curriculum are placed by their schools than of non-whites. (The preliminary sample includes only males with an IQ range of 90-109.)
(7) No academic graduates of either sex were employed in skilled blue-collar jobs, compared with 22 and 5 percent, respectively, of male and female vocational graduates.
(8) The size of the city is related to starting pay rate.
(9) Males progress to higher pay levels than do females; vocational graduates rise higher than academic graduates; and non-white vocational graduates are relatively less disadvantaged as compared with the academic curriculum graduates.
(10) Vocational graduates express greater satisfaction with promotional opportunity than do academic graduates, and non-white academic graduates are less satisfied with their pay.
(11) Four times as many academic graduates gave "returned to school" as the reason for leaving their first job than did vocational graduates; twice as large a percentage of white academic graduates moved up to better jobs than their non-white counterparts; and, just the opposite relationship among the color groups holds in the "returned to school" category.
(12) Females and non-whites are far more negative in their perception of promotional opportunity than are white males.

In general, it can be said that the non-white academic graduate is apparently in the poorest relative position. Female graduates from both curricula also face lower earnings potential and more narrowly prescribed employment opportunities. The male, and specifically the vocational male, graduate is in the best relative position. The preliminary nature of all findings reported here is re-emphasized. Further analysis in great depth will clarify or change some of the relationships discussed in this preliminary report.

SCHOOL AND COMMUNITY FACTORS IN PLACEMENT OF VOCATIONAL GRADUATES*

JAMES W. ALTMAN
AMERICAN INSTITUTES FOR RESEARCH

PURPOSE

The American Institutes for Research is conducting a study for the Office of Manpower Policy, Evaluation, and Research. The purpose of this work is to describe school and community factors which have been associated with rapid job placement, with placement in jobs highly related to training, and with a high degree of job satisfaction for trade and industry graduates. The study is motivated by the assumption that a description of school and community factors associated with job placement is likely to have implications for improved programs of graduate placement. Today's discussion will be limited to a brief survey of general results and to a somewhat more extended review of the characteristics of an effective placement program in the school.

METHODS AND PROCEDURES

Data were available from another AIR project on the placement and employment experience of 2,555 graduates of trade and industry courses in 1962.[1] These graduates came from 50 vocational and 50 comprehensive high schools. The schools were selected randomly within geographic, enrollment, and type-of-school (comprehensive or vocational) strata from the 667 United States schools offering three or more trade and industry courses in the 1961-62 school year.

For the current study, 44 of the 100 schools in the earlier study were eliminated for one of three reasons: because they were located in very large metropolitan areas (with a population of more than two million) where a meaningful network of community organizations could not be established; because they were predominantly Negro with poor placement records and could not be matched with Negro schools having good placement records; or because they had too few

* Based on Contract MDTA 37-64 between the Office of Manpower Policy, Evaluation, and Research, U.S. Department of Labor, and the American Institutes for Research. Approval of this paper for presentation does not necessarily imply agreement by the Department of Labor with its contents.

1 M. U. Eninger, *The Process and Product of T & I High School Level Vocational Education in the United States* (Pittsburgh: American Institutes for Research, September 1965).

graduates (less than 15) to get a stable index of placement performance for the school. A set of 32 schools was selected from the remaining 56, including, from both comprehensive and vocational schools, the eight with the highest and the eight with the lowest composite placement and employment performance.

Representatives of schools, employing institutions, labor unions, community organizations, and employment security offices provided data for each of the 32 communities. For each variable on which community representatives supplied data, graduate placement and employment performance of those communities which ranked high were compared with placement and performance of those which ranked low in the community variable. Comprehensive and vocational schools were analyzed separately. Specifically, comparisons were made of the following factors:

(1) Placement — time between graduation and first job.
(2) Relatedness — average closeness of jobs to training as judged by the graduate.
(3) Satisfaction — graduate's average rating of all jobs held.
(4) Security — proportion of available time graduate was gainfully employed.

We may note that placement is implied in the security measure so that the two are not independent of each other. In general, we will not differentiate these measures here but will use placement in a generic sense to indicate situations in which significant results were obtained with one or more of these measures.

EMPLOYMENT OPPORTUNITY

Unemployment rates for 1962 in areas surrounding vocational schools were essentially unrelated to placement performance. In contrast, 1962 unemployment rates in areas surrounding comprehensive schools were highly related to placement — comprehensive schools in areas having high employment had superior placement of trade and industry graduates.

This difference between comprehensive and vocational schools in their sensitivity to general unemployment seems to stem in large part from differences in commitment on the part of school personnel to placement of graduates. Graduates of vocational schools report substantially more assistance from the school in obtaining their first job than do comprehensive school graduates.[2] Graduates of vocational schools obtain initial jobs in less time, obtain more related jobs, have better security, and report slightly more job satisfaction than comprehensive students. It is suggested that an active and

2 *Ibid.*

committed placement program by the school will, within reasonable limits, tend to offset the effects of general unemployment.

COMPREHENSIVE VERSUS VOCATIONAL SCHOOLS

We found the relationships between community and graduate data to be substantially more significant for vocational schools than for comprehensive schools. This probably results, at least in part, from a reduction of inter-community differences in graduate placement deriving from the need to eliminate, for a variety of reasons, 21 of the 50 comprehensive schools from the possibility of selection for "high" or "low" placement groups. Attenuation of community differences in average graduate performance reduces the likelihood of finding significant relationships with community variables. It is also possible that effects associated solely with vocationally trained students were obscured by the more diffuse comprehensive school programs, although the current study can neither support nor refute this hypothesis.

SCHOOL ACTIVITIES

The following school activities were found to be associated with superior graduate placement and employment performance:

(1) The development of an organized placement program with a designated coordinator and with responsibility assigned to a number of staff members.
(2) A policy of actively seeking and using community support to help place graduates.
(3) A systematic accumulation of knowledge concerning individuals to be contacted within relevant community sources of assistance.
(4) Frequent use of personal contact, advisory services, and "open-house" events to communicate with the community.
(5) Development of community awareness of the areas in which students receive training, and the formation of favorable attitudes concerning the quality of this training.

EMPLOYERS

Schools rightly direct a major part of their placement effort toward potential employers, for it is school-employer relationships that have the greatest effect on graduate placement, relatedness of

job to training, and job satisfaction. Contacts for the purpose of placing specific individuals, requests for advisory services, personal visits, and shop "open houses" for employers all contributed, as we have said, to a superior graduate placement experience.

UNIONS

The role of unions in graduate placement is more restricted than that of employers, and more selective interaction with the school seems to be associated with superior placement. Coordination of apprenticeship programs and maintenance of a union policy which is not detrimental to vocationally trained graduates were particularly related to effective placement.

COMMUNITY ORGANIZATIONS

Community service, civic, social, and fraternal organizations were usually quite responsive to requests of the school for a wide variety of placement and other aid. But a great deal of interaction between school and community organizations took place which was not reflected in superior graduate placement. If the school's objective is to enhance graduate placement, its emphasis with respect to community organizations might best be on keeping them informed of its program and of the capabilities and employment needs of its graduates.

EMPLOYMENT SECURITY OFFICE

In general, the higher the degree of interaction between school personnel and the Employment Security Office, the less effective the placement of graduates. This is not to say, of course, that contact with the Employment Security Office caused poor placement. It is more likely that schools which made greater use of this office did so because they had difficult placement problems to begin with. Schools with an above-average placement record registered a mean number of 33 students with the Employment Security Office, in contrast to a mean number of 86 students registered by schools with a below-average placement record. However, the Employment Security Office placed about 34 percent of the students registered from schools with an above-average placement record, in contrast to about 24 percent from schools with a below-average record.

We should perhaps note that schools contacted the Employment Security Office about four times as often as the Office contacted the

school. Placement of students or graduates was only the fourth most frequent reason for a contact between school and Employment Security Office. More often, contacts were for the purpose of inquiring about job opportunities, obtaining occupational information, and arranging for aptitude testing. We might also note that placement of trade and industry students depends upon the total environment within which the school and the Employment Security Office operate. In communities with a poor placement record, the representative of the Employment Security Office reported restrictions on apprenticeship programs about five times as often as in communities with above-average placement.

The weight of evidence certainly does not support the view that contact between school and Employment Security Office is undesirable. Nevertheless, the strong tendency to associate use of that agency with relatively poor graduate placement suggests that schools should not depend upon it as the mainstay of their placement program. Rather, the evidence indicates that graduate placement is superior when the Employment Security Office provides specialized and limited assistance to the school.

CHARACTERISTICS OF AN EFFECTIVE PROGRAM OF JOB PLACEMENT BY THE SCHOOL

We have dealt almost exclusively so far with rather raw empirical results — highly summarized, and essentially descriptive rather than interpretive. We must now ask what is suggested when we try to go behind the surface relationships to see the principles which organize and structure the many aspects of a school program to enhance graduate placement. At the present time, we discern three major organizing principles for an effective placement program — focus, initiative, and role compatibility.

Focus

By "focus" we mean the coherent organization of a placement program within the school. An effective program begins by accepting responsibility for its objectives. Schools which expressed the view that they had a responsibility to help vocational course graduates locate a job showed better graduate placement than schools which did not share this view.

Thus, vocational schools with a coordinator of placement had superior performance; when coordination was left to the vocational director, or when responsibility was assigned to the shop instructors, placement was less effective. Moreover, placement improved when a greater number of people were assigned to placement activities. Other organizational factors associated with superior

placement were broad community representation on advisory committees for school vocational programs, and procedures such as requiring formal reports of placement activities and keeping records of employer requests for graduates to fill jobs. Let us not confuse focus with rigidity, however, for placement was less effective where trade and industry instructors were required to visit employers and where specific rather than general assignments were given to personnel.

Placement is not, of course, a one-shot operation; it takes place over time. Schools which made more contacts during the school year to line up jobs for graduates, schools which made more contacts to place students on co-op jobs and to check student progress, and schools which gave students more instruction on how to locate and apply for jobs achieved greater placement success.

Initiative

"Initiative" refers to the activeness of the role a school takes in placing the student. Instead of waiting for either the individual student or other agencies to assume responsibility, the school with initiative engages in many activities directed at placing students. While many school activities were not associated with either superior or inferior placement, and though some activities were actually associated with inferior placement, it seemed to be the general rule that, within the constraints of a focused program and role compatibility, placement activity on the part of the school more often contributed to superior than to inferior placement.

Those schools which reported a greater proportion of their students to have been placed through the efforts of the school had a superior placement record. This is not so much of a truism as it may at first sound. It is reasonable to expect that students and graduates would turn to the school if they were having difficulty in locating a job. If this were the case, one might expect, other things being equal, that schools involved in placing more of their students would have a poorer placement record. The fact that superior over-all placement was associated with quantitatively more placement suggests that school initiative may preclude placement difficulties.

In general, schools engaging in the greater number and variety of rationally relevant activities showed superior placement. Something of the nature of activities associated with both effective and ineffective placement will be revealed as we turn our attention to role compatibility.

Role Compatability

By "role compatibility" we mean the direct relevance of school

placement activities to the goal of placement, and their appropriateness to the community elements at which they are aimed. We might imagine a continuum of directness. At one extreme, we would have a direct activity such as calling a specific employer to place a specific individual on a specific job. At the other extreme, we would have contacts with the community to invite help in obtaining equipment or supplies. Those activities with a clear, direct, and rational relationship to placement have the greatest empirical association with effective graduate placement.

The tendency for directness of school activities to be associated with placement effectiveness varied, however, with the type of organization contacted. Direct contacts with employers were much more strongly associated with effective placement than contacts less directly aimed at a specific placement problem. This was less clearly the case for labor union contacts, and still less for community organizations such as clubs. Such results parallel the saliency of the type of organization involved. That is, for organizations with a large number of total school contacts which were significantly associated with effective placement, a large proportion of the contacts tended to be directly related to specific placement problems. For organizations having a smaller total number of school contacts which were significantly associated with effective placement, the proportion of significant contacts that were directly relevant to specific placement problems was smaller. One possible interpretation is that student placement is enhanced by a base of communication and good will between the school and all community organizations. However, beyond this basic position in the community network, the major efforts of the school might best be aimed at those organizations having most direct control over job opportunity — in particular, potential employers.

The Employment Security Office represents a special case. There is some evidence that a positive attitude on the part of the school toward the Employment Security Office was associated with effective placement. However, as we have said before, when the school depended primarily on that agency for placing its students, its placement record was inferior. Again, beyond establishing a base of understanding and good will, major placement efforts of the school seem best aimed directly at where the jobs are.

SUMMARY IMPLICATIONS

Already, in our summary description, we have had to gloss over a great deal of potentially important detail. But let us compound the felony by grossly summarizing some of the general beliefs about placement of trade and industry graduates to which the study has led us:

(1) School activity is central to effective placement.
(2) An effective school effort is focused in a coherent program which accepts responsibility for placing students.
(3) A placement mechanism in the school does not suffice; the school must take the initiative in contacting organizations throughout the community.
(4) A base of good will and communication with all elements of the community is desirable, but the major effort should be aimed where the jobs are — at potential employers.
(5) The school cannot abrogate its responsibility for placement through recourse to some other organization — not even to one as sympathetic and knowledgeable about placement as the Employment Security Office. To do so is to invite graduate placement which is less than optimum.

SOME MISCONCEPTIONS ABOUT OCCUPATIONAL CHOICE*

ROBERT A. ELLIS
THE UNIVERSITY OF OREGON

The Center for Research in Occupational Planning is currently engaged in a long-term research effort to add to our understanding of the nature of the occupational decision process and of the social and personal factors that facilitate, impede, or prevent youth in our society from developing occupational goals that can be effectively and realistically implemented.

An interdisciplinary staff, consisting of persons from the fields of education, psychology, and sociology, has been brought together to carry on research to answer the following questions: (1) How and why do occupational preferences develop and how do these change over time and crystallize into occupational choices? What are the goal components of a career plan? (2) What intermediate steps must be taken to implement career goals effectively? At what points do these intermediate decisions start to restrict the range of occupational alternatives that remain open? (3) What variables, both internal and external to the individual, impinge upon occupational choice? (4) How and why do some people drift into occupations with little apparent planning or forethought? (5) How and why do other people have their occupational plans disrupted or brought to a standstill? Are there intrapersonal or situational factors that make some individuals better able to readjust their goals once they have been disrupted?

DESIGN OF THE STUDY

The eventual aim of the research program is to undertake a longitudinal (i.e., panel-designed) study, on a nation-wide scale, of the planned and unplanned aspects of occupational decisions made by youth in our society. Because of the magnitude and scope of this endeavor, a preliminary research program has been initiated for the purpose of developing and perfecting the concepts and methods that will be relied on in the larger undertaking. To this end, fourteen separate pre-studies have been conducted by members of the Center's staff during the past year.

* This paper has been developed out of research supported by a contract with the U.S. Office of Education, Department of Health, Education, and Welfare.

The projects vary widely both in scope and in topic. Some are purely methodological in nature, as, for example, a pre-study being done to determine the relative utility of questionnaires and interviews for gaining information on occupational choice and its related factors. Others focus on the conceptualization and measurement of situational factors presumed to have significant bearing on the occupational choice process. For instance, the goal of one pre-study is to perfect instruments for ascertaining those aspects of family organization — and the familial attitude toward work and life in general — that are relevant to how youth develop conceptions of the world of work and form occupational plans. Another is designed to develop and validate a measure of religious involvement so as to test hypotheses about the bearing this factor may have on occupational choice. Still other pre-studies concentrate on the nature of the occupational decision process itself. One, for example, is concerned with gauging the relative degree of involvement youth may have in decisions about getting married, owning a home, purchasing a new car, or getting an education, as well as getting a job. Once developed, these items will serve as a base line for ascertaining the relative amount of planning that actually enters into occupational choices. Another pre-study has as its purpose the development of procedures for assessing young people's willingness to defer gratifications in order to gain desired occupational goals.

The initial research strategy being followed is to allow each investigator to pursue independently, and at his own pace, the objectives of the pre-studies under his direction — and thus exercise his own judgment as to the source of data and the research design to be used. Nevertheless, research efficiency requires that at a certain point the test instruments and questionnaires, and/or interview items that have been developed, be brought together into a unified research schedule, allowing for a coordinated data-collection effort. This will permit us to test the extent to which these procedures can be applied to youth who vary widely in social and intellectual characteristics.

Two sets of samples will be drawn in order to coordinate the research. One will consist of college-age youth from 17 to 19 years old who vary widely in race, socio-economic background, cognitive ability, educational experiences, and work prospects. To insure this diversity, samples will be drawn from three markedly different institutional settings: The University of Oregon, Los Angeles City College, and the Tongue Point Job Corps Center.

Once the applicability of procedures developed has been demonstrated for this broad spectrum of youth — holding age constant — a second test will be conducted to determine their applicability for youth at different age levels. For this purpose, tests will be administered to a cross-sectional sample of students in a socially heterogeneous high school.

Thus, the sampling design for the coordinated pre-study calls first for varying institutional setting and holding age constant, and then, for varying age but holding institutional setting constant.

SOME BASIC QUESTIONS

Since much of the data being assembled for the exploratory pre-studies are still being processed for analysis, it is not possible, even tentatively, to summarize the results. I can, however, discuss some of the questions that have guided our inquiries — particularly those that point to possible misconceptions in past thinking about the nature of the occupational choice process and its related factors.

In doing so, I shall draw upon three sets of data for purposes of illustration. The sets are based upon the orientation to work of (1) lower-class youth in an urban job corps who are not college-bound; (2) lower-class youth at Stanford University who are using higher education as a channel for social mobility; and (3) upper-middle-class youth at Stanford University who are using higher education to maintain their social position in society.

(1) To what extent do occupational choices focus on the intrinsic characteristics of the job? Most investigators have assumed that the decisions youth make about work are basically job decisions. In other words, they choose among occupational alternatives by examining the requirements and rewards of particular jobs and balancing these considerations against what they perceive to be their own interests, capacities, and values.[1] While this may, indeed, be the situation for many youth — particularly for those following upper-middle-class career patterns — it obscures the fact that concern with the characteristics of a particular job may be of secondary, or even little, importance in work decisions that are made. Hollingshead, for example, points out that lower-class adolescents in Elmtown drop out of high school, not to take a job, but to go to work in "the factory."[2] It is clear from his analysis that these youth, in their work orientation, have developed a conception of being attached to a particular organization, but do not think of this in terms of there being a specific occupation or series of occupations involved.

This notion that job considerations may be secondary in work decisions is sustained by data we have collected on college students

1 See, for example, Peter M. Blau *et al.*, "Occupational Choice: A Conceptual Framework," *Industrial and Labor Relations Review* IX (July 1956), pp. 531–543; Eli Ginzberg *et al.*, *Occupational Choice: An Approach to A General Theory* (New York: Columbia University Press, 1951); and Donald E. Super *et al.*, *The Psychology of Careers* (New York: Harper, 1957).

2 August B. Hollingshead, *Elmstown's Youth* (New York: John Wiley & Sons, 1949), pp. 360–388.

and job corpsmen. Some youth are primarily oriented to the institutional setting for work, such as those who say: "I want to work for Standard Oil;" or, "I want to make the army my career." Still others are more concerned with the external environment than the job. They report: "I want a job where I can work outdoors;" or, "I want a job in an area where I can go hunting and fishing." Thus, these data suggest that any conceptual model of how youth are oriented toward the world of work needs to be expanded to take into account the extrinsic characteristics of work that motivate youth.

This is not to deny that there are many attributes of the job itself which are valued by youth in our society and help to shape their occupational choices. Moreover, youth from different social backgrounds vary in the occupational values they deem highly important. For example, we find that, in comparison to middle-class youth, those coming from the lower class are less likely to value a job that provides them autonomy and a chance for self-expression; they emphasize, instead, the importance of having a job that offers security, lets them earn a good deal of money, and gives them a chance to work with things rather than people.

(2) To what extent do job plans entail long-term career goals? Of concern here is the common research practice of drawing inferences about career plans from statements youth make about the work they intend to follow after college or high school. Without information about job goals in late adulthood, inferences about career plans can be misleading and often invalid. This is well illustrated by the research we have been doing on career orientation among college females. That a girl plans on getting a master's degree in social work, and knows that when her education is finished she intends to do social work in child welfare (preferably, she mentions, in an institutional setting), is by no means an indication that she has long-range work goals in mind — let alone that she is considering a life career in social work. Even though they may contemplate advanced education, many girls see their work as terminating with marriage — or at least after they have children. When asked about what work they want to do at age 50 (a time period selected so they could, if they desired to do so, have a chance to interrupt their career to raise a family and then return to the world of work), many girls with crystallized job plans reported that they hope to be a wife, mother, or even a grandmother. Clearly, such girls could be classified as having well formulated work plans, but not long-term career plans. Other girls, while they intend to continue working — or to return to work — by age 50, do not view the occupational area in which they start as a focal point for a sustained career. For example, the girl referred to above with the highly crystallized plans for going into social work in child welfare wants, by age 50, to go into either writing or teaching. While she can be classified as having a

long-term work goal in mind, it would be misleading to classify her, and others like her, as career-oriented.[3]

There is also a need for distinguishing between short-term work plans and long-term job goals in studying the occupational choices of males. The fact that an adolescent boy has well defined plans for entering a profession may well signify that he views work in a professional field as preparation for another career. A good example of this is provided by the field of law. For many college students, the legal training they desire is seen as the background for a lifetime career in law. For others, however, work in law is viewed as an intermediate goal, a stepping-stone to a career in politics, government, or corporation management. To classify the latter as having made law their occupational choice is inaccurate unless their intermediate occupational objectives are qualified to take into account their long-term career goals.

The importance of this is brought out by data obtained on the occupational plans of upwardly mobile, lower-class youth at Stanford. Through a kind of *anticipaiory socialization,* they have assimilated many of the norms, values, and judgmental standards of the middle-class world they seek to enter.[4] It is, therefore, not surprising that the large majority of them, as entering freshmen, "indicate that their future career plans entail going to graduate school, and once that is completed, entering a high-status profession that will permit them in adult life to 'become respected and looked up to in the community.'"[5]

Nevertheless, their career goals still distinguish them from the upper-middle-class students who numerically and socially dominate the undergraduate student body at Stanford. The upwardly mobile students view work in the salaried professions as an end in its own right and, thus, a basis for a lifetime career. Students from upper-middle-class backgrounds, on the other hand, are far more likely to perceive the salaried professions as means to an end — as stepping-stones to later executive success. Thus, despite the similarity of their initial occupational goals, the career objectives of these two groups are distinctively different — a difference which, if not recognized, could lead to quite erroneous conclusions.

To understand the occupational choices of youth who are not

3 Mirra Komarovsky, "Cultural Contradictions and Sex Roles," *American Journal of Sociology,* LII (November 1946), pp. 184–189; Betty Friedan, *The Feminine Mystique* (New York: W. W. Norton, 1963).

4 Robert K. Merton, *Social Theory and Social Structure* (Glencoe, Ill.: Free Press, 1957), pp. 224–386.

5 Robert A. Ellis and W. Clayton Lane, "Social Mobility and Career Orientation," *Sociology and Social Research* L (April 1966), pp. 280–296.

college-bound, it is necessary to gain information on their long-range as well as their immediate work goals. Some of the job corpsmen we have interviewed see the vocational training they receive as preparing them for a lifetime job; while there are others who perceive their later years as ones of physical decline, and qualify their job plans accordingly. The latter group see themselves as taking up some form of easier work at age 50 — the nature of which is usually not specified — because they will be getting old. Finally, there are many who reveal by their interview responses the essentially short-term nature of their work objectives. To the question, "What kind of work do you want to do at age 50?" they indicate that they have not spent time thinking about whether their present goals are ones they want to continue indefinitely. Some simply reply that they live for the present and let tomorrow take care of itself — an orientation that undoubtedly has contributed to the difficulties they have experienced prior to entering the job corps, and will, unless changed, hamper their forming effective occupational goals.

(3) To what extent are occupational plans formed through a process of exclusion rather than of choice? In the research literature, only passing attention has been given to the role of negative choice in occupational decisions. The decision process is conceived instead as a progressive narrowing of occupational preferences.[6] Yet one source of difficulty for many youths is that they know what they do *not* want to do, but not what they want to do. This is true of many of the job corpsmen we have studied. Through personal experience, they have discovered a number of jobs they do not want: digging ditches; washing cars, working as a janitor, farm work, etc. They reject these jobs on the grounds that they are dirty, pay poorly, require back-breaking labor, and are boring.

Even though they have not, for a variety of reasons, formed any positive work goals, they have nevertheless made some fundamental occupational decisions. It is this essentially negative character of their decisions that accounts in part for their past history of drifting from job to job. Our data also reveal that some college students find themselves in a similar plight: They graduate as seniors without firm occupational goals, but know what kind of work they do not want to go into (or social circumstances prevent them from going into). Some end up deferring the time of decision by extending their education beyond the undergraduate level. Others, however, back into the world of work without any crystallized work objectives.

While the exclusion process may, in some circumstances, be the main factor in work decisions, it seems in the majority of cases to operate conjointly with the choice process. Before coming to college, students have already learned that certain job areas are not

6 *Cf.*, Blau *et al.*, *op. cit.*; Ginzberg, *et al.*, *op cit.*; and Super. *op. cit.*

appropriate for them; others, they find, are not feasible because of a lack of talent and limited opportunity for specialized training; others they perceive as not desirable. At the same time, they have at least provisionally developed long-range goals for the future at the time they enter college and, in addition, have formed alternative choices to fall back upon in case these original goals fail to materialize.

Students coming from higher social levels have a decided advantage over upwardly mobile students, in that their families play, not only a direct role in shaping their future life plans, but also an indirect role in providing work or travel experiences that prove of help in the decisions that are reached. For the lower-status youth in college, the family's role is much more limited, largely, it would seem, because the family does not have the proper background, resources, and experience to help shape and direct their life goals — even though the family was very often initially instrumental in motivating them to use higher education as a channel for social mobility.[7] For these decisions, lower-class students necessarily turn to persons outside the family for support and advice. Except for the school teacher, who serves as a general role model for many of these mobile youth, there is a rapid turnover among persons outside the family who can serve as reference individuals. Thus, adults outside the family, and high school friends, are instrumental in putting them on the path to college, but prove of little help once they are in college and have to choose a major. While at college, they are helped by their high school teacher and to a lesser degree by college teachers and college friends.[8] Yet, once they reach the end of their college days and are faced with the task of making decisions about entering the middle-class occupational world, they apparently find the high school teacher's advice of less help. They now turn to members of their immediate environment (college friends and college teachers) for aid and direction.

One consequence is that students from upper-middle-class backgrounds have the dual advantage of (1) being better prepared by their early experiences to make more enduring occupational decisions; and (2) failing that, they are more likely to have "backstop" choices upon which to draw. Among the upper-middle-class students, approximately one-half graduate with occupational goals that differ little from those with which they entered. Moreover, half of those who do change revert to the occupation which was their second choice as entering freshmen. Thus, 75 percent graduate from college with occupational goals they had considered as a first or

7 Robert A. Ellis and W. Clayton Lane, "Structural Supports for Upward Mobility," *American Sociological Review* XXVIII (October 1963), pp. 743–756.

8 *Ibid.*

second choice at the time of matriculation. By way of contrast, three out of four upwardly mobile youths graduate from college with occupational objectives distinctively different from those with which they entered, and none of those who change goals end up going into the occupation they had considered their second choice in freshman year.[9]

College years, therefore, serve as a period in which occupational choices are progressively narrowed and refined, and in which earlier choices may be rejected as classroom, travel, and work experiences provide a finer test of the students' interests and capacities. Because of the operation of the exclusion process, one measure of "vocational maturity" may well be that youth have a viable set of occupational alternatives on which to draw.[10] Whether "backstop" choices play a similarly significant role for youth who are not college-bound is a problem currently being investigated.

CONCLUSION

I have tried to describe briefly the nature of the research program being carried out by our Center, and to illustrate with preliminary research findings some overlooked considerations in the study of occupational choice. Since the research program is still in process, and the findings fragmentary and incomplete, any conclusions to be drawn must necessarily be tentative. Nevertheless, it would appear that in research on occupational choice: (1) more attention needs to be paid to factors extrinsic to the job itself as incentives for work; (2) consideration must be given to youths' long-term work objectives, as well as their short-term job plans, if we are to identify and understand properly their orientation to the world of work; and (3) considerably more emphasis needs to be placed on the exclusion process in occupational choice.

9 Ellis and Lane, "Social Mobility and Career Orientation," *op. cit.*

10 Super, *op. cit.*, pp. 187–191.

DISCUSSION

SYLVIA G. MC COLLUM
U.S. OFFICE OF EDUCATION

I have several very firm preconceptions and prejudices which I hold to be sacred, and against which I test the validity of all social science research. These preconceptions, simply stated, are that in the United States, and possibly even in the world, it is better to be rich than poor, white than non-white, physically and mentally attractive and healthy rather than unattractive, and last, but by no means least, any kind of male rather than any kind of female.

Each of the three papers presented in this session has, in my opinion, a high degree of validity, since each in some ways supports these sacred preconceptions.

Seriously, however, for social science research to be most meaningful, it needs to identify "new" knowledge. Professor Kaufman's paper tells us several things that we didn't know, and, of course, tells us once again something we all have heard time and time again: namely, that sex differences are more important than curriculum differences insofar as determining future earnings is concerned. While I am not sure that, in the final analysis, all of the new ideas we have had set before us will hold up, I think it important to identify them.

Professor Kaufman gives us at least three important messages: (1) vocational schools did a better placement job for graduates than did their academic counterparts; (2) vocational school graduates enjoyed better earnings during their first year's work after graduation than their academic counterparts; (3) vocationally trained Negroes earned more during their first year's work than their white or Negro *academic* counterparts and indeed better than white vocational school graduates.

This last point, in particular, needs checking. A 1963 study of Negro and white vocational school graduates in Baltimore, carried out by Johns Hopkins University on behalf of the Office of Economic Opportunity, showed exactly the opposite results.[1] The Kaufman study holds constant the IQ or aptitude level, whereas the Baltimore study does not. The Baltimore study tried very carefully to measure the earnings (as measured by Social Security Data) of graduates from the

1 "The Employment Situation of White and Negro Youth in the City of Baltimore—Initial Experiences on Labor Market" (Interim Report No. 1), prepared for the City of Baltimore, Equal Employment Commission, by the Department of Social Relations, Johns Hopkins University (April 1963), p. 21.

same occupational curriculum. It is not altogether clear from the preliminary remarks of Professor Kaufman whether or not this was the case in the Penn State Study. In any case, his paper raises, some provocative questions, and I am sure the final report will clarify this last point.

Professor Ellis' paper suggests a high correlation between the economic class from which you come and the likelihood that you will modify career objectives during your college career — the lower the economic class the higher the likelihood. Implications of this are extremely important for anyone interested in the process of career choice and how best to prepare youngsters to make sound decisions. His paper suggests to me that the choice should be deferred as long as possible, particularly with respect to lower income young people. The crucial question here seems to be one of available information about alternatives.

Research of this type should go a long way toward discouraging educators and others (parents?) who seem to feel that life-career decisions can be made by youngsters 14-16 years old. Asking such young people to make a lifetime commitment to a limited field of work seems nonsensical on the face of it. If, as Mr. Ellis indicates, lower-class youngsters entering college tend to change their career choice with greater frequency than middle- or upper middle-class youngsters, think of the greater frequency with which career choices would change among lower-class high school students if they could be exposed to the alternatives revealed in college preparation and college work. I think this is a very important study and should raise some interesting questions about just what aims we are serving by attempting to give specific job preparation to youngsters 14-16 years old.

Mr. Altman examines two levels of job placement efforts — the school and the community.

With respect to the unglamorous task of finding a job, several studies have already identified two placement forces as being the most important: namely, family and peer group assistance. Since we know empirically that disadvantaged individuals particularly lack family and peer group support in job hunting, and since we know that restructuring the family and peer groups is a long and painful endeavor, it becomes extremely intelligent and pragmatic to strengthen school and community job placement efforts — particularly for individuals coming from low income families. Mr. Altman correctly identifies school efforts as being crucial to effective job placement, and, most important, he focuses on the fact that these efforts must be aimed at where the jobs are — the potential employer.

The findings of the Altman study are most significant for lower income youngsters since it is they who are most dependent on school and community job placement efforts. The implications of this need

for school and community job placement support are very profound with respect to the high school dropout who then has no institutional base from which to request or to receive support.

CARL J. SCHAEFER
RUTGERS UNIVERSITY

It is encouraging, if not downright inspiring, to have Jack Kaufman, a labor economist, Jim Altman, a psychologist, and Bob Ellis, a sociologist, directing their attention to problems of man, education, and work. These are not educators, but individuals representing related disciplines. A decade ago, those of us in vocational and technical education would not have had the opportunity to focus such talent on our own problems.

It is impossible for me to be unbiased about the Kaufman paper, since I am personally involved in it, and because many of the findings of this study support what we vocational educators have been saying for some time. He could have reported — and will do so in his final report — that "one of the greatest strengths of vocational education is staff — that vocational education has been traditionally underrated, under-encouraged, or at best ignored. Staffs have had to be good to enable programs to survive."

He did not report that, in the exemplary programs studied, less than ten percent of the student population was enrolled in vocational programs. He did not report that, when it comes to the impact of vocational education on the employment needs of the communities included in the study, the results were disappointingly small. Nor did he report that we, as a research team, do not do a very good job of assuring ourselves that the quality did not vary tremendously from program to program; or that top school administrators don't really understand the aims and objectives of vocational education, and that this is the one aspect of education which is undernourished in terms of budget, physical facilities, and public relations support.

What Mr. Kaufman did report is encouraging; but, as an educator, I came away from our visits with the thought, "We have failed to do an adequate, let alone a superior, job in providing education for the world of work."

Jim Altman and his colleagues from the American Institutes for Research are certainly to be complimented for their interest in the problems of vocational education. I suppose many of the participants in this conference could have "second guessed" the findings of this study — that "local employment offices do not assist measurably to facilitate placement after graduation." But if this is the case, and apparently it is, the question remains, why? Certainly we must continue to study the problem, and I hope the AIR will come up with some answers.

The finding, that "placement was less effective where trade and industrial instructors were required to visit employees," does not correlate very well with the finding of improved effectiveness brought about by coordinators of cooperative programs. Possibly, this is not due to the concept of the role of the teacher placement official *versus* the cooperative placement official, but rather to the intrinsic differences between the programs themselves.

Finally, the whole question of occupational choice is one that has bothered us for some time. Bob Ellis and his colleagues are focusing on an important area. Of particular interest will be the findings of the pre-study directed toward the assessment of youths' willingness to defer gratifications in order to gain desirable occupational goals. Such willingness has significant relevance to those who are preparing for highly skilled occupations which take years to master.

I, for one, cannot get worked up over the use of job corpsmen as a sample indicative of a well known institutional setting. However, I submit that this sample may be atypical, as so often true of our neighboring Camp Kilmer Job Corps.

I would also add that, if immediate job opportunities are, as Hollingshead found, of lesser importance to youth than just plain work, certainly long-term career goals are still more vague in their minds. The important point here is direction — the "start," in other words, and how, when, and where youth get that start.

Even more important, however, as one of the members of our visiting team in the Kaufman-Schaefer study put it, is that "The school, as an institution, is subjected to forces outside of its orbit and control. Our public education system, which presumably is open and free to all to the limit of their ability, is being defined and delimited by the restrictions in the post-school world of work by community patterns of discrimination, or directly through the families' evaluation of these restrictions and their decisions regarding their children's course of study." And I might add that, unless youth has a choice — even a substantial number of choices — through many public school curricula, the school institution, which has so long characterized this country, cannot be worthy of its place.

IV

EXPERIMENTS IN COUNSELING, CURRICULUM, AND TRAINING

REHABILITATION AND TRAINING OF THE SCHOOL DROPOUT*

J. PASCHAL TWYMAN, VICTOR O. HORNBOSTEL, and JOHN C. EGERMEIER
OKLAHOMA STATE UNIVERSITY

In our increasingly complex technological communities, persons who enter adult life without successfully completing a minimum of twelve years of education are considered to be at a serious disadvantage. It is expected that certain grave consequences of this disadvantage will accelerate over a period of time.

Numerous studies have been made of causes and correlates of the school dropout situation. However, relatively little research of an experimental nature has been done concerning the correction or rehabilitation of the young person who becomes and remains a school dropout. Most of the early efforts in this area have emphasized the development of vocational skills. It might be expected that the success of such programs for the dropout could be enhanced through the inclusion of additional units of related training.

Under provisions of the Manpower Development and Training Act of 1962, as amended in 1963 by Public Law 88-214, a training program was authorized in Oklahoma with specific provision for a youth component. While this program was being implemented, contact was made with officials of the several agencies involved to determine whether a training proposal within the youth section of the Act could be designated for experimental purposes. Funding was requested from the Ford Foundation in support of research, evaluation, and other items not covered by Federal funds; and approval was granted for a project in Oklahoma City which would permit an analysis of the effects upon school dropouts, of vocational training alone, academic training alone, a combination of academic and vocational training, and no training.

OVER-ALL RESEARCH OBJECTIVES

The research aspects of this project will cover a total of 44 months (January 1964 through August 1967). The training programs opened on Augus 3, 1964, and were all completed by June 30, 1965.

* The research reported herein was sponsored by the Ford Foundation and administered by the Oklahoma State University Research Foundation, Stillwater, Oklahoma, Marvin T. Edmison, Director. The authors wish to acknowledge the assistance of Gerald E. Boggs, Collin W. Bowen, James L. Casey, William G. Chance, William D. Frazier, Douglas W. Hamm, David S. McElhiney, Merrill D. Redemer, and Gaylen R. Wallace.

Participants are being contacted at six-month intervals over a two-year period for the purpose of evaluating their success after training. In an ancillary study, employers are being interviewed to obtain their impressions of the trainees as employees.

The primary research objective of the project is to determine whether there is a significant relationship between the type of training the subjects received and the extent of their achievement in the academic and vocational education curricula which they were offered. Also of interest is the extent and direction of any shifts in their interest patterns, personal and social adjustment, anxiety levels, and social class value orientations during the training period. A second major research objective is to determine whether the type of training the students received led to certain post-training behavior and attitudes judged to be desirable. However, this paper will report only on the findings relative to the first objective of the study, and is limited to the assessment of differences in academic achievement among the post-test mean scores of the treatment groups. The analysis is made by the use of the raw scores of subjects on the *Sequential Tests of Educational Progress (STEP)*, Forms 3-A and 3-B. In some pilot work, this level of testing with the STEP battery appeared to be getting at the concept of general educational development, which may be inferred, in some circumstances, from academic achievement.

THE POPULATION

The population eligible for the program was defined by the Manpower Act to include unemployed and underemployed youth who were at least 17 years of age, but less than age 22, and who had failed to attend high school for at least a year. They were also expected to meet certain minimum aptitude levels, as measured by the *General Aptitude Test Battery* (described in the appendix). While eligibility for the experimental program was not restricted to Oklahoma City youth, most individuals who applied were living within the Oklahoma City metropolitan area. School officials estimated that over 2,000 youth fell within the eligibility limits.

DESIGN OF THE STUDY

The basic plan for this project was a pre-test-post-test control group design described by Stanley and Campbell.[1] The study included comparisons of five groups of subjects — three experimental

1 Donald T. Campbell and Julian C. Stanley, "Experimental and Quasi-Experimental Designs for Research on Teaching," *Handbook of Research on Teaching*, N. L. Gage, ed. (Chicago: Rand McNally, 1963), pp. 183–94.

groups and two control groups. *The Academic-Vocational Group* received a combination of vocational and academic training; the *Vocational Group* received only vocational training; and the *Academic Group* received only academic training. The control groups consisted of *Control Group I*— eligible youth who applied for the program but who did not enter it for training — and *Control Group II*—those students who started the program but dropped out before a significant portion (designated as 15 percent) of their total projected training time had elapsed.

Types of Academic and Vocational Training Offered

The academic portion of the program consisted of instruction in communication skills, mathematics, social studies, and science. Vocational skill areas were selected by the Oklahoma Employment Security Commission on the basis of findings from their labor market surveys. Titles of the eight programs offered are given in Table 1, with the duration and completion date of each. Also shown are the duration and completion date of the academic instruction.

TABLE 1

Training Areas

Course	Weeks of Training	Completion Date
General Office Clerk, Refresher	20	December 18, 1964
Machine Tool Operator	26	January 29, 1965
Stenographer, Refresher	26	January 29, 1965
Welder, Combination	26	January 29, 1965
Office Machine Mechanic	36	April 9, 1965
Sheet Metal	36	April 9, 1965
Cosmetology	43	May 28, 1965
Auto Mechanics	48	June 30, 1965
Academic [a]	43	May 28, 1965

[a] Subjects in the Academic-Vocational Group received academic training only up to the completion date of their specific skill-training program.

Recruitment and Selection of Subjects

The agency responsible for recruitment of subjects for the study was the Oklahoma Employment Security Commission, through the

local offices of the Oklahoma State Employment Service. An intensive campaign of newspaper, radio, and television advertising, as well as personal contact by Employment Service personnel, served to publicize the program.

The initial plan of the project was to randomly assign eligible youth to one of the experimental or control groups. Since this was a public program, however, strict adherence to the desired procedure could not be maintained. Therefore, the research team decided to conduct pre-tests of as many of the potentially influential variables as possible, so that statistical analyses of the data could be made. (See the Appendix for a brief description of instruments used.)

The Training Program

The Oklahoma State Board for Vocational Education was responsible for setting up the instructional program, ans staff supervisors representing that agency were available as needed during the training program. The Central High School building and a facility adjacent to the Washington School provided instructional space. Administrative and teaching personnel for the program were employed by the Oklahoma City School System.

Both the vocational and academic phases of the training were individualized and non-graded. In addition, credits earned in academic areas could be counted toward a high school diploma. Instruction utilized programmed materials, audio-visual aids, and various devices and models for demonstration. Vocational skill teachers taught students from the academic-vocational group and from the vocational group in the same class. Similarly, the teacher in each academic area taught the students from both the academic-vocational group and the academic group. Thus, the possible effect of the teacher was controlled in those situations where it was pertinent.

Students enrolled in a vocational skill attended class for five hours daily. Those enrolled in academic areas spent three hours a day in class, devoting the entire period to a single subject area. Students in the academic-vocational group had to meet the requirements of both schedules.

One staff counselor, who served also as the over-all director of training, provided the in-school counseling. Out-of-school counseling was given by four counselors from the Oklahoma Employment Security Commission.

In addition, a variety of activities supplemented the formal instruction. These included special recreation programs at the YMCA and the YWCA; field trips with the teachers; student assemblies addressed by outside speakers from government and private enterprise; and special sessions with some of the regular staff at Central

High School on such matters as grooming, and learning social amenities and manners, which might be important for students when seeking employment.

DATA COLLECTION: PRE-TESTS AND POST-TESTS

During the first week of the training program (August 3-7, 1964), subjects in both experimental and control groups completed a number of instruments designated as the pre-test battery. A comparable battery was later used in post-testing.

The different completion dates for subjects in vocational training made it necessary to divide groups into two units for post-testing purposes; these were designated *Time I* or *Time II*, according to post-test completion dates. The Time I unit completed post-tests on January 7, 1965, and the Time II unit on May 6, 1965. The academic group and control groups were divided randomly for post-testing. The number of subjects for whom complete pre-test and post-test data were secured for the training period is shown in Table 2.

TABLE 2

Students Included in Analyses

Group	Time I (Early Post-test)	Time II (Late Post-test)
Academic-Vocational	56	18
Vocational	42	13
Academic	19	15
Control Group I	15	12
Control Group II	13	14
Total	145	72

STATISTICAL PROCEDURES

In identifying the pre-test scores to be used as concomitant variables in the analysis of covariance, the initial procedure was to estimate the impact of these variables on each dependent variable by a multiple regression technique. The multiple regression computer program chosen for this purpose calculates the reduction in the sums of squares for each variable, and the multiple correlation coefficient.

In the initial regression analysis, each sub-test score for all the instruments used was entered as a variable. It was decided, arbitrarily, to hold for further analysis those variables on which the F value on adjusted scores was 1.00 or higher.

A second regression analysis was made of the variables that were retained as a result of the first step. For a variable to survive the second step, the F value on adjusted scores was evaluated at the .05 level of significance.

The analysis of covariance then afforded the basic statistical procedure for evaluating project results on academic learning. Comparisons which yielded F values at the .05 level of significance or higher were followed by a test for the adjusted means, taking two groups at a time. Since a simple *t* test is usually regarded as inappropriate for making *a posteriori* comparisons, we followed instead the method developed by Scheffé.[2] This method is reported to be more rigorous than others with regard to Type I errors, and Scheffé has therefore suggested that the .10 significance level should be used in applying his test.

FINDINGS ON ACADEMIC ACHIEVEMENT

The Time I findings for five academic achievement variables are presented in Table 3. From the probability levels reported, it was decided to adjust the means for STEP writing, STEP social studies, and STEP science, and to test the combinations of adjusted means two at a time by the Scheffé procedure. With the information developed by the Scheffé method, it is also possible to estimate the result of comparing two groups by an ordinary *t* test. This is done by extracting the square root of the reported F, a familiar procedure for an F test of two groups. For example, the square root of a reported F of 4 gives an ordinary *t* of 2 which is at about the .05 level of confidence for the degrees of freedom of the pairs under consideration. The adjusted means and the results of the Scheffé procedure for the three significant STEP variables are shown in Tables 4, 5, and 6.

As indicated in Table 4, no comparison of two adjusted STEP writing means was significant. However, comparisons of both the academic-vocational group and the vocational group with control group I appear to have contributed to the finding of a significant difference in the analysis of covariance.

Three comparisons of the adjusted means on STEP social studies were significant at the indicated level, as shown in Table 5. The mean for the academic group was highest in each case. The significance level of the three groups compared with the academic group

2 Henry Scheffé, *The Analysis of Variance* (New York: John Wiley and Sons, 1959), p. 209.

TABLE 3

Analysis of Covariance for Five Academic Achievement Variables, Time I

Source of Variation	Adjusted Sum of Squares	*df*	Variance Estimate	F	P
Reading[a]					
Total	6,938.45	138			
Between	347.50	4	86.87	1.77	.10<P<.25
Within	6,590.95	134	49.19		
Writing[b]					
Total	5,345.95	137			
Between	429.03	4	107.26	2.90	.01<P<.025
Within	4,916.92	133	36.97		
Social Studies[c]					
Total	4,530.77	136			
Between	615.95	4	153.99	5.19	
Within	3,914.82	132	29.66		P<.0005
Mathematics[d]					
Total	3,799.24	138			
Between	58.13	4	14.53	.52	.50<P<.75
Within	3,741.11	134	27.92		
Science[e]					
Total	3,948.97	137			
Between	314.94	4	78.73	2.88	.01<P<.025
Within	3,634.03	133	27.32		

[a] Concomitant variables were GATB verbal, STEP reading, STEP social studies, CTP social adjustment, IPAT covert anxiety, and IPAT overt anxiety. $R^2 = .72$.

[b] Concomitant variables were GATB verbal, GATB clerical, STEP reading, STEP writing, STEP social studies, CTP social adjustment, and IPAT covert anxiety. $R^2 = .74$.

[c] Concomitant variables were GATB intelligence, GATB numerical, STEP reading, STEP social studies, Preference for familiar and stable situations, Preference for avoiding conflict, CTP personal adjustment, and CTP social adjustment. $R^2 = .78$.

[d] Concomitant variables were GATB numerical, GATB spatial, GATB mathematics, Kuder Preference for familiar and stable situations, CTP social adjustment, and IPAT covert anxiety. $R^2 = .70$.

[e] Concomitant variables were RUO total, GATB verbal, GATB motor coordination, STEP reading, STEP social studies, STEP science, and Preference for familiar and stable situations. $R^2 = .66$.

TABLE 4

Comparison of Adjusted Means, STEP Writing, Time I

Group	Unadjusted Means	Adjusted Means	Comparisons $F' = 7.76$ [a]	F
Academic-Vocational	38.31	34.80	Academic-Vocational with Control I	6.29
Vocational	31.52	34.67	Vocational with Control I	6.22
Academic	40.15	37.95	Academic with Academic-Vocational	3.81
Control I	37.40	39.23	Academic with Vocational	3.81
Control II	32.23	38.29	Vocational with Control II	3.52
			Academic-Vocational with Control II	3.48
			Others	<3.00

[a] For any differences to be significant at the .10 level, F must be greater than or equal to F'.

TABLE 5

Comparison of Adjusted Means, STEP Social Studies, Time I

Group	Unadjusted Means	Adjusted Means	Comparisons $F' = 7.76$ [a]	F
Academic-Vocational	48.57	45.26	Academic with Vocational	20.40
Vocational	40.69	42.51	Academic with Control II	10.83
Academic	50.26	49.31	Academic with Academic-Vocational	7.85
Control I	43.13	46.39	Academic-Vocational with Vocational	6.12
Control II	36.92	42.86	Vocational with Control I	5.61
			Others	<3.00

[a] For any difference to be significant at the .10 level, F must be greater than or equal to F'.

TABLE 6

Comparison of Adjusted Means, STEP Science, Time I

Group	Unadjusted Means	Adjusted Means	Comparisons $F' = 7.76$ [a]	F
Academic-Vocational	36.73	34.57	Academic with Vocational	9.65
Vocational	31.57	32.62	Academic with Control I	6.83
Academic	38.21	37.11	Academic-Vocational with Vocational	3.34
Control I	29.87	32.39	Others	<3.00
Control II	30.85	35.48		

[a] For any difference to be significant at the .10 level, F must be greater than or equal to F'.

was highest with the vocational group, next highest with control group II, and third with the academic-vocational group.

Table 6 shows the adjusted means for STEP science, and the results of the Scheffé procedure. Again, the adjusted mean of the academic group was the highest. The significant comparison with this group was the vocational group. Only slightly lower in critical value was the comparison with control group I.

The results for the five academic achievement variables, Time II, are shown in Table 7. None of the F values and their associated probabilities were such as to warrant adjustment of the means for further comparisons of groups taken two at a time. The results on STEP mathematics and STEP science, however, approach such a level.

An examination of the footnotes to Table 3 and Table 7, which show the values of R^2 for the group of concomitant variables associated with each of the academic learning dependent variables, indicates that all multiple coefficients of correlation were higher than .80 .

DISCUSSION OF THE FINDINGS

It is reasonable to conclude, on the basis of the results of the academic learning variables, that the academic group and the academic-vocational group should do well, and that the vocational

TABLE 7

Analysis of Covariance for Five Academic Achievement Variables, Time II

Source of Variation	Adjusted Sum of Squares	*df*	Variance Estimate	F	P
Reading [a]					
Total	2,962.71	65			
Between	42.36	4	10.59	.22	.90<P<.95
Within	2,920.35	61	47.87		
Writing [a]					
Total	2,021.14	65			
Between	139.74	4	34.94	1.13	.25<P<.50
Within	1,881.40	61	30.84		
Social Studies [c]					
Total	3,686.34	65			
Between	172.37	4	43.09	.75	.50<P<.75
Within	3,513.97	61	57.61		
Mathematics [d]					
Total	2,177.87	68			
Between	240.51	4	60.13	1.99	.10<P<.25
Within	1,937.36	64	30.27		
Science [e]					
Total	2,025.19	65			
Between	193.86	4	48.46	1.61	.10<P<.25
Within	1,831.33	61	30.02		

[a] Concomitant variables were GATB form perception, GATB motor coordination, GATB manual dexterity, STEP reading, STEP social studies, and CTP social adjustment. $R^2 = .70$.

[b] Concomitant variables were GATB spatial, STEP reading, STEP writing, STEP mathematics, Kuder preference for working with ideas, and CTP personal adjustment. $R^2 = .76$.

[c] Concomitant variables were STEP reading, STEP social studies, K Preference for being active in groups, Kuder Preference for familiar and stable situations, CTP personal adjustment, and CTP social adjustment. $R^2 = .71$.

[d] Concomitant variables were STEP mathematics, Step science, and Kuder Preference for avoiding conflict. $R^2 = .66$.

[e] Concomitant variables were GATB numerical, GATB clerical perception, STEP social studies, STEP science, CTP personal adjustment, and IPAT overt anxiety. $R^2 = .67$.

group, control group I, and control group II could all be considered control groups. The comparisons we have made suggest that the indicated result is substantiated with regard to the academic group. However, the question that remains unanswered is why the academic-vocational group did not do as well. It is evident that most of the differences between the academic group and the academic-vocational group were not significant; but it is also apparent that the academic-vocational group did not differ significantly from the three other groups.

On most comparisons, it is possible to explain this result by postulating that the eight-hour school day for the academic-vocational group had a dampening effect on their learning.

Another perplexing question is why the vocational group emerged with the lowest adjusted mean as often as it did. A possible explanation here is that the vocational training provided a minimum amount of experience which could be reflected in academic learning, and that the day-to-day informal learning experiences of the two control groups were reflected somewhat more, although not significantly.

The findings on achievement in STEP writing, however, are still perplexing in the light of the foregoing discussion, for the highest adjusted mean was achieved by control group I. It may be that, in some of the forthcoming analyses of personal and social variables, some additional explanation will be suggested.

A final question that should be asked about the findings on academic achievement is why Time II groups did not show some significant probability levels. The two vocational skill areas represented in Time II were cosmetology and auto mechanics. While not detailed in this paper, except where academic ability was influential as a concomitant variable, the groups in Time II appeared to be less able, and may therefore have been less successful in academic learning. It should be pointed out, however, that the indications of differences appearing for Time II groups at lower probability levels do not contradict the previous discussion.

This analysis, then, has indicated some modest success for the academic learning portion of the project, but not so much as we had hoped for with the academic-vocational group. Forthcoming analyses dealing with various personal and social variables should provide additional insights into academic achievement, vocational achievement, and the possibilities of successful employment for the subjects of the study.

It is hoped that final results will have significant implications for the development of future youth training programs.

APPENDIX

Instruments Used for Analysis

1. Before training, the Oklahoma Employment Security Commission administered this test:

General Aptitude Test Battery, Form B-1022. The GATB yields nine aptitude scores. Titles of the sub-tests and their respective test-retest reliability estimates are: .80+ for general intelligence, verbal aptitude, numerical aptitude, and spatial aptitude; .70+ for clerical perception, form perception, motor coordination, and manual dexterity; and .60+ for finger dexterity.

2. Research team personnel administered the following on a pre-test and post-test basis:

Sequential Tests of Educational Progress, Form 3-A and 3-B for Reading, Writing, Social Studies, Mathematics, and Science. Median reliabilities reported for each test estimated by the Kuder-Richardson Formula 20 are .915 for reading, .865 for writing, .850 science, .835 for mathematics, and .890 for social studies.

California Test of Personality, Form AA and Form BB, Secondary Level. A total adjustment score is derived by simple addition of scores for the two major sections of the test, "personal adjustment" and "social adjustment." The personal adjustment section is based on feelings of personal security. It has six component parts: self-reliance, sense of personal worth, sense of personal freedom, feeling of belonging, withdrawing tendencies, and nervous symptons. The social adjustment section is based on feelings of social security. Component parts are: social standards, social skills, anti-social tendencies, family relations, school relations, and community relations. Reported reliability coefficients for the several components range from .70 to .97; the coefficient for total adjustment is .96.

Kuder Preference Record, Personal, Form A. This instrument is composed of five scales which describe different types of personal and social activities. The scales are considered to be independent and non-additive. They are: (a) preference for being active in groups; (b) preference for familiar and stable situations; (c) preference for working with ideas; (d) preference for avoiding conflict; (e) preference for directing or influencing others. Reported reliabilities of the five scales range from .76 to .89, as computed by the Kuder-Richardson formula.

IPAT Anxiety Scale. This instrument yields scores of covert or hidden anxiety and overt or symptomatic anxiety. In addition, five

factors which group together as anxiety components are measured by the instrument. These include defective integration or lack of self-sentiment, ego weakness or lack of ego strength, suspiciousness or paranoid insecurity, guilt proneness, and frustrative tension or id pressure. A total composite anxiety score is also derived from the instrument. All reliabilities reported are .80+ by split-half, immediate retest, and delayed test-retest procedures.

Social Class Value Orientation Inventory. This is an experimental instrument under development by Solomon Sutker, Professor of Sociology at Oklahoma State University. It yields a total score from responses to 33 pairs of value statements. The responses reflect either middle-class or lower-class orientation. The inventory was constructed on four dimensions, each yielding a sub-total score. The dimensions are: (1) time orientation: planning, deferring gratification — future time vs. present time; (2) control of destiny: planning and effort vs. fatalism; (3) presentation of self: controlled and socially conscious vs. uncontrolled and unconcerned; and (4) social world: non-familistic vs. familistic.

Rural-Urban Orientation Inventory. This instrument is also under development by Professor Sutker. It yields a total score from responses to ten pairs of value or opinion statements. The instrument was constructed from three dimensions which yield three sub-total scores. The dimensions are: (1) individual autonomy over actions and time use: less need vs. more need; (2) moral attributes in man's work or nature: neutrality vs. nature superior to man's work; and (3) distinctive city characteristics of social density, distance, heterogeneity, institutional variety and richness: acceptance vs. resistance or acceptance of rural counterparts.

THE EFFECT OF A VOCATIONAL PROBLEM-SOLVING EXPERIENCE ON CAREER EXPLORATION AND INTEREST

JOHN D. KRUMBOLTZ
STANFORD UNIVERSITY

The problem of making career plans is complicated for most young people by the fact that they have incomplete and inadequate bases for making the decisions. Many youths would like to decide on some type of goal, but their knowledge and experience are so limited that they cannot make even a tentative choice. Others do make firm career commitments, but often on the basis of inaccurate or unrealistic expectations of the type of work that will be required of them. Almost all have doubts about what they themselves are capable of accomplishing.

As J. Samler points out, "One of the key problems confronting the counselor has to do with making the work world real. For many youths the situation is such that they are not confronted with the reality of work. They are separated from it physically and even vicariously."[1] The problem stems from the fact that young people have very few opportunities to actually solve the types of problems faced in a job situation. They may observe employed persons at their work, but even then they see only the outward manifestations of the job, not the problem-solving process itself. An adolescent may have virtually no idea of the problems and responsibilities faced on the job by his own father. Even though he may see his father at work on some occasions, he sees only the superficial aspects of the job. He may see him signing his name, punching a calculator, talking to a secretary, or adjusting machinery. But he has no conception of what is being accomplished, what problems must be solved, or how this job fits into the total process. Most of all, he hasn't any idea whether he himself could do the job.

The present study is a first step in evaluating some materials designed to give young people the opportunity to solve simple, but realistic, problems similar to those encountered by members of

* This research project was supported under a contract with the U.S. Office of Education with funds authorized by the Vocational Education Act of 1963. The authors are indebted to Elizabeth Van Dalsem, Director of Guidance and Research for the Sequoia Union High School District, and to Philip S. Maslin, Principal, and Julian Polon, Head Counselor and Vice Principal, of San Carlos High School, for their wholehearted cooperation, support, and efforts in conducting this study. Our appreciation is also extended to the teachers, junior class counselors, secretaries, and students of San Carlos High School for their cooperation and attention to the countless details essential to this project.

1 J. Samler, "Occupational Exploration in Counseling: A Proposed Re-Orientation," *Man in a World at Work*, Henry Borow, ed. (Boston: Houghton Mifflin, 1964), p. 412.

various occupations. It is limited to those occupations related to accounting. The materials are designed to enable young people to experience job-related problems, to evaluate whether or not they themselves would like to engage in similar kinds of activities in the future, and to encourage active career planning and exploration.

The basic theoretical question of this study is this: What are the factors that cause a person to enter any given occupation? Factors influencing career choice have been explored by psychologists, sociologists, and educators for many years, and a number of valuable studies have been conducted to identify the correlates of various occupational interests. These correlates appear to be remarkably stable over time, enabling us to predict with considerable accuracy the particular occupation certain persons will enter.[2]

J. L. Holland has identified five major research programs concerned with vocational behavior: (1) Super's work on vocational development at Columbia University; (2) Tiedeman's work on career development at Harvard University; (3) Roe's work on vocational choice at Harvard University; (4) Holland's studies of vocational behavior at the National Merit Scholarship Corporation; and (5) Flanagan's studies of vocational behavior at the American Institutes for Research.[3] All five of these programs have involved correlational studies designed to relate vocational behavior to other data collected at an earlier, the same, or a later time. None of them has entailed experimental manipulations to determine the effect of certain experiences. The correlational and descriptive studies have been valuable in providing leads about possible causative factors, but the very nature of correlational studies precludes an inference of causation with any known degree of certainty.

The early work of E. L. Thorndike, though not frequently cited now among those generating research in the field of interest development, still has relevance.[4] Among the forces which can modify interest, Thorndike listed contiguity, suggestion, imitation, and conditioning by rewards and punishment. Conditioning, first by rewards, and then by associative shifting, was seen by Thorndike as accounting for the great majority of modifications made in human behavior in general, and probably for the modifications made in interests and attitudes in particular.[5]

2 E. K. Strong, Jr., "An 18-year Longitudinal Report on Interests," *The Strong Vocational Interest Blank: Research and Uses* (Minneapolis: University of Minnesota Press, 1960).

3 J. L. Holland, "Major Programs of Research on Vocational Behavior," *Man in a World at Work*, Henry Borow, ed. (Boston: Houghton Mifflin, 1964), pp. 259–84.

4 E. L. Thorndike, *Adult Interests* (New York: Macmillan, 1935).

5 For other theoretical studies in the area of interest development, see: E. Ginzberg, S. W. Ginsburg, S. Axelrod, and J. L. Herma, *Occupational Choice: An Approach to*

Like Thorndike, E.K. Strong believed, in 1943, that associative learning theory would account for most of the change in interests or occupational choices.[6] However, in reviewing his 18-year longitudinal study in 1960, he suggested that interests are "discovered" rather than learned, although it should be pointed out that his research was not designed to determine how interests originate.

Reviewing for a moment some of the factors which are believed to influence occupational choice, in 1961, O. Uzzell surveyed Negro male high school students and found that 70 percent knew people in the field to which they aspired, and most were influenced by these people. [7] Occupational aspirations were also thought to be influenced by mass media. R.W. Matteson found that college students increased their interests in those areas where they gained in experience.[8] However, the precise nature of each experience (e.g., whether it involved success or failure, satisfaction or frustration, participation or observation) was not considered. Bordin and Wilson found that curricular shifts were accompanied by changes in Kuder profiles.[9] And Becky J. White discovered that girls with career interests tended to come from homes in which the male parent was deceased, or in which there was little communication between the girl and her parents.[10]

In her work with eminent scientists, Anne Roe found that her successful groups generally came from socio-economic backgrounds which were above average.[11] However, her hypotheses about early family influence on career development have not generally been borne out by subsequent correlational research.[12] Roe herself states

a General Theory (New York: Columbia University Press, 1951); H. D. Carter, "The Development of Vocational Attitudes," *Journal of Consulting Psychology,* IV (1940), pp. 185-91; and, E. S. Bordin, "A Theory of Vocational Interest as Dynamic Phenomena," *Educational and Psychological Measurement,* III (1943), pp. 49-66.

6 E. K. Strong, Jr., *Vocational Interests of Men and Women* (Stanford: University Press, 1943).

7 O. Uzzell, "Influencers of Occupational Choice," *Personnel and Guidance Journal* XXXIX (1961), pp. 666-69.

8 R. W. Matteson, "Experience-Interest Changes in Student," *Journal of Counseling Psychology* II (1955), pp. 113–20.

9 E. S. Bordin and E. H. Wilson, "Change of Interest as a Function of Shift in Curricular Orientation," *Educational and Psychological Measurement* XIII (1953), pp. 297-307.

10 Becky J. White, "The Relationship of Self Concept and Parental Identification to Women's Vocational Interests," *Journal of Counseling Psychology* VI (1959), pp. 202-206.

11 Anne Roe, "A Psychological Study of Eminent Biologists," *Psychological Monographs* LXV (1951); "A Psychological Study of Psychologists and Anthropologists," *Psychological Monographs* LXVII (1953); and "A Psychological Study of Physical Scientists," *Genetic Psychology Monographs* CDXXXI (1951).

12. For example, see D. Hagen, "Careers and Family Atmospheres: An Empirical Test of Roe's Theory," *Journal of Counseling Psychology* VII (1960), pp. 251-56.

that "The evidence seems clear, even allowing for the methodological limitations of these studies, that the relationship predicted between parental attitudes in childhood and later occupational selection does not hold for individual groups of occupations." [13] However, establishing the relationship between early experiences and subsequent vocational events is a knotty problem. Some clear-cut experimental evidence, though difficult to obtain, is needed to identify the types of experiences that tend to cause various interests to develop.

Among Leona Tyler's longitudinal studies was the finding that special abilities seemed to correlate with interest for boys, but not for girls.[14] She hypothesized that patterned interests develop through the acquisition of dislikes by individuals whose initial attitude is favorable toward everything.

One of the few experimental attempts to generate interest was reported by May and Lumsdaine.[15] They found that showing a movie of a novel did not necessarily cause students to take that book out of the library, but showing just a few interesting episodes did lead students to withdraw the book. Perhaps if students are presented with some interesting occupational problems, they will be motivated to engage in a more extensive exploration of career opportunities.

The basic hypothesis to be tested in our study is that students who are given an opportunity to solve successfully a realistic job-related problem will indicate greater interest in related occupational activities, and will explore more career opportunities than will students who are given either specific or general occupational information.

METHODOLOGY

Subjects

The subjects consisted of eleventh-grade students from a large suburban high school in an upper middle-class community. The study was conducted during the spring of 1965, at which time 540 students were enrolled in the eleventh grade. The main analysis of the data was based on 379 subjects who completed all phases of the experiment

13 Anne Roe, "Personality Structure and Occupational Behavior," *Man in a World at Work, op. cit.*, p. 209.

14 Leona E. Tyler, "The Relationship of Interests to Abilities and Reputation Among First Grade Children," *Educational and Psychological Measurement* XI (1951), pp. 255-64; "The Development of Vocational Interests: The Organization of Likes and Dislikes in 10-year Old Children," *Journal of Genetic Psychology* LXXXVI (1955), pp. 33–44; and "Distinctive Patterns of Likes and Dislikes over a 22-year Period," *Journal of Counseling Psychology* VI (1959), pp. 234-37.

15 M. A. May and A. A. Lumsdaine, *Learning from Films* (New Haven: Yale University Press, 1958).

and who were not involved in any other special program which might affect the results of the study. (Some analyses involved a few additional cases about whom partial data were available.)

Another sub-group consisted of 74 students who were enrolled in three English classes where a classroom assignment was made which required students to select a vocation and seek out information about their choice. This assignment was made a few days after all students were given the experimental materials for the study. Since subjects were randomly selected, a separate analysis was conducted to assess the effect of the experimental treatments on the groups that had the additional assignment. Sixty of these — those for whom complete data were available — were included in the analysis. Twenty-four students were excluded because they were cooperating in another study; and another 63 students were excluded because they were absent either during the treatment or at times when criterion data were collected.

Experimental Treatments

In order to arrange a reasonable test of the experimental hypothesis, an occupation had to be chosen which met the following criteria: (1) it is open to both men and women; (2) it is not a "glamour" job to which eleventh-graders might already aspire on the basis of superficial information; (3) it must be in some social demand according to Labor Department statistics; (4) related jobs at various skill levels must be available; and (5) no rare or unusual skill is required for successful performance.

The occupation of accounting met the five criteria and was selected for purposes of this experiment. While fewer than 10 percent of all professional accountants are women, a large proportion of workers at the basic skill level, e. g., bookkeeping, are women. People with training in accounting may qualify for such positions as programmer, systems analyst, management analyst, and management trainee. Related occupations at lower skill levels include ledger or cost clerks, bookkeepers, timekeepers, and junior internal auditors.

The problem-solving materials were prepared in accordance with the following guidelines: (1) the problem should be realistic and representative of the type of problems faced by members of the occupations; (2) 95 percent of the target population should have no difficulty in reading the problem; (3) the problem should be considered intrinsically interesting by the majority of the target population; (4) at least 75 percent of the target population should be able to read the material and solve the problem successfully within 50 minutes; and (5) the problem should be completely self-contained and self-administered.

Three treatment groups were constituted: (1) the problem-solving group — the experimental group which solved a problem in accounting;

(2) the accounting information group — the first control group, which received occupational information about accounting; and (3) the general information control group — a second control group, which received information about career choice without mention of any particular occupation.

The Problem-Solving Group

The problem-solving kit begins by explaining briefly the valuable services performed by accountants. It then asks the student to imagine that he is an accountant who has been consulted by the owner of a small sport shop about diminishing profits. Since it was assumed that the subjects had no prior experience with accounting or banking procedures, a brief explanation of how a check is written, endorsed, and cleared is provided. The student is then asked to remove a packet of cancelled checks from an envelope and compare them with the records kept by the bookkeeper. A detailed comparison would reveal a number of discrepancies involving forged signatures, overpayments, possible kick-backs and misappropriated funds. The student is then asked to pick which of three letters he would write to the owner of the sport shop. Any student discovering four of the eight possible discrepancies is told that he has successfully mastered some tasks like those performed by accountants.

The cancelled checks, the accountant's letters, and the other forms were constructed to be nearly identical to the corresponding documents used in business. The complete kit was examined and approved for accuracy and representativeness by two certified public accountants prior to its preliminary testing. Slightly more than 90 percent of the subjects in this group attained "success" in solving the problem.

The Accounting Information Group

The accounting information materials were designed to be attractive and easily read just like the problem-solving kit. They were contained in a virtually identical cover, involved about the same amount of activity in answering questions, and required approximately the same amount of time to complete. The main difference was that their content was basic information about the accounting profession. They described the same problem situation as that in the problem-solving material, but did not ask the students to handle any documents or solve any problems.

The General Information Control Group

The general information kit did not mention accounting or any other specific occupation. It was concerned with general information about the importance of planning one's future career and relating it to one's own interests and abilities. It was printed in a booklet similar to that of the other two sets of materials. Included were pictures, drawings, diagrams, and cartoons designed to stimulate the students to begin thinking about their career plans. It was written at about the same level of reading difficulty, involved answering questions, and took about the same amount of time to complete as the other two sets of materials.[16]

Random assignment of the three types of materials was accomplished by arranging the three kits in a random order prior to their distribution to students. The materials were administered in regular classrooms by specially trained persons, not by the regular classroom teachers. The students were given the following directions:

> We are interested in having you try out some new materials about occupations. You are not all receiving identical material because we are trying out different versions of this material. Please read the material in your packet carefully and follow the instructions precisely. You will be asked to write your answers to some questions which you will find explained when you come to the proper spot. You may now open your kit, read the instructions carefully, and proceed.

When all students had completed the experimental material, the following announcement was made:

> If you wish more information about the occupational material on which you just worked or other career information in which you may be interested, please fill out the form which will be passed to you. This will allow you to set up an appointment with a person trained in the vocational field within the next few days.

A total of 154 students requested interviews. Interviews were held with 148 of these, although only 124 had sufficiently complete records to be included in the data analysis.

CRITERION MEASURES

The following criterion instruments were designed to assess the extent to which students developed an interest in activities and

16 For reproductions of all three sets of materials, see L. E. Sheppard, "Effects of a Problem-Solving Procedure for Stimulating Vocational Exploration," unpublished Ph.D. thesis, Stanford University, 1943.

occupations related to accounting, and the extent to which they engaged in exploratory activities relevant to their career choice.

Information-Seeking Behavior

About two and one-half weeks after the experimental treatment, small groups of from eight to ten students were formed. These students were asked to fill out a questionnaire that was designed to obtain self-reports of certain information-seeking behaviors evidenced since the administration of the experimental treatments. Twenty-four specific questions were included to elicit the following kinds of information: (1) persons with whom students talked about possible schools or jobs; (2) educational or vocational material the student had read, examined, or bought; (3) educational or vocational visits students had made or planned; (4) plans to investigate jobs in relation to an occupation being considered, or for purposes of obtaining further education; and (5) specific plans to take vocational tests or to talk with their counselor regarding future plans. The small groups enabled a member of the research team to answer individual questions in filling out the form.

Thirty of the subjects were chosen at random so that their behavior report could be validated. Investigators were hired to check the reported activities and to confirm or invalidate each specific report. No evidence of false reporting was discovered, but 23 of the 86 information-seeking behaviors could be neither confirmed nor disconfirmed.

The score for each subject was the frequency of information-seeking behaviors reported.

Kuder Preference Record, Occupational–Form D

In an attempt to discover whether accounting interests were affected by the experimental treatments, *Kuder Form D* was administered one month prior to the treatment and again one month after the treatment. Both the total score on the accounting key and the score of each individual item contributing to the accounting key were recorded.

Vocational Interests

A simple questionnaire which asked each subject to state the degree of his interest in 42 different occupations was administered one month before and after the experimental treatment. Students were asked to rate each of the occupations, including accounting, on a five-point scale representing the degree of their current interest in that job. (A higher score for an occupation indicated a stronger interest.)

Additional Criterion Data from Students Requesting Interviews

During the 20-minute interviews, held three to fourteen days after the treatment, the interviewer recorded students' questions and requests for information. The interviewer was careful not to suggest occupations that the student might consider. Three types of data were recorded: (1) the number of different occupations for which each student requested information; (2) the name of each occupation; and (3) a rating of the degree of specificity of questions as judged by the interviewer on a three-point scale.

RESULTS

Vocational Interests

Although students were asked to rate their interest in each of 42 different occupations, primary concern was focused on their response to Item 12: accountant. A one-way analysis of covariance was computed comparing the three treatments — adjusting for the pre-treatment rating on each occupation. On the accounting item, the adjusted means for each treatment were as follows: problem-solving, 1.983; accounting information, 1.955; general information, 1.736. The resulting F value for 2 and 387 degrees of freedom was 3.38, significant at the .05 level. The problem-solving and accounting information groups indicated significantly more interest than the general information group in accounting, but they were not significantly different from each other.

The remaining 41 occupations were also examined by analysis of covariance in a similar manner. Only one other occupation showed a significant difference. Item 33: factory worker, showed a significant difference at the 5 percent level with the general information group most interested. Since 42 different analyses were run, since the factory worker item was not hypothesized in advance, and since there is no ready rationale to explain the finding, this result is probably best classified as a chance occurrence, pending possible cross-validation.

Kuder Preference Record, Occupational—Form D

No significant difference between treatments on the accountant total score was obtained in the analysis of covariance — adjusting for the pre-treatment score. In addition, 129 analyses — one for each individual item on the accountant key — were computed. Three of the items yielded F values significant at the .05 level and one at the .01 level. Since these frequencies are about what would be expected by random sampling in a population where the null hypothesis is true, it must be concluded that the experimental treatments produced no

differences that could be detected on the accountant key of the *Kuder Preference Record—Form D.*

Information-Seeking Behavior

A three-way analysis of variance design was used to analyze differences attributable to the three treatments, the two sexes, and the three groupings of subjects (those who were not interviewed, N = 255; those interviewed, N = 124; and those receiving the extra class assignment on vocations, N = 60). Six analyses of variance were performed; one for each of the five sections of the questionnaire, plus one for the total information-seeking frequency. Only the total is reported here; the remainder are reported by Sheppard.[17] The analyses were performed with the aid of a computer program, using the formula described by W. J. Dixon.[18]

The variance analysis of the total number of information-seeking responses appears in Table 1, while the corresponding means,

TABLE I

Analysis of Variance of Total Number of Information-Seeking Responses

Source	SS	*df*	MS	F
Treatment	9.37	2	4.69	.68
Group	571.36	2	285.68	41.34*
Sex	70.12	1	70.12	10.15*
T × G	11.42	4	2.86	.41
T × S	29.68	2	14.84	2.15
G × S	22.62	2	11.31	1.63
T × G × S	254.13	4	63.53	9.19*
Residual	2,908.79	421	6.91	
Total	3,877.49	438		

*P < .01

standard deviations, and N's are reported in Table 2. The finding of greatest interest is the second-order interaction effect, which is highly significant. The problem-solving treatment was the most effective for the females who were interviewed, for the females who were also given the additional assignment in their English classes, and for males who did not request an interview. The problem-solving

17 *Ibid.*

18 W. J. Dixon, *Biomedical Computer Programs* (Los Angeles: University of California at Los Angeles, 1964).

TABLE 2

Means, Standard Deviations, and N for Each Treatment by Group and Sex on Total Frequency of Information-Seeking

Sex	Treatment	Group: Not interviewed M	SD	N	Interviewed M	SD	N	Had additional class assignment M	SD	N	All groups M	N
Females	Problem-Solving	3.84	2.84	45	4.52	3.60	23	6.92	2.39	12	4.50	80
	Accounting Info.	3.43	2.56	60	4.16	3.34	19	5.64	3.63	14	3.91	93
	Control Info.	4.10	2.43	40	3.92	2.28	26	4.70	2.67	10	4.12	76
	Total	3.74		145	4.19		68	5.81		36	4.16	249
	Problem-Solving	3.18	3.23	39	3.32	3.29	22	4.33	2.50	9	3.37	70
	Accounting Info.	3.07	2.64	41	2.50	2.28	16	6.75	3.30	4	3.16	61
Males	Control Info.	2.53	2.83	30	3.61	2.45	18	6.55	3.98	11	3.60	59
	Total	2.96		110	3.18		56	5.75		24	3.38	190
	Problem-Solving	3.53		84	3.93		45	5.81		21	3.97	150
	Accounting Info.	3.28		101	3.40		35	5.89		18	3.62	154
Totals	Control Info.	3.43		70	3.79		44	5.67		21	3.90	135
	Total	3.41		255	3.73		124	5.79		60	3.83	439

treatment was least effective for males with the extra assignment, though the N was small in this group. On the average, the group which received the extra assignment engaged in more information-seeking activities than the groups which did not. Females engaged in more information-seeking activities than males, on the average – a finding consistent with previous findings by Krumboltz and Schroeder[19] and Krumboltz and Thoresen.[20] In view of the significant interaction described above, the absence of a significant-treatment main effect is of little importance, though the slight trend favors the problem-solving treatment.

The results suggest that the effect of the treatment depends upon the type of student to whom it is applied. It would be dangerous to overgeneralize from the significant interaction, since the specific nature of the interaction was not hypothesized in advance, and since the findings have not been cross-validated.

Nature of Information Requested by Interviewed Group

Approximately equal percentages of students from the three treatment groups requested interviews. How did the treatments influence interest in accounting? Among those interviewed there were eight requests for information about accounting from the problem-solving group, six from the accounting information groups, and none from the general information control group. This total of 14 requests was greater than that for any other single occupation. (The second highest total was 11 for social work with 4, 4, and 3 requests from each treatment group, respectively.)

Which treatment group asked the questions rated as more specific? The more penetrating and specific questions were asked by members of the problem-solving groups, with their mean rating being higher than the accounting information group at the .05 level, and higher than the general information control group at the .01 level.

Which treatment group requested the most information? The problem-solving treatment group asked for the most information regardless of the nature of the questions asked, but the difference between groups did not reach significance at conventional levels ($P < .12$).

DISCUSSION

Some limited success for the vocational problem-solving approach can be observed in the results, although it is unrealistic to expect

19 J. D. Krumboltz and W. W. Schroeder, "Promoting Career Planning Through Reinforcement," *Personnel and Guidance Journal* XLIV (1965), pp. 19-26.

20 J. D. Krumboltz and C. E. Thoresen, "The Effect of Behavioral Counseling in Group and Individual Settings on Information-Seeking Behavior," *Journal of Counseling Psychology* XI (1964). pp. 324-33.

large effects from an exercise lasting less than 50 minutes. Career interests are developed over many years through a wide variety of experiences. One additional problem-solving experience is unlikely to make a major difference for the majority, though for certain persons it could be quite important. The significant interaction supports the notion that the problem-solving experience stimulated relatively more information-seeking behaviors for some groups than for others. Perhaps such a problem-solving experience would be a significant event at one crucial time in the career development history of a person, but insignificant before he was ready or after he had made other commitments. The fact that some sub-groups were affected more than others suggests that further research is needed on the timing of problem-solving within the sequence of career decision making.

One weakness of this pilot study is that the differences between the experimental and control treatments may not have been sufficiently great to produce the desired effects. A no-treatment control group was not included, although subsequent studies will remedy this defect. The accounting information control group did read a description of the same problem situation that the problem-solving group received, although they did not actually handle the "cancelled checks" or attempt to solve the problem. The general information control group were asked to consider their own interests and abilities in relation to their career choices — a form of problem-solving in itself.

The basic rationale for studies of this type is related to the theory of work adjustment propounded by Dawis, England, and Loftquist.[21] They propose that job satisfaction depends on the correspondence of a person's needs with the reinforcers available from his work. It is hoped that the provision of simulated job experiences will enable persons to better determine for themselves whether a certain type of work will give them the kind of reinforcers they seek from life.

The problem-solving experience used in this study was related to only one occupation, accounting. Future research on this project will consider the effects of problem-solving experiences in many occupations. In the long run, students may wish to experience the problem-solving activities of 50 or more occupations with the expectation that only one will make any difference in their lives. Future research will be designed to find out what kinds of experiences, provided at what times, will help which kinds of students form a realistic basis for their career planning.

SUMMARY

It was hypothesized that eleventh-grade students who were given the opportunity to solve some simulated vocational problems would,

21. R. V. Dawis, G. W. England, and L. H. Loftquist, "A Theory of Work Adjustment," *Minnesota Studies in Vocational Rehabilitation* XV (Minneapolis: University of Minnesota Industrial Relations Center, 1964).

first, explore possible career opportunities and, second, engage in various interest-indicative activities to a greater extent than equivalent subjects given two different types of control procedures.

A total of 540 high school students were randomly assigned to one of three treatment groups: (1) the problem-solving group, which received a kit providing materials and instructions for solving a simple, but realistic, accounting problem; (2) the accountant information group, which was given a similar-appearing kit with descriptive information concerning the occupation of accounting; and (3) the general information control group, which was given general information about occupations and the importance of planning one's future career.

The criterion measures consisted of: (a) a self-rating of occupational interest; (b) the amount of subsequent information-seeking relevant to career plans; and (c) interests as measured by the *Kuder Preference Record Form D*.

The number and nature of information requests from subjects who subsequently requested personal interviews were also analyzed.

FINDINGS

(1) Subjects in the problem-solving and accounting information groups reported a greater interest in the field of accounting than did the general information control group.

(2) The problem-solving treatment stimulated more career-relevant information seeking than the other two procedures for only half of the sub-groups identified. This significant interaction needs to be replicated to confirm the type of subjects most affected by the problem-solving procedure.

(3) Interest in accounting, as measured by items from the accounting key of the *Kuder Form D*, was not differentially affected by the treatments.

(4) Among subjects from the three treatments who requested interviews, accounting was the occupation most frequently inquired about, even though no one from the general information control group did so. Subjects from the problem-solving group asked the type of questions rated as most specific.

A STUDY OF RECOMMENDATIONS FOR TECHNICAL EDUCATION CURRICULA*

JOSEPH P. ARNOLD
PURDUE UNIVERSITY

It would be redundant to present an analysis of trends in occupational structure to this audience. However, changes in job functions comprise the main source of support for the claim that curriculum guidelines for two-year post-high school technical programs are inadequate as they currently exist. The emerging occupations, many of which are being placed in the same ball park as the more common two-year technical programs, are responsible to a large extent, but by no means totally, for the need for continual redefinition and refinement of technical curricula. I am suggesting that course and program content for electrical, mechanical, chemical, and other of the more traditional subject areas in technical education are by no means adequately established. Because of rapid technological changes, such areas are in constant need of evaluation and reorganization in order to focus more closely upon employer needs in technical personnel. One has only to browse through recent issues of the better news periodicals to obtain a glimpse of technological changes and their impact on the occupational world.

Total reliance on junior college, university, and technical institute personnel as the primary sources of authority for determining technical curricula should be modified. In the study which I shall review here, technically competent persons in industry who supervise the job performance of technicians were consulted in an effort to relate technician job functions to two-year post-high school technical curricula. The management or supervisory respondents selected for participation in the study had (a) direct responsibility for the work of one or more qualified technicians, (b) generally high levels of technical background themselves, and (c) by virtue of their jobs, a recognized higher degree of knowledge and concern for company objectives and policies than the technicians. Any question as to whether or not these management personnel constitute a legitimate source of authority for defining technician job functions must be referred to the reality of the situation — right or wrong, they are the men who hire and direct the activities of the technicians and who are paid for knowing what the technicians are doing. A group of technicians was used as a criterion group, to which I will return later.

* The research reported herein was supported by the Cooperative Research Program of the U.S. Office of Education, Department of Health, Education, and Welfare, as Project S–196, U.S.O.E., December 1965.

OBJECTIVES

The intent of the study is explained by the following five objectives and accompanying rationale.

(1) To compare assessments of technical curriculum content made by management with assessments made by technicians themselves.

The existence and availability of data from other research presented an opportunity to compare technician and management views to determine whether or not the "level" of the respondent, with its apparent differences in age, educational background, and other characteristics, actually represented a measurably different educational opinion. The implication of such differences could be considered important in planning the composition of advisory and curriculum committees.

(2) To isolate and analyze selected variables (age, educational attainment, time with company, and time in present job) and measure their relationship to curriculum recommendations.

These variables were studied primarily in order to establish the structure of the levels referred to above. If respondents among the four levels of management in the study did not differ in any of these variables, there would be little reason to believe the management and technician levels to be meaningful, and therefore even less reason to expect differences among the levels.

(3) To establish and assess the degree of relationship between level of authority of management and generality of recommendations for curriculum content.

It was reasoned that differences in generality of content selection would have implications for for advisory and curriculum committee composition; if management would choose more general content than the technicians, it would appear that one could expect different emphases in technical curricula when management personnel participated in the design.

(4) To identify a core of courses agreed upon by management as desirable for most post-high school technical programs.

The core to be identified is simply that spectrum of material on which management exhibits high agreement concerning its importance to technical curricula. Because the curricular recommendations contained in this report are based on the professional judgments of technically competent industry personnel who have a direct concern for the education of technicians, I feel that the cores represent a collective viewpoint which warrants consideration when designing technical curricula in the areas studied. It should be

noted, however, that I am not suggesting industry as the only source of curricular views.

(5) To establish and assess the degree of relationship between the level of authority of management and the frequency of content selections; the higher the level, the greater the number of selections for curriculum content.

Considered as a second measure of generality, the educational implications of this objective are the same as for (3) above.

DESIGN AND PROCEDURES

Definitions

Technicians were used as the criterion group of respondents in this study; for this reason, a definition was needed which would serve to distinguish them from skilled operators, craftsmen, and other workers, as well as from professional and other semi-professional occupations. The definition selected appeared to include essentially all of the desired types of employees in the sample of manufacturing establishments. A technician was defined as follows:

> The engineering or scientific technician is usually employed in (1) research, design, or development; (2) production, operation, or control; (3) installation, maintenance, or sales. When serving in the first of these functional categories, he usually follows a course prescribed by a scientist or engineer but (may or) may not work closely under his direction. When active in the third category, he is frequently performing a task that would otherwise have to be done by an engineer.
>
> In executing his function, the scientific or engineering technician is required to use a high degree of rational thinking and to employ post-secondary-school mathematics and principles of physical and natural science. He thereby assumes the more routine engineering functions necessary in a growing technologically based economy. He must effectively communicate scientific or engineering ideas mathematically, graphically, and linguistically.[1]

Persons who had attained the baccalaureate and who were employed as technicians were excluded from the study because it was feared that their responses would tend to be based on educational background rather than on job requirements.

The term, management, as utilized for the main body of respondents, was taken to describe those employees in positions within three steps

1 *Organized Occupational Curriculums in Higher Education* (Washington, D.C.: Department of Health, Education, and Welfare, 1961).

of authority above and responsible for the work of at least one technician. Formal company organizational structure was not necessarily used to establish this identification; the prime criterion was rather responsibility for the work of one or more technicians. "Levels of management" refers merely to the number of steps of authority removed from a given technician's job.

The U.S. Bureau of Census definitions for "manufacturing" and "establishment" were used because they were consistent with definitions employed in identifying the universe and sample of firms which supplied the respondents.

THE SAMPLE

The initial portion of the sample of firms was randomly selected from the universe of manufacturing establishments in Illinois, as listed by the Illinois State Employment Service. Five hundred firms were so identified for possible participation in Project 2048.[2] Thirty-nine of the larger firms in the 2048 sample were selected to furnish respondents for this study. Eighteen additional manufacturing establishments in Illinois were added in July 1965, 13 of which were found to employ the requisite technicians and management. Hence, a total of 52 establishments participated, each of which employed 200 or more persons, and each of which supplied two, three, or four respondents for this study.

The firms identified after July 1, 1965 were selected from product manufacturing classifications in order to improve the sample's representation of manufacturing establishments in Illinois, as distributed among the major classifications of the *Standard Industrial Classification Manual.*[3] Actual identification was based on the *Illinois Directory of Manufacturers,*[4] which lists firms and their characteristics, and which is also consistent with the Illinois State Employment Service listings used in the initial selection procedure. At this point it was not considered practical to randomize the selection of the additional manufacturing firms.

Participation by level of respondent was as follows: 52 technicians (T), 52 management one (M_1), 46 management two (M_2), and 18 management three (M_3). Of the 168 respondents, data from 39 of the technicians were used in both Projects 2048 and S-196, but the remaining

2 The investigator was employed as a research associate on the staff of Project 2048, *Curricula Content for Technical Education,* supported by the U.S. Office of Education, and conducted at the University of Illinois under the direction of William Schill. The final report of this project was published by the U.S.O.E. Cooperative Research Branch in December 1964.

3 Executive Office of the President *Standard Industrial Classification Manual* (Washington, D.C.: U.S. Government Printing Office, 1951).

4 *Illinois Directory of Manufacturers* (Chicago: Manufacturers' News, Inc., 1963).

129 management and technician respondents were in no way connected with Project 2048. The participation of fewer management respondents at the higher level reflects the non-existence of a third level of supervision in most firms, but in an extremely few cases it was due to inaccessibility.

INSTRUMENTS AND DATA COLLECTION PROCEDURES

An interview schedule and a curriculum deck were the two instruments utilized. The interview form was closely structured and designed for numerically coded responses. Recorded were: age of respondent, manufacturing classification of employing firms, educational background, information on current job, time with present company, and data describing each management respondent's working relationship with the technician respondent from the same firm. About one-half of the management personnel interviewed had worked as technicians at some time previously.

Each technician and each management respondent was interviewed, and all responses were recorded by the interviewer.

The curriculum deck was comprised of 99 3 × 5 cards which contained essentially all subjects, or course content, which might be considered as *related* to technician job performance. The deck was designed around 250 course descriptions taken from technical institute, college, and university catalogs, and was developed for and used in Project 2048 while the investigator of this project was employed on its staff. Following deletion of repetitious material by project staff, a jury of University of Illinois professors representing several disciplines reviewed the deck and recommended further changes. The revised deck was then tested in three pilot studies where technician and management respondents were asked to make comments on the coverage, grouping, and wording of the items. The final revision resulted in rearrangement of content and reduction of the number of cards to 99.

Each technician (one from each firm) sorted the deck into three stacks in terms of relatedness to his own job; *viz: related, somewhat related,* and *unrelated.* Each management respondent sorted the cards in the same manner, but always in terms of the jobs of the participating technician in the same firm. Thus, there were as many as four sets of responses for each technician job: (1) those of the technician (T); (2) those of his direct supervisor (M_1); (3) those of a second level of supervision (M_2); (4) those of his department head, chief engineer, vice president, or other person whose functions placed him three steps removed from the technician, but who still maintained responsibility for the technician's work (M_3). Thus, one technician and one, two, or three management respondents from each

firm participated. In the remainder of this paper the four levels of respondents will be referred to as T, M_1, M_2, and M_3.

A rather limited body of descriptive data was obtained, primarily for the purpose of validating the levels structure established for the study. Experimental data were comprised of responses to the curriculum deck; these data were utilized in analyses and/or comparisons of curricular recommendations, and for establishing the cores of recommendations described above.

OCCUPATIONAL FAMILIES

A system of identifying job families was developed to classify 46 of the 52 technician jobs in the study (moving upward only through M_2). M_3 respondents were omitted from this classification, and from the subsequent analysis, because use of them would have eliminated all but 18 firms and reduced representation to only 18 actual technician jobs. Classifications were made by review of the job characteristics as recorded on the interview schedule. The job-family groups and the number of technicians in each were: electro-mechanical, 8; mechanical, 21; chem-mechanical, 7; chemical, 5; and chemical-foods, 4. ***It must be remembered that three respondents from each firm(T, M_1, and M_2) contributed data to define content for one technician job in a given firm.*** Although 46 firms were utilized, a total of 45 technician jobs is indicated; this is because no analysis was performed for the electrical family, which had only one technician respondent.

Core of Subjects

A *general core* of curricular recommendations (as contained on the cards) was identified on the basis of agreement among respondents across five job families (M_3 respondents excluded). The general core was defined as those courses or subject areas which respondents tended to agree were related to the technician job function across all job families.

Individual cores by job families were subsequently identified. Each individual core was intended to contain the more differentiated content for a given job family, and was considered to be above and in addition to the general core.

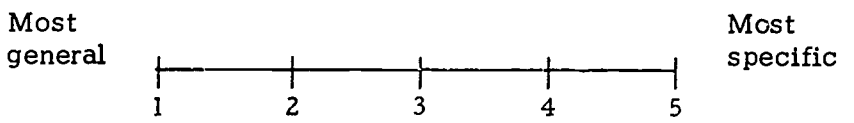
Selection of cards for the general core was based on a scoring system of three points for each *related* response, two for each *somewhat related*, and one for each *unrelated*. The mean score for each card was then calculated for each group of respondents (T, M_1, and M_2). When technicians, M_1, *or* M_2 (across all five job families) rated the card 2.0 (somewhat related) or greater, the card was included in the

general core. A parallel procedure was used for selection of cards for each individual core, but it involved only those respondents who were concerned with a technician in that job family for which the core was established. These procedures essentially allowed any group of respondents (T, M_1, or M_2) to identify a card for placement in a core. M_3 respondents were omitted from the core selections because of their applicability to only 18 technician respondents.

Indices of Generality

Two objectives of the study involved comparison of card-sort responses of the technicians with those of management on the criterion of generality. It was hypothesized that management respondents would tend to select cards containing *more general* content than would the technicians, and also that they would tend to select a greater number of cards as *related*. Hence, assessments for generality were based on (1) values assigned to each card on the basis of a continuum from general to specific, and (2) the number of cards selected as related (by each respondent).

A jury of experts assigned values between one and five to all 99 cards, with the result that each of the 99 cards carried a *generality* value for use in later analysis. The continuum of generality on which assignments were based is:



Statistical Methods

The .05 significance level was considered as minimal in all portions of the analysis.

One-way analysis of variance was used for multiple comparisons of mean responses for three levels of respondents (T, M_1, and M_2) for the purpose of comparing their relative contributions to each of the cores; and Newman-Keuls procedures were utilized for establishing which means were significantly different from others when variations were indicated.

Kruskal-Wallis one-way analysis of variance was employed in comparing groups of respondents (T, M_1, M_2, and M_3) for salary, and other characteristics. It was also used for comparisons of management and technician responses to the card sort.

Spearman rank difference correlation was used to measure the degree of association between card-sort ranks of Project 2048 technicians and each of the four groups of respondents in this study. The ranks assigned to the 99 cards were determined by the frequency of

related responses given the card by all respondents in each group.

Agreement among the jury's assignments of generality values was assessed by Kendall's coefficient of concordance. Chi-square and two-way analysis of variance were used in the various *generality* comparisons of technicians and different levels of management.

FINDINGS AND DISCUSSION

The findings of the study are grouped into four areas: (1) descriptive differences between technicians and management, (2) generality comparisons, (3) identification of the core programs, and (4) comparisons with Project 2048. They may be set forth as follows:

(1) Age, educational attainment, salary, time on present job, and time with present company were analyzed for differences among the groups (levels). Application of Kruskal-Wallis one-way analysis of variance produced significant values of H ($P < .02$) for the first three variables mentioned. The significant values of H and the consistency of the intervals among the means provide a basis for accepting the means of the groups as different from each other.

(2) Chi-square tests revealed that the distribution of responses of technicians and of all three levels of management was more general than could be expected from random selections from the 99-card deck, although responses of the technicians and of the three management groups were not significantly different from each other. On the criterion of generality, technicians and management tend to support one another in their recommendations.

(3) Content of the general and individual cores was identified as follows (in summary):

The General Core (by card numbers)

1. written and oral communication
17. use of simple test equipment
52. algebraic graphing, powers, roots, radicals
53. metric system and square root, plane and solid geometry
66. ASA standards, use of handbooks, graphical treatment of empirical data
77. use of measuring equipment to control a system
79. calibration and use of typical industrial and laboratory instruments
98. environmental testing of components, parts and products

The eight cards in the general core were grouped into (a) mathematics, (b) testing and instrumentation, (c) communication skills, and (d) engineering graphics. Ranking of these cards, using data from all 168 respondents, establishes "use of simple test equipment" as the function most often selected as related to technician job performance.

(a) Mathematical facility through algebra and geometry only, was found to be common to all the technologies studied. It may surprise some that analytic geometry, trigonometry, and differential calculus were not included; but, keeping in mind that individual cores contain additional mathematical selections, it is obvious that functional mathematical requirements differ considerably among the various technologies. Allowing for such factors as anticipated upgrading of job functions and vertical mobility, it still seems a very questionable policy to include a high-level mathematical requirement without regard to the type of technical program involved. I am not advocating indiscriminate deletion of mathematics courses from technical programs, but rather I am suggesting the linkage of mathematical content as much as possible to job function.

(b) Of the eight courses in the general core, four were grouped under testing and instrumentation. Perhaps it is noteworthy that these selections, strongly oriented toward application, took complete precedence over selections involving engineering theory.

(c) Placement of written and oral communication in the general core is not surprising, except insofar as these outrank most technical subjects. It is concluded that courses in speech, technical writing, business communication, conference participation, and perhaps others in verbal communication, should collectively occupy a prominent position in nearly any two-year technical program.

(d) The single card from the engineering graphics area is different from what one might expect to find. It mentions ASA standards, use of handbooks, conversion charts, and other content of an informational nature; but it does not include sketching or drawing itself.

The individual cores were identified and summarized as follows:

Electro-Mechanical

3. numerical control, data processing, interpretation of engineering drawings
4. thermosetting and thermoplastic materials; films, enamels, paints
8. analysis and design of basic electronic circuits
12. Coulomb's Law, electrostatics, AC and DC theory
18. principles of pulse and timing circuits
26. basic psychology in planning, conducting, and evaluation of conferences and interviews
34. composition and resolution of forces, Newton's Law, rotational motion, elasticity
35. metal forming including machining, chemical milling, spinning, explosive forming
37. metal forming including diecasting, casting, forming, extruding
38. applied statics and strength of materials
44. (PERT) selecting and sequencing of specific identifiable events necessary to successful completion of a project

46. differential calculus
47. graphical solution of problems involving points, lines, revolutions and intersections
51. trigonometry
57. vacuum tube and transistor theory
60. analytic geometry
61. sketching forms from observation
63. machine elements and calculations
65. preparation of block diagrams, schematics, layouts
67. projection and graphic representation
70. ferrous and non-ferrous metal heat treating, composition
71. circuit theory, video amplifiers, tuned amplifiers
72. pattern drafting and layout
73. metal fabrication
75. use of synchros and sychromechanisms, industrial control circuitry
80. basic laws and theories of elements, compounds
89. mechanics of fluids, temperature scales, thermal expansion

Mechanical

For the sake of brevity, cards in this core will be noted only by number if included in the previous core. Cards 3, 35, 37, 38, 44, 47, 51, 61, 63, 65, 67, 70, 72, and 73 are listed accordingly. One card of this core was not included previously: it is:

56. linear, radical and quadratic equations, binomial theorems, complex numbers

Since the mechanical and electro-mechanical occupational families utilized the greatest number of respondents, 63 and 24 respectively, a summary of them may be helpful. The electro-mechanical respondents selected mathematics through differential calculus while the mechanical respondents limited their recommendations to trigonometry and algebra. The large amount of electrical theory selected by the former group was (as would be expected) not selected by the mechanical respondents. Both groups showed a strong need for engineering graphics content.

Chem-Mechanical

Card numbers 3, 34, 35, 37, 38, 47, 51, 61, 63, 67, 70, 72, and 80 (previously summarized in the electro-mechanical core), were identified in this family. Cards included which have not been discussed previously were:

27. time study and science of management
33. tension and compression, Hook's Law
83. chemical testing of industrial materials and products
85. carbon compounds, their structures

90. atoms, single crystals and polycrystalline materials, nature and making of alloys
99. equations of state, the first and second laws of thermodynamics

Chemical and Chemical-Foods

Cores were identified for these two job families, but because of the small number of respondents in technician jobs (N = 4, N = 5) no description is included in this summary.

(4) The fourth category of findings revealed that the responses of T, M_1, M_2, and M_3 were all closely related to the card ranks assigned by the technicians in Project 2048. High positive correlations ($P < .001$) were obtained between the technician responses of that project and each group in this study. Note in Table 1 that the obtained value of R was only slightly lower for the higher levels of management.

TABLE I

Spearman R Comparisons of Rough Sort Data
Projects 2048 and S-196*

Project S-196	Techs.	Mgmt. 1	Mgmt. 2	Mgmt. 3	Total
Project 2048	.94	.93	.93	.91	.90

*$P < .001$ for all values

Visual comparisons of frequency data and card ranks for each group of respondents show isolated differences, but these are not large enough to affect a decision on the importance of any of the highly ranked cards. Card number one, oral and written communication, was ranked slightly lower by management than by technicians, but still very high in relation to and in competition with the total deck.

CONCLUSIONS AND IMPLICATIONS

Implications for this study are considered most significant in the mechanical family of technician occupations. The analyses, findings, and conclusions offered for the remaining four families are strongly suggestive of curricular concerns in their respective disciplines; but, because of the limited number of jobs involved, it may

nct be possible to generalize to the universe of technicians in each of those occupational areas.

The study was based on an assumption that management and/or supervisory personnel employed in the participating firms would be both willing and able to cooperate in supplying the judgments necessary to complete the card sort. This assumption is now claimed to be correct: there were very few cases in which respondents did not willingly fit the interviews into their already busy work schedules.

The results of the job-family classifications admittedly lie outside the objectives of this study. However, they are mentioned because of the surprising number of technician jobs which appeared to be "hybrids" rather than specifically electrical, mechanical, or chemical. All but one of the technicians interviewed from within the electrical manufacturing area were classified as electro-mechanical rather than electrical. If hybrid technical occupations are increasing or changing, the need for systematic identification of the extent and direction of that change is necessary. Programs of study which purport to prepare competent technicians must provide subject matter and skill development in areas which are consistent with occupational requirements.

The notion that management and technician respondents would differ measurably in their curricular recommendations is concluded to be untenable; indeed, the tests showed the views of the two groups to be surprisingly similar. The cores outlined here are offered as possible guidelines for the design and refinement of post-high school technical programs.

ADDITIONAL REFERENCES

Arnold, Joseph P., *Technical Education Curricular Recommendations by Management Representatives in Illinois*, unpublished Ed. D. dissertation, University of Illinois, Urbana, 1965.

Clark, Burton R., *Educating the Expert Society* (San Francisco, California: Chandler Publishing Co., 1962).

Schill, William J., and Arnold, Joseph P., *Curricula Content for Six Technologies* (Urbana, Illinois: Bureau of Educational Research, 1965).

Siegel, Sidney, *Non-Parametric Statistics for the Behavioral Sciences* (New York: McGraw-Hill, 1956).

Winer, B.J., *Statistical Principles in Experimental Design* (New York: McGraw-Hill, 1962).

DISCUSSION

PHILIP A. PERRONE
THE UNIVERSITY OF WISCONSIN

In this discussion, I shall attempt to focus on one aspect of each study. While this may give a disproportionate emphasis to the area discussed, it seems more meaningful to use this approach in the time available for discussion. The points outlined here reflect a hierarchy of importance which I have assigned from among the many which could have been mentioned — both positive and negative. In all three studies, I was impressed both by the originality of design and by the attempt to execute an experimental approach to the problem under consideration. But in every case these merits seem lessened by the lack of suitable criterion measures available.

In Mr. Hornbostel's paper, I found myself seeking an explanation for the results. The design seemed to be sound, but the use of the Sequential Test of Educational Progress (STEP) as the criterion in "the assessment of differences in academic achievement among treatment groups" seemed a poor choice. I would like to support this statement by noting a few of Stecklein's comments regarding the STEP:

(1) No statistical evidence of validity is presented except correlations with SCAT. Careful and systematic validity studies are lacking.

(2) Some of the Form A tests are not of desired reliability and reliability evidence is available for only the Reading Test of Form B.

(3) There is a complete lack of information about the equivalent of the two forms.

(4) Any comparison of growth or gains in scores from level to level for the same test will be meaningless because no normative standards are available.[1]

In a subsequent conversation with one of the investigators, I questioned the use of raw scores in testing differences. My concern here is that these raw scores have little meaning to anyone other than the researcher, whereas the use of percentiles would have been more meaningful to the consumer of research. My concern with the consumer, however, did not seem to be shared, which underlines in my mind the need to determine whether the objectives of research in the social sciences generally, and in vocational and technical education specifically, have any applied value.

My comments on Mr. Arnold's paper are restricted to the

significance I see in his findings. First, it appears that male students are using inaccurate stereotypes when deciding on a technical job, because of a strength in math and sciences and a weakness in written and oral communication. Teachers, counselors, and parents have perpetuated this stereotype in advising youth, and hopefully these findings will awaken them to their error.

Second, it appears that many of the required competencies, particularly the communication skills, are established in the early years. I am sure that curriculum development, at all grade levels, could benefit from these findings.

Third, it is evident from Mr. Arnold's study that skills requiring the use of instruments and manuals are learned more efficiently and effectively on the job, where the trainee has the opportunity for continuous application of what he has learned.

Fourth, as a former mathematics teacher, I found the specific technical knowledge and behaviors which were identified to be useful guides for determining course content. However, course titles (such as "geometry") provide little meaning or direction. I do not mean to indicate an exclusive preference for an applied approach to education, but I feel that the essentials should be determined and included in the course offerings and not left to acquisition by chance.

My fifth point in regard to the Arnold study is that competencies will undoubtedly change over time. Assuming this, I wonder which ones will change, and in what way. It would seem that provisions need to be made in order to ascertain competencies, not only in the present, but in the future — particularly when today's trainees are not today's workers, but tomorrow's.

Finally, I would find a definition of competency very useful; for "being competent," or "having a competency," can have a wide range of meanings.

Regarding the procedures outlined by Mr. Krumboltz, I cannot help but feel that the influence across experimental groups should be considerable for a single class within a school. Since no one from the third (general treatment) group mentioned the occupation of accounting on the follow-up, I find the results even more impressive.

The experiment is fascinating, and the eventual goal seems desirable. But I wonder if enough is known about stimulating behavior to enable us to control the amount of stimulus used. Mr. John Krumboltz's conclusion, that "the effect of treatment depends upon the type of student to whom it is applied," suggests that, if the correct treatment were determined for each individual, then all students could be affected or motivated. There does seem to be a void in our knowledge about varying the stimulus strength when trying to motivate human behavior.

In regard to associative learning, I question whether motivational procedures and reinforcement are perfected to such a state that the desired association — "exploratory behavior" — is produced. It concerns me that "accountant" should become the learned response, and that behavior is limited to exploring *only* the accountant field. What will happen if 50 career responses are available? In discussing the idea further, the principal investigator inferred that students would receive their packet after identifying the field in question; yet the procedure here suggests that an attempt is being made to motivate the behavior of all students or to create readiness for a specific occupational direction.

T. ANTOINETTE RYAN
OREGON STATE UNIVERSITY

The three papers presented at this session have one common characteristic: they all clearly point up the feasibility of bridging the gap between the theory and practice of vocational education. Separately, each makes a unique contribution to the field, as well as raising questions and suggesting topics for further discussion.

The paper presented by Victor Hornbostel is concerned with a timely and important topic: the rehabilitation and training of the school dropout. Its most significant contribution, however, is its experimental approach. The authors modestly note that "numerous studies have been made of causes and correlates of the dropout condition." In reality, thousands of cause-correlate studies have been reported, while there has been very little attention given to experimental studies aimed at dropouts. The Hornbostel study points to the kind of research which is needed, and demonstrates that experimental studies can be implemented in vocational education.

The paper raises several questions. The findings suggest that "vocational training" is not effective in "rehabilitating" dropouts. This discovery is not consistent with results reported by the Washington School of Psychiatry, where special vocational programs — including operationally defined procedures — were found to be effective in improving academic achievement and increasing favorable attitudinal behavior of potential and actual dropouts classified as juvenile delinquents. I would therefore suggest that the study reported by Hornbostel focused more on academic outcomes than on the rehabilitation of dropouts. It seems quite possible that failure to find improved academic performance among students in vocational and academic-vocational programs is a

logical outcome, in terms of the treatment conditions of these groups.

A related question concerns the rationale underlying the development of a treatment which was hypothesized as being effective for producing academic achievement. In comparing the three approaches — academic, vocational, and academic-vocational — it is noted that, in addition to differences in time, there is an uncontrolled duration variable, so that comparison of treatments involves comparing, not only content, but also duration. As Mr. Hornbostel points out, it is quite possible that the eight-hour day had a punishing effect, rather than the rewarding effect which a three-hour day might have had. It is unfortunate that each approach did not include the three durations, making possible a comparison by treatment across duration.

Another uncontrolled factor was that of the reward offered by the diploma. The diploma, it seems, was a reinforcing element for two groups, but not for the third.

In general, the study appears to have focused only on content, rather than on process. Prior research, including recent work at Oregon State University, indicates that instructional approach is a critical variable influencing learning outcomes when content is held constant.[1]

Notwithstanding these questions, however, Mr. Hornbostel's study marks a milestone in dropout research, exemplifying the kind of experimental work essential to vocational education.

The paper by John Krumboltz and Lawrence Sheppard, on the effect of a vocational problem-solving experience on career exploration and interest, represents a worthwhile contribution to vocational education theory-building. It also demonstrates an approach to the practical application of theory in the regular school setting.

The problem of career choice remains high on the list of priority areas for vocational education research. This problem is generally recognized among school counselors and vocational educators, but the identification of practical procedures and techniques for coping with it continues to be a major concern.

A particular strength of Mr. Krumboltz's paper is the way in which the problem-solving task approach is related directly to a solid theoretical base. The assumptions underlying the study appear entirely viable. The rationale for using realistic problem-solving tasks to increase the subject's interest in career opportunities and to stimulate his career-exploring behavior is based solidly on prior research. This study is an excellent example of behaviorally defined goals and a logically derived experimental treatment for achieving these goals.

One question comes to mind, however, concerning the study's

1 See 1965 and 1966 studies by T. A. Ryan.

failure to produce significant main effects on the Kuder test and on the amount of information-seeking behavior. Are the findings to be interpreted to mean that the problem-solving task approach is ineffective? Or are the data indicative of some kind of limitation in experimental design? It appears that the question may be answered in terms of design limitations, rather than inadequacies in approach.

Another question is why the study was concerned with only one occupation. The fact that more tests are planned for the future, focusing on other occupations, may well be significant. Findings from these studies may yield different results. I suggest that there should be tasks in several areas, since students need a wider range of experiences from which to select. It does not seem logical that all students could be expected to identify with "accounting," and it would therefore seem highly desirable to replicate the study, including occupations in the areas of agribusiness, health and paramedicine, and the technologies.

A third question concerns the selection of criterion measures. The use of the Kuder Form D may well have been partly responsible for the non-significant findings. This instrument appears not only to contain many questionable items, but to be lacking in supportive data which would give it the precision demanded by Mr. Krumboltz's study. There is also some question about the self-report form used to determine the extent to which subjects engaged in information-seeking behavior; nor is it clear to what extent the reading-level factor was controlled.

A fourth question, discussed in part by Mr. Krumboltz, involves the lack of inactive controls. The study compared three treatments, and it is entirely possible that all three could have been effective. Research on reinforcement counseling to improve the vocational decision-making of community college youth suggests that there is a powerful reinforcing value for subjects engaged in self-analysis tasks.[2] The General Information Approach reported by Mr. Krumboltz could have had such a reinforcing value.

My final question relates to an apparent fallacy in logic, which Mr. Krumboltz himself has mentioned. There seems to be an implicit assumption that one fifty-minute task could make a difference in career exploring and career interests of the subjects. Research on career choice implies that such an assumption may be fallacious. I would suggest that a series of problem-solving tasks be developed, and that subjects be required to participate in problem-solving activities regularly during the school term. If a variety of occupational areas were covered, and more practice given in problem solving for the different areas, there is every reason to expect that this approach could be effective and highly worthwhile in any school setting.

2 T. A. Ryan (1965).

Joseph Arnold's recommendations represent an approach to curriculum development which may have merit for post-secondary-school administrators and vocational educators. The U. S. Office of Education has listed curriculum development as one of the top priority items for research and development in the field of vocational education in 1966-67.

A real strength of Mr. Arnold's paper lies in its clear definition of the problem of the inadequacy of the current two-year technical programs and curricula resulting from rapid technological change. Mr. Arnold states that certain force factors have created an imbalanced situation of general concern to many people, and he points out the need to reorganize technical curricula in order to cope with the problem.

His statement of objectives, however, seems a little less straightforward. It is not clear just how the first three objectives (i.e., comparisons of management and technician ratings of job functions; isolation of variables such as age and time with company; and comparison of management and technician generality ratings) relate to evaluation and reorganization of technical curricula. The fourth objective — identifying a core of courses for post-high school technical programs — is clearly stated and relates directly to the problem.

The paper prompts several questions, most of which relate to a comparison of Arnold's methodology with the approaches of other people working on the same problem. The Oregon State Division of Community Colleges and Vocational Education is conducting a statewide study, under the direction of Dr. William G. Loomis, which is concerned with utilizing a systematic approach for continuous planning, implementation, and evaluation of vocational education programs. This approach is based on the concept of job clusters, and makes continuing evaluations of employment opportunities, and of human and educational resources. The work of Gagne and Altman of the American Institutes for Research derives from implementing a two-way grid approach which considers both the behavioral processes of workers and areas of job content.

In comparing Arnold's methodology to the Oregon and Pittsburgh approaches, one must ask "Why does Arnold *not* consider the variable of human resources?"

Another question, related to this, concerns the criterion group. It is not clear what function this group was intended to serve. If it was assumed at the outset that the responses of the criterion group were "correct responses" and could be accepted as indicating the needed curriculum reorganization, then it appears that time and effort were misdirected in implementing the study. On the other hand, if this assumption was not made, then there seems to be some question as to the purpose served by the criterion group.

Assuming that the study was justified, there is still a question concerning sampling procedure, for there is no clear statement of criteria defining population. Since it is not evident how the sampling was done, one is skeptical of a procedure which at first selected 39 firms and later added 18 more. There is no indication that the firms selected were representative, nor is there any suggestion of the extent of representativeness which might be possible. This question seems particularly significant, since the answer could mean that the recommended curriculum would be relevant only to 57 manufacturing firms in Illinois.

A related question involves instrumentation. It is not clear what procedures were employed to establish the reliability and validity of criterion measures and techniques. The development and standardization procedures for the curriculum deck are also vague, and a limitation may derive from a circularity in reasoning. Since the curriculum deck seems to have been developed from primary data in school catalogs, the question arises as to what chance there would be for innovative approaches, or for curricula based on multi-occupational clustering, if the deck were constructed on the basis of existing curricula.

In listing the items called for in the interview, there is no indication of how these data were related to curriculum development, or how job families were developed from the interview data. Nor is it clear how the core curriculum was developed. Mr. Arnold states that PERT was included because it was suggested by university staff members; but his paper does not indicate that university staff members were included in the interview group.

The merit of Arnold's paper is that it calls attention to a curriculum development approach which differs from the Oregon and Pittsburgh methodologies. However, in analyzing his approach, we must consider the following questions: Can we rely on the perceptions of workers and/or managers to define the course content and technical education programs for vocational educators? Can we abrogate responsibility for considering the occupational opportunities and human resources dimensions in program planning? Can we derive job clusters through interviews with workers and/or managers? And what bases are there for assuming that job clusters can be defined independently of the behavioral processes involved in implementing job functions?

V

RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION

RESEARCH IN VOCATIONAL AND TECHNICAL EDUCATION*

RALPH C. WENRICH
THE UNIVERSITY OF MICHIGAN

In attendance at this conference are both researchers and practitioners, and a few who play both roles. For the benefit of those directly involved in the organization and operation of effective vocational and technical programs, I should like to make the point that vocational educators need not be defensive about their programs. Neither do they need to resist research and evaluation because of the fear that the results may not be complimentary. The research results to date would indicate that most programs have served youth and adults quite well. But no practitioner, if he wishes to be considered a leader, can rest on his laurels.

It should be pointed out that, until recently, most of the research in vocational education had been done by students as a part of their degree programs. That which had been done by staff members was generally oriented toward their own subject-matter fields — agricultural education, business education, industrial education, or home economics — since the interests of these people were generally limited to their own occupational areas. They were not primarily concerned with the broad spectrum of occupational education; neither were they basically research oriented. Frequently it was a matter of finding adequate justification for programs in the several fields, rather than a search for new truths. I thought I detected some of this tendency in several reports today.

I believe it is correct to say that vocational educators generally have not been research oriented, and some of them preferred not to raise questions about programs and practices; but vocational educators are not alone in this respect. Also, until recently, researchers outside vocational education were not much interested in this field. But with the growing interest in vocational and technical education, accompanied by research funds made available through the Cooperative Research Program, the Manpower Development and Training Act, and the Vocational Education Act of 1963, we have had an upsurge of interest in research in this field. Increasing numbers of persons identified with vocational education have become interested in doing research. But, perhaps more significant, persons in other disciplines and other professional fields have come to recognize vocational and technical education as an area which needs to be studied.

* This paper was presented by Mr. Wenrich at the conference banquet on Friday, June 10, 1966.

In my opinion, the best research has come from those situations where vocational educators and researchers in other areas of education or other disciplines have joined forces. We have had several reports today on research which was done through the combined efforts of vocational educators and economists, sociologists, and psychologists.

As vocational education becomes more directly related to the problems and needs of people in our society and the requirements of our economy, the need for the involvement of other social scientists in our research efforts will become even more essential.

Michigan, I am pleased to say, has been interested in research for some time. In 1958 the State Board of Control for Vocational Education allocated $75,000 for a three-year evaluative study of vocational education in the state. One study which grew out of this project dealt with the financing of the education of vocational teachers. This study recommended the allocation of 25 percent of all state and federal teacher training funds for research. For the past four years the State Board has allocated $50,000 each year for research. Although this has been a modest expenditure, it has given us the basis for some of the research we are now doing; it has also given us a head-start with our Research Coordinating Unit in the State Department of Education.

If I can make any contribution to this conference, it might be in the area of helping to define areas which need to be explored. Since research generally grows out of problems or needs which individuals or groups recognize, I thought it might be useful to attempt to identify some areas of concern which vocational educators recognize, and which have implications for specific research problems.

I should hasten to say that I am not interested in developing a laundry list of specific research problems for others to study. I have gone down this blind alley before. In 1962 I participated in a national conference of state directors and others interested in research in vocational education, where we spent several days exploring this possibility. Some time ago, a National Conference on Research and Studies in Trade and Industrial Education listed 75 problems. I suspect that few people other than those who participated in the conference ever consulted this list.

More recently (May 12, 1966), the American Vocational Association Trade and Industry Research Committee held a meeting at which they discussed the question of identifying problems and identifying researchers with common interests. This committee, wisely, I think, decided not to make a list of problems that necessitated research, nor to prepare a directory of researchers with common interests. Instead, they agreed to identify several broad areas in which research is needed, and they hope to arrange a workshop involving persons who have an interest in, and who have already done

some work in, the general areas. These persons would represent whatever disciplines are relevant to the problem areas. Through a series of such conferences or workshops, researchers interested in a common problem would get to know each other, would find out what others have already done in a particular area, and, hopefully, some would get the necessary inspiration and encouragement to continue their work in that area. Through such a procedure we might also form new combinations of research workers for particular problems. This, it seems to me, is a much better approach than we have ever taken before to focus attention on certain necessary areas of research and to get competent people to work on them.

Now let me return to the identification of areas which concern vocational educators, and which might suggest to you specific problems which need to be researched.

(1) Vocational educators are concerned about the fact that many researchers from other field and disciplines do not understand the terms and concepts used in vocational education. Frequently, "outsiders" do not understand or take the trouble to find out about either current practices or the theory and philosophy underlying these practices. For example, the phrase "education for work," or "education for employment," is used frequently. To be employable, a person must have acquired those habits, attitudes, and understandings which are a part of good citizenship; he should also have had the opportunity to explore his interests and aptitudes so that he might have a better appreciation of his own strengths and weaknesses. And finally, to be employable, one must have had specialized education designed to provide salable skills and knowledge. Education for work, then, consists of two parts: (1) those *general* educational experiences which all future workers need as a part of their preparation for employment, regardless of the occupations they will enter, and (2) those *specialized* educational experiences which are designed to give youth the salable skills and knowledge appropriate for employment in a particular occupation or family of occupations. Elementary schools are devoted almost exclusively to the former — that is, general education — but our high schools, area vocational and technical schools, community colleges, and adult schools must be concerned with *both* general and specialized education. If one accepts this concept, it is obvious that education for work begins in the elementary grades and continues throughout the school life of every individual. Furthermore, if we want to help the worker maintain himself in the labor force, opportunities for continuing education for work must be provided as long as he remains active in the labor force. Thus, education for work becomes a lifelong process which starts early in life and never ends.

Anyone working on research in vocational and technical education should recognize the difference between vocational education and

the practical arts. The former is specialized education, while the latter is general education. The distinguishing feature is the *purpose*. The purpose of a vocational course or curriculum is to prepare the student for employment or progression in a particular occupation; while practical arts courses are designed to enhance the general education of children, youth, and adults. The distinction between general and specialized education cannot be made on the basis of subject matter, for any subject in the curriculum can be taught as either general or specialized education. It is the way we as educators use subject matter that determines which category it falls into. Confusion is greatest in the field of industrial education.

"Education for work" is broader than vocational and technical education and can be defined as the *process of discovering and developing human potential for work*. Public education in a democratic society is dominated by the idea, or the ideal, that all children and youth should be provided with equal educational opportunities so that each individual might develop his potential as far as possible. All too frequently, "equal educational opportunities" is taken to mean the *same* opportunities for all. But children and youth, like adults, are unique. No single curriculum or set of learning experiences can be expected to discover and develop the talents of all. Diversity in the curriculum is absolutely necessary.

Education for work can also be described in terms of educational objectives, which, when achieved, produce a successful worker. Such objectives fall into three categories: (1) *the cognitive*, which includes those objectives which deal with the recall or recognition of knowledge and the development of intellectual abilities and skills; (2) *the affective*, which includes those objectives which describe changes in interests, attitudes, and values, and the development of appreciations; (3) *the psychomotor*, which includes the manipulative or motor skills, and which requires neuro-muscular coordination. However, we cannot consider any one of these three classifications as separate from the other two, because the human being must be considered as a total organism.

Traditionally, the emphasis in education has been on the cognitive area. One exception to this is in the field of vocational education, where the emphasis has been on manipulative skills. It should be pointed out here that education for work involves all three areas, and therefore it is not simply a matter of providing for some learners the manual skills needed to get and hold a job. The effective worker must be able to manipulate facts and ideas as well as materials and things; his interests, attitudes, appreciations, and values are equally important to his success as a worker.

Education for work can be thought of as producer education, as distinguished from consumer education. The educated person is willing and able to carry his share of the load by producing goods or

services for which society has a need. Some of this productivity can be achieved through his vocation; much of it can be achieved through the work that he does outside the job. We are primarily concerned here with education for work in one's vocation. However, with the decrease in the number of hours per week which man is required to work on the job, he will need more work (or play) to engage him during his "leisure time." To this extent, the task of education for work outside the job will become increasingly important and should be recognized by educators.

Both general and specialized education are essential ingredients of education for work. While it is imperative that we avoid a dichotomy between the two, it is equally important that we understand the distinctive purpose of each and the relationship of *both* to education for work.

Although general education seeks to discover and develop individual talent, it emphasizes preparation for activities in which men engage in common as citizens, workers, family members, and members of other groups in the community. T. R. McConnell, in an article on "General Education" in the *Encyclopedia of Educational Research*, points out that general education is very much like liberal education:

> General education undertakes to redefine liberal education in terms of life's problems as men face them, to give it human orientation and social direction, to invest it with content that is directly relevant to the demands of modern society. General education is liberal education with its matter and method shifted from its original aristocratic intent to the service of democracy. General education seeks to extend to all men the benefits of an education that liberates.

By definition then, general education is that part of education which seeks to meet the *common* needs of children, youth, and adults for competence, both as individuals and as members of various groups. Specialized education is that part of education which seeks to meet the unique or "special-interest" needs of each learner. For a fuller treatment of this subject I would recommend Jerry Moss' article in the November 1963 issue of *The Education Forum*. I would classify the general vocational capabilities study reported by Morrison at this conference, as general education. On the other hand, Frantz and Maley, in dealing with the "cluster concept," are talking about specialized education. The point I want to make is that anyone doing research in vocational education should learn the terms, concepts, and philosophy of vocational education if he expects the results of his research to be accepted. Conversely, the vocational educator engaged in research needs to learn the terminology and fundamental concepts of other disciplines. The team approach serves to overcome this problem.

(2) A second concern of vocational educators is the question of the proper balance between general and specialized education. There are those who believe that specialized education should be deferred until after high school (among them are high school principals, and faculties who want to operate a college preparatory high school); but there are others who believe that *for some youth* specialized education for work should begin even earlier than is now the practice. Grant Venn, in a speech at the West Virginia Vocational Education Association Conference several years ago, said that "Vocational programs to prepare for such jobs as service station attendant, clerks in stores, household work and the like must begin much earlier for a large majority of the youngsters who lack the basic abilities and aspirations required in more highly skilled jobs." When should specialized education begin and what proportion of a student's time should be devoted to it? This also introduces the question of the role of the high school in relation to the role of the community college and the technical institution.

(3) A third concern is the problem of gearing vocational education programs to the needs of society (in terms of manpower requirements) *and* to the needs of the learner. The needs of society and the individual are not in conflict; in fact, they are reciprocal. But the planner of vocational and technical programs must keep both of them clearly in mind. The vocational educator is interested in discovering more effective ways of determining manpower needs, both now and in the future. The question of whether to base a program on local, regional, or national manpower requirements is not clear. There is considerable disagreement among the "experts" on this question, as is evidenced to some extent in the papers presented at this meeting.

Of particular concern to vocational educators is the development of more effective programs in the service occupations, including the paramedical field.

(4) Should the schools prepare youth for initial employment or for a lifetime of employment? Obviously, we should not aim at either of these extremes; but we must determine just what is the role of the public schools in this regard.

(5) Vocational educators must also determine the relationship of the school's role to that of employers in providing specialized training. What criteria can be used to determine the proper function of the public schools?

(6) Perhaps the greatest single problem facing vocational and technical education is the short supply of teachers and persons to fill leadership roles. This raises questions of teacher qualification and certification, school accreditation, salary schedules, and working conditions of vocational teachers.

(7) The development of suitable instructional materials and

teaching methods is a further important concern. The need for teaching materials is especially pressing in some of the new and emerging occupations. Teachers want to make fuller use of modern technology in their teaching methods, but they need help. Individualization of instruction in vocational and technical education can reach a new high as we put into use new teaching materials and machines.

(8) In the area of organization and administration of vocational-technical programs, the role of comprehensive high schools and community colleges versus the role of specialized vocational and technical schools is unclear. A related question concerns the effect of attitudes of academic teachers (frequently unsympathetic) toward vocational and technical education. The role of schools operated by local school districts where some youth are being served by area vocational schools needs attention. The problem of small schools versus large schools needs more research; and the internal administrative structure of our schools should be studied.

(9) How can vocational educators make better use of community resources? Our goal should be a more effective involvement of the community in planning and operating vocational programs.

(10) Much of the research we are doing is not useful to the practitioner. I don't want to get into the "pure vs. applied" research controversy, but I suspect some problems being studied are of interest and value only to the researcher and his colleagues in the same discipline and have little practical value. We may be more interested in using some research technique than in helping to solve a problem. Our research needs to be made functional by combining findings from many sources, by correlating these findings with experience and wisdom, and by planning a course of action. Our goal should be not simply dissemination, but innovation.

(11) How can we get the whole faculty of a comprehensive high school or community college involved in the process of educating youth for employment? A few *vocational* teachers, and a few *vocational* courses will not do the job. Education for work must permeate the whole school. The entire faculty must be committed to the idea of helping each youth prepare for his next step in life. All subject-matter fields have a contribution to make if instruction is properly organized and taught, with the needs of employment-bound youth in mind. How do we get more "team planning" as well as team teaching?

(12) Finally, vocational educators are concerned about the development of attitudes and the changing of values. What can we do to give youth a better understanding of and a more wholesome attitude toward work? Work is more than simply earning a living. An appreciation of the meaning of work in a person's life would place education for work in an entirely different perspective.

Vocational and technical education has tremendous public support. The public has high expectations, and only through research and experimentation can we hope to develop programs which will meet these expectations. The public does not want simply more of the traditional type of vocational programs. Programs must be functional in the lives of people; that is, they must be geared to the needs and interests of students and to the employment opportunities available.

Through the work which is being done by researchers such as those in attendance at this conference, and through the implementation of their findings by the people who are responsible for planning and operating the public schools of our country, we will, I feel certain, meet the expectations of society by serving all youth and adults more effectively. The result will be a sound economy and a healthy society.

VI

SOME ECONOMIC CONSIDERATIONS IN VOCATIONAL EDUCATION PLANNING

WHEN SHOULD VOCATIONAL EDUCATION BEGIN?*

ARTHUR J. CORAZZINI
DARTMOUTH COLLEGE

In recent years, a large number of studies have pointed out the profitability of public and private investment in education. The rate of return on total high school costs has been estimated at 14 percent,[1] and the return on college costs has been estimated at nine percent. The casual observer might suggest, upon inspection of these data, that public decision-makers should allocate larger quantities of limited community resources to the support of expanded investment in public education. Unfortunately, such a recommendation would overlook a multitude of problems.

On the positive side, one might argue that these estimates *understate* the return to the investment in education. As has been pointed out elsewhere, the value of additional education has at least two income components.[2] The first is the amount of additional earnings which result from completion of a given level of education; the second is "the value of the 'option' to obtain still further education and the rewards accompanying it."[3] In addition, the external benefits resulting from the investment in education would increase its over-all profitability.

On the negative side, it is obvious that most empirical work deals with an average rather than a marginal return to the investment in education.[4] It is the marginal rate of return to further investment which is the relevant consideration for decision-makers, not the average rate of return on past investment. Nonetheless, since, in practice, average rates are the only measure of profitability

* This research was supported by funds provided under Title 4(c) of the Vocational Education Act of 1963. It was carried out while the author was a member of the research staff of the Industrial Relations Section at Princeton University. The author wishes to thank the U.S. Office of Education and the director of the Industrial Relations Section at Princeton, Frederick Harbison, for making this work possible. In addition, he wishes to thank Loren A. Ihnen for his comments on an earlier draft of this paper.

1 T. W. Schultz, "Education and Economic Growth," *Social Forces Influencing American Education* (Chicago: National Society for the Study of Education, 1961), Chapter III.

2 For a complete discussion of the option value of education, see B. Weisbrod, *External Benefits of Public Education: An Economic Analysis* (Princeton, N.J.: Industrial Relations Section, Princeton University, 1964), p. 20.

3 *Ibid.*

4 For an empirical study dealing with the problem of marginal returns, see W. Lee Hansen, "Total and Private Rates of Return in Investment in Schooling," *Journal of Political Economy* LXXI (April 1963), pp. 128–140.

available to decision-makers, such data are used with the hope that they will lead to more optimal investment decisions.[5]

When decision-makers approach the problem of vocational education, their task is made all the more difficult. In addition to deciding whether to provide more education for all children, they must determine the mix of that education. That is, given a decision to provide high school education, should they offer general or vocational education? Given a decision to provide an additional year or two beyond the high school level, should that additional year be junior college education or vocational-technical education? Given a decision to provide vocational-technical education, should that education be at the high school level or the post-high school level?

In order to make such choices, the costs of the alternative investments must be compared with the benefits of the alternative programs. There are, of course, both private and public costs to consider. Private costs are incurred by the individual. The largest immediate one is the opportunity cost of remaining in school rather than working, but there are also direct school expenses which must be paid by the individual. Public costs consist of all the normal school expenses, both direct and indirect, incurred by the public authorities in the running of the school. Adding the public and private costs gives us the total resource cost of the program. In the first approximations, the benefits would be measured by the gains in lifetime income which are attributable to the education received by the individuals completing the respective programs.

When the choice is between vocational education at the post-high school level and the same education at the high school level, some interesting questions arise. Vocational education should be considered a partial substitute for on-the-job training. The question is whether to invest in that formal training during the first twelve years of schooling, or to add two additional years to the public education system. Formal training undertaken at the high school level must be accompanied by the basic general education provided to all high school students,[6] whereas trainees entering a post-high school program already possess high school diplomas. In any event, there are those who have argued that the number of school years ought to be decreased; for example, the "Machlup plan" would compress all the material now taught in twelve years into ten years.[7] The provision of post-high school vocational-technical education would extend what could be a twelve-year

5 For a complete discussion of the average and marginal returns to education, see F. Machlup, *The Production and Distribution of Knowledge in the United States* (Princeton, N.J.: Princeton University Press, 1962), p. 120.

6 The vocational high school student puts in a longer school day than the regular high school student in order to complete both basic academic work and shop work.

7 Machlup, *op. cit.*, p. 134.

program into a fourteen-year program.

Graduates of post-high school programs would have to earn more than those of high school vocational programs, if the investment in post-high school training is to appear rational. If high school vocational graduates earned as much as post-high school graduates, then the marginal return to the extra investment in education would be zero. The individual would forego two years of earnings, incurring direct costs, but receiving no increase in lifetime income for his investment.

The individual could receive a non-pecuniary benefit from the knowledge that he had completed some sort of higher education program. He might also obtain an indirect pecuniary benefit in the form of an "option" to continue his education. In other words, if completing post-high school vocational education courses resulted in a greater probability of going on for a four-year degree than graduation from vocational high school, the "option" to obtain this four-year degree might make the investment somewhat more attractive.

The requirement that post-high school vocational training result in higher earnings holds only if the two competing programs are identical. That is to say, if certain kinds of vocational education require an educational background equivalent to a high school degree, then obviously high school vocational training and post-high school vocational training are not alternatives. It would be irrational for the private decision-maker to forego earnings for two years beyond high school without gaining added income. However, the added income would not result from the formal training received, since he could have gotten the same formal training at the high school level. Presumably those that graduated and then trained would have had more time to spend in general education courses which would prepare them for future on-the-job training programs.[8] It is also possible that the quality of the academic instruction given those at regular high schools is superior to that given at vocational schools. Thus, these students could be considered better candidates for formal training, and, having graduated from the training program, for further on-the-job training. Hence, the added income would simply be a premium paid by entrepreneurs to those individuals who demonstrated extra ability and potential expertise by graduating from high school and then undertaking formal training. In a sense, then, either post-high school vocational training does not increase lifetime earning, and individuals would be irrational to invest in it, or it does bring increased earning because entrepreneurs pay a higher wage, not for the amount of formal training received by the graduate,

8 Note that, since the vocational high school student does take *all* basic academic courses, these extra general education courses would have to be additions to the core courses given *all* high school students.

but for the number of school years completed. Having outlined the framework in which a decision between high school and post-high school vocational training would have to be made, we may turn now to an empirical investigation.

Educators in Worcester, Massachusetts, have chosen to set up both high school and post-high school vocational education programs. The high school program begins at the ninth grade level, continues for four full years, and offers the student his choice of eleven different courses in the skilled trades. The post-high school program is a two-year program, offering the same eleven skilled-trade training courses, and four additional technical training courses.

In September 1960, 176 boys entered the ninth grade of the vocational school.[9] Of the group that entered, 123 eventually graduated, although not always within four years of entrance. Out of the 123, 101 were placed in occupations directly related to their training, 76 of them graduating and being placed on jobs in June 1964. The placement records of these 76 were readily available to investigators.

In September 1962, 121 students enrolled in the post-high school vocational program, and 90 graduated two years later. Of these, 42 had taken the same training courses as the high school vocational graduates, and 34 of them were placed in occupations directly related to their training. Of the other 48 graduates, who had taken one of four technical training courses open only to post-high school students, 37 were placed in occupations directly related to their training. We begin our evaluation by comparing the placement records of the 34 graduates who took the same training courses as the high school students with the placement record of the 76 vocational high school graduates. The two groups are assumed to have received the same amount of help in finding jobs. If one group did receive more placement guidance per pupil, the extra costs and benefits of this effort would have to be accounted for in any over-all evaluation.[10]

THE BENEFITS

With regard to starting salaries, we find that in two of the eleven trade areas the post-high school graduates received less than, in three other trade areas the same as, and in the remaining

9 All data in this paper referring to the Worcester school system were supplied by school officials.

10 The placement procedure was quite informal. One man was officially in charge of all placement for both groups. In reality, each department head helped place graduates in that trade area. Hence, the actual ratio of placement officers to students would vary with the size of the enrollments in each department.

six trade areas more than the vocational high school graduates. The amount of the premium paid to post-high school graduates varied from 5¢ to 35¢ per hour, with an average premium of 20¢ per hour. For a 40-hour week, this would amount to $8 a week, or $400 a year for a 50-week work year. The annual figure assumes that the wage differential remains the same, in absolute terms, throughout the working year. Taking each of the six trade areas separately, we find that two paid a premium of 5¢ per hour, which is $2 per week or $100 per year. Three other trades paid 25¢ per hour, amounting to $10 per week or $500 per year. Finally, in one trade area, the premium paid was 35¢ per hour — $14 per week or $700 per year.

The average starting wage for a post-high school graduate who took one of the eleven trade courses offered high school students was $1.84 per hour; the average starting wage for the vocational high school graduate was $1.76 per hour. Hence, over-all, the average premium paid post-high school graduates was a mere 8¢ per hour — $3.20 per week or $160 annually.

The picture is somewhat improved if we look at the 37 post-high school students who took training open only to high school graduates and were then placed in jobs related to their training. For this group, the average starting wage was $1.95 per hour, or 19¢ per hour above the vocational high school graduates' starting salary and 11¢ per hour above the wage paid post-high school graduates of the eleven trade courses. The individual who graduated from one of these four technical training programs began his career by making about $8 per week or $400 a year more than if he had taken a trade course at the high school level.

THE COSTS

The cost of vocational-technical education is always assumed to be greater than the cost of general education; however, the exact relationship between the two is a matter for empirical investigation. Using data provided by the city of Worcester and the Worcester school authorities, we arrive at a measure of vocational education costs for that community (see Table 1). Exact figures, of course, may vary widely from community to community.

If we look only at public costs, we see that vocational high school education in Worcester is about 2.3 times (or, for our purpose, twice) as expensive as regular high school education. Since post-high school technical education costs nearly as much as vocational high school education, there is no difference, from a public cost point of view, between buying two extra years of vocational-technical education and buying four years of vocational high school education.

TABLE I

Total Resource Costs, Worcester Public High School, Worcester Boys' Vocational School, Worcester 13th and 14th Grade Vocational-Technical School, 1963-64

	$ per Pupil		
	Public High Schools	Vocational High Schools	Post-High School Vocational-Technical
Total Public Costs	532	1,210	1,230
Current cost	452	964	984
Implicit rent [a]	59	165	165
Property tax loss [a]	21	81	81
Total Private Costs [a]	1,176	1,176	2,544
School-related costs	56	56	121
Foregone earnings	1,120	1,120	2,423
Total Resource Costs	1,708	2,386	3,774

Sources: Worcester Public Schools, Office of the Superintendent; Worcester Boys' Vocational High School and Worcester Industrial Technical Institute; Office of the Assessor of the City of Worcester; and Massachusetts State Department of Education, Department of School Building Assistance.

[a] Estimated using techniques in T.W. Schultz, "Capital Formation by Education," *Journal of Political Economy* LXVII (1960), p. 575; and in Machlup, *op. cit.*, p. 100.

To illustrate this point, let us assume that all those now taking vocational high school education will be put in post-high school programs. Before they can enter, they would still have to graduate from regular high school. Since regular high school costs are one-half those of the vocational school, the four-year savings gained by keeping these people at the regular school would buy two years of post-high school vocational-technical training. Of course, if expanding post-high school enrollments caused marginal costs to rise, this might not be the case. Hence, for the conclusion to hold, we must assume that marginal costs are equal to average costs.

If we consider private costs, the picture is somewhat altered. The individual who foregoes two years of employment incurs real costs in the form of lost earnings. When direct school costs are added to these foregone earnings, we estimate a total yearly cost

per pupil of $2,544. Thus, the total resource cost of adding two years of vocational training beyond the high school level is $3,774 per pupil per year. This compares with total resource costs of $2,388 per pupil for vocational high school and $1,708 per pupil for regular high school.

AN EVALUATION

The graduate of post-high school training seems to have made a poor investment if he chose one of the eleven training programs open to vocational high school students. He has foregone two years of earnings and has incurred direct school costs, at a total of $2,544 per year. In return, he received in the first year an average salary of $160 more than the vocational school graduate. Unless he can look forward to a much more lucrative career than his vocational school counterpart, it certainly appears that he should have chosen to train at an earlier age.

The graduate of the post-high school program who enrolled in training courses open only to high school graduates found himself in a somewhat different position. Again, his two-year costs were considerably higher than the immediate premium he received relative to the vocational school graduate: his costs were $2,544 per year, and his salary averaged $400 per year more than the vocational school graduate. However, his job was in the technician rather than the skilled-trade category. In no way could it be argued that he would earn the same approximate lifetime income as the vocational school graduate.

The slightly higher starting salary paid to graduates of the post-high school training course who trained in the same areas as vocational students appears to be a premium for having graduated from high school. It could be argued that whatever chance the post-high school graduate has of earning more in the same skilled trade than his vocational counterpart results from the greater ability he has demonstrated by completing regular high school. Similarly, the potentially more lucrative technical careers began with training which required high school graduation as proof of ability.

We need not draw the conclusion that training really ought to occur at the post-high school level. Since private costs are much greater than the immediate wage premium paid to post-high school graduates, there is an obvious pay-back period involved. That is to say, there is some definite length of time during which all of the higher wages paid to these graduates relative to vocational high school graduates must be charged off against the initial deficit; the initial premium must be maintained and enlarged for some time, or the extra costs will never be recovered. Here we assume that the

average premium paid post-high school graduates relative to vocational school graduates in the same trades amounted to $160 per year, providing that the absolute difference in starting wages was maintained for the entire year. The difference between this figure and the private costs figure of $2,544 is $2,384. Unless the absolute difference in wages received by the two groups of graduates widens, it would take 15 years to pay back the costs incurred during one year of post-high school training. If the individual were to consider a discounted stream of extra returns and attempt to equate these returns with the present value of his extra costs, a longer pay-back period would be required. Indeed, this average differential of $160, if discounted at a 5 percent interest rate, would not equal the two-year discounted extra costs of $4,965 within the working life of the employee. The largest differentials of $500 and $700 per year, if discounted, would equal the extra costs within $15\frac{1}{2}$ years and 10 years, respectively (Table 2).

Given the highly uncertain nature of an individual's labor market experience, it seems that a fruitful technique would be to minimize the pay-back period. This could be accomplished by offering an accelerated training program during the last two years of high school. Those vocational students not able to proceed at the faster academic pace would take the ordinary four-year program. Those students who would ordinarily graduate from high school and then take vocational training could undertake a two-year program at the eleventh grade. Completion of training would also mean completion of high school. No added private costs would be incurred by these students. If their present higher starting salary is due to their higher ability, it should still be easy for entrepreneurs to distinguish between those that took a four-year program and those that took the training in two years.

Much the same sort of argument can be made for those who took technical training. If high school education is actually a necessary condition for this type of training, little change can be made. On the other hand, the average premium paid these graduates in the first year, relative to vocational high school students, was $400. This would mean a pay-back period of 5.3 years for one year of training beyond the high school level.[11] Again, if the stream of extra returns were discounted, it would take 21 3/4 years to equate these returns with the discounted extra costs (Table 2). Obviously, if technical training could be given at the high school level, it would be expedient to do so.

Finally, we have said that providing post-high school training could be a worthwhile undertaking if the individual thereby bettered

11 Comparing the salaries of vocational trade graduates with the salaries of technical course graduates is somewhat suspect, since we could argue that from the individual's point of view the two training choices are not substitutes.

TABLE 2

Number of Years Differentials Would Have to Remain, in Order for the Present Value of Extra Costs to be Equal to Present Value of Extra Returns

Wage Differential	Rate of 5% of Discount
$100 per year	Never equated [a]
$160 per year	Never equated
$400 per year	21 3/4 years
$500 per year	15 1/2 years
$700 per year	10 years

Source: Official records of the respective schools.

[a] The two-year discounted extra private costs were $4,965.

his chances of going on to four-year college. Looking at the actual numbers of Worcester vocational high school graduates and post-high school graduates who continued their education, we find that, from an entering vocational high school class of 176, only six (or 3.4 percent) continued their schooling beyond high school. Out of an entering post-high school class of 121, only three (or 2.5 percent) continued their schooling beyond the two-year training program. At least in this particular case, both programs seem to be terminal occupational training.

Several additional factors might modify the findings presented in this paper. In the first place, we have only discussed starting wages Certainly, investigators should follow vocational and technical school graduates over several years of their working life. Further, direct benefits in the form of lifetime income are actually only the most immediate return to educational investment. There may be several categories of external benefits which accrue to one or another of the training groups studied, which might considerably alter the tentative conclusion reached here. Moreover, to reach a final conclusion on whether to invest in high school vocational training, we would have to compare the vocational high school graduate with the graduate of the ordinary high school.

AN EXPLORATORY SURVEY OF PROPRIETARY VOCATIONAL SCHOOLS*

HARRY V. KINCAID and EDWARD A. PODESTA
STANFORD RESEARCH INSTITUTE

The number and variety of vocational education offerings by proprietary schools advertised in newspapers or listed in telephone directories are particularly striking to persons interested in vocational education in the United States.[1] Yet, surprisingly little is known about the role of these schools in the total scheme of vocational education: about the effectiveness with which they perform their educational function, or how they organize resources (both human and physical) to achieve their objectives, or about the nature of the clientele they serve. Since evidence indicates that proprietary schools are a significant part of the total educational resources of the community,[2] much more needs to be known about them, if educational policies and programs are to be made more consonant with the needs of our society. In short, proprietary schools represent a national resource. The gaps in our knowledge concerning these schools must be closed before effective decisions can be made concerning their optimum utilization.

We conducted an exploratory survey of proprietary schools in Santa Clara County, California. The primary objective of the study was to inventory proprietary schools in the county for the purposes of (1) developing preliminary ideas on methods that might be used in broader-scale studies, and (2) formulating hypotheses worthy of

* The research reported herein was performed in connection with a pilot study pursuant to a contract with the U.S. Department of Health, Education, and Welfare, Office of Education, and will be incorporated into the final report, *Supply and Demand Factors Affecting Vocational Education Planning,* to be submitted to that agency.

1 The use of the term "vocational education" in this paper follows the definition in the report of a panel of consultants on vocational education, entitled *Education for a Changing World of Work* (Washington: GPO, 1964), OE–80021. Vocational education is defined here as including "all formal instruction for both youth and adults, at the high school, post-high school, and out-of-school levels, which prepares individuals for initial entry into and advancement within an occupation or group of related occupations." Education leading directly to a baccalaureate or professional degree is excluded. The term "proprietary vocational school" refers to a profit-making school offering a course of education or training that leads to a vocational objective.

2 The section of Johnstone and Rivera's substantial work on adult education, *Volunteers for Learning* (NORC, 1965), that deals with educational facilities and programs in two middle-sized cities includes the observation that "proprietary schools represent an extremely important segment of the educational resources used by adults in these cities," and notes that more adults took courses in such schools than in the local secondary schools, colleges, and universities. However, this work focuses on adults, and deals with persons under 21 years of age only when they are married or heads of households.

testing on a more systematic basis. The specific findings cannot be generalized beyond Santa Clara County; however, the methods and hypotheses generated may be useful for more ambitious studies.

SCOPE OF PROPRIETARY SCHOOL ACTIVITY

In the absence of a comprehensive national inventory of proprietary vocational schools, an indication of their prevalence can be obtained by referring to the membership reports of various associations and accrediting organizations.[3] For example, the 1966 directory of the United Business Schools Association lists 441 private business or commercial schools in the United States as members;[4] and the National Association of Cosmetology Schools has more than a thousand affiliated institutions.[5] A recent article on the training of medical and dental assistants observed that Career Academy, Inc., which claims to be the nation's largest private school in that field, has trained between 7,000 and 10,000 students since 1961.[6]

Some detailed information can be developed at the state level on proprietary school activity, but the comprehensiveness of such data varies with the degree and level of control exercised by individual states over proprietary school operations. A 1965 tabulation by the California State Department of Education listed 469 proprietary schools offering either resident or correspondence courses authorized or approved under the provisions of the California Education Code.[7] Adding to these the 215 private cosmetology schools and the 26 approved barber colleges, the total number of proprietary vocational schools in California comes to more than 700. The aggregate offerings of these schools provide students with a choice of more than 250 courses, ranging from the commonly known business and commercial or trade and technical subjects to programs in commercial deep-sea diving, horseshoeing, stunt training for motion pictures, and candle-making.

As the 1965 California totals indicated, cosmetology schools

3 *The Vocational Training Directory of the United States* (Arlington, Virginia: Potomac Press, 1958) listed more than 7,000 schools; however, the compilation was admittedly incomplete, and a check of its listings indicated that a number of schools known to be operating in Santa Clara County at that time were not included.

4 United Business Schools Association, *The 1966 UBSA Directory of Business Schools* (Washington, 1966).

5 *Encyclopedia of Associations, Vol. 1: National Organizations of the United States* (Detroit: Gale Research Co., 1964).

6 James Ridgeway, "The Girls in White," *The New Republic,* February 19, 1966, pp. 10–12.

7 California State Department of Education, *Courses Offered by California Private Schools* (Sacramento, California, July 1965).

dominated the proprietary schools field, business and commercial schools followed, and real estate schools ranked third. These three groups also represent the three classifications of proprietary vocational schools in terms of educational objectives: (1) preparation for employment, (2) preparation for a licensing examination, and (3) a combination of both.

The schools offering resident instruction cluster about the two major population centers — the Los Angeles-San Diego area and the San Francisco Bay and Peninsula area. Beyond these metropolitan centers, the offerings are limited. Chains of proprietary schools, operating either under single ownership or as franchised activities, are not uncommon; however, with the exception of a few national systems that franchise branch schools, most chains are regionally oriented, either in Southern or Northern California.

Local control over proprietary schools in California is generally confined to licensing of the institutions as commercial enterprises under applicable local business and safety codes. Matters pertaining to curriculum, instructional staff, facilities, and enrollment solicitation are the concern of the state — primarily the Superintendent of Public Instruction (through the Bureau of Readjustment Education), the State Board of Cosmetology, and the State Board of Barber Examiners.

Private vocational schools seeking approval through the Bureau of Readjustment Education must meet specific criteria.[8] These include comparability of course content and quality with similar courses in public schools or other private schools; adequacy of space, equipment, and instructional material; financial responsibility; and maintenance of accurate student records. Minimum requirements for instructor qualification are five years of successful experience in the trade, industry, or occupation on which the instructor is to teach, or a combination of such experience with education at the college level, totaling at least five years. The code also controls the manner in which schools may advertise and solicit enrollments.

PROPRIETARY SCHOOLS IN SANTA CLARA COUNTY

Santa Clara County is located some 30 miles south of San Francisco, and most of its population of about 900,000 is located in the urban northern half of the county. The introduction and expansion of electronics, aerospace, and research and development activities has transformed the economy of the area in the past decade from

8 These criteria are set forth in considerable detail in Division 21, Private Educational Institutions, of the California Education Code. Provisions for cosmetology and barber colleges are contained in the rules and regulations of the State Board of Cosmetology and the State Board of Barber Examiners.

agriculture to technological industry. Today, all but one of the major employers are concerned with "space-age" production.

Santa Clara County has three universities with an estimated enrollment of some 27,000; four junior colleges with about 11,500 students; and 42 high schools enrolling approximately 54,000.[9] Each junior college offers nontransferable programs in a variety of occupational areas — business and office, health services, trade and technical, and public and personal services — and a check of class schedules for the 1965-66 school year showed 80 such courses in the four schools.

In January 1966, we initiated research to determine the scope and extent of proprietary school vocational activity in Santa Clara County. Advertisements were screened, telephone and business directories were checked, and the resulting information on school offerings was compared with the listings of cognizant state agencies so that we could develop a comprehensive roster of proprietary schools in the county. We visited each school for the purpose of interviewing administrators, managers, and instructors, and to observe classes. This survey provided information on 38 active proprietary schools and one correspondence school, all of which were offering programs that were occupationally oriented. The following breakdown shows the distribution by occupational area:

	Number of schools
Business and commercial	6
Health services	1
Real estate	6
Cosmetology	9
Barber	1
Trade and technical	8
Miscellaneous	7
Correspondence	1
	39

The trade and technical group includes schools with programs in radio and television repair, electronic assembly, offset printing, welding, auto mechanics, electronic technology, commercial driving, and drafting. Schools in the miscellaneous group offer programs for such diverse occupations as professional models, bartenders, cocktail waitresses, or masseurs. The health services school gives instruction for medical or dental assistants, and the correspondence school teaches piano tuning.

All of the 38 resident schools are located in the northern part of the county, and 28 were either in San Jose — by far the largest city

9 Santa Clara County Office of Education, *Occupational Needs and Their Educational Implications for Schools and Colleges in Santa Clara County* (San Jose, California, 1965).

in the county — or in contiguous communities. However, no school drew its students exclusively from the local community, since all schools could easily be reached from any of the suburban areas of this part of the county.

These schools, with only two or three exceptions, share several common characteristics in their method of operation: (1) a variety and range of courses available — none requiring more than twelve months, and a substantial number requiring less than six months to complete; (2) no requirement for high school graduation as a condition for enrollment (although two schools, both business colleges, did require non-graduates to pass a twelfth grade equivalency test); and (3) operation on a year-round basis and, in most cases, acceptance of new students into classes within a week of enrollment.

Business and Commercial Schools

As of January 1966, the six business and commercial schools had a total enrollment of 470 students in various business and office courses. Recent junior college enrollment figures suggest the degree to which these proprietary schools compete with the public institutions in attracting students; in May 1965, there were 966 students enrolled in two-year terminal business education programs in the accounting, clerical, office operations, and general secretarial fields at the four junior colleges of the county.[10]

The proprietary business school courses usually call for 25 class hours per week in a full-time schedule; however, these schools are quite flexible so that they can accommodate those students who hold full- or part-time jobs. All but one of the six schools have evening programs as well as day classes. The payment terms and schedule vary from school to school, but, regardless of the pricing system used, a student could expect to pay from $100 to $125 per month and a total of from $225 up to $1,295, depending on the program selected. Most schools offer discounts for full payment in advance and provide financing arrangements for extended payment plans. Several typical programs are listed below to indicate the span of costs and time involved.

Executive secretarial	25 hours/week	9 months	$900
PBX-receptionist	25	3	298
General office clerk	25	9	650
IBM keypunch	15	2	225

Aside from the fact that about 90 percent of the students in these schools are women, the composition of the student body varies from school to school. For example, the school that provides the greatest variety of course offerings reported that about two-thirds of

10 *Ibid.*

its students were in the 17- to 22-year age group with a background of general academic subjects in high school, little if any additional education, and no prior work experience in the field of study. Enrollment at two Palo Alto schools included a large number of students' wives, reflecting the influence of nearby Stanford University. Another school showed heavy summer enrollments of high school age students (presumably those who had just completed school), and sharp enrollment increases in February as "those who couldn't make it after a semester in college" turned to these business courses. All business schools indicated that their female students over 30 years of age tended to enroll in the short-course programs, or, where they had prior work experience, to take brush-up courses in secretarial skills.

On the basis of educational background and related employment experience, the quality of the faculty in these schools appears to be quite high. Each of the four full-time instructors at one school has a baccalaureate degree, a teaching credential from California or another state, more than a year of prior teaching experience in business subjects at the high school level, and at least three years of experience as a secretary or bookkeeper. Similarly, all of the instructors at three other business schools have college degrees and substantial teaching and employment experience. In another school, staff members who instruct skill courses only are high school graduates, with usually less than a year of college, but with from six to ten years of employment experience in their instructional specialty — PBX, keypunch, teletype, etc. — in addition to teaching experience in the proprietary school system. Finally, the instructional staff of the school with the widest selection of courses represents a mix of the two types described above: instructors in machine skills have a high school education and substantial work experience, and teachers of subjects such as accounting, business law, and business English hold college degrees with majors in the teaching field. Female instructors dominate the field. Only one school had equal numbers of male and female teachers, and four of the schools had no male instructors on the teaching staff at the time of this survey.

All but one school, a two-teacher activity, reported considerable turnover of instructional staff, on the order of one-third each year. Some of the losses came about as instructors who had taken positions the previous year were hired into the public school system during the annual spring recruitment. School administrators attributed other losses to the fact that many of the female teachers were working wives who terminated when their husbands moved, or when the requirement for additional income was no longer a factor. School managers seeking replacements or additional instructors used teacher employment agencies, classified advertisements, college and university placement services, and word-of-mouth inquiries.

There is apparently no shortage of instructors in this field. As one school manager put it, "there are plenty of teachers around but very few good ones, and we can't afford to have a poor teacher — the word spreads and our enrollment is affected. We screen about 25 applicants for every position vacancy that comes up."

These schools use a variety of methods to attract prospective students. All employ telephone directory advertising, and several maintain substantial schedules of classified newspaper advertising. While explicit or implicit statements regarding employment guarantees are prohibited by law, each school stresses its free placement service in the promotional literature that describes the course offerings. This service operates in much the same manner as a college placement office, receiving calls from prospective employers. In addition, many school managers establish informal working relations with personnel departments of the major firms and institutions in the area, in order to develop information on job vacancies.

Real Estate Schools

The six real estate schools each offer the real estate salesman's course and the real estate broker's course — both preparation programs for state licensing examinations. One of the requirements for state licensing as a real estate salesman is a written commitment by a licensed real estate broker to employ the candidate as a full-time salesman. Thus, individuals who take the preparation course for the salesman's license will in almost all cases have an employment commitment. The real estate broker's course attracts persons active in the real estate business, since candidates for the real estate broker's license must be licensed real estate salesmen for at least two years, and, among other things, must show evidence of completed sales that satisfy minimum criteria as to dollar amount and type of transaction.

All but one of these real estate schools is relatively new to the area; the oldest has operated in various locations in the north of the county since 1936, but the remaining five all started after 1960. Three of the real estate schools are operated in conjunction with active real estate sales firms. The total enrollment of 380 students as of January 1966 included 330 in the salesman course and 50 in the broker course. Most of these students were attending the three schools with no real estate organization affiliation; each such school had more than 100 students enrolled.

The method of operation at each of the six schools is substantially the same. Courses for the salesman's license examination run from four to six weeks, with lessons organized into independent instructional blocks. Thus, new students can be admitted at any time, and can remain until they have completed the course cycle.

All but one school allows students to repeat classes or retake the entire course without additional charge, and one school guarantees that if students who follow its instructional program fail to pass the licensing examination, the cost of the course will be refunded.

A salesman's course costs from $50 to $75 and will include from 21 to 60 class hours of instruction, including sample examinations. Charges for the broker's course run slightly higher, from $65 to $95, and include from 26 to 74 class hours. Classes are available in the morning, afternoon, and evening, and are usually scheduled two or three times a week.

Aside from the state licensing requirements that set 18 as the minimum age for a licensed salesman and 21 as the minimum age for a licensed broker, the schools have no prerequisites for admission other than the ability to read and write English. The range of student ages at the schools visited was wide — from 18 to 70 — with the majority of the students in the 35 to 45 group. Approximately one-third of the students were housewives who saw real estate sales as a source of additional income, and about 10 percent of the students were of retirement age.

Instructors in all instances had extensive backgrounds in real estate as brokers, attorneys, or as teachers in real estate schools. Each school used the sample examination technique to prepare its students for the state licensing examinations and devoted up to one-third of the course to critiquing results of the sample examination.

Students are attracted to real estate schools by telephone directory and classified newspaper advertising. Referrals from brokers and salesmen also provide a substantial number of applicants. January, February, and September are the peak enrollment months, while the summer months have extremely low enrollment. Several instructors in real estate schools observed that their enrollments have always been highest when unemployment rates were up and lay-offs and cutbacks occurred in the major industries of the county.

Cosmetology and Barber Schools

The nine cosmetology schools and one barber college together account for the largest proprietary vocational school enrollment in the county; as of January 1966, there were 589 cosmetology students and 65 student barbers attending these schools. The applicable state examining board licenses the school, instructors, and students; establishes student-teacher ratios; sets minimum standards for space and equipment; and prescribes the curriculum in considerable detail. Except for a handful who are taking brush-up courses, all of the above students are in programs to satisfy the educational requirements of the state licensing authority and to become eligible to sit for the licensing examination. The courses and enrollments

are listed below:

Cosmetologist	1,600 hours in 9 months	569 students
Manicurist	350 hours in 3 months	2
Teacher training	600 hours in 4 months	10
Brush-up	As required	8
Barber	1,248 hours in 12 months	65

Although there is no minimum enrollment age, state licensing regulations operate to govern student admission requirements. The applicant for licensing as a cosmetologist or manicurist must not be younger than 18, and, in addition to having completed the prescribed course of study, he must either have completed the 10th grade or passed an equivalency test. The applicant for licensing as an instructor must not be younger than 21, must be licensed as a cosmetologist, and must either have completed the prescribed teacher training course or have a minimum of one year of practical experience in all fields of cosmetology.

A barber college graduate who applies for examination to practice as a registered apprentice must be at least $17\frac{1}{2}$ years of age and must have completed the 9th grade or passed an equivalency test. Instructors must be registered journeyman barbers, have at least two years of experience at that level, have completed the 12th grade or passed an equivalency test, and must pass the state examination for instructor registration.

In every cosmetology school, more than 80 percent of the full-time students were girls younger than 21. None of the schools had established an upper age limit, but managers and directors of instruction agreed that students over 50 did not have the dexterity or stamina for shop work, and they discouraged persons in this age group from enrolling. Only one of the cosmetology schools offers a part-time instruction program, providing evening classes in addition to the regular day schedule. Most of the students in the part-time program are employed or attending school; they are in the 25 to 30 age range and, unlike the day students, about evenly distributed as to sex. The barber college permits students to schedule either full- or part-time programs during the day. With full-time attendance of 48 hours per week, a student can complete the course in 26 weeks. Most students, however, take less demanding programs and complete the program in about nine months. Approximately 75 percent of the students enrolled are under 23; the remainder include all ages up to the mid-50's.

The cosmetology and barber schools maintain an informal free placement service for students who receive their licenses. Inquiries about personnel from salons or shops are answered; these employers are informed of recent graduates, and the students are told of the referral. Some schools use a bulletin board system for

posting all inquiries. Placement appeared to pose no problem, for either cosmetologists or barbers, and informal inquiries in the trade indicate that there is considerable employee turnover, particularly in cosmetology, as young women leave to get married or move to another location.

Because of the uniformity of cosmetology school programs, one would expect course prices to be highly competitive. However, this is far from the case. The 1,600 hour cosmetology course can be taken at three schools for as little as $300, but one school charges $600 for the same course. The most expensive school competes with three other schools within a half-mile, yet its enrollment equals the total enrollment of the other three nearby schools, where tuition is under $500. Whether students, in selecting a school, tend to equate course cost with quality of instruction cannot be determined, although there is some indication that this is the case. For example, one school proprietor stated that she had offered "cut-rate" specials on enrollments from time to time but had little response; however, when she raised the basic tuition charge, the enrollments increased.

Medical and Dental Assistant Schools

Although career programs in medical or dental assisting are available at the two largest public junior colleges in the county, a large proprietary school for dental and medical assistants has not lacked for students since it opened in 1964. A unit of a four-school chain in Northern California, this school offers a seven-month medical assistant course for $525 with both day and evening classes available, and a four-month dental assistant course for $295 with day classes only.

The school catalog makes no mention of educational or age requirements for enrollment. The school director said that high school graduates are preferred, but this requirement is waived in the case of mature applicants. Students from 17 to 50 years old are accepted; new students can be added to the medical assistant program every eight weeks, and enrollments in the dental assistant course are restricted to the beginning of a new class each four months.

The instructional staff consists of two medical assistant instructors, one for day and one for night classes, who are both registered nurses, and one dental assistant instructor with ten years' working experience and five years as an instructor in this school chain. On completion of the course, students work for two weeks as "internes" in the office of a cooperating doctor or dentist. The school reports a drop-out rate of less than 5 percent since opening, and the director said that many of these losses were temporary, since students tend to return to complete their course work.

Enrollments in February 1966 totaled 50 students in the medical assistant course and 60 in the dental assistant course. In comparison, in May 1965, San Jose City College had 38 students in its two-year medical assistant course and 39 in the dental assistant program, and Foothill Junior College had 60 in the medical assistant course and 50 in the dental assistant course.

Trade and Technical Schools

Trade and technical programs are given at two welding schools; two automotive institutes; two schools with radio-television repair courses, as well as other subjects; a drafting school; a driver training institute; and an electronics maintenance school.

One welding school operates as an adjunct to a job shop, with the proprietor and his assistant serving as instructors. The other is exclusively an instructional facility with a manager and two instructors. This school has been in operation since 1961 and offers three programs: (1) an eight-month day course designed for Indian students and sponsored by the Bureau of Indian Affairs; (2) a six-month day course that is a modified version of the Indian student program; and (3) several evening courses in inert gas welding, electric weldind, and similar subjects, for individuals seeking to upgrade their skills. The former school has four courses in subjects such as microwire welding, acetylene gas welding, inert gas welding, and manual arc welding, requiring from 84 to 148 hours of instruction and totaling 534 hours when taken as a complete instructional package.

Both schools accept students between the ages of 18 and 45. They require good physical condition and eyesight, but no physical examination. No specific educational background is necessary, and the instructors determine student aptitude for this type of work by observation during the early stages of the program. Since instruction is conducted on an individual basis, students are accepted for enrollment at any time.

Of all the proprietary school course offerings in the county, the welding courses are the most costly to the student. The use of expensive materials in practical work instruction places the charge per class hour for some courses in the $4-$6 range, and school proprietors admit that this is usually beyond the reach of a student who is not sponsored by a government agency or by local industry. Employment prospects for qualified welders, particularly ones who can work with stainless steel or aluminum, are good, and an inside shop man could expect to earn from $3.50 to $4 per hour in the local area.

Similarity between the course offerings at the two automotive schools is not coincidence; the owner and manager of one school was formerly an instructor at the other. One school alternates seven-

week courses of 280 hours in automatic transmission repair and in automotive tune-up throughout the year. The other offers the transmission course on an evening schedule, and alternates a daytime seven-week tune-up course (280 hours) with a four-week brake repair and wheel aligning course (160 hours). Concurrently, an eleven-week general mechanics course (440 hours) is offered. Both schools price their programs at $2.50 per class hour.

Admission policies at both schools call for successful completion of the Bennet Mechanical Comprehension Test. One accepts an eighth grade education, and the other asks for ninth grade completion as a minimum. Incidentally, these two schools were the only institutions surveyed that used a formal aptitude test to screen every applicant for admission.

At the time these schools were visited, one had seven students (all sponsored either by the Veterans Administration or the state rehabilitation agency) enrolled in the tune-up course. The students ranged in age from 23 to 41, and were classified as handicapped persons by the sponsoring agencies. The other school had fifteen students enrolled in the tune-up course and five in the general mechanics course; seven of these were similarly sponsored. Student ages ranged from 18 to over 50.

One of the two "trade schools" surveyed offers evening courses to prepare students for 1st and 2nd Class FCC licenses and for entry level employment as electronic technicians or as radio and television repairmen. All classes are scheduled on a three-hour per night, three-night per week basis, and the FCC license courses vary in length according to the student's background in electronics. The technician-repairman course is scheduled for a year; however, the curriculum design permits students to take only those increments that are directly related to their employment objective.

Students are accepted from 16 years of age for enrollment, and the 17 students who were attending classes at the time of the survey ranged from 16 to 40 years of age. There are no educational prerequisites for any of the courses, but prospective students are informed that, without a high school diploma, employment opportunities will be limited, even though the students complete the course and receive a certificate to that effect. If the objective of a prospective student is employment in industry rather than work in a repair or service shop, the school holds the upper age for enrollment at 40.

At the time of the survey, there were six students enrolled in the FCC 2nd Class license course and eleven in the radio-television-electronics course. Four students were sponsored by their employers, and the remainder were paying their own tuition. Tuition arrangements at this school were unusual, in that all programs were priced at $1 per class hour on a pay-as-you-go basis, and students

were not committed at enrollment to complete a specified number of class hours.

The school manager, whose background includes more than 13 years of experience as training supervisor for a major airline, stated that, since this was an evening school, he had little difficulty in obtaining qualified instructors. He observed that his last advertisement for a replacement instructor produced 30 applicants, all of whom were employed in the field and considered a teaching position the ideal opportunity to "moonlight." The three instructors currently on the staff are all employed full-time in research and development programs in the local electronics industry.

Aside from company-sponsored students, the school attracts two distinct groups of individuals. One group consists of young men, usually under 23 years of age, who have had some high school and have been or are employed in a low-skill capacity. They seek this training to qualify themselves for positions in the electronics and aerospace industry. The other group consists of employed men in their upper 30's or early 40's who look to the training as preparation for an occupation that is less demanding physically than their present employment.

The other "trade school" offers a somewhat similar course in radio and television servicing and repair, a short course in electronic assembly, and a graphic arts program in offset printing. This latter course uses the facilities of a small job shop that is adjacent to the school and owned by the school manager.

The admission policy for students is flexible, and acceptance or rejection of a prospective student is based on the manager's knowledge both of requirements of the employment market and of the objectives of the student. Students at this school generally are in the 25 to 30 age group, and in most cases have had no prior experience in the course subject area. Both men and women are enrolled in the electronic assembly course, and classes have tended to be about evenly divided.

Although this school offers both day and evening programs, the major enrollment is in night classes. Of the 24 students on the school rolls at the time of the survey, 17 were in the night radio-television repair class. A variety of schedules is available; for example, there are three radio and television repair programs — one of 25 weeks' duration at 30 hours per week for $795, one of 25 weeks' duration at 15 hours per week for $445, and the night course of 50 weeks' duration at 6 hours per week for $10 per week. The electronic assembly course has no fixed time schedule; however, the school manager estimated that day students would complete the course in four to six weeks. The graphic arts program is broken down into a press element (8 weeks at 30 hours per week for $540) and a camera element (4 weeks at 30 hours per week for $270).

This school has had as many as seven instructors (full- and part-time), but, at present, classes are taught by the school manager and one instructor with a background of more than 30 years in radio servicing. In the event that part-time enrollments increase, two technicians employed in the electronics industry can be called on to augment the staff. The manager of the school stated that he has had difficulty in finding individuals with shop experience who are also qualified and willing to instruct classes according to the school's lesson plans.

The school provides placement assistance and has canvassed potential employers regarding job availability for course graduates. The manager stated that about half of the graduates in radio and television servicing found employment in the electronics industry, and the remainder took work in service shops. He estimated that 95 percent of the graduates of the electronic assembly course were employed in local plants, which appears reasonable in view of the shortage of personnel for this type of bench work in the local area.

The one drafting school in the county has been in operation for a year, offering evening classes in basic and intermediate drafting to prepare students for entry level employment as draftsmen. This is a one-man activity with classes limited to a maximum of 20 students. Individual instruction is given by the school owner, who is employed as a design draftsman specialist by a local aerospace organization.

There are no education or drafting experience prerequisites for enrollment; however, students under 18 years of age are accepted only with the approval of their parents. All students pay one month's tuition ($32) in advance and are accepted on a trial basis, permitting the instructor to determine whether the student has an aptitude for drafting and the student to determine whether the drafting field has appeal. If students leave at this time, their advance tuition payment is refunded.

Two three-hour evening classes are held each week in two courses: mechanical drafting (12 months) and electronics drafting (9 months). The $32 per month charge applies to both courses. Since the instruction is individual, new students can enroll at any time. All eleven students in the present class are employed; their occupations include utility crewman, bank clerk, service station attendant, assembly line supervisor, and ambulance driver.

Although quarters are modest, the school is well equipped and the students use a current college-level text for drawing problems. The instructor grades all projects and provides the student with an analysis of his grade score; three-hour written examinations are scheduled about every six weeks, and each phase of the course — basic, intermediate, and advanced — includes a final written examination. Students who fail to do at least C+ work, or who have a record of absences or tardiness, are interviewed by the manager and

urged to drop out of the program. This new school has not graduated any students; however, several aerospace firms familiar with the work of the school manager have expressed an interest in interviewing those graduates that he might recommend as above-average students.

The driving school is a franchised activity which offers resident instruction for non-commercial drivers and accepts applications for commercial driver training. It is conducted at an affiliated school in San Francisco. In the past year, six persons from the local area have enrolled in the course and completed the 90-hour training program in San Francisco, taking classes in the evenings and practical driving work on various types of equipment on Saturdays. All have been employed persons seeking a change in occupation.

There are no educational requirements for enrollment; however, the student must be able to qualify for a state operator's license on completion of the course, and must obtain a learner's permit before entering the phase of training that involves vehicle operation. Applicants who are under 23 years of age are discouraged from enrolling, since the high insurance premiums for drivers in this age group almost preclude their employment after obtaining a license.

Philco Technical Institute, an activity of the Techrep Division of the Philco Corporation, has operated in the county since 1963 and offers a 72-week (1,800 class hours) course in electronics maintenance, with emphasis on computer, radar, and communications equipment maintenance. This school has not up to this time offered training programs to the general public; all students are Indian youths, sponsored by the Bureau of Indian Affairs, from reservations west of the Mississippi River. Screening and selection of applicants are performed by the Bureau of Indian Affairs.

The course is skill-oriented, with laboratory periods introduced in the second quarter of the six-quarter program to provide a 3-to-2 lecture-lab ratio for the remainder of the program. The typical instructor is in his early 30's, has two to three years of college-level education in electronics, and has a minimum of five years of related instructional experience as a technical representative or in the military service. The present staff of four instructors serves two class groups, one of 16 students who will graduate in August 1966, and another of 29 students who will graduate in January 1967. The initial student enrollment in these two class groups was 30 and 37 students, respectively. The attrition rates are attributed by school officials primarily to lack of student interest, despite indicated aptitude in the screening tests (such students tended to transfer to other programs such as welding that were available in the area), or to student fear of failure in course work, often despite average or above-average academic performance.

The school has been successful in placing its graduates

throughout the industry, for, notwithstanding its affiliation, the school does not function as a manpower development resource for the Philco organization. All members of the first class to complete the program were employed in their specialty within a month after graduating, and most had firm job commitments 60 days before their course ended. A follow-up study of this group showed all but one individual continuing in the field, and half of these former students were still with the original hiring organization.

Special Interest Schools

Several of the resident proprietary schools not only present unusual programs without counterparts in the county array of public schools, but also represent unique situations in terms of admission criteria, instructional staff, and student enrollment. According to its owner and manager, the objective of a massage school was to "train individuals for the field of massage to the end that they have the ability to give a massage and know what they are doing, and to develop membership for the American Massage and Therapy Association." This involves a 1,000-hour course; however, only 200 hours of this program are devoted to class work. The remainder are taken as home study in subjects such as basic anatomy (200 hours) and basic physiology (200 hours), with applicable volumes of the Barnes and Noble College Outline Series as texts.

There are no educational prerequisites for admission, and both male and female students are accepted. Applicants over 30 are preferred and those under 25 are not encouraged to enroll. The prospective student must provide three character references and be cleared by the local police. There is no tuition charge for the course; however, the student who is accepted pays a $25 fee for application processing and a police permit and further agrees that on completion of the course he will become a member of the American Massage and Therapy Association at a fee of $44.

The school, which began in 1958, is operated in conjunction with a commercial massage parlor. Classes are held in the evening after regular business hours, using all of the rooms and facilities of the building. Some 22 students were enrolled at the time school was visited, and instruction in massage techniques was conducted by the school manager and his wife with assistance from time to time by others also employed in the massage field. Advanced students sometimes assist in the work on paying customers at the establishment. The present student class was described as being in the middle and upper age ranges and all were currently employed — the manager mentioned having a minister, a public relations man, an attorney, and several school teachers in this class.

The manager and his wife have been self-employed in the

massage field for about ten years and both are members of the American Massage and Therapy Association. The manager holds a "Diploma of Naturotherapy," a "Diploma of Osteopathy," and a certificate from the Anglo-American Institute of Drugless Therapy. He also serves the California chapter of the massage and therapy association as lobbyist in the state capitol.

Since the students are required to join the therapists' association on completion of the course, that organization would be available for assistance in obtaining employment. On the other hand, the school manager stated that there was no pressure to enter this field of work, and he felt that employed individuals such as those in in the current class "probably were taking the training to have something to fall back on." The school could not provide information on the employment status of former students, but some were hired from time to time to augment the permanent staff of the massage parlor associated with the school.

A bartenders' school trains both bartenders and cocktail waitresses in a classroom setting that is a replica of a typical tavern with a bar stocked with a full array of glassware, mixers, and bottles filled with colored liquids to simulate the original contents, both as to color and specific gravity. During the six-week bartender course, which costs $200, students learn to mix at least 100 different cocktails or other mixed drinks. The cocktail waitress course of three weeks, for a $100 tuition, concentrates on practical work in taking and serving orders. Students in both courses must be at least 21 years old to qualify for employment on completion of the course. A maximum of eight students can be accommodated at any given time; there were five enrolled at the time of the survey visit.

Three "charm schools" offer modeling programs. However, students are not admitted directly to this course but must first complete the five- to six-month program of self-improvement courses that attract most students to these schools.

One school manager stated that her experience indicated that perhaps 15 to 20 percent of the students who enroll in the school considered careers in modeling. At the time of this survey, 20 of the 75 students enrolled in her school were either in the modeling course or had indicated a desire to take this course on completion of the basic self-improvement course. Another school reported 155 active enrollments with 30 of these students in a modeling instruction program. All school directors agreed that few students enrolled with the specific objective of receiving training for a career in modeling. As one manager put it, "they drift into modeling after they've been with us a while and begin to realize their potential."

Analysis of Exploratory Survey

Although some proprietary schools operate in vocational areas which, at least up to this time, are outside the fields of interest of public education, a considerable number of the courses concern subjects and instructional also available in the public education system — either in evening adult education programs or in the junior colleges. Since most students in the proprietary schools could meet the admission requirements of these public institutions, one might ask why an individual would invest several hundred dollars for a course that is available at no charge in a public school.

What appeals do these proprietary schools hold for their students, particularly those young persons who are in the junior college age group? In this exploratory survey, informal interviews were held whenever possible with one or several students at each of the schools. We do not suggest that information and opinions obtained in this manner are conclusive evidence of prevailing attitudes regarding vocational education offerings. However, we do believe that the unanimity of opinion expressed on certain areas and interests warrants serious consideration for a more rigorous and comprehensive investigation of student attitudes toward vocational programs.

Course content and time were two of the three factors mentioned most frequently by these students in explaining their decision to enroll in a proprietary school program. Time is an important consideration in both course length and facility of enrollment. Students mentioned that when they had reached a decision to take a course, they could begin classes either at once or, at the most, within one or two weeks. There were no scheduling problems to cope with, and registration was a simple matter that involved only signing a contract and arranging for payment. Course length is directly related to course content. As a recent high school graduate who was taking a secretarial course explained, "Here, I don't have to bother with English composition, physical education, history, or science; I spend all of my time on business courses, and after all, that's what I need to learn to get a job." This point was made repeatedly by students in every type of vocational program. They expressed the feeling that the nonconventional subject requirements of public schools served only "to drag out the time" and made no contribution to the development of their skills. Several business college, cosmetology, and medical and dental assistant students, although admitting that the course costs represented a substantial financial outlay, pointed out that they could complete the course and recover their investment through earnings within a year after enrolling in the program, while their counterparts in junior college would still have to attend school another year.

The third factor that students mentioned as influencing their decision to attend a proprietary school was the placement service. Students felt that these schools would make every effort to obtain employment for their graduates, believing that the school's continuation as a commercial enterprise would depend on the degree to which its students were successful in securing employment after training. Students also had the impression that these schools maintained close relations with potential employers and represented a channel to job opportunities not elsewhere available. When the role of the vocational counselor in public schools was discussed in student interviews, students observed that the guidance they received was general, concerned more with qualifications for employment than with employment leads. Such a misconception of the role of the counselor is reinforced by the fact that counseling in the proprietary school does include reference to specific job opportunities.

Students also commented on the individual attention they received and the relaxed classroom atmosphere. Some students remarked that they felt free to ask questions because they were no longer threatened by the scorn of the instructor or the ridicule of classmates which they had experienced in high school.

Although the physical facilities in most schools were not as good as those of public schools, none of the students interviewed mentioned this in our discussions. They did feel, however, that their instructors were more closely related to and aware of conditions in the world of work than instructors in public schools. Further inquiries on this subject usually revealed that the student was comparing his present vocational counselor with academic subject counselors from his high school; nevertheless, he would reaffirm an opinion regarding the "impracticality" of his educational experience in the public school.

AREAS FOR FURTHER INVESTIGATION

In highlighting promising areas for further investigation, most of our comments stem from personal concern with the public policy aspects of vocational education. Most of our suggestions for future research therefore concern the contribution of proprietary schools to a community's total vocational education effort.

One of the highest priority items is a detailed, descriptive study of proprietary schools on a much broader scale than ours. At the very least, such a study should encompass an area justifiable as a relatively independent economic system — such as the greater San Francisco Bay area or the four-parish New Orleans area — and seems defensible on the basis of both our study and the limited information

available from other sources. It would provide an essential context for developing questions whose answers have relevance to education or manpower policy. The remainder of our paper attempts to anticipate some of the kinds of questions that would emerge from such a study.

First, how effective are proprietary schools in preparing students for employment and in actually getting them jobs? Our study provides fragmentary data indicating that the majority of students from certain schools find immediate employment in jobs directly related to their training. In the case of several of the schools we studied, such as the chain business schools, one could infer that reasonable success in placement was a prerequisite to remaining a profitable enterprise over a long period of time. However, more systematic evidence is required before such questions can be answered.

How do school-age students in proprietary school vocational programs compare with their counterparts in similar programs in the public schools? What, for example, are the levels of aspiration of the two student groups? At what point in their academic career did the students decide to pursue a vocational objective? What factors influenced this decision on the part of each of the student groups? What leads some students to regard the proprietary school as a more congenial climate in which to learn? How do they justify the proprietary school cost that would not be required in public schools? What are the consequences to the proprietary school students of not being exposed to the liberal arts courses that they might take in a public school vocational curriculum? What has been the public school experience of those students who turn to proprietary education?

Attention should also be directed to questions concerning the supply and demand for vocational teachers. How and from where, for example, do proprietary schools recruit their teachers? How do proprietary teachers vary in terms of job satisfaction, general working conditions, community status, salary and fringe benefits, when compared with public school vocational teachers? How many teachers serve both public and proprietary schools?

Many questions of significance center upon the proprietary school as an institution. What is the effectiveness of proprietary schools compared with public schools in gearing up quickly to provide training to meet critical labor requirements; in using the most modern and effective teaching devices and procedures; and in the efficiency (cost vs. benefit) with which they prepare students for jobs? What sort of entrepreneur is involved with proprietary schools, and how much money does he make (or lose)? From where does his financing come? How long, on the average, does the proprietary school remain in business? And, for all these questions, it is important to know the variation by type of proprietary school.

Another set of questions concerns the way in which the community views the proprietary schools. How, for example, does the employer view the products of such schools, particularly as compared with other workers trained by different schools or in the plant? How do public school administrators, teachers, and counselors view the proprietary system of education? How do parents view proprietary schools, and how does this influence advice given to their children?

Finally, do the proprietary schools represent a potential for expansion of the public school vocational programs — particularly in areas of short-term need or modest student demand — through some arrangement such as now operates in those cases where students in proprietary schools are sponsored by state or federal agencies?

While our exploratory study of proprietary schools has merely scratched the surface of the situation in one California county, we hope it will stimulate interest in what seems to be a neglected aspect of research on vocational education. On the basis of enrollment data, it appears that proprietary schools may be making a more substantial contribution than we had suspected in instructional areas which are also in the public school domain. It also seems clear that, in terms of numbers of schools, courses, teachers, and students, proprietary vocational education represents a significant portion of the total vocational offerings in a community. Other information in various directories, although incomplete, indicates that this is the case for the country as a whole.

INDUSTRY PARTICIPATION IN LOCAL VOCATIONAL AND TECHNICAL EDUCATION PROGRAMS*

SAMUEL M. BURT
EDUCATION COUNCIL OF THE GRAPHIC ARTS INDUSTRY

It has been an article of faith among vocational educators that industry[1] participation can contribute decisively to the shaping of effective occupational education programs. Industry has also wholeheartedly subscribed to this axiom, for there is an obvious interdependence between the economy of our nation and vocational education — with its emphasis on the preparation of youth and adults for jobs and careers in trade, industry, agriculture, business, and the sub-professional fields. Thus, vocational and technical education, more than any other educational discipline, provides unlimited opportunity for involvement of, and participation by, industry. The qualitative extent of such participation can well determine both the practical effectiveness of the occupational education provided by the public schools and the role of the schools in our nation's program for developing its manpower resources.

This paper is concerned primarily with the practices of local schools and school systems in developing industry-education cooperation. But it should be recognized that a number of federal and state government agencies, national employer, trade, labor, and professional organizations, as well as national educational associations, play an important role in promoting industry involvement in occupational education.

However, since it is the local educators who are responsible for the administration and operation of the schools, it is also their responsibility and prerogative to arrange for effective utilization of industry people in their programs. Indeed, industry offers its services, its time, its personnel, and its funds in vain unless local educators exercise the necessary leadership in channeling and utilizing industry's interests and efforts. While a number of schools and school systems can cite situations in which industry-education cooperation has been effective, there is little, if any, meaningful, .

* This paper has been adapted from a chapter prepared by the author for inclusion in a volume entitled *Dimensions of Manpower Policy*, to be published in late 1966 by the Johns Hopkins Press. It is based on a study completed in April 1966 by the author for the W. E. Upjohn Institute for Employment Research, under a grant from the Ford Foundation Fund for Advancement of Education.

1 "Industry" or "industry people" will hereafter be used to include representatives of business, the professions, labor and agriculture, as well as trade and industry.

sustained, coordinated, and systematic participation and involvement of industry in a vast number of school systems. The resulting disaffection of both industry and the general public, for secondary school vocational education in particular, must be blamed on the educator, regardless of mitigating factors. Much of the fault stems from a lack of knowledge as to the nature of and motivation for industry participation, a lack of proper staff to develop cooperation between industry and education, and an inadequate organizational structure both in the school system and in the community on which to build such cooperation.

NATURE OF INDUSTRY-EDUCATION COOPERATIVE ACTIVITIES

When industry participates in occupational education, it is usually concerned with the initiation of new programs; the expansion or elimination of established programs; the interpretation of studies of manpower and skill requirements in terms of curriculum needs; the development of curricula; the acquisition of shop and laboratory equipment; counseling and recruitment of students; the recruitment and training of instructors; job placement of work-study students; the employment of graduates; public relations; and the evaluation of school programs.[2] Each of these activities includes a range of services which may be classified as either "advisory" or "operational," depending upon the extent to which educators can persuade industry representatives to become involved.

An example may be useful. Participation by individuals representing industry in the "interpretation of manpower and skill requirements studies" may include: (1) advising school staff as to which employers in the community should be included in the study; (2) advising school staff as to specific information to be included in the survey instrument; (3) providing the information requested in the survey instrument; (4) providing job analysis information; (5) calling on employers in the community urging them to fill in and return the survey instrument; (6) reviewing the survey report prepared by school staff and suggesting revisions when necessary; and (7) testifying at meetings of the board of education in support of the findings of the survey. Thus, we see how industry representatives may participate and become involved in vocational and technical education programs operationally as well as in an advisory capacity.

Another instance in which industry may play such a dual role is in the equipping of a school shop for a particular occupational program. Educators may ask industry for advice regarding specific

2 A checklist of some 30 activities and services provided by industry to occupational education programs of schools is available upon request from the W. E. Upjohn Institute for Employment Research, 1101 17th St., N.W., Washington, D.C., 20036.

equipment to be placed in the shop; or they may request industry to arrange for donations of equipment. That industry has donated equipment is well documented in many schools. For example, the Los Angeles Trade-Technical College estimates that the replacement value of its donated equipment is close to $1 million — almost one-quarter of the total value of the equipment in the school.

Industry's participation in occupational education involves practically all of the problems of the vocational educator except those dealing with day-by-day administration and the actual confrontation of the instructor with students in class and shop. To invite industry into the school is a *caveat* which educators must accept. Industry can either become critical of what it finds, or it can help in overcoming difficulties faced by the educators. It may criticize the length of time required to initiate a new program, or it can help speed up the process by providing equipment, finding and training instructors, assigning knowledgeable personnel to assist in preparing curriculum materials, and assuring job placement of graduates. As industry becomes involved in studies of manpower needs, it may soon be disenchanted with "playing the numbers game," or may come to recognize the necessity for meaningful projections. In developing curricula, it may become annoyed by the fact that other schools all over the country are also developing curricula for the same type of instructional program — with little or no coordination, and with no effective clearing house of information. And in evaluating school programs, industry may find it is being asked to "whistle" in the same dark areas with many vocational educators whose sole criterion is questionable statistics as to "job placement of available graduates." The quickest way to disillusion a group of businessmen about a school program is to have them meet once a year for a one-hour tour of a vocational school shop, and then ask their opinion of the effectiveness of the occupational education program. The only valuable opinion they may have is of the person who arranged the meeting!

One of the more disturbing areas of industry-education cooperation is the matter of conducting manpower and skill needs surveys. With funds available under the Vocational Education Act of 1963, a number of school systems are beginning to conduct such studies with their own staff, utilizing the Employment Service reports merely as resource material, if at all. (This, despite the fact that the Act calls for cooperative arrangements between educators and the Employment Service.) Thus, industry is being called upon by both school people and Employment Service staff to supply essentially the same type of information.

While few hold any brief for the present efficacy of Employment Service techniques in conducting manpower and skill needs studies, the Service does employ economists and trained manpower

specialists. It would seem more reasonable for the schools to educate Employment Service staff concerning the information they must obtain from such studies, instead of establishing their own organizations and duplicating much of the work being done by the Employment Service; at least, it appears so to industry, which is called upon to participate in such studies. It also appears logical and reasonable to industry that school counseling and testing be coordinated with the counseling and testing services of the Employment Service, particularly since there is a shortage of professional personnel in these fields. Educators might also consider taking the initiative in integrating the counseling and testing services of the schools with such agencies as the Office of Economic Opportunity, the Veterans Administration, correctional institutions, etc.

FACTORS MOTIVATING INDUSTRY TO PARTICIPATE IN VOCATIONAL EDUCATION PROGRAMS

A variety of factors motivate industry groups and individuals to volunteer their advice, services, and participation in school programs designed to prepare students for employment in particular occupations. An understanding of these factors will help educators to better perform their critical role of leadership.

Industry wants to become involved in occupational education programs in the schools because: (1) they would like to have the school system assume the burden of costs of initial job-entry training of new employees, as well as the skill upgrading of currently employed personnel; (2) they would like to have a reliable source for a continuing supply of well educated new employees in order to reduce their costs of recruitment and selection; (3) they would like the prestige which accrues to the industry as a result of having a program in the schools; (4) they consider their work with schools as fulfilling a community public service responsibility; (5) they seek the opportunity to engage in an educational activity that provides them, as individuals, with some measure of prestige among their associates, neighbors, friends, and inner family circle; (6) they may satisfy their desire to be considered altruistic and philanthropic by providing prizes, awards, and financial aid to young people; (7) they desire to take advantage of such public and customer relationships as may result from participating in educational programs; (8) they are satisfying a personally felt moral and social responsibility for helping young people prepare themselves to become productive and useful citizens; and (9) they believe that the industry they represent can provide young people with interesting and worthwhile career opportunities, and they want to help young people just as they themselves were assisted when seeking a career.

Recognition of these motivating factors can provide educators with innumerable clues for developing greater participation and involvement of industry people in school programs. For example, school officials should include in their catalogs the names of industry representatives who are serving in an advisory or cooperating capacity to the school. Not only would this simple technique afford a great deal of personal satisfaction and pride to the industry people involved, but it would also inform the prospective student, his parents, and his guidance counselors that industry is indeed identified with the occupational education program of both the school and the school system.

TECHNIQUES FOR ACHIEVING INDUSTRY-EDUCATION COOPERATION

Educators involve industry people in vocational and technical education programs by channeling their services into five major capacities: (1) the general advisory committee to the school or school system; (2) the occupational cooperating committee; (3) the Joint Apprenticeship and Training Committee; (4) the school-appointed coordinator or special consultant for industry liaison; and (5) the local trade and professional associations in the community. These instrumentalities are not mutually exclusive. Actually, the extent to which they are interrelated can be indicative of a high degree of industry-education cooperation, with each function being used where and when it is best suited to accomplish a particular objective.

The General Advisory Committee

School administrators generally acknowledge the need for an over-all *system* of occupational education and training for all the youth and adults in the community who need and desire such instruction. In developing such a system, it would appear reasonable to have the benefit of the advice and counsel of a general advisory committee composed of industry executives from all segments of the community. In practice, however, few local school systems have developed an articulated system of occupational education, nor have they utilized general advisory committees. Most school superintendents are not willing to establish what they consider "another committee," particularly since so many superintendents and school principals are unfavorably disposed to vocational education in the first place. However, now that public attention has focused on occupational education (as evidenced by the variety of federal legislation since 1958), school officials and boards of education should certainly be more interested in developing ways and means

for improving these programs. A general advisory committee can be one of the most important techniques.

The general advisory committee is usually responsible to the superintendent and his staff for reviewing reports from occupational committees, and for recommending priorities for occupational programs within a previously established systemic framework. This system, including long-range goals, should be continuously revised to correspond with both a changing technology and the composition of the community work force. Such a plan should relieve the superintendent and his board from pressure by individual groups in the community to consider the establishment of occupational programs in schools without reference to the needs of other industry groups, funds available, or the future industrial development of the community.

The Occupational Cooperating Committee

Many schools have established committees to advise school officials on each occupational program. For example, the schools in Wisconsin have some 300 occupational committees with a total estimated membership of over 2,000 industry people; and the Opportunity School in Denver has over 80 occupational committees with a membership of approximately 500 industry representatives.

Practically all the literature on industry participation and involvement in vocational and technical education has concerned itself primarily with occupational advisory committees formally organized by school officials. Such literature emphasizes the "advisory" function without seeming to recognize that such committees are frequently called upon by educators to become "operationally" involved. The importance attached to "advisory committees" has led to considerable confusion among both educators and industry representatives as to the actual role of the occupational committee. Much of this confusion could be eliminated if the committees were more realistically termed "cooperating committees."

School occupational cooperating committees, as well as general advisory committees, are not substantially different from the committees to be found in other economic, social, political, religious, and cultural institutions. They accomplish little without effective leadership and staff work. Most schools, because of lack of funds and/or interest, have not assigned a special staff to work with the occupational committees — leaving it to already overburdened directors, supervisors, and department heads to organize them. No matter how well motivated school officials may be in organizing such committees, it is often only a matter of a short time before the committees cease to function, except perhaps for an occasional *pro forma* meeting. Thereafter, school officials maintain relationships

with industry through infrequent personal contacts with individuals whose judgement they trust, with whom they feel comfortable, and who are willing to provide advice when called upon. This is true even in many local schools and school systems where state law requires the organization of local advisory committees. Many of these committees simply exist on paper.

While numerous case-studies of effective formal cooperation between industry and education can be documented, they are still the exception rather than the rule. Furthermore, in metropolitan areas, there is a woeful lack of organized cooperative relationships between occupational committees for the various vocational and technical schools within the boundaries of a given school system, between neighboring school systems, between various levels of occupational education, and between the local committees and the state advisory council. Seldom is any effort made to relate the occupational education curricula to an industry's on-the-job training programs, despite the fact that occupational committees composed of representatives from industry may have participated in developing a specific school curriculum for a particular occupation. Finally, there is little effort made to coordinate the work of school committees with that of other public agencies involved in manpower education and training.

The Joint Apprenticeship and Training Committee

A local JATC exists for many of the skilled apprenticeable craft occupations in a number of communities. It is organized through joint voluntary agreement of management and labor unions as part of the collective bargaining process. The JATC is usually entrusted with the selection, training, education, and job placement of the apprentices within the craft over which it has jurisdiction. In its relationship with vocational and technical schools, the JATC arranges for the use of facilities to provide approximately 144 hours or more of job-related instruction during the school year for at least the first several years of apprenticeship. In addition to its responsibilities to the apprentice program, the JATC is utilized by many schools as the occupational cooperating committee for regular day and evening school programs. Since the JATC is established by management and labor to work with schools (as prescribed by special federal and state legislation), it is not a "creature" of the schools *per se*. For this reason, it is obvious that problems can develop concerning the relationship between the school and the JATC's, particularly since the committees can bring the weight of union leadership and pressure to bear on school officials. It has been found preferable, where possible, to utilize JATC's as subcommittees of the school-appointed occupational cooperating committees.

In recent years there has been a growing tendency for local JATC's to employ full- and part-time coordinators and training directors. These coordinators are beginning to expand the scope of the JATC's beyond localized school systems and into regular day and evening school programs. The JATC meetings are generally well attended, particularly by the union members; and for the most part the membership is deeply involved in the business of the committee. Apparently, being somewhat administrative in nature and having "something to do," plus the constant promotional efforts of federal and state apprenticeship agencies and education directors of the the national unions, helps the committee members to develop a sense of identification with the manpower recruitment, education, and training program of their industry. Educators may not appreciate the tactics of some JATC's, but they might find many useful parallels and guidelines in the JATC movement for developing more effective occupational cooperating and general advisory committees for their schools.

Despite the fact that many educators and economists have been predicting the demise of apprenticeship, there are indications that a large increase in the number of apprentices is beginning to take place. If this growth is truly a reversal of the trend of former years, the JATC will become a major force to be reckoned with by public school officials. This is particularly possible in light of the fact that many unions are encouraging the use of JATC coordinators, relaxing restrictive practices in accepting and placing apprentices from minority groups, and developing special local and national union educational and training funds to provide instructional materials and equipment for public school programs. Many unions are also using these funds to operate trade schools outside the public school system.

Local Trade and Professional Associations

Frequently, the initiative for developing industry-education relationships emanates from local employer, labor, and professional associations. Such organizations, concerned with the improvement of their industry or profession, exist for almost every occupational and professional activity of our industrial economy, and many of them establish education committees. Sooner or later, they become concerned with vocational and/or technical education. Thus, many industry members of school occupational and MDTA advisory committees are selected from the educational committees of local associations.

The education committee of a local association is usually chaired by a member who is vitally interested in educational matters and who is willing to devote considerable time to school matters. The

other members of the committee will usually follow his recommendations and support his efforts. When an association's executive secretary is also interested in developing working relationships with the schools, there is almost no limit to the extent of cooperation the schools will receive from that particular industry or professional group.

Local associations obtain a variety of materials concerning instruction and career opportunities both from their members and from their national headquarters office. They distribute this, usually free, to instructors and guidance counselors. It has been estimated that national and local associations spend over $160 million annually for the production and distribution of such literature. Local associations are also very helpful in any school and local Employment Service efforts to conduct manpower and skill-needs surveys, recruit students, obtain donations of supplies and equipment, and evaluate the effectiveness of a school program for the specific industry or profession represented by the association.

The School-Industry Coordinator or Special Industry-Liaison Consultant

The term "coordinator" is usually applied to teachers associated with distributive, diversified, and cooperative education. These "teacher-coordinators" are responsible for arranging with employers for part-time job placement of their students, for supervising students while they are on the job, and for some classroom instruction. In this paper, the term "coordinator" is applied to staff who have been assigned to supervise several related departments comprising an entire industry or technical education program in the schools. For example, there could be one coordinator for all the health service programs, one for all the construction industry programs, and one for all the graphic arts industry programs. Formulas for assigning responsibilities to such coordinators vary among the schools and school systems. Generally, it is the coordinator who is directly responsible for developing formal and informal relationships with industry people, and occupational cooperating committees for the school programs under his jurisdiction. While instructors and department heads also develop and maintain their own relationships with industry (a great deal of industry-education cooperation results from such informal relationships), they usually keep the coordinator informed of any direct contact made for a specific purpose.

Coordinators, in those schools utilizing such staff, usually report directly to the school principal or junior college president, and have a staff relationship with the local director of vocational and/or technical education. Where coordinators are assigned to the central office of the school system, they usually report directly to the

director or supervisor of vocational and/or technical education. The coordinator's interests and abilities are those of an administrator. He enjoys organizing, attending, and speaking at meetings of industry groups, interpreting industry's manpower needs to school people, and helping translate these needs into school programs. He is comfortable in dealing with industry executives, as well as with teachers, and is skilled in the leadership techniques of group dynamics. Coordinators can be an extremely important and effective means of achieving industry-education cooperation. Part of the salary of such staff (who are better designated as industry-liaison consultants) is eligible for reimbursement under provisions of the Vocational Education Act of 1963.

SOME MAJOR OBSERVATIONS OF THE RESEARCHER

School officials responsible for occupational education have a variety of techniques and instrumentalities available to them for achieving industry-education cooperation. A first step to be considered is the appointment of a general advisory committee by the superintendent of schools and the board of education. The committee should meet periodically, on a continuing basis, to review the over-all occupational education and training program of the community and its schools, to advise on new requirements and priorities, and to develop "all-industry" student recruitment programs rather than individual industry projects. To assist the general advisory committee in their deliberations, resource staff from the public school system, industry, labor, other public and educational institutions, and the behavioral sciences, should be provided as needed. The "industry-education team" concept must be expanded to include the expertise of other disciplines in order to meet the challenges posed by technological and societal needs in this last third of the 20th century.

Reporting to the general advisory committees, specific industry occupational cooperating committees should be organized by the superintendent of schools and his occupational education supervisory staff. These cooperating committees should be part of the central office program, rather than established by individual vocational and technical schools in the school system. Where considered desirable, task force subcommittees of the occupational committees could be provided for individual schools.

A *sine qua non* for developing an effective industry-education cooperative effort is the appointment of industry-liaison consultants by the school system. Industry liaison, both formal and informal, is a vital responsibility of vocational and technical education. It cannot be left to haphazard, accidental, and "pressures of the

moment" arrangements which prevail when full-time industry-liaison staff is not available.

There is a great need for more effective leadership to be exercised by state vocational and technical education directors and state boards and departments of education in developing a coordinated system of industry-education cooperation for the state and the local school systems within the state. State occupational advisory committees for the major industry complexes should be established as part of the state advisory council organization. Periodic statewide meetings should be held involving the general advisory and occupational cooperating committees of local schools. Other state and local agencies, and their industry committees, concerned with manpower development and training programs, should be invited to participate in these meetings. State department industry-liaison specialists should be assisting local industry-liaison staff in their work. These are but a few examples of what must be done at the state level by many states in order to achieve a coordinated and comprehensive statewide program for meeting the occupational education needs of its citizenry and its industry.

At the national level, the American Vocational Association, the American Industrial Arts Association, and the American Association of Junior Colleges should provide their membership with case-study reports of both formal and informal effective local industry-education cooperative activities and programs on a continuing basis. The same is true for national employer, labor, and professional associations.[3] The U.S. Office of Education should employ several specialists in the field of industry-education cooperation to develop guidelines for state and local vocational and technical educators, and to assist national industry groups in promoting such cooperation among their memberships. The Office should also immediately revise its 1960 publication concerning local industry-education cooperation in order to bring it up to date with current legislation, and to provide guidelines for new dimensions in the partnership of industry, education, and other segments of our economy.

School officials responsible for occupational education who find the task of developing industry-education cooperation too burdensome and expensive should not complain when such cooperation is lacking. Neither should they be surprised by criticism that the occupational education programs of their schools are failing to meet the needs of the community. If there is any validity to the thesis that occupational education is an integral part of the total educational system of our schools, as well as of the manpower development program of our nation, an organizational structure and the use

3 As an example, the Education Department of the AFL–CIO arranged for labor representatives on state vocational education advisory councils to meet with officials of the U.S. Office of Education. The meeting was held September 8–10, 1965, at Michigan State University. Proceedings of the conference are available from the AFL–CIO Education Department, Washington, D.C.

of industry-liaison personnel by the schools are needed to assure industry-education cooperation. Without such an organizational structure and staff, we can expect little beyond occasional meetings and sporadic cooperative activities from educators and industry people. Much more than this is required. Educators must provide the ways, means, and strategies for industry people to *identify*, themselves with, and feel themselves full-fledged partners in, solving the problems of the schools and school systems of our nation. Only through such a partnership will our schools and communities be in a position to offer purposeful, meaningful, and effective education for the world of work.

We are concerned that the educators have not utilized industry's cooperation to its fullest potential in maximizing the student's opportunities for employment. Such cooperation has been an article of faith for so long by so many that its mere verbalization has come to be accepted as proof of practice. Yet, in a recent study concerning the establishment of area vocational-technical schools, it was found that "over one-half of 273 area vocational directors indicated that advisory committee approval . . . [has] been used to obtain industrial support . . ."[4] Why didn't the other 50 percent of the directors attempt to enlist industry support? Possibly because they were so certain of the "rightness" of their own judgements and decisions, and, because the money was available, it was decided not to bother with the time-consuming matter of "industry cooperation." Perhaps they were correct. If so, let's stop issuing exhortative literature and making platitudinous speeches. However, if industry-education partnership *is* vital to the development and conduct of meaningful occupational education, it is evident that there is a long way to go before it can be called a "way of life" in a large number of schools and school systems.

4 Richard Lyons Burns, "Guidelines for Establishing Area Vocational-Technical Schools and Programs," *School Shop* (May 1966), pp. 23–25.

DISCUSSION

BERNARD MICHAEL
U.S. OFFICE OF EDUCATION

I am particularly pleased to be able to participate in this discussion of economic considerations in vocational education planning, because I believe that the planning function is becoming more crucial than ever to the development of an adequate vocational education system in this country. The recent wave of vocational legislation, and, in particular, the Vocational Education Act of 1963, has radically changed the nature of the responsibilities of state and local administrations. Unlike the previous federal vocational acts, which allocated funds to programs, the Act of 1963 focuses on purposes and leaves the allocation of funds to programs to the state administrative bodies. The state boards and the state director of vocational education must decide which program to support and which to level off or cut back. Furthermore, planning must take into consideration the needs of the population needing or wanting vocational training and the needs of the labor market as well. Training to be offered is to cover a much broader range — including the economically, socially, and academically disadvantaged and the talented, as well as the middle ability students traditionally served.

I have talked with state vocational administrators all over the country during a series of regional conferences just completed, and I can assure you that these new responsibilities are understood. I can also assure you that these people need and want all the help they can get to plan and carry out their programs. There is a tremendous interest in research that can be utilized in the planning process. My comments on the papers presented today are made with this interest in mind.

The question "When should vocational training begin?", the topic of Mr. Corazzini's paper, is one which many administrators must face, and his study makes an important contribution to the field of cost-benefit analysis. However, some aspects of the paper worry me. I am disturbed by the extensive use of starting wages of high school and post-high school graduates as a basis for analysis. How valid is the assumption that wage differentials between high school and post-high school graduates in the same trade will not widen? Do the post-high graduates have greater access to higher paid supervisory or sales jobs? Do they have greater occupational mobility? Has their additional education better prepared them to understand and cope with the major issues which they will face as citizens?

Mr. Corazzini bases his empirical investigation on a framework in which a decision must be made between high school and post-high school vocational training. I wonder whether the either/or framework is not too limited even from the point of view of the economist. From what we know about vocational choice, it is readily apparent that many if not most youngsters simply are not able to make an occupational choice early in high school. If we accept this as a valid assumption, then the cost and benefit analysis might proceed along different lines — that is, a study of the costs and benefits both to the students and to society of obtaining post-high school vocational training or entering the labor market. Within this framework it should be possible to study the "with" and "without" aspects of post-high school vocational training. I suspect that foregone earnings of individuals choosing to take the training would be less than the one- or two-year time period. In view of the high unemployment rate among teenagers, at least some of this time would be spent looking for work. I would guess that earnings of individuals obtaining such training would soon compensate for the costs of such programs and that contributions to society as a result of their training would be far greater than without it. (Remember Mr. Corazzini's analysis that the cost of post-high school training to the community is small.)

I have little quarrel with what is included in the paper — it is what is left out that worries me. (I certainly agree with the author that studies are needed to examine external benefits which might accrue from post-high school trade training.)

I submit that the question of high school vs. post-high school trade training, and that of general vs. vocational high school education, are not either/or questions, but how much of each.

Mr. Kincaid's study begins to explore an area about which too little is known. Information on proprietary schools (in fact, on all private schools) is needed to give the total picture of vocational training available in this country. The paper outlines some of the data which should be available — type of courses, duration, fees enrollment and completions, placement and other services, teacher qualifications, etc.

Questions such as attitudes of the public toward private and public vocational offerings, reasons why persons are willing to pay for private training, and what they are receiving, are worth exploring. It certainly appears that further pursuit of data on the policy questions emerging from the exploratory study of proprietary schools would yield some useful information. Insofar as possible, future studies should attempt to compare public and private vocational education and training.

Mr. Burt's study is unique in that it not only reports research findings but suggests a framework for action. His paper is difficult

to comment on because I agree with most of what he says. Many of his points could be acted on immediately: for example, the suggestion that educators take the initiative in establishing advisory committees and other relations with industry. His suggestion that positions for school-industry coordinators or liaison personnel be established at many levels may be controversial, but it makes sense to me. I would go further and suggest the need for a person or persons responsible for placement as a part of every school. This might well be part of the job of the industry liaison person. Certainly there should be a close tie between the industry liaison function, placement activities, and the guidance and the planning efforts.

Mr. Burt lists areas in which industry can be or is involved in vocational education. He alludes to but does not elaborate on the role of industry in evaluation of programs or the system. I would be interested in hearing his views on what industry's evaluative role should be, particularly if industry advisory groups are involved in the planning function.

LOREN A. IHNEN
NORTH CAROLINA STATE UNIVERSITY, RALEIGH

My remarks are going to be addressed primarily to the Corazzini paper, but I would like to make a few comments about the interesting Kincaid-Podesta paper. Kincaid and Podesta's description of proprietary schools raises many interesting questions (which they mention in their concluding section). Three of these questions seem particularly interesting to me. Restated in my terms, first, what are the *private* rates of return to students enrolling in proprietary schools, and how do these rates compare with the rates of return received by students enrolling in comparable programs at public institutions? Second, what are the *social* rates of return to investments in education and training via proprietary as opposed to public schools? Third, what *economic, political,* and other factors led to the formation and development of proprietary schools, and how will changes in these factors affect proprietary schools in the future? I view the Kincaid-Podesta study as a necessary first step in obtaining answers to these questions, and I hope they will devote some attention to these questions in the future.

Let me turn now to Corazzini's intersting and informative paper. He begins with a brief description of some of the problems involved in estimating returns to the investment in education; he follows this with a description of specific educational programs; and he concludes

with some estimates of the costs and returns associated with these programs.

The author's concern about empirical work on investment in education falls into two broad categories. First, the estimates of costs, returns, and rates of return are available only for past investments, not investments which will be made in the future. Moreover, these estimates are for a specific quantity and type of investment, and thus cannot provide us with information about the schedules of returns for alternative quantities and types of investment. Corazzini suggests that we question the advice of those who argue, on the basis of average rates of returns, that further investments will yield equally high returns. I agree, but I seriously doubt that competent economists have suggested using point estimates of past rates of return as schedules of the rate of return for future investments. Moreover, how would Corazzini suggest that we obtain rates of return for alternative levels and types of future investment? The problem involved in generating this information is an impossible task. Surely we are likely to make better decisions given many studies of past rates of average returns.

There is another caution one should consider when using average rates of return to advise prospective investors in education: these rates of return are averaged over all individuals making the investment, so the investment may have a high return to some and a low or negative rate of return to other individuals.

The second problem area is the possible bias in the estimates of average returns to investment in education. Two components of the value of additional education, i.e., additional earnings and the value of the option to obtain further education, are cited. The problem of trying to estimate the quantity of increased lifetime earnings due to educational level is severe, but the quantity and quality of work in this area vastly exceeds that mentioned.[1] Again, this problem is not a one-sided one, for, as Becker has indicated, we can go too far in standardizing for the income effects of other variables, and thereby eliminate the true effect of education.[2] The components of the value for additional education are also more numerous than indicated in this paper. Most of the discussions of returns to education have considered present and future consumption,

1 An interesting review of economic studies of investment in human capital through education is presented in Mary Jean Bowman, in "The Human Investment Revolution in Economic Thought," *Sociology of Education* XXXIX, 2 (Spring 1966), pp. 111–137. For a review of some of the problems involved in estimating rates of return to investment in education see Mark Blaug, "The Rate of Return on Investment in Education in Great Britain," *The Manchester School of Economic and Social Studies* XXXIII, 3 (September 1965), pp. 205–261. For an excellent bibliography see Mark Blaug, *A Selected Annotated Bibliography in the Economics of Education* (London: University of London Institute of Education, 1964).

2 Gary S. Becker, *Human Capital* (New York: Columbia University Press, 1964), p. 86.

non-pecuniary benefits, and the effects on the earnings of other members of society, both within and between generations. Ignoring these factors probably would tend, on net, to cause a downward bias in the estimate of return to investment in education. Thus, Corazzini is certainly on safe ground in suggesting that we use extreme care in interpreting our estimates of rates of return.

This study adds to the literature on costs and returns to education by evaluating two competing programs. The first program consists of 12 years of schooling, including vocational education. The second program is a 14-year program with 12 years of general schooling, followed by two additional years of vocational education training. The vocational courses in these two programs are identical except for timing in the school life of the student. The 14-year program would move in a direction opposite to that suggested by Professor Machlup and others in what Corazzini calls the Machlup Plan.

Let us consider the Machlup Plan briefly.[3] Professor Machlup suggests that all material now taught in 12 years could be compressed into ten, for all students. Obviously, if such a move could be undertaken without any cost, it would be desirable, if we hypothesize that (1) people do not prefer prolonged education; no market mechanism for satisfying their tastes exists; and public schools currently are inefficiently organized and operated for satisfying people's desires; or (2) the population's tastes for prolonged education are undesirable.

Corazzini's work provides us with an estimate of the costs and returns of two additional years of general education, because he is comparing a 12-year program and a 14-year program containing identical vocational education training. Hence, the two programs must differ only in terms of time invested in general education. Note that the additional or prolonged training is general, and not oriented towards skills or occupations.

One of the characteristics of investments in education is the extraordinarily long pay-off period, and this characteristic may particularly fit general education.[4] Thus, iow initial returns to the 14-year program might be quite consistent with a substantial lifetime rate of return. I am somewhat surprised that the 14-year training program results in an immediate increase in earnings: $160 per year. I find little reason for Corazzini's statement that these additional earnings are not for training received. Doesn't general education also represent training? There is little reason to assume, as Corazzini implicitly does, that entrepreneurs are either irrational

3 Fritz Machlup, *The Production and Distribution of Knowledge in the United States* (Princeton: Princeton University Press, 1962).

4 Becker, *op. cit.*, p. 112.

or lack information, and that they pay higher wages merely for number of school years completed. Isn't the additional wage received by graduates of the 14-year program evidence that employers must believe their productivity is greater than for persons completing the 12-year training program? Moreover, Corazzini's assumption that one cannot attach a very high probability to the prospect that graduates of the 14-year program will continue to receive substantially higher salaries during their lifetime is a hypothesis which should be tested. Given the initial annual return of $160, a continued increase in returns over the work life would not be surprising.

I find inadequate support for the conclusion that the graduates of the 14-year training program have made a poor investment. Nor do I find that this analysis supports Corazzini's recommendation that the pay-back period be minimized. Certainly, individuals have other goals, such as maximizing the rates of return or maximizing the discounted capital values of their investments. In his summary, Corazzini has qualified all his statements referring to post-secondary vocational training as a poor investment, but the impression remains.

I am in complete agreement with Corazzini and Machlup that we should attempt to reduce inefficiency in our educational system, or in other parts of our economy, wherever it exists. But we need more evidence before we conclude that great returns can be obtained by compressing or shortening the training period.

VII

CURRICULUM DEVELOPMENTS IN VOCATIONAL EDUCATION PROGRAMS

PRE-TECHNOLOGY PROGRAMS IN THE SAN FRANCISCO BAY AREA

GEORGE CHAMPION
SAN FRANCISCO STATE COLLEGE
CENTER FOR TECHNOLOGICAL EDUCATION

BACKGROUND

The pre-engineering-technology study grew out of a concern for a group of students who were receiving relatively little attention in curriculum development. Considerable time, effort, and money have been devoted to developing curricula for both the highly capable and the mentally deficient student. However, a large in-between group has been largely ignored: the capable average student.

Through a grant from the Rosenberg Foundation, it was possible for two high schools (De Anza and Harry Ells) in the Richmond Union High School District in Richmond, California, and the Cogswell Polytechnical College in San Francisco to embark upon a curriculum model for the average learner. The project began in 1961 and, after a considerable period of planning, a pilot experimental program was initiated for a two-year trial. The program became known as the "Richmond Plan."

The basic question which this study attempted to answer was, "Is it possible, through a re-evaluation of the principles and practices of high school programs, to design a program to meet the specialized needs of average high school students in terms of higher education; and is a high school pre-technology program feasible?" The planning group for the study recognized that industry in the United States was placing increasing emphasis upon technical training which requires education beyond the high school level. They also recognized the developing paradoxical situation in which the country was facing an unemployment problem on the one hand, and an increasing shortage of talented engineering technicians on the other. It was estimated that industry would require 140,000 beginning technicians per year, while the school systems were producing approximately 40,000. Much of the unemployment problem was and is being created by the large number of youthful, unskilled job seekers entering the labor market from high school.

This study was therefore initiated with a two-pronged goal. The first was to devise a program in which the student could find the motivation and success to stimulate him to remain in school longer. The second was to offer a program that would enable the student to

enter the labor market with saleable skills if he chose to terminate his education at the end of high school. In other words, we wanted to work out a program which would develop the desirable skills necessary for either work *or* advanced education.

DEFINITION OF THE PRE-ENGINEERING-TECH PROGRAM

Once the planning group agreed to focus upon engineering technicians, an analysis of the technician's function was made. The results of the analysis indicated a need for a person who could communicate effectively, who could understand the math and science principles involved in the technology concerned, and who possessed the tool skills necessary to put these principles into practice. Thus, an interdisciplinary preparation, including math, science, English, and a technical laboratory, seemed to be called for. In the pre-engineering-technology programs undertaken so far, this kind of preparation has become an established pattern.

Each school selects an interdisciplinary team consisting of a counselor, an English teacher, a math teacher, a science teacher, and a technical laboratory teacher. Our concept of team teaching should not, however, be confused with the more common idea of team teaching where several teachers hold forth in the same room. In our program math is taught as a math course by a math teacher in the math department, and the same is true for each of the other subjects. The team function is in planning the teaching strategy: objectives are established for each area, and then units are constructed which relate the objectives to each area and each area to every other area. In this way, a constant reinforcement is taking place in every class: the teachers complement one another, and the student is constantly exposed to the importance of each subject and its interrelation with other subjects.

The technical laboratory is an extremely important part of the program and in my opinion serves three critical purposes beyond the discipline function: (1) it provides motivation; (2) it serves as a means for reducing abstract principles to practical values; and (3) it is in the technical lab that the separate subjects coalesce, allowing the student to obtain a true insight into the value that each possesses. Math becomes calculation, English communication.

Because of the experimental nature of the Richmond pilot, careful attention was given to the selection of students. Thirty students in each school were chosen to participate; all were enrolled in a college prep track and were interested in going to college. In addition, their IQ scores and all other available information indicated that they were of average or greater ability but were not being successful in their college prep programs.

The rationale for developing the program around a *goal orientation* rather than specific subjects will be evident from the following analysis:

(1) Industry's best source of technicians is the technical institute. However, these institutes derive their trainees from high school students who are either traditional college prep or have no inclination to attend college. The result is that the institutes offer a make-up program which could be eliminated if students had a proper high school background.

(2) A pre-engineering-technician track in the high school would afford a rich curriculum to students who could then go on to technical institutes and within two years receive the training necessary to prepare them for industry.

(3) Technical institutes place all their qualified graduates and could fill more positions if they had the qualified student personnel. Since the shortage of such personnel is becoming increasingly acute, it is imperative that high schools recognize this fact and take the initiative in preparing capable students for advanced training and eventual employment.

(4) Through team teaching, correlating academic subjects to the technical laboratory, and through constant theory-application techniques, the student can empirically develop an appreciation of subject matter which will aid him in establishing realistic goals.

(5) Such a program is also a potential aid to the student who drops out of high school for psychological reasons — the student who finds himself unable or unwilling to compete with fast learners in the college prep program and drifts through his high school years, barely passing, with no goals and no motivation.

(6) The primary purpose of the program is to prove to the student he can succeed — not merely passing tests and earning grades, but understanding what he is doing and why he is doing it. His success will be measured by what he has learned and can demonstrate, not by how he can parrot a series of rote answers.

By getting away from subject matter compartmentalization, the student will be shown the rational integration of the sciences and the arts so that a finished product, well done, results.

RESULTS OF THE PILOT PROGRAM

The results of the two-year pilot program in the two Richmond high schools are best summarized by the following statement from Mr. William Plutte, who was Principal at De Anza High School: "During the first year of the plan, eleven of the thirty boys made the honor roll, and I'll bet it's a first time for all of them. When we pick these students, we're not even sure they will graduate from the high school, yet, in two years of operation of the plan, there have been only three dropouts from the group to 60 students in the program. Further, there were 20 honor students at De Anza High School alone in the four semesters."

A report made during the semester following the graduation of the first class offers further evidence of the success of the plan. The first graduating class from Harry Ells High School was distributed in this way: 1 - armed forces; 14 - junior college; 3 - polytechnic college; 2 - university; 5 - technical employment; 3 - non-technical employment; and 1 - unemployed.

A reservation often expressed about pre-tech programs is whether they force students to make a career choice too early, and whether they specialize the student at the expense of his being able to select other career options if his interests change or his insights into other fields increase. A distribution of the enrollment pattern of the nineteen who entered college from the first graduating class suggests that, far from being restrictive, the program actually broadened the student's options. These nineteen enrolled in six major areas as follows: 4 - electronics; 3 - architecture; 4 - business; 1 - chemical technology; 6 - engineering; and 1 - agriculture.

DEMONSTRATION PHASE

Following the two-year pilot program in Richmond, a two-year demonstration of the program in ten additional high schools throughout the Bay Area was initiated through Cogswell College. The demonstration phase of the study was completed in June 1966.

A questionnaire study of the school involved was recently conducted by the San Francisco State College Center for Technological Education. Items for the questionnaire were based on a matrix developed by an intersection of two axes: one, an analytic axis consisting of five categories — planning, operation, program change, program coordination, and program prospects; and the other, an axis comprising four phases of curriculum development — program objectives, program content, learning activities, and evaluation. From this matrix a total of 139 questionnaire items were written, covering written information, and opinions and attitudes. Questionnaires and/or questionnaire

interviews were designed for administrators, pre-technology students, non-pre-technology students, and parents of pre-technology students.

The responses from all groups suggest a high positive perception of the pre-technology program. Over half of the pre-technology teachers (53 percent) felt that their students were proud to be in the program, and 74 percent agreed that their students now had a sense of belonging. In response to questions about the program, 65 percent of the teachers felt that students were finding more interest in this program than in other programs in which they had been involved; they also felt that this program was useful (93 percent), fruitful (72 percent), and challenging (51 percent); and that student-teacher relationships were warm, relaxed, and friendly (77 percent).

The major problem of the program pointed out by the teachers was the need for a greater allotment of time for the planning of objectives, content, method, materials, and coordination. It should be noted that the pre-tech teams were not given extra released time; rather, in most schools, they were scheduled with a normal preparation period. A great majority (82 percent) felt that the program has great promise; however, only 68 percent thought the program would be continued unless some time adjustments were made for the teaching teams. The need for additional preparation time may be lessened as curriculum materials are further developed and become more available.

Answers from the students themselves indicated that the pre-technology students were responsive to both the program and the teaching efforts. Seventy-nine percent indicated pride in belonging to the program, and 60 percent rated their teachers as more helpful than non-pre-tech teachers. When questioned about which was most helpful, the teachers or the program, 58 percent indicated the program. This shows a relatively strong feeling about the value of programs which are student-oriented rather than discipline-oriented, a conclusion which is supported by the 59 percent who responded that the program gave them an opportunity to make something of themselves, and by the 46 percent who felt strongly that they had a definite advantage over students in other programs for college preparation.

One goal of the pre-tech program was to encourage students to remain in school at least through the junior college. In response to questions about their plans after graduation, 80 percent planned to attend college, 67 percent planned to enter a junior college, and 13 percent expected to enter a four-year college or university. Of the non-pre-technology students questioned, 69 percent intended to enter college, 39 percent junior college, and 30 percent college or university.

A problem of any program is its status in the eyes of the student population. The responses of the non-pre-technology students showed that they felt the pre-tech program was for students much like themselves and that it was planned for students interested in going to

college or entering technical employment. Only a fraction of the group thought the program to be of lower quality or to be designed for students of lower ability than those in the college-prep track. However, in filling out the questionnaires, 50 percent of the non-pre-tech students and teachers answered "I don't know" to each question about the pre-tech program, so we cannot necessarily assume a positive perception of the program.

CATEGORIES OF PROGRAM ACTIVITY

The responses on Categories of Program Activity provided the following information:

(1). Planning for its Major Components. Sixty-five percent of the teachers responded that the major components of the program (its objectives, content, student selection, and coordination) were planned by the teachers acting as a group. Yet, elsewhere, 57 percent indicated that such decisions were made individually. This variance is seen also in the teachers' responses to questions concerning their practices in developing content, methods, and materials. Thirty-four percent responded that the curriculum was developed on an individual basis, and 44 percent responded that it was developed through a broadly based cooperative effort. Twenty-one percent were uncertain as to how the curriculum was derived.

(2) Operation. What are the programs like in operation? Teachers and students both felt that the program was helpful, useful, demanding, and satisfying. The strong endorsement of subject coordination was the most frequently mentioned characteristic. The usefulness and interest of the program, as well as the opportunities it provided, were the next most frequently mentioned aspects. The most commonly considered source of difficulty was the coordination of course sequence, teacher interest, and student progress.

(3) Changes. The most frequently recommended changes were an increase in time for preparation, and better coordination of courses. Disparity between goals and accomplishments was a source of disappointment to the students, giving rise to many suggestions that the program's goals, methods, evaluation instruments, and selection procedures be frequently reappraised.

(4) Evaluation. What do students and teachers believe to be the program's results, effectiveness, and future? The general feeling was that the students' grades improved, that the students now had a genuine opportunity to improve both themselves and their chances in life, that the program enjoys broadly based cooperative support, and that it has great promise and will most likely continue for some time.

CONCLUSIONS

The data suggest that teachers and students have a high positive perception of the pre-technology program. Students are generally responsive to the program and are inclined to view favorably the intentions and efforts of their schools and teachers. Also, on the basis of questionnaire responses, there seems to be a general acceptance of the pre-technology program by non-pre-technology students: they do not see it as a "dumping-ground," or a program for dropouts. Finally, it appears that there is a closer relationship between teachers and students, and that students find their experiences in this program more rewarding than in other programs.

The data indicate several problem areas, however. Among these are the need for additional time for teachers to coordinate their curriculum; a lack of full understanding by non-pre-technology students; and inability on the part of some students, teachers, and counselors (both in and out of the program) to define and understand the purpose, scope, and direction of the pre-technology program; and the lack of necessary coordination between the various schools and between the teachers on planning, presentation, and assessment of the program.

PRESENT STATUS OF THE PRE-TECH PROGRAM

A great amount of interest, both local and national, was generated during the demonstration phase of the plan. That this is a continuing interest is evidenced by the schools that have, or are planning to initiate, pre-tech programs. In the San Francisco Bay Area, there are now 17 schools with programs under way; hopefully, this number will be doubled at the beginning of the new school year in September.

A number of adaptations of the pre-tech program are in various stages of planning, one of which is reported in detail in this volume by Dr. Lou Batmale. Other interdisciplinary programs will be initiated in the health services, aero-technology, electronics, and business at the beginning of the school year.

There is also considerable interest in developing programs with other types of students and at other maturity levels. Two junior high schools in San Mateo, California, will initiate programs in September. An interdisciplinary program, combining English, math, and industrial arts, and designed for freshman high school students who measure in the lower quartile, was initiated last summer and continued through the current school year at Crestmoor High School in San Bruno, California. The early results of that program are very encouraging and, coupled with the success of other adaptations,

they offer support to the notion that the conceptual framework of the pre-technology program, when properly planned and implemented, is applicable to a wide variety of curricula.

The success of any educational program ultimately rests in the hands of the teacher, and the continued success of pre-technology programs will depend upon the supply of talented teachers. Teachers for new programs will be needed, as well as replacements for those teachers who leave. To this end, the Center for Technological Education at San Francisco State College has sponsored in-service workshops for teachers — through the regular college evening program, and through extension services — in which over 100 teachers were enrolled during the spring semester. Five workshops will be conducted during the current summer session program. In addition, the first pre-service program has been approved by the college and will be launched on a pilot basis during the fall semester.

SUMMARY

The pre-engineering-technology program was an attempt to focus on those capable average students who were not doing as well as should be expected. The establishment of a realistic student "goal orientation," coupled with a well-planned, cooperative teaching effort, was used as the source of motivation. Clearly, the results of the preliminary questionnaire, the enthusiasm of both teachers and students, the successful adaptation to other "goal orientations," and the public and professional interest all suggest that the potential value of the pre-tech approach has as yet merely been tapped.

THE IDENTIFICATION OF COMMON COURSES IN PARAMEDICAL EDUCATION*

WILLARD M. FETTERHOFF
ARIZONA STATE UNIVERSITY

I would like to describe briefly some of the conditions and circumstances which influenced and prompted the submission of this research proposal to the United States Commissioner of Education, under the provisions of Section 4 (c) of the Vocational Education Act of 1963. The national personnel shortage which exists in allied medical and health service occupations, frequently called paramedical occupations or paramedical careers, is expected to increase. The growing specialization of health services, the recent social concern for extending health care, and the lengthening life span all stress the need for attention to education in paramedical occupations. The health agencies, ranging from the Office of the Surgeon General to offices of the local hospital directors, are presently emphasizing the urgent need to provide, not only for more personnel trained in the paramedical occupations, but for improved efficiency in recruitment and training in these occupations. These needs must be met if the agencies involved are to provide and maintain adequate health services for the public and expand to meet future needs.

Many physicians, hospital administrators, educators, and other interested observers feel that progress toward providing needed and improved health services can be made by taking an evaluative look at the status of the present fragmented systems of education for paramedical occupations. The increasingly serious shortage of semi-professional and technical personnel in the nation's hospitals could conceivably lower the standards of health care if present educational facilities are not expanded and additional facilities made available.

In a report entitled "Manpower Trends in Selected Paramedical Occupations," (prepared by the Manpower Planning and Employment Development Section of the Arizona State Employment Service, June 1965), Charles A. Boyle, Administrator, reported that a current survey of his office revealed that 14,280 persons were employed in 16 health services occupations in the State of Arizona. More than half of these were in the Phoenix area. With vacancies in each of the 16 classifications, the Arizona State Employment Service, taking into consideration the demand, the replacements, and the deficits, conservatively projected a net deficit of 2,321 persons in Arizona by 1970. It reported further that an additional deficit could be anticipated as a result of (1) the population growth in Arizona (which has averaged

* I regret that Dr. Bill Fullerton, principal investigator for this research proposal, was unable to make this presentation due to a prior commitment.

seven percent or more annually in the past 15 years); (2) the recent Kerr-Mills and Medicare legislation; and (3) the trend toward increasing demand for and use of hospital and other health care.

The Hospital Development Association of Maricopa County was organized in 1964, because of the realization on the part of many physicians, hospital authorities, and other community leaders of the need for an organized effort to plan for the orderly development of all the health services in the Phoenix area. This association, in 1965, recommended action, in the form of community planning, to meet the needs for trained paramedical personnel. It suggested further that financial assistance for planning this program be sought from private, state, and federal agencies, and that a Paramedical Education Board be established to carry out the program. Such a board was established, consisting of representatives from the Hospital Development Association; individual hospitals carrying the main responsibility for paramedical education; the medical profession; the state departments of health, vocational education, and employment security; the public secondary schools; the public junior colleges; and the Arizona State University.

In short, then, the proposal for our community project entitled "The Identification of Common Courses in Paramedical Education" was transmitted to the United States Commissioner of Education on August 19, 1965. Dr. William J. Burke, Vice President for Research and Dean of the Graduate College of Arizona State University, requested federal funds in the amount of $8,920 to conduct research over a period of six months. The research contract was approved for the period beginning November 15, 1965, and ending May 14, 1966. Dr. Bill J. Fullerton, Professor and Chairman of the Department of Secondary Education, Arizona State University, was designated as principal investigator. Dr. Arthur M. Lee, member of the Phoenix Planning Board for a Health Services Education Center, was designated as planning director.

This proposal was designed to be the first step of a continuing curriculum development project in paramedical education which would ultimately improve the efficiency of training and help to alleviate shortages of hospital and other health service personnel in the Phoenix area. It was felt that the initial task should be to identify common courses in present curricula of paramedical education. The objectives of this proposal were, therefore, to determine (1) courses common to present paramedical education programs, (2) the nature and extent of such commonalities, and (3) guidelines for the integration of these programs. The research proposal provided for the establishment of a community action research committee — the Advisory Workshop Committee on Curriculum Planning — selected by the Phoenix Planning Board and Health Services Education Center. This committee was made up of representatives from the faculty and administration of high schools, junior colleges,

universities, and hospital paramedical education programs, representing the seven major institutions in the Phoenix area and all major medical and paramedical groups. It included people from the Phoenix area with the responsibilities indicated by their official positions, as shown in Table 1. Each member representing an institution that offered curricula in paramedical careers was assigned to analyze paramedical education programs in his own specialty (see Table 1).

Under the supervision of the principal investigator, assisted by the director of the planning program and by a planning advisor, the Workshop Advisory Committee proceeded to gather curriculum data from 110 training institutions for the 20 paramedical careers. They made detailed analyses of course content, identified common courses, prepared guidelines for the integration of paramedical education programs with common courses, and prepared a spectrum of all curricula for the programs, showing the points and extent of overlapping. Table 2 shows the 20 paramedical careers studied, the number of contacts made with the training institutions, and the number of programs which were ultimately analyzed.

Regular three-hour weekly sessions were scheduled, in which reports were made on the various careers under study. During these, data were obtained regarding the requirements for admission to training programs; the courses required and elected in the programs; the number of hours required in lecture, laboratory, and clinical practice in the various courses; and the general nature of the training institutions. Table 3 shows the name and location of each of the 109 different training institutions whose paramedical programs were analyzed.

The study encompassed more than 2,613 different course titles from the 109 institutions preparing students for paramedical occupations. These 2,613 course titles were ultimately classified into 126 different subject classifications. In many instances, institutions surveyed offered the same, similar, or related training experiences, but under different course titles than the other institutions surveyed. Each Advisory Committee researcher exercised his own professional judgment in his field to select a common, subject-classification name, and then classified the many different course titles under the one subject classification which he felt most appropriate. In a number of instances, it was difficult to determine the appropriate subject classification beyond a doubt, because too little information had been given concerning an unusual course title, or because of an apparent overlapping between two subject classifications. Table 4 lists those subject classifications which were common to two or more of the 20 careers studied.

Where subject classifications were common to two or more careers the extent of commonality measured by the number of clock hours devoted to the subject—in terms of hours of lecture (discussion,

seminars, classroom activity, etc.), laboratory, and clinical practice (on-the-job training) — varied within a given paramedical field and among the 20 occupations analyzed.

Table 5 consists of sample pages from the computer showing the courses grouped into the general subject classifications in the three-year nursing program. As an example, note that 22 courses from 12 different institutions were classified as nursing fundamentals in the three-year registered nursing program. Note also that the number of clock hours required in nursing fundamentals varied widely among the 12 different training institutions.

Because of competition for use of the computers on our campus, we have experienced some delay in completing the analysis of data. We have applied to the U.S. Office of Education for a two-month extension to the original May 14 deadline. Hopefully, then, by July 14 we shall have completed analysis of data and arrived at recommendations. The complete report will be submitted to the U.S. Office of Education by that time.

The report promises to be somewhat voluminous because of many tables of computer data. We hope that this very small research proposal may serve as a stimulus for more extensive and more comprehensive research, and that funds will be made available for this purpose.

TABLE I

Paramedical Curriculum Advisory Committee

Name	Title
Floretta Awe, R.N.	Chairman, Nursing Department Phoenix College
Carl R. Bjorklund, M.D.	Director of Physical Medicine and Rehabilitation, Chairman, Department of Physical Medicine and Rehabilitation Good Samaritan Hospital
Vurlyne Boan, R.N.	Director, School of Nursing Good Samaritan Hospital
Gordon V. Bradshaw, Ph.D.	Professor of Biology Phoenix College
Eugene Chasey, Ed.D.	Assistant Professor of Education Arizona State University

TABLE I (cont.)

Sister Mary Christina, Ph.D., R.N.	Director, School of Nursing St. Joseph's Hospital
Paul Crosier	Architectural Consultant Busby Associates
Ralph Fargotstein, M. D.	Director of Laboratories Maricopa County General Hospital
Willard Fetterhoff, Ed. D.	Assistant Professor of Education Arizona State University
Bill J. Fullerton, Ed. D.	Chairman, Department of Secondary Education, Professor of Education Arizona State University
Donald Grandgenett	Research Assistant and Faculty Associate Arizona State University
Nelson L. Haggerson, Ph. D.	Professor of Education Arizona State University
Richard Harms	Director of Rehabilitation Services Good Samaritan Hospital
Clyde Hollister	Director of Radiologic Technology Training St. Joseph's Hospital
Robert H. Huntington, D.M.D.	Chairman of Dental Hygiene Arizona State Dental Association
Arthur M. Lee, Ph. D.	Director, Arizona Health Services Education Association
Shirley Mannion, R. N.	Department Head Practical Nursing Program Phoenix Union High School
Colonel Harold Moore	Assistant Director, Arizona Health Services Association
William T. Northey, Ph. D.	Assistant Professor of Microbiology Arizona State University

TABLE I (cont.)

Charles Purtymun, D. M. D.	Chairman of Dental Hygiene Arizona State Dental Association
James Riordan. M. D.	Director of Radiology St. Joseph's Hospital
Samuel Runyon, A. R. I. T.	Director of Inhalation Therapy St. Luke's Hospital
Irwin Spector, M. A.	Director of Research and Curriculum Maricopa County Junior College System
Mildred Welnick, R. R. L.	Director, Medical Records Dept. St. Luke's Hospital

TABLE 2

Summary of Contacts and Program Analyses
in Each Paramedical Career

Code	Paramedical Career	No. Contacts	No. Programs Analyzed
1	3-year R. N.	23	18
2	2-year R. N.	17	11
3	L. P. N.	18	9
4	Nurse Aide	28	2
5	Dental Assistant	17	2
6	Medical Technologist	22	12
7	Medical Secretary	14	9
8	X-Ray Technologist	4	3
9	Dental Hygienist	14	4
10	Dental Technician	14	1
11	Physical Therapist	10	9
12	Physical Therapy Assistant	4	1
13	Occupational Therapist	7	7
14	Occupational Therapy Assistant	11	2
15	Inhalation Therapist	14	8
16	Medical Assistant	18	4
17	Laboratory Assistant	12	4
18	Medical Records Librarian	35	15
19	Medical Record Technician	13	2
20	Radioisotope Technician	3	3

TABLE 3

Institutions Participating in Paramedical Research

1. Alexian Brothers Hospital; Chicago, Illinois.
2. American Medical Association Committee on Medical Education and Hospitals.
3. Arizona State College; Flagstaff, Arizona.
4. Arizona State University; Tempe, Arizona.
5. Baptist Memorial Hospital; Memphis, Tennessee.
6. Bellin Memorial Hospital; Green Bay, Wisconsin.
7. Bowman Gray School of Medicine (North Carolina Baptist Hospital); Winston-Salem, North Carolina.
8. Bradley University; Peoria, Illinois.
9. Burlington Hospital School of Nursing; Burlington, Iowa.
10. Carnegie College; Cleveland, Ohio.
11. Chicago Wesley Memorial; Chicago, Illinois.
12. Clark College; Vancouver, Washington.
13. Colorado State University; Fort Collins, Colorado.
14. Cook County Hospital; Chicago, Illinois.
15. Crawford W. Long Memorial Hospital; Atlanta, Georgia.
16. Eastern School for Physician's Aides; New York, New York.
17. Essex College of Business; Newark, New Jersey.
18. Evangelical Deaconess; Milwaukee, Wisconsin.
19. Everett Junior College; Everett, Washington.
20. Foothill College; Los Altos Hills, California.
21. Fullerton Junior College; Fullerton, California.
22. Good Samaritan Hospital; Phoenix, Arizona.
23. Harper Hospital School of Nursing; Detroit, Michigan.
24. Herman Hospital; Houston, Texas.
25. Hillcrest Medical Center; Tulsa, Oklahoma.
26. Homer G. Phillips Hospital; St. Louis, Missouri.
27. Idaho State University; Pocatello, Idaho.
28. Indiana University; Bloomington, Indiana.
29. Knapp College of Nursing; Santa Barbara, California.
30. Loma Linda University; Loma Linda, California.
31. Long Beach City College; Long Beach, California.
32. Los Angeles Valley College; Van Nuys, California.
33. Medical College Hospital; Charleston, South Carolina.
34. Medical College of Virginia; Richmond, Virginia.
35. Mercy College of Nursing; San Diego, California.
36. Michael Reese Hospital and Medical Center; Chicago, Illinois.
37. Michigan State University; East Lansing, Michigan.
38. Monmouth Memorial Hospital; Long Branch, New Jersey.
39. Mount Mercy College; Pittsburgh, Pennsylvania.
40. Mount Sinai; New York City, New York.

TABLE 3 (cont.)

41. Newport Hospital; Newport, Rhode Island.
42. O'Connor Hospital School of Nursing; San Jose, California.
43. Orange Coast College; Costa Mesa, California.
44. Ottumwa Heights; Ottumwa, Iowa.
45. Our Lady of the Lake; Baton Rouge, Louisiana.
46. Phoenix Junior College; Phoenix, Arizona.
47. Phoenix Union High School; Phoenix, Arizona.
48. Point Park Junior College; Pittsburgh, Pennsylvania.
49. Providence Hospital; Seattle, Washington.
50. Queen of Angels Hospital; Los Angeles, California.
51. Richmond Professional Institute; Richmond, Virginia.
52. Sacred Heart Dominican College (St. Joseph's Hospital); Houston, Texas.
53. Schweiter School; Wichita, Kansas.
54. Springfield Technical Institute; Springfield, Massachusetts.
55. Southwest Preparatory; Phoenix, Arizona.
56. St. Clare's Hospital; Allegany, New York.
57. St. Luke's Hospital; Kansas City, Missouri.
58. St. Joseph's Hospital; Phoenix, Arizona.
59. St. Joseph's Hospital; Mount Clemens, Michigan.
60. St. Petersburg Junior College; St. Petersburg, Florida.
61. St. Vincent's Hospital; Los Angeles, California.
62. Swedish Covenant Hospital; Chicago, Illinois.
63. Tufts University; Medford, Massachusetts.
64. Thompson Institute; Harrisburg, Pennsylvania.
65. University of Arizona; Tucson, Arizona.
66. University of California; Berkeley, California.
67. University of California at Los Angeles; Los Angeles, California.
68. University of Florida; Gainesville, Florida.
69. University of Illinois; Urbana, Illinois.
70. University of Kansas; Lawrence, Kansas.
71. University of Maryland; College Park, Maryland.
72. University of Michigan; Ann Arbor, Michigan.
73. University of Missouri; Columbia, Missouri.
74. University of New Mexico; Albuquerque, New Mexico.
75. University of North Carolina; Chapel Hill, North Carolina.
76. University of Pacific; Forest Grove, Oregon.
77. University of Southwestern Louisiana; Lafayette, Louisiana.
78. University of Wisconsin; Madison, Wisconsin.
79. Viterbo College (St. Francis Hospital); LaCrosse, Wisconsin.
80. Washington University; Seattle, Washington.
81. Weber State College; Ogden, Utah.
82. Yale University; New Haven, Connecticut.
83. Zweegman School; San Francisco, California.

TABLE 3 (cont.)

84. National Office
85. Medical College of Georgia; Augusta, Georgia.
86. Emory University Hospital; Atlanta, Georgia.
87. Kress School of Practical Nursing (Pima County General Hospital); Tucson, Arizona.
88. Cochise Junior College; Douglas, Arizona.
89. Dayton, Ohio School of Practical Nursing; Dayton, Ohio.
90. Saint Anthony Hospital School of Practical Nursing; Denver, Colorado.
91. Mesa Junior College; Mesa, Arizona.
92. Mercy Central School of Practical Nursing; Springfield, Ohio.
93. Pierre School of Practical Nursing; Pierre, South Dakota.
94. Arizona State Hospital; Phoenix, Arizona.
95. State University of New York at Buffalo; Buffalo, New York.
96. Hendrick Memorial Hospital; Abilene, Texas.
97. Sinai Hospital of Baltimore; Baltimore, Maryland.
98. Spokane Community College; Spokane, Washington.
99. St. Joseph's Hospital; Lowell, Massachusetts.
100. Incarnate Word College (Santa Rose Medical Center)
101. Madison Sanatorium and Hospital; Madison, Wisconsin.
102. St. Margaret's Hospital; Hammond, Indiana.
103. City College of San Francisco; San Francisco, California.
104. Stanford University (Stanford Medical Center); Stanford, California.
105. St. Louis University; St. Louis, Missouri.
106. Duke University Medical Center; Durham, North Carolina.
107. Misericordia Hospital; Philadelphia, Pennsylvania.
108. Doctors Hospital; Cleveland Heights, Ohio.
109. Tucson School District #1; Tucson, Arizona.

TABLE 4

Code Number Index to the Subject Classifications in 20 Paramedical Careers

Subject Classification	Code Number	Number of Careers to Which Common
General Education	124	16
Anatomy and Physiology	4	15
Microbiology	20	14
Anatomy	3	12
Ethics, Professional	13	12
Psychology, General	16	12
Terminology, Medical	64	11
Mathematics	15	9
Chemistry, General	5	9
Physiology	10	8
Health, Personal and Community	17	8
First Aid	27	8
Nutrition	14	7
Sociology	19	7
Physics	29	7
Human Growth and Development	6	6
Pediatrics	21	6
Nursing, Psychiatric	22	6
Theology	25	6
Pathology	53	6
Human Relationships	18	5
Zoology	30	5
Nursing Fundamentals	1	4
Nursing, Medical Surgical	11	4
Obstetrics	23	4
Pharmacology	24	4
Psychology, Applied	34	4
Histology	43	4
Laboratory Techniques, Medical Technologist	45	4
Urinalysis	46	4
Hematology	50	4
Office Practice	62	4
Typing	65	4
Radiography, Intra-Oral	78	4
Therapeutic Exercise	96	4
Orientation, Occupational Therapy	97	4
Vocational Relationships	12	3

TABLE 4 (cont.)

Dietetics	26	3
Nursing, Geriatrics	31	3
Electrocardiograph (EKG)	49	3
Secretarial Practice and Procedures	63	3
Administration, Departmental	68	3
Radiation Physics	81	3
Radiographic Isotopes	83	3
Anesthesia	84	3
Physical Agents, Physical Therapy	90	3
Neurology	91	3
Tests and Measurements, Physical	105	3
Nursing Trends	2	2
Nursing	7	2
Clinical Practice, Nursing	9	2
Dental Assisting	36	2
Chemistry, Inorganic	40	2
Biochemistry	41	2
Blood Bank	47	2
Serology	54	2
Accounting	56	2
Filing	60	2
Office Machines	61	2
Economics	66	2
Radiation Safety	74	2
Radiation Therapy	82	2
Dental Anatomy	85	2
Clinical Practice, Dental	86	2
Dental Health	87	2
Orientation, Dental	88	2
Dental Materials	89	2
Clinical Assignment, Physical Therapy	92	2
Orientation, Physical Therapy	94	2
Physical Therapy	95	2
Principles and Practices, Occupational Therapy	100	2
Kinesiology	101	2
Clinical Assignment, Occupational Therapy	104	2
Organization and Administration, Medical Record Librarian	114	2
Directed Practice, Medical Record Librarian	115	2
Medical Record Science, Medical Record Librarian	116	2
Medical Record Science, Legal Aspects	118	2

TABLE 5

A Listing of Courses Reported in the Survey of 20 Paramedical Careers
Grouped According to Subject Classifications

THREE-YEAR REGISTERED NURSE	CAREER NUMBER 1						
	LECTURE	LAB	CLIN	TOTAL	INST	CLASS	LEVEL
1 Nursing, Fundamentals							
adjustments professional 1	0	0	0	24	1	1	3
nursing fundamentals	48	0	360	408	1	1	3
nursing orientation	76	0	32	108	9	1	3
nursing orientation	36	0	0	36	18	1	5
nursing orientation	36	0	0	36	18	1	5
nursing fundamentals	130	15	0	145	23	1	3
adjustment professional	18	0	0	18	29	1	3
adjustment professional	22	0	0	22	36	1	3
nursing fundamentals	45	0	30	75	40	1	1
nursing fundamentals	10	62	0	72	42	1	3
nursing fundamentals	26	10	0	36	42	1	3
nursing fundamentals	0	0	0	0	42	1	3
relationships professional 1	36	0	0	36	50	1	3
relationships professional 2	36	0	0	36	50	1	3
relationships professional 3	36	0	0	36	50	1	3
adjustments professional 1	10	0	0	10	56	1	3
nursing fundamentals	48	48	0	96	58	1	3
nursing fundamentals	48	48	0	96	58	1	3
nursing fundamentals	56	48	0	104	58	1	3
nursing fundamentals	56	48	0	104	58	1	3
orientation, basic	75	0	0	75	58	1	3
nursing fundamentals	30	0	54	84	61	1	3

TABLE 5 (cont.)

2 Nursing Trends							
nursing history of legal aspects	0	0	0	42	1	1	3
nursing trends 1	28	0	0	28	11	1	3
nursing trends 2	44	0	0	44	11	1	3
nursing survey of	24	0	0	24	18	1	5
nursing trends	32	0	0	32	18	1	5
nursing trends	24	0	0	24	22	1	3
nursing trends	15	0	0	15	23	1	3
nursing trends	18	0	0	18	29	1	3
professional development	30	0	0	30	40	1	1
professional trends	30	0	0	30	40	1	1
nursing trends	45	0	0	45	41	1	3
professional trends	24	0	0	24	42	1	3
professional trends	24	0	0	24	42	1	3
adjustments professional 2	10	0	0	10	56	1	3
adjustments professional 3	10	0	0	10	56	1	3
nursing trends	32	0	0	32	58	1	3
nursing trends	32	0	0	32	58	1	3
nursing trends	16	0	0	16	61	1	3
nursing, history of	16	0	0	16	61	1	3
3 Anatomy							
anatomy	32	48	0	80	4	1	3
anatomy	32	48	0	80	4	1	3
anatomy	57	0	0	57	9	1	2
anatomy	62	0	0	62	11	1	1
anatomy	0	0	0	0	50	1	1
anatomy	48	48	0	96	58	1	2
anatomy	48	48	0	96	58	1	2
anatomy	32	48	0	80	61	1	1

TABLE 5 (cont.)

4 Anatomy and Physiology							
anatomy and physiology 1	0	0	0	48	1	1	3
anatomy and physiology 2	0	0	0	36	1	1	3
anatomy and physiology 3	0	0	0	36	1	1	3
science basic	57	0	0	57	9	1	2
anatomy and physiology	0	0	0	112	18	1	2
science natural	230	10	0	240	23	1	3
anatomy and physiology	54	108	0	162	29	1	2
anatomy and physiology	54	72	0	126	35	1	1
anatomy and physiology 1	23	15	0	38	36	1	3

PROJECT FEAST (FOOD EDUCATION AND SERVICE TECHNOLOGY)

LOUIS F. BATMALE
CITY COLLEGE OF SAN FRANCISCO

WHAT IS PROJECT FEAST?

Project FEAST is a program developed in the San Francisco Bay Area to train students in food preparation and service in a comprehensive high school setting. The purpose of the program is to afford interested and qualified students an opportunity, first, to explore and, then, to prepare for a career in the commercial foods industries.

The high school curricula are designed so that occupational training is conducted on a continuing basis and so that students leaving school at any point after the first semester will have the skills necessary for employment. Experience to date has demonstrated that a high percentage of the FEAST students complete high school.

It is expected that those who continue and graduate will not only be employable, but will be placed. Information relative to continuing education will be made available to these students, and it is hoped that they will take advantage of on-the-job training and apprentice programs, local adult education programs, trade association courses, and/or other available opportunities, depending on their field of interest and their abilities.

The student who demonstrates the abilities and motivation necessary for further schooling is advised to continue his education in one of the local community colleges. A close liaison is maintained with the staff of the local post-high school programs, such as the John O'Connel Technical Institute in San Francisco, emphasizing cooking and baking skills; Laney College in Oakland, offering training in restaurant management, dining room service, cocking, and baking; and the City College of San Francisco, which offers a broad comprehensive program in hotel and restaurant operation. Students with exceptional academic ability and interest are encouraged to aim for a four-year college program in hotel restaurant administration.

As experience with Project FEAST graduates increases, it is expected that post-high school programs will be altered so as to articulate effectively with the FEAST program. These institutions should then be able to enrich their offerings and expand their programs to better prepare the young people for their chosen career. The result will be a continuum from grade eleven through an apprentice or training program, through grade fourteen in a junior college and, in

the case of certain qualified students, through the baccalaureate. The actual school experience, whatever it may be, will produce a qualified employee working at a job commensurate with his academic abilities, occupational aptitudes, and personal characteristics.

The goal of Project FEAST is to provide a program that will make school more meaningful — challenging the student's interest and developing his full potential. The graduate will have the basic knowledge and skills necessary for the beginning level of employment. He should also have the added incentive to continue his educational and intellectual growth after employment — to become an asset to his community.

WHAT IS ITS GENESIS?

The first high school program developed to satisfy the basic objectives outlined herein was the Pre-Engineering-Technology Program (Richmond Plan). It was started in 1961 under the joint auspices of Cogswell Polytechnical College, the Rosenberg Foundation, and the Richmond Unified School District, under the leadership of Marvin J. Feldman, then Vice President at Cogswell. The Ford Foundation recognized the potential of the pre-tech approach and made funds available for further experimentation in districts other than Richmond.

The success of this program caused administrators, teachers, and industry to speculate about its adaptability to other occupational fields. Among the speculators were the staff members of the City College of San Francisco. They were convinced that the program would give new meaning to the high school education of many students, that it would provide effective articulation with many of their semi-professional programs, and that it would provide sorely-needed trained personnel for many industries. Consequently, they sought Ford Foundation assistance for an experiment involving all of its semi-professional programs.

Following conferences between Marvin J. Feldman (now Program Associate with the Ford Foundation), the architect of the Richmond Plan, and the author of this paper, it was agreed that the next logical step was to test the principles of the program by experimenting in one additional field. The field of food preparation and service was selected for the following reasons: (1) the genuine interest of the local hospitality industry in education; (2) the capacity of the program to serve a broad range of student abilities; (3) the great and growing variety of employment opportunities available in this field; (4) the availability of a highly qualified project director, Mrs. Hilda Watson Gifford; and (5) the excellent reputation and wide acceptance of the City College of San Francisco Hotel and Restaurant Department.

Also of importance is the fact that jobs may be found in the hospitality industry for the entire range of abilities, from the lower level

high school trained person to top management opportunities for the college trained graduate in hotel administration. Many years ago, Ernie Byfield wrote, "The hotel industry uses ten professions and forty trades." These numbers may well have increased with the recent growth of industry and of demands by the government and public.

A proposal for a grant was made and approved. The contracting agency, on behalf of the City College of San Francisco, was the Hotel and Restaurant Foundation — a non-profit organization founded by members of the alumni, supporters from industry, and representatives of the staff for the purpose of managing gifts and grants to the college's Hotel and Restaurant Department.

The grant was made for a two-year experiment in three schools: Pacific High School, San Leandro; Oakland Technical High School, Oakland; and Balboa High School, San Francisco. The program started in the former two schools in 1964, and in the latter in 1965. The three schools covered San Francisco and the East Bay. However, interest was such that it was deemed advisable in the second year to encourage and include schools from the third Bay Area community, the Peninsula. Capuchino, from the San Mateo Union High School District, and Ravenswood, from the Sequoia High School District, applied and joined in the second year of the program. In the fall of 1966, five additional schools in the San Francisco area developed programs, making a total of ten schools participating.

The concept appears to have taken hold. The City College of San Francisco has fulfilled its commitment and the responsibility for future developments has been passed to the Ford-sponsored Center for Technological Education at San Francisco State College.

WHERE DOES PROJECT FEAST DIFFER?

Interdisciplinary Approach and Team Teaching

Project FEAST was planned so that instruction in areas other than food service and preparation would reinforce the occupational training. The FEAST faculty includes the home economics teacher (who generally serves as team leader and food preparation and service instructor), an English teacher, a business teacher, a counselor, and the cafeteria manager. These teachers function as an interdisciplinary team, and plan their instruction together. Materials in English and business are closely related to the content covered in the foods laboratory. The cafeteria manager and counselor function of the team to assure meaningful on-campus work experience and to provide informed guidance.

Flexibility in Scheduling

Considerable latitude has been given to each school in the scheduling of the various subjects, and, as a result, there is some variation among the schools. The allocation of time in one representative school is as follows:

11th Grade:

Foods Laboratory and Cafeteria Work	2 hrs.
Foods English	1 hr.
Foods Business	1 hr.
Social Studies	1 hr.
Physical Education	1 hr.

12th Grade:

Foods Laboratory (Cafeteria)	2 hrs. First Sem.
Outside Work Experience	2-4 hrs. Second Sem.
Foods English	1 hr.
Elective	1 hr.
Social Studies	1 hr.
Physical Education	1 hr.

The science requirement is met in the home economics class by including materials dealing with the chemistry of foods, food sanitation, some physics (including heat and light), properties of metals, refrigeration, use of electronics, radiation, and steam and quick-freezing equipment.

The first semester laboratory work is offered in the home economics facilities and covers the basic principles of food preparation. The following two semesters of the laboratory take place in the cafeteria kitchen, the cafeteria, and the faculty dining room. The fourth semester is spent in cooperative work experience in a local industry. Success in getting this portion of the program under way has varied from fair to excellent. The critical factors in launching it have been administrative and industry support, an adequate time allowance for a team member assigned this responsibility, and the imagination and initiative of the team leader.

There is evidence of a unity and team spirit among Project FEAST students, which results in a high morale. Yet the students are by no means isolated, since classes in social studies and physical education are taken with the general student body, and the FEAST students participate in school activities and athletics.

Teacher Orientation

The two weeks of summer vacation prior to commencing the program are spent in workshop at the City College of San Francisco. The teachers are exposed to the two-year program in capsule form. They

become acclimated to the industry point of view through actual experience in quantity food preparation and service, through conferences with industry representatives, and through visits to hotels and restaurants. Two additional weeks are spent in the development of an over-all outline of curriculum and, more specifically, of the course content for grade eleven. The second summer is spent in a four-week workshop to develop material for grade twelve. Some have spent this summer in industry; one accompanied a team of students in a highly successful summer work experience in Yosemite National Park.

Resource materials are made available to each teaching team for the development of the curriculum outline. For example, the Council on Hotel, Restaurant, and Institutional Education is currently studying and collecting all available materials under a U.S. Office of Education grant. The findings of this project should be available in the spring of 1967 and should be of great value to teachers and administrators developing new programs.

Courses and teaching guides from the American Hotel and Motel Association Educational Institute are made available for background instructional material. In addition, the complete set of manuals used in the Erie County Technical Institute commercial foods courses, the City College of San Francisco Hotel and Restaurant Department, and the Chadsey High School are utilized.

The Alice Statler Library at the City College of San Francisco is always open to participating faculty members. It provides the best reference library west of the Mississippi in the field of public housing and feeding.

The teams from all schools are brought together for a Saturday meeting once each semester. Teams report on developments in their schools; instructors in each discipline meet and exchange ideas; new resource materials are introduced and made available; and problems are aired and debated. In addition, the principals meet each semester to discuss their problems and share experiences.

Finally, the director and advisors at the City College of San Francisco are available to the team on a continuing basis.

Industry and Labor Involvement

An advisory committee from industry, labor, and post-high school programs has been developed for each of three areas — East Bay, Peninsula, and San Francisco. They serve as resource people for instructors and counselors, and they assist both in the workshops and conferences and in the development of work experience and placement programs. A sampling of their activities is outlined below:

A. Work with counselors
   1. make career materials available and participate in "Career Day"

2. align and make available the resources of:
   a. local associations and organizations
   b. the National Council on Hotel, Restaurant, and Institutional Education
   c. the American Hotel and Motel Association
   d. the National Restaurant Association

B. Work with director and school staffs
   1. act as resource people for teachers in curriculum matters
   2. participate in meetings
   3. develop scholarship programs
   4. participate in evaluation of program

C. Work with students
   1. confer with and guide in career matters
   2. give occasional lectures and demonstrations
   3. provide field trip experiences and assist in special activities
   4. make available work experience, and part-time and full-time work opportunities
   5. make necessary evaluations of the program and of student performance

Informed Leadership

The teachers in this program are relatively uninitiated into the industry for which they are training their students. The workshop provides some orientation and the advisory committee some support, but these alone are not enough. There is need for a director or coordinator who (1) understands industry and education (both high school and post-high school); (2) can assist teachers in the development of the program; and (3) may serve as confidant and counselor as teachers become confronted with completely new problems and situations. This type of supportive direction may very well be the most essential ingredient for the success of the program.

Such leadership has been provided by the program director, Hilda Watson Gifford. She is a graduate of the Cornell University School of Hotel Administration and has had extensive experience in industry, as well as in high school and junior college training programs. Her most recent activities were as Educational Director of the American Hotel and Motel Association. She is an accepted leader with international reputation in this field.

Members of the staff of the Hotel and Restaurant Department of the City College of San Francisco have also served as valuable resource people. The facilities of the College have proved indispensable in conducting the teachers' workshop and in developing the curriculum.

In addition to the important supportive role described above, the director has principal responsibility for: (1) selection and recruitment

of possible high schools; (2) planning and administration of the workshop, field trips, and conferences for teachers; and (3) development of a continuing training program for teachers and counselors providing necessary resource persons and materials. The director also assists participating schools in establishing criteria for the selection of students; in recruiting students through conferences and parents' meetings; in supervising teachers; and in establishing a liaison with an advisory group comprised of industry, local labor, and management organizations.

STUDENTS

The program has appealed to both boys and girls, with proportions ranging from all-boy programs to others having about half of each. The students, in most instances, have been selected from those failing to make satisfactory adjustment to their present programs and/or those who have expressed interest in a career in food preparation and service. The ability range has been broad, with a heavier representation from the lower ability groups. Early evidence indicates that the students from this latter group are now staying in school, becoming better citizens, developing employable skills, and performing quite satisfactorily in the school and industry responsibilities assigned to them so far. A more formal evaluation is planned, and there is reason to be optimistic about its findings.

Among the schools selected have been two with a preponderance of minority group students, one which is racially mixed with a predominantly lower middle class population, one Caucasian lower middle class, and one essentially middle class. The program, it appears, appeals to and affords opportunity for youth from the whole student population regardless of color, ability, or economic status. The primary prerequisite appears to be student interest and motivation.

HOW IS PROJECT FEAST DOING?

Although the Project FEAST program is completing only its second year, there is evidence that the anticipated results outlined earlier are being realized. Initial aspirations for the program focused on four major objectives: assisting students, improving teacher morale, helping industry, and improving articulation with junior colleges. Let us elaborate on the progress in these areas:

Assistance of Students

Project FEAST aimed to assist students by (1) giving new meaning to their high school experience; (2) serving those students who lack

the aptitude, interest, or motivation to succeed in existing college preparatory programs; (3) keeping many young people from dropping out of high school and entering the labor market unprepared; (4) affording students within the framework of the comprehensive high school an opportunity to select more realistic goals; and (5) preparing these students for a job, an apprenticeable occupation, or a vocational school or junior college program.

Of the original 26 students in Oakland Technical High School, 19 have completed Project FEAST. Of the three who graduated last fall, two are working — one as a cook, another as a baker — and the third tried junior college work, failed, and is now planning to enter industry.

This year (1966), 16 are graduating: five plan to attend the City College of San Francisco, ten plan to go to work; and one student is getting married and has no other present plans. Seven students did not complete the program: of these, one joined the Navy, one left school to marry, one dropped out of school, and the other four were advised to transfer to different programs because of lack of aptitude or interest.

At Pacific High School, of the 24 students entering the program, 21 are graduating. (Three students moved out of the area; one of these reported back that he obtained a part-time job on the basis of his training.) Of those graduating, five expect to continue at the City College of San Francisco, 13 plan to go to work, two will enter the service, and one girl plans to go to beauty school.

Team leaders and administrators state that they are pleased with the results and feel that the goals outlined above are being achieved. They plan to continue the program as part of their regular offering without foundation support. An interesting evidence of student interest is found in the fact that more students are applying for Project FEAST for the fall of 1966 than can be accommodated.

Improving Teacher Morale

It was hoped that Project FEAST would help improve the morale and thereby the performance of non-academic teachers. Previously their classes have too often been populated by problem students who lack interest and motivation. Through Project FEAST, the teachers' efforts have become more noticeable, because their courses are now part of a continuum leading to jobs. Students programmed into their classes are not only motivated, but they have realistic and obtainable goals. Consequently, these teachers have gained prestige and support by becoming part of a team with other high school teachers, junior college instructors, and representatives from labor and industry.

In an article in the May 1966 issue of *Reader's Digest*, one of the FEAST home economics teachers is quoted as saying, "I have been

in this school for twenty years, and this is the first time I have felt that I am really teaching something." Another defended her program in a letter to the editor of a local paper and stated: "The real value of the program is to the students, many of whom saw no value in school and did poorly in their studies. It has helped them to see a purpose and make full use of one of the fine educational opportunities provided at Ravenswood High School."

It is difficult to document the enthusiasm of the teachers, but the fact that they gave up two successive summer vacations to attend workshops testifies to their interest. Teachers have left the program for marriage, pregnancy, or transfer, but no teacher, counselor, or cafeteria manager has asked to be relieved because of discontent with the program.

Helping Industry

The hospitality field, like all other occupational areas, is sorely in need of qualified and productive personnel. Industry is finding that it has much to gain from Project FEAST.

The original enrollment in the first two schools was 50 students. In the fall of 1965, it was 155. In 1966, we expect over 350 students. From the original classes, 40 students will graduate. We have reason to believe that the holding power will continue, and next year we expect to graduate approximately 130. By the spring of 1968, it is reasonable to expect that these schools will prepare close to 250 young people per year for interesting, profitable, and productive careers.

Industrial leaders are showing increasing interest in the program. Tangible indications of their willingness to participate include: (1) their acceptance of invitations to speak to trade associations to explain the nature of the program; (2) their numerous visits to Project FEAST schools; (3) their encouragement of local administrators to undertake such projects; (4) their acceptance of responsibilities as advisory committee members; and (5) the opportunities for work experience — in the form of part-time and summer jobs — that they have made available to students. It is significant that there have not been enough graduates to fill all of the job opportunities offered by industry.

Improving Articulation with the Junior College

The initiative that gave birth to both the pre-tech and Project FEAST programs came from junior colleges — Cogswell Polytechnical College and the City College of San Francisco. Those of us who became involved in Project FEAST anticipated that the solution to many junior college problems might be found in programs similar to ours, i.e., those whose eleventh and twelfth grade offering might

become articulated with those of our thirteenth and fourteenth grade curricula.

Some of the junior college problems are: (1) the relatively low enrollment in semi-professional programs; (2) the need for more realistic matching of the goals of students with their abilities and with opportunities in the community; and (3) the need for an earlier occupational commitment, made possible by an exploratory experience in high school, and resulting in a firmer commitment on entry into college.

At the City College of San Francisco we are looking forward to the enrollment of the first group of twelve Project FEAST students. These students will be committed to careers in the hospitality field; they will have considerable training and work experience; and the prospect of their handling the more difficult junior college program is good. During this first year, we will observe their progress closely.

If our hypothesis is correct, when ten schools are operative we can expect to populate our program with a class that will consist predominantly of Project FEAST students. It is anticipated that a higher proportion of these students will complete our curriculum than is presently the case, and that some adjustments in our offerings will have to be made because of their FEAST experiences. We can then expect to graduate a student who is more competent technically. And we hope that we will be able to present a continuing program starting in high school at grade eleven and finishing at grade fourteen at the City College of San Francisco.

CONCLUSIONS

The early returns on Project FEAST support our hypothesis that the principles developed in the Pre-Engineering-Technology Program can be successfully applied to other occupational areas. It is our belief that these principles should lend themselves just as readily to the development of effective open-ended continuums in other areas, such as business, health services, and the visual arts. In our community, we are extending the experiment under VEA auspices to this latter area, and we hope to move into others in the near future.

Though the principles of the FEAST and pre-tech programs are essentially the same, there are certain differences, as we might expect, resulting from the nature of the industry and the population served. Among these are the following:

A Closer Liaison with Industry

It was necessary to develop a much closer liaison with industry in Project FEAST, because (1) graduating students planned to enter the

labor market upon completion of high school, or even earlier; (2) outside work experience had to be provided for all students in the twelfth grade; and (3) industry participated in teacher training in the summer workshop. This interaction between the educators and industry resulted in excellent student-teacher morale and in a feeling on the part of industry and labor that this was *their* program. One union went so far as to create a special classification for these students.

Adaptation to a Wide Range of Ability Differences

In the pre-tech program, the group selected was quite homogeneous in abilities, interests, and school achievement. But FEAST, as previously stated, was developed to serve a heterogeneous group. Job opportunities in the hospitality field are such that students with a wide range of abilities and school competencies are enrolled in the program, although they are to be prepared for the same broad occupational field. Among the FEAST students are included those who may leave before graduation, those who will barely graduate, and a few others who will go on to baccalaureate or associate of arts programs. The challenge of adapting to these differences is being met within classes by grouping, individual assignments, and other techniques. The members of the team discuss students as well as subject matter; information and observations are shared. As might be expected, this results in more effective guidance and teaching. In grade twelve, certain students who show exceptional promise and who have performed well in grade eleven are scheduled differently so that they can satisfy certain college matriculation requirements.

Project FEAST is demonstrating that the pre-tech principles can be applied to areas serving the entire range of abilities, and that in certain future programs an entire high school population could be served. We can now plan to move with confidence into other promising fields such as paramedical services with their variety of opportunities for high school students of different abilities and interests.

An Experienced and Informed Director

Finally, an important ingredient introduced into FEAST which distinguishes it from pre-tech — and which probably accounts for most of its success — was the appointment of a highly qualified director or coordinator. Mrs. Gifford's qualifications and contributions are outlined elsewhere in this report. In San Francisco, as we move into other areas, the first order of business will be to provide such leadership and direction. A fully qualified coordinator, working with high school and junior college teachers and administrators, and bringing them together with labor and industry, serves as the catalyst that leads to success.

DISCUSSION

ROBERT A. RISTAU
WISCONSIN STATE DEPARTMENT OF PUBLIC INSTRUCTION

This research conference has been especially good for those of us who are practitioners, because it has offered us a type of sophisticated learning experience which we need. The papers have presented concrete evidence in support of the "job-cluster" approach to vocational-technical education. Also embodied in various reports were techniques which proved successful in the effective articulation of high school and post-high school programs. I think it is important to recognize the role that these techniques play on each level, since a high school program must do more than simply meet the requirements dictated by a program "above it" if it is to be meaningful for high school students. I believe that there is some reluctance on the part of high school curriculum directors to have their programs dictated by college and post-high school requirements. However, this is not a serious problem once personnel from both levels of activity work together. It also seems significant to me that all of these programs are being offered in the comprehensive high school rather than in a separate vocational-technical high school. Although the information was not presented as such, I wonder to what extent teacher-pupil ratios were involved in the success that has been reported for each case.

Mr. Champion's program, besides having a great potential, is very well timed in terms of high school program development in Wisconsin. This program in particular helps us to confront the problems previously discussed at this conference concerning the apathy of the academic teachers toward vocational education. The involvement of the whole staff is one of the highlights of this program, I believe.

The motivation factors, of course, are of real interest to all of us; and I suspect that this may be due in part to the "pilot activity" of the project. It would seem necessary to keep this kind of stimuli within the program in order to maintain it at a very high level; this might in turn suggest that the "Hawthorne effect" would be perpetuated to some extent.

There is definitely a need to provide over-all guidance and coordination for this kind of program, and to sustain interest in redefining or reaffirming the goals of the project. In the Wisconsin high school program, many schools are using a staff person, referred to as a Local Vocational Education Coordinator, to give comprehensive direction

and coordination to the various programs. This person's role seems to be well established in the pre-tech development.

I would like to know more about the extent to which academic teachers are made to feel they are a part of the total program, since the ways in which this is done would be of great concern to us. I also wonder whether the content of courses in mathematics, English, etc., was actually modified as a result of this program.

It would be interesting to know more about the qualifications of those students who operated outside of the college-prep track program, and the extent to which any movement was permitted between the college-prep and the pre-tech sequences. It would also seem desirable to have the technical school personnel represented on the planning committee to help effect the articulation desired.

The "broadened goals" may have resulted from motivation to learn that which was not offered before. And undoubtedly there is a real need for a broad-base goal of related job clusters for those programs offered on the high school level.

The perception responses were most significant, and they indicate that the needs expressed by high-ability dropouts (such as those analyzed earlier in Mr. Cardon's presentation) are being met in this kind of program. This sort of activity is badly needed in today's public high schools, and it is a good example of the way in which vocational education can effectively respond to that need.

The time problem continues to rear its head, and apparently it can be solved in part through an extended employment period for vocationally qualified teachers. This would seem to be an excellent source of activity for teachers, and certainly a wholesome utilization of the talent and resources available in education.

It would be interesting to know whether there were any special qualifications looked for in the academic teachers who participated in this program. That is, were there desired qualifications or qualities beyond those which might have been developed in the orientation program preceding the development of the program itself?

Project FEAST, described by Mr. Batmale, was offered within the comprehensive high school, and I feel that it is significant because of the degree to which it is oriented toward continuing education.

One of the important aspects of this program is its ability to appeal to and handle effectively all levels of students who wish to enter the program, especially since there appears to be a sufficient spectrum of occupations within the project to handle a variety of student abilities and interests.

I wonder about the role of distributive education as a separate discipline in conducting this program. It seems to me at this point that the content relating to distributive education could well be handled by those who have a special background in that area; but I see no indication that distributive education personnel were utilized in the planning or implementing stages.

To what extent is the cooperative education phase essential to the total program? It would seem very likely that a great many simulated experiences could be provided in school which would be effective in the total training program.

Related to this is the question of whether this program would have comparable success in an area that is not highly urbanized. One of the problems which faces vocational education is that of providing realistic programs for students who live in basically rural areas; perhaps an adaptation of Project FEAST could be made for such schools.

I suspect that teacher orientation is a key to the success of a program such as FEAST, especially the degree to which teachers were "infected" with enthusiasm for both the food and hospitality field itself and for the education necessary in this area. An added factor in the program's success is, of course, the cooperation given by industry.

Finally, I must ask whether the FEAST program appeals to a variety of students, and whether the interested students look on it as a prestige program. It would seem desirable to evaluate this program in terms of student perception, as was done in the pre-tech research.

An analysis of the common elements of occupations, such as that carried out in the paramedical program discussed by Mr. Fetterhoff, is not only worthwhile in itself, but has significant implications for other vocational areas.

The variation in hours required by the different programs is interesting, and has presented some problems in terms of curriculum planning. Unfortunately, the number of hours required does not sufficiently reveal the extent to which the subject is treated in each program. Perhaps one of the contributions of this analysis is that it helps us to get out of the rut of thinking that certain courses must be standard in terms of the number of hours. More wisely, we might describe the subject matter content rather than the number of hours involved.

Would in-service programs at hospitals supplement or affect the paramedical program itself? Is there a necessity to articulate the paramedical programs offered in the high school with the in-service training conducted at various health institutions?

The program in general seems to have a potential for meeting short-term or intermediate career goals of students. Consequently, it might do a real service to students, as well as lead some of them into the higher levels of nursing or the medical technician occupations.

A common factor in the evolution of all the programs mentioned seems to be meaningful involvement during the planning phase. Both the time factor involved in the planning and development of the paramedical program and the participation of those who engaged in the planning committee activities seem to be significant.

However, it may be necessary to distinguish the more common occupations in terms of actual levels of training required in order to examine the nature of the performance demanded, and to identify the

kind of student who should enter the program. Information of this kind would help to determine those programs which would best be offered at the high school level and those which should be offered at the post-high school level. It would also provide an opportunity to give positive direction to articulated programs. In addition, there may be value in analyzing just how much these programs should appeal to various levels of students within a given student body.

The nature of the subjects involved in the paramedical program suggests a fairly high-level student, in terms of academic achievement. On the other hand, there appear to be important levels of accomplishment which might make the program appeal to a variety of students.

The comments which I have made are in no way meant to suggest that the programs are not very effective or valuable to us. I would hope that the discussions here will prompt other schools into activities which might bear comparable fruit.

JEROME MOSS, JR.
THE UNIVERSITY OF MINNESOTA

When the so-called "Richmond Plan" first came to the profession's attention several years ago, most of us were glad to learn that some innovations were going to be tried out in the high school program. Since then, it has been very impressive to learn how rapidly the original pilot programs have developed and expanded. It illustrates an encouraging willingness to change on the part of at least some educators and administrators. Certainly, those directly associated with planning, directing, and conducting the pre-tech and FEAST programs are to be commended for their efforts and congratulated for their many apparent successes.

But a discussant should not dwell on the merits of the projects that have been described; rather, it is more helpful if he plays the role of the devil's advocate by raising questions, probing for weaknesses, and by attempting to provide constructive criticism. Consequently, I shall raise certain questions and make comments about: (1) the nature of the innovations proposed, (2) the manner in which they have been implemented, (3) the results that have been observed, and (4) the long-range implications of the projects. My reactions are not based solely upon the papers presented, but they are also influenced by the reports of other persons who were or are directly associated with the projects.

What, then, are the innovations, common to both the pre-tech

and FEAST programs, that have been claimed to be significant? These, we are told, consist of an integrated, or at least a correlated, approach to subject matter, made practical through the mechanism of team teaching, with selected content relevant to the occupational goals of the students and consistent with labor force demands. While each separate idea is certainly not new or untried, their combination, if appropriately applied, has theoretical potential for (1) improving student motivation by illustrating the value of content for achieving occupational goals, and (2) increasing understanding of content by showing its interrelationships, providing for application, and thus developing a functional conceptual structure.

Unfortunately, it appears that the *manner* in which the more important of these innovations have been applied is almost haphazard. In both programs, the least attention, both theoretical and practical, seems to have been given to a systematic, replicable plan for organizing correlated subject matter, and for exploiting the potential benefits of team teaching. For example, the FEAST program describes an excellent, but not unusual, high school vocational program. Laboratory work is accompanied by related instruction in Foods English, just as mathematics for printers has and is being taught in other schools as related instruction for printers.

In the pre-tech program, a definite impression has been created that the potential correlation is actually cooperation among teachers when they find it convenient to do so within the structure of their respective subjects. With block time at their command, it is strange that no report has been made of trials with various size groupings of students that would evidence some reasonable degree of coordination. Moreover, unplanned inconsistencies in the organization of content among the several schools offering the "same" pre-tech program lends credence to the view that the most interested and strong-willed teacher in each team is controlling the internal structure of the respective curricula. This lack of systematic planning and implementation based upon some theoretical model may be convenient, but it provides little basis for the generalization of results; nor does it add much to education as a science.

The favorable preliminary results that have been reported by both projects are certainly open to serious question. The evaluation to date has been primarily subjective, based upon students who are screened volunteers *and* who have been deliberately manipulated to maximize the Hawthorne effect. There is an obvious need for a more rigorous evaluation of outcomes, including the influence of the programs upon subsequent post-high school experiences. Such an evaluation probably should have been incorporated into the projects at their inception.

When the long-range implications of these programs are examined, several questions can be raised with respect to their basic purposes.

The FEAST program presumes that it is most desirable to provide specialized education of a vocational nature *in the high school.* If one considers the need for increasing amounts of (1) common, general education, (2) the additional time becoming available for education, (3) the importance of delaying occupational choice, and (4) the difficulty of providing "comprehensive" curricula in the average and small size schools, etc., a case can be made for the desirability of putting off vocational instruction until the post-high school level. On the other hand, the pre-tech program has placed its emphasis on providing "pre-vocational" instruction. It, too, assumes that specialized education has a place in the senior high school, that the high school should and can afford to provide a wide variety of course patterns, each of which can best prepare students for particular kinds of subsequent occupational instruction, and that the pattern which makes the major contribution to the readiness of students who will later prepare for engineering technician positions is known.

None of these assumptions should remain unchallenged. For example, the results of several recent studies have failed to show any unique pre-vocational value in other courses or course patterns which purported to have that value. The preliminary findings of the pre-tech program itself can be interpreted to indicate that it might have equal usefulness for a much wider range of future occupational goals than originally envisioned. Thus, the specialized educational objectives of both programs are of questionable value.

However, the theoretical methodological innovations that are being tried out could have major long-range educational implications if they were appropriately adapted. By controlled experimentation with various combinations of integrated or correlated subject matter and team teaching techniques, it might be possible to improve the effectiveness and efficiency of the *common, general education* needed by all youth at the high school level, regardless of their particular occupational goals. This is one avenue of research that should be pursued.

The research effort of Mr. Fetterhoff's paramedical project consists essentially of a survey to obtain information, and a content analysis of that information, in order to provide guidelines for curriculum development.

With respect to the collection of data, the investigators have not provided any basis for estimating the representativeness of the school sample used, thus it is not possible to determine how broadly applicable the study results will be.

With respect to the content analysis procedure, several questions might be posed. First, is it wise to assume that current course offerings provide the best resource for a more effective curriculum? Second, how useful are the 124 different subject classifications that formed the basis of the analysis? For example, how mutually exclusive are they? What was the degree of agreement among judges in establishing

the categories and in assigning content to each category? Are the categories used—like general education, economics, sociology, etc.—too broad to be really effective in identifying common content? Third, could it be dangerous to use *hours* as the unit of measure indicating degree of commonality of content, and to use the resultant commonality of content as a guideline for curriculum development? Does this not ignore important differences in specific content, student ability and aptitudes, and *patterns* of content? Would this not tend to encourage the acceptance of a somewhat meaningless average as the basis for an "improved" curriculum?

In summary, and as the project directors themselves have implied, a lot of food has been brought to the table, there will be difficulty in digesting it, and its nutritive value seems slight.

HARLAND E. SAMSON*
THE UNIVERSITY OF WISCONSIN

The "Richmond Plan" program has become widely known and is frequently discussed, but it is good to hear directly from someone who has full and complete knowledge of it. It is interesting to note that this program began with a concern over the existing high school program. The principles and practices of high schools are not as frequently assessed and re-oriented as they should be. Thus, as we find too often, the school tends to remain fixed in its programs, while the needs of the students fluctuate and shift.

The significance of the pre-tech programs should be determined by looking at their objectives: "an attempt to do something for the capable average student who was not doing as well as should be expected." This objective, coupled with the need of industry and business for qualified "technicians" in a wide range of cccupations, places the emphasis of the pre-tech program on a problem of major importance.

The opportunity to be in a program where activity is meaningful and the "goal" more sharply defined should be significant to the student. The evaluation by the students—the one showing that 46% felt strongly that they had a definite advantage over students in other programs—indicates this (assuming that the scale used was more than two level; if not, then 54% felt it was a disadvantage and this would lead to a different conclusion).

The general satisfaction of the teachers is encouraging. Workshops for potential teachers seem to be highly desirable; and the work of

* These remarks were prepared by Mr. Samson, but delivered by Russell J. Hosler, Professor of Business and Curriculum and Instruction, The University of Wisconsin.

the Center for Technological Education appears to be dealing with this.

One of the strong features of the pre-tech program lies in the structure of the instructional staff. These people are not just "taking turns," but they represent an interdisciplinary approach in which they all focus on the same objectives. This concerted effort to keep on target is one excellent feature of the design.

Some questions about the program were not answered. These are: (1) How does this plan fit in with the industrial arts and the trade and industrial education programs of the schools? (2) How carefully is the student "selection" done? Are students "eliminated" from the program because they are not in college prep? (3) Is it the intent of the technical institutes to try not to provide make-up programs? (4) Has this program reached the right group of students?

One of the weaknesses of the design is the lack of time given to the instructors for planning. The impression was given that this might not be as serious when portions of the initial work are completed. This could be a false notion. Time for planning and coordinating of effort in any worthwhile program must be properly provided by the school. One of the serious shortcomings of many excellent program ideas is that they are undertaken without due consideration to the extra work required of the teacher. The Richmond Plan, because of its widespread publicity, could perform a service to education across the country if it included adequate time for staff planning and coordination. If people see the program operating without time provisions for staff, they will feel that such programs can be carried out that way in their community.

The cost of the pre-tech program is not indicated in any way. It would appear to be reasonable. The adaptability of the program to other schools should be easy, as evidenced by its current expansion within the immediate area.

In terms of the goals established, the program has probably done well. It might well be, however, that its greatest contribution has been to stimulate others to adopt and innovate along similar lines. The FEAST program is a good example of how other programs can be generated which would also have a terrific impact upon youth.

Turning now to Mr. Fetterhoff's paper, the continued expansion of services connected with health makes a study of paramedical occupations particularly significant. The urgency reflected in this paper is certainly justified, and its contribution should be reviewed carefully by those who are planning to develop additional programs for this field.

The single point that stands out as being most significant is the recognition that we do have a fragmented system of education for the paramedical occupations. With such a system, regardless of the occupational field, there is bound to be a certain amount of

inefficiency in conducting education. If, as a result of this study, duplication and overlap can be eliminated, an important contribution will have been made.

The design of this study appears to involve elements which are essential for programs of this kind: the advisory committee, collection of data directly from training institutions, the analysis of course content, and the classification of this data by careers. It would be interesting to note what percent the 110 training institutions represent of all training institutions in this area in the United States. It would also be useful to know whether or not the 20 careers represent an adequate picture of the occupations involved. The design assumes that each researcher will exercise the proper judgement in selecting a subject classification name. It might have been helpful to use terms of researchers who want independent classification and those on which there was an agreement, a determination jointly made as to the appropriate classification.

The real value of this study will be its usefulness to those who are planning programs, or who are revising or evaluating programs in the area of paramedical occupations. The study lays a foundation for more extensive and more comprehensive research.

The tables included in the report provide additional information and understanding about the project. Careful analysis of each of these by the principal investigator should aid the interpretation considerably.

Mr. Batmale, the City College of San Francisco, the San Francisco high schools, and the other personnel and institutions involved in Project FEAST should be complimented on a most innovative and worthwhile program. The development of this project appears quite sound and well conceived from the point of view of the most important group involved, the students.

The significant point was made that this program was directed toward a heterogeneous group of students. Too few occupational programs really achieve this perspective in their actual operation. Jobs in the food service industry do require a wide range of abilities and talents, and it is a pleasure to see a program that approaches training with this in mind.

The FEAST program is significant also in that it is making a deliberate attempt to hold students to a formal education program, as well as extending their educational level. The fact that those who complete one semester have something to offer is important. The concept of making continuing education a fundamental part of the program is also noteworthy.

The administrative design of the program is very good. It uses advisory committees to gain not only the advice, but the cooperation of industry as well. The teachers are supported by orientation periods plus adequate back-up in the way of materials and periodic joint

meetings. The impression is given that this project is more than just a team effort within a school, because it also extends *among* the schools. The lack of occupational experience is a recognized weakness.

Of particular interest in the Batmale study was the structure of the student's work within the school, which would seem an important way of keeping these students regularly involved with the rest of the student body. Thus, the inclusion of these students with others, in social studies and physical education, maintains their identity with the school and with their fellow classmates.

One of the essential ingredients in occupational education seems to be flexibility. The design of the FEAST project does provide this, which is undoubtedly one of the features that is contributing to the program's success.

The follow-up and evaluative comments are encouraging. It would be interesting to build in a more vigorous evaluation plan. Perhaps a longitudinal follow-up study on the enrollees, whether they graduate or not, would produce some findings in a few years that would be valuable not only to FEAST but to other programs. The characteristics of the students entering the program are unique enough that such additional research should be most worthwhile.

The report does not give information on the cost of the project. However, the staffing costs would not appear to be high. And the in-school laboratories of the home economics departments and the school cafeterias are not additional new costs. A statement about the economic feasibility would be helpful to others who might wish to consider adoption of the plan.

The presence of Mrs. Gifford is one of the elements of the FEAST project which would be hard to match anywhere else. Her stature in the field certainly has moved the local industry to accept and cooperate with the program, where it might not be so easy in other cities and states. The dedication of the staff also seems to be a contributing factor. It is apparent that these people believe in what they are doing, and thus get it done.

It was noted that the support and cooperation of the junior colleges was essential to the project. In any feasibility analysis of such a project, the attitude and philosophy of the post-secondary institutions would be important. The post-secondary school must have a concern for the vocational level of training as well as for the articulation of students to advanced work. The students should not be viewed simply as selected clientele for the Associate Degree.

Again, the project staff and sponsors should be complimented. The project is a fine contribution, and the report was well done.