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ABSTRACT

This analysis of current and available information on the evaluation of vocational education and its policy implications includes a methodological appendix showing major studies of cost-effectiveness analysis, a critique of the various techniques employed in these studies, and an extensive bibliography of relevant source materials and related studies on vocational education evaluation. The present vocational education system is an umbrella for a wide variety of programs, which have as a common denominator their eligibility for Federal support through the different vocational education acts and amendments. These programs usually supply students with a marketable skill while providing them with a basic knowledge of the humanities and may include training in homemaking skills and consumer education. On-the-job training, apprenticeships, community colleges, and other programs supplement vocational education curriculums offered in public schools. In fiscal 1970, only one sixth of the total government expenditures for vocational education represented Federal funds, showing that Federal support is too small a percentage of the total for the Federal Government to be a primary change agent within vocational education. Part II of this report is available as VT 017 227 in this issue. (AG)

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POLICY ISSUES AND ANALYTICAL PROBLEMS IN EVALUATING VOCATIONAL EDUCATION

PART I

FINAL REPORT
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POLICY ISSUES AND ANALYTICAL PROBLEMS IN EVALUATING VOCATIONAL EDUCATION

Center for Priority Analysis
National Planning Association

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U.S. DEPARTMENT OF
HEALTH, EDUCATION, AND WELFARE

Office of Education
Office of Program Planning and Education

FOREWORD

This final report delineates policy issues and analytical problems involved in the evaluation of vocational education. The study was performed for the Office of Program Planning and Evaluation of the U.S. Office of Education by the National Planning Association's Center for Priority Analysis.

This report consists of an analysis of current and available information on the evaluation of vocational education and its policy implications, a methodological appendix showing major studies of cost-effectiveness analysis and a critique of the various techniques employed in these studies. Also included is an extensive bibliography of relevant source materials and related studies on vocational education evaluation.

The National Planning Association wishes to express its appreciation to national and state officials representing the Office of Education and personnel from various information sources such as libraries and information systems, whose cooperation made this study possible.

The report was conducted under the overall direction of Dr. Leonard A. Lecht, Director of the Center for Priority Analysis. Project Manager was Dr. Marc Matland and Principal Investigator, John B. Teeple. Project Staff who conducted major portions of the study were Dr. Leonard A. Lecht who authored the policy paper and Dr. Ernst Stromsdorfer, Associate Professor of Economics, Indiana University, who developed the methodological appendix. Ann Parker Maust, Elizabeth McGovern and Neil McMullen worked on the identification of relevant studies for the bibliography. Others who contributed to the project include Michael Carbine, Rory Redondo, Nancy Monroe, Margaret Takenaka, and Chris Muzyk.

The assistance and cooperation of the project monitor, Emmett Fleming, Jr. is hereby acknowledged.

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Appendix A

Chapter 1

Introduction and Summary

I.

Vocational Education and National Priorities

There has been considerable controversy in the past decade concerning the role, the adequacy, and the objectives of vocational education. Much of this questioning arises from changes in the larger society, and from the need by the educational system to define responses to these changes. Vocational education is an educational program, and it has also taken on aspects of a manpower and social program. Recent legislation, i.e., the 1968 Amendments to the Vocational Education Act, assigns a high priority to vocational education as a program for meeting the nation's manpower needs and increasing economic opportunity for the disadvantaged and the handicapped. This report attempts to summarize the implications of recent research for national policy in vocational education.

Few sharp lines can be drawn between "vocational" and "nonvocational" education. Mastering the basic skills of reading, writing, and arithmetic is an activity with important vocational connotations since an inadequate grounding in these subjects constitutes a severe barrier to employment in other than the least skilled and the poverty-prone occupations. Similarly, the vocational courses can be used as the setting for inculcating basic learning skills. Mathematics may be taught by job related problems, while English may be learned by reading work instructions as well as conventional textbooks.

Moreover, many students in vocational education are pursuing these subjects for their avocational interest. Young people enrolled in auto mechanics or typing courses may be interested in learning how to repair their automobile or how to type term papers rather than in the use of this knowledge for gainful employment.

The present vocational education system is an umbrella for a large variety of programs. Most of these programs attempt to supply students with a marketable skill while at the same time providing them with a basic knowledge of English, arithmetic, and social studies. Others offer training in homemaking skills and consumer education, activities which contribute to the welfare of individuals although this contribution is not included in the measures of the Gross National Product or the labor force. The common denominator of these programs is their eligibility for Federal support through the different vocational education acts and amendments. For purposes of completeness, enrollments in home economics are included in the count of enrollments in this report, but the homemaking programs are omitted in reviewing the evaluative research on vocational education. They are excluded because these programs are not set up to impart vocational training.

The federally-supported vocational education system is only one of a number of channels by which training can be acquired for nonprofessional work. For workers already employed, much training is acquired on-the-job. Apprenticeship programs are an important source of training in many skilled crafts, particularly in the building trades. The existence of private vocational schools is a testimony to the desire of many people to gain specific occupational training through formal educational programs. In the public sector,

some skills acquired through training in military service are transferable to civilian employment. Community colleges, in recent years, have greatly expanded the scope of the occupational preparation offered in these institutions very largely without the support of Federal funding. The massive growth of the Federal Government's remedial manpower training programs for adults in the 1960's underscores the importance attached by our society to enhancing earning capacity and employability as the remedy for the poverty of persons who are, or who could readily be, in the labor force. The specific differentiating feature of vocational education is that it is occupational instruction provided by professional educators in a school context and offered largely, but not exclusively, to young persons who are not yet in the labor force.

Persons seeking an assessment of vocational education are typically concerned with the Federal Government's policies as they involve national problems and priorities. There is considerable interest, for example, in the effects of the Federal support in increasing the enrollment of students from disadvantaged backgrounds, or in enlarging the relatively low enrollments in fields of rapidly expanding employment opportunities, i.e., the health occupations. However, decisions in vocational education are largely made by state and local education agencies who implement priorities as they are defined by these agencies of government in education. While Federal funds and regulations for qualifying for them may influence the decisions, the Federal Government's support is too small a share of the total outlay to be a primary agent for change in many areas within vocational education. For instance, in fiscal 1970,

a reported total of $1.8 billion was spent by Federal, state, and local governments for vocational education. Approximately $300 million of this sum, or one sixth of the total, represented Federal support for vocational education.[1/]

1/ Trends in Vocational Education, Vocational Education Information No. 3, U.S. Office of Education, June, 1971, Table 6, p. 14.

II.

Students and Enrollments

A person seeking information about the students enrolled in vocational education programs is likely to encounter a series of problems tracing back to a long-standing inadequate data base and reporting system. The Advisory Commission on Vocational Education reported in 1968 that "because of the absence of information on who receives vocational education, how much they receive of what kinds, (and) what its quality is, we have been unable to complete satisfactorily our assignment to appraise the results of VEA 1963."[2/] There have been considerable improvements in the data system since 1968, but the underlying inadequacies of the data still pose a formidable obstacle in obtaining answers to such basic questions as the number of students enrolled in vocational education. An order of magnitude improvement in the vocational education data reporting system, a change likely to be facilitated by Federal support coupled with more rigorous Federal reporting requirements, is a first priority for monitoring changes in the structure and progress of vocational education.

The student data published by the U.S. Office of Education largely deals with program or course enrollments, and for this reason, the data contains a substantial, but unknown element, of double-counting of students in vocational

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2/ Education for Employment: Report of the Advisory Council on Vocational Education, 1968, reprinted as Policy Paper in Human Resources and Industrial Relations No. 14, Institute of Labor and Industrial Relations, the University of Michigan - Wayne State University, and the National Manpower Policy Task Force, 1969, p. 44.

education.[3] In addition, the enrollment data generally refer only to programs funded by Federal sources, since it is the Federal funding which gives rise to the reporting requirement. Accordingly, little is known, to cite one instance, about the number of students in course enrollments in the extensive vocational programs offered in community colleges. There are many special studies dealing with the socio-economic backgrounds of students or their performance after graduating from high school. These studies are frequently based on surveys with low response rates, or they fail to distinguish between the program variables and student characteristics such as learning ability which influence outcomes after leaving school.

To cope with these problems, the National Planning Association has evaluated the recent studies and reports in vocational education in the light of their assumptions and research techniques. Special attention has been given to one of the most recent studies, the National Longitudinal Surveys conducted by the Center for Human Resources Research at Ohio State University and the Bureau of the Census.[4] The nonresponse rate in this survey for young out-of-school males in 1966 and 1968 was less than 20 percent.

Program type and characteristics of students must be taken into account in any assessment or program survey. The indicators of success should relate to improvements in earnings, the time lost because of unemployment, and the further education of the students who are enrolled in them.

3/ For examples, see Trends in Vocational Education, op. cit., and Vocational Education: Characteristics of Teachers and Students, 1969, U. S. Office of Education, 1970.

4/ National Longitudinal Surveys, Survey of Work Experience of Males, 14-24, 1966, and Survey of Work Experience of Young Men, 1968, Center for Human Resources Research, Ohio State University, and U.S. Department of Commerce, Bureau of the Census, 1966 and 1968, often referred to as the Parnes study.

The overall findings relating to student backgrounds, program characteristics, and enrollments are summarized below. They are:

1. Most students in vocational education come from families with a lower socio-economic status than the population at large. Nearly 1 in 5 high school graduates, for instance, come from families in which the father went to college. Only 1 in 10 vocational graduates comes from similar family backgrounds.[5/]

2. Enrollments in agriculture and homemaking, the two programs least related to career opportunities, declined as a proportion of total enrollments in the 1960 to 1970 period. Excluding the enrollment in office occupations first listed in 1965, this proportion fell from 63 percent of the total in 1960 to 49 percent by 1970.[6/]

3. Enrollment in the agricultural programs, although declining as a share of the total, still amounted to 850,000 in 1970, or about 50,000 more than in 1960. Employment in the farm occupations fell by 2 million between these two years.[7/]

5/ Somers, Gerald G. et. al., The Effectiveness of Vocational and Technical Education, Center for Vocational and Technical Education, University of Wisconsin, 1971.
6/ Derived from Table 3-2 passim.
7/ Derived from Table 3-2 passim, 2-v, Manpower Report of the President, 1971, Table A-9, p. 215

4. The most rapid growth in vocational enrollments in the past five years has taken place in the post-secondary programs, frequently 13th year programs closely linked with labor market needs. Enrollment in the post-secondary programs grew from 200,000 to 1,000,000 between 1965 and 1970.[8/]

5. Young persons from disadvantaged groups are substantially represented in the vocational programs. For instance, a survey of young men in the labor force in 1968 showed that the same proportion of blacks as of whites, 16 percent, had high school concentrations in vocational or commercial programs.[9/] There is some evidence that the percentage of nonwhites in the vocational programs has been increasing during the 1960's.

6. Completions of vocational programs in 1968 amounted to about a third of the anticipated annual job openings for high school graduates in 1980. While completions were about two-fifths of the estimated future job openings in mechanical crafts or clerical occupations, they were less than one-tenth in rapidly growing fields such as the nonprofessional health or the protective service occupations.[10/]

7. Enrollments in new and innovative programs in vocational education, although growing, are still small. Enrollment in the cooperative work-study program, for instance, amounted to less than 300,000

8/ Derived from U.S. Office of Education, Trends in Vocational Education, Vocational Information, No. 3, 1971, Table 5.

9/ Unpublished data, National Longitudinal Surveys, Survey of Work Experience of Males 16-26, 1968, U.S. Department of Commerce, Bureau of the Census, and Center for Human Resources Research, Ohio State University.

10/ See Table 4-1 and its sources.

in 1970, or something under 4 percent of all vocational enrollments.[11/]

8. The distribution of enrollments in the high school vocational programs perpetuates the traditional stereotypes of "men's jobs" and "women's jobs." Women, for example, constitute over 90 percent of the enrollment in health programs and less than 10 percent in the trades and industry and technical programs.[12/]

The overall drift of these findings is that as enrollments and programs have expanded in vocational education, they have become more responsive to career opportunities and to national priorities. However, these changes have taken place with many lags and inconsistencies as is illustrated by the persistence of the large enrollments in the agricultural programs. The vocational education programs which have grown most rapidly in enrollments in the past five years, the post-secondary courses, are also the programs in which the economic return to the students is greatest.

11/ See p. 1-18, footnote 24.
12/ Trends in Vocational Education, op. cit.

III.

Indicators of the Success of the Vocational Programs

Since vocational education programs include both educational and manpower aspects, the criteria by which their success is evaluated must take into account both the educational and the economic dimensions.[13] The relevant indices of economic success would include the earnings and unemployment rates of vocational students as compared with similar students in academic and general programs. The indicators of successful outcomes should also allow for differentials in dropout rates among students in different curricula and for difference in the likelihood of their continuing with further education after leaving high school. Recent studies, however, question the emphasis on low high school dropout rates as a measure of the success of secondary school programs for students with widely diverging backgrounds, aspirations, and ability levels.

Evaluations of vocational education could be undertaken solely in terms of economic efficiency criteria, that is, by seeking the programs which yielded the greatest ratio of dollars of benefits for each dollar of costs. Since the costs per student in vocational programs typically run an estimated $100 to $200 more than in secondary programs generally, a positive rate of return to outlays in vocational education presupposes a larger dollar return than in other high school curricula.[14] However, efficiency criteria are only

13/ If adequate data were available, it would be desirable to include indicators of job satisfaction, personal fulfillment in nonvocational activities because of participation in vocational programs, and similar social-psychological measures.

14/ For a discussion of costs per students, see chapters 5 and 6.

one of several measures utilized in appraising the vocational education programs, and they sometimes conflict with other criteria such as equity considerations. If national policy were concerned only with efficiency criteria, the appropriate policy would be to invest resources in the education of the most capable and to ignore the handicapped and the disadvantaged. Since the Federal Government's policy assigns a high priority to increasing the enrollment of students from disadvantaged backgrounds in vocational education, comparisons of economic returns must allow for the variation in socio-economic backgrounds and in learning ability of the students in different high school curricula.

The economic rationale for vocational education has been based on the perception that increasing the occupational skill level of individuals by formal training or other means generally increases their earnings and reduces their susceptibility to unemployment. In 1971, for example, the unemployment rate for laborers (other than farm laborers) was 10.8 percent, for semi-skilled operatives it was 8.3 percent, and for skilled craftsmen the comparable rate was 4.7 percent.[15/] The median annual earnings for male laborers in 1969 was just under $2,500 as compared to nearly $6,250 for operatives, and almost $7,950 for craftsmen and foremen. This economic rationale has been adhered to in hopes of reducing the high unemployment rates among out-of-school teenagers, the highest rates for any group in the labor force. In 1971, the unemployment rate for nonwhites in the 16 to 19 year age group

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15/ Manpower Report of the President, 1972, Table A-17, p. 179.

was nearly 32 percent, and the rate for white teenagers was 15 percent. The economywide unemployment rate for all age groups in 1971 was 5.9 percent.[16/]

The National Longitudinal Surveys (the Parnes study), the most recent and one of the most reliable of the surveys of out-of-school youth, confirm the findings of earlier studies indicating that the exposure to the vocational programs increases earnings. However, the Survey also shows that the effects of vocational education on earnings are highly sensitive to changes in economic conditions. The Survey data on which this conclusion is based summarizes the experience of out-of-school males in the 14 to 26 year age group in the fourth quarters of 1966 and 1968. The Survey data show no significant differences in the earnings of out-of-school young males from different high school curricula in the fourth quarter of 1966, a period marked by cyclical downturn and growth in unemployment. Significant differences show up for the fourth quarter of 1968, a period of rising economic activity and declining unemployment rates. For this period, statistical analysis which controls for a variety of social and demographic variables shows that the former vocational students earn about $400 more a year than do the former academic students who were in the labor force at the time of the survey, and about $275 more than the students with a background in the general curriculum. The National Survey data also show somewhat higher average employment rates in 1968 for young men whose high school background was in the vocational as compared with the academic or general curriculum. Another study, a case

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16/ Ibid., Table A-5, p. 163.

study of three cities, shows that high school graduates from the vocational curriculum in the instances surveyed experienced 5 to 10 percentage points more time employed during a six-year follow-up period than was the case with the graduates of the academic programs who did not attend college.[17]

The findings based on an analysis of the National Survey data suggest that the influence of vocational education on earnings is more closely related to changes in labor market conditions than had been thought to be the case before. In periods when rising levels of economic activity reduce the pool of unemployed persons, employers are more likely to seek out the vocational graduates and to utilize their school training as the basis for more specialized on-the-job training. At times when economic activity is slackening and unemployment is rising, the economic premium attached to vocational training diminishes as other persons with work experience compete for the same jobs with recent graduates with little or no experience.[18]

To many, it appears that the primary rationale for vocational education grows out of its potential to serve as general education, especially for students with limited verbal skills and interests. The physical setting, freedom of movement, personalized instruction, and the emphasis on physical skills in the vocational programs are widely believed to motivate the less verbal students to remain in school rather than to become high school "drop-outs."

17/ Teh-wei Hu, et al., A Cost Effective Study of Vocational Education: A Comparison of Vocational and Nonvocational Education in Secondary Schools, Pennsylvania State University, University Park, Pa., 1969.

18/ In interpreting the experience in the two years, an allowance should be made for the fact that the persons surveyed were two years older in 1968 than in 1966 and they had generally acquired two more years of labor market experience.

There is little evidence that exposure to the vocational programs encourages students to remain in high school until they graduate. The National Survey data show that the graduation rate for young out-of-school males with backgrounds in the academic curriculum was 21 percentage points higher than for students in the vocational programs. For blacks, the differential favoring the academic curriculum was 34 percentage points. The dropout rates for young males from the vocational and general high school programs were similar. These findings are substantiated by other studies such as Project Talent.[19/]

The reasons for the low retention rate among vocational students, or the significance to be attached to this rate, are unclear. It may be that the vocational students are more dropout prone because they have more readily marketable skills than the academic students or because the vocational programs attract students who are more likely to drop out. It may also be that the typical high school vocational program is too long for students seeking entry level training in specific occupations. Recent studies suggest that 3 and not 4 years may be an optimal length of high school in terms of school costs and earnings foregone in a number of occupations, i.e., electricians or machinists.[20/] Other studies indicate that the low lifetime earnings of dropouts are more closely related to their low socio-economic background, low scores on the standard tests of academic ability, and to being held back

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19/ See analysis of Project Talent data in "An Analysis of Vocational Education in Our Secondary Schools," (unpublished), U.S. Office of Education, Tables 20, 21, pp. 28-29.

20/ See Appendix Table VI-15.

in school than to the presence or absence of a high school diploma. Dropping out, by itself, according to Dr. Jerald Bachman of the University of Michigan, author of a recent report on the problem, is "neither good nor bad."[21]

While exposure to vocational education may not increase high school graduation rates, recent studies show that secondary vocational education frequently provides a foundation for further schooling. Over half of the vocational high school graduates obtain some additional education after leaving school. However, the vocational students are considerably less likely than their academic curriculum counterparts to attend college. According to the National Survey, the vocational students show about 55 percent less attendance in a college at any time than the students in the academic curriculum. The Metro study indicates that the proportion of vocational program high school graduates who enter full-time college programs in the semester following high school graduation is about the same as for graduates of the general education curriculum, about one-fourth of each group.[22] Thus, the vocational students make up a substantial part of the high-school student population who have not absorbed the prevailing middle class belief that a four, or at least a two-year college degree is an essential prerequisite for economic, social, and personal fulfillment in American society.

The studies dealing the economic and educational performance of the vocational students are far from conclusive. They make a reasonable case for a positive economic return to investments in vocational education. The studies also challenge the notion that vocational education should receive support

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21/ The New York Times, May 7, 1972, Section IV.

22/ Eninger Max, et. al. Effectiveness Evaluation for Major City Vocational Education Systems in the United States (in process).

because it encourages students with limited verbal ability to remain in school. The problem in assessing the economic return to vocational education is that a great deal may be expected from a program with a limited purpose without recognition of the condition which is necessary for its success -- a dynamic economy.

IV.

Looking Ahead to 1980

Vocational education is only one, although it is the largest, of the publicly supported training programs. Changes in the composition of the workforce and implementation of new concepts in career education suggest potentials for a greater role for vocational education in the decade ahead. The rapid rates of increase in employment in the 1970's are projected to take place in the services sector in the private economy and in state and local government in the public economy. Young people who are prepared to become competent auto or electronic equipment repairmen, to fill the many technicians jobs likely to develop in connection with pollution control, or to enter the nonprofessional health occupations are likely to find themselves with many options for employment in the next decade. So far, programs and enrollments related to these areas of anticipated rapid employment growth have been modest in vocational education. Enrollment in the health occupational training programs, for instance, made up slightly more than 2 percent of all enrollments in 1970. The progress of the vocational education system in the next decade will reflect the extent to which more changes are made to align program offerings more closely with the areas of expanding employment opportunity.

Many of the occupations for which a college degree is typically the prerequisite for admission are expected to provide lesser opportunities in the

next decade as the supply of graduates increases more rapidly than job openings.[23] Teachers, engineers, and scientists are currently the leading instances. As the occupations which employ college graduates frequently become overcrowded, the attractiveness of vocational education can be expected to increase to many young people, their parents, and the community. Current developments in career education to equip all young people with entry level job skills whether they leave school at minimum school leaving age or go on to further education should increase the options open to vocational education in the 1970's. One of the options which will probably receive greater support are the work-study programs carried on in cooperation with industry. Cooperative education has grown slowly in the past because it requires special time-consuming attention to each student and because the concept must be sold to employers to enlist their cooperation. However, by 1980 it is a reasonable anticipation that emphasis on new departures in career education will multiply the present 300,000 students enrolled in these programs by as much as several times over.[24]

Changes in Federal-state-local financial relationships can significantly reshape priorities in vocational education in the next decade. State and local expenditures for vocational education have been increasing more rapidly than the Federal support since the mid-1960's. Accordingly, the Federal share of the total has decreased from 29 percent in 1966 to 16 percent in 1970.[25] If the Federal Government's share in vocational education expenditures continues to decline in the next five or ten years, it is also likely that the

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23/ For a discussion of this problem see Ginzberg, Eli, The Outlook for Educational Manpower, 1972.

24/ Manpower Report of the President, op. cit., p.93.

25/ Trends in Vocational Education, op. cit. Table 6, p. 14.

Federal Government's role in determining priorities will become reduced. Many state and local governments, for instance, may be more concerned with the potential for attracting new industries to their state or locality by providing a pool of skilled manpower trained at public expense than in increasing the enrollment of hard-to-train disadvantaged persons in the vocational programs. Current proposals for revenue sharing in education now receiving consideration in Congress and elsewhere would have the effect of reducing the weight of the Federal Government's priorities and increasing the importance of state and local decision-making in vocational education. Whatever the specific priorities to be implemented by the vocational education system in 1980, they will be substantially influenced by the changes in federal-state financial relationships adopted in education in the next few years.

Ch. 2 The Socio-Economic Background of the Students in Vocational Education Programs

I.

Data Gaps and Policy Choices

In 1970 nearly 8.8 million students were recorded as enrolled in vocational education courses eligible for Federal support.[1/] While the data describing the socio-economic backgrounds of the vocational students is often incomplete and contradictory, it is apparent that the vocational programs serve a student population drawn from families with a preponderance of heads who are blue collar workers and persons with less than a full high school education.

Many important policy choices in vocational education depend on what is known, or assumed, about the social and economic backgrounds and the ability levels of the students in vocational education. For one consideration, are the vocational programs in fact taking on substantially more of the character of a social program concerned with students from low-income and minority group backgrounds? Should an expansion of supporting services such as remedial education and special counselling services receive a high priority in order to overcome the educational and motivational handicaps imposed by disadvantaged family backgrounds? Do the ability levels of the vocational students in the secondary schools suggest a need for focussing on an expansion of programs leading to employment in highly skilled specialities such as medical or electronic technology, or should the emphasis be placed on occupations with lesser skill requirements?

To answer these questions requires recourse to reasonably reliable and comparable data in periodic reports and special studies extending over a period

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1/ Trends in Vocational Education, Vocational Education Information, No. 13, U. S. Office of Education, 1971, Table 1, p. 6

of time, usually about five or, preferably, ten years. The researcher or decision-maker who seeks to make use of the currently available information frequently encounters a maze of inconsistent and incompatible estimates, especially in the data relating to developments over time. The problems in utilizing this data, and the conclusions which can be drawn from it, are discussed in the sections which follow.

II.

Conflicting Reports and Data Sources: The 1970 Report

There has been considerable controversy extending back to the discussions preceding the adoption of the 1968 Amendments about the extent to which the vocational students resemble or differ from the general student population in their socio-economic characteristics. Thus, the U.S. Office of Education reported in 1970, on the basis of a 1969 survey, that "taken as a whole, students attending vocational classes...were an approximate cross section of the total population of comparable age groups." [2] Other studies such as an unpublished analysis of the Project Talent data issued by the Office of Education in 1967 conclude that "high school students enrolled in vocational programs are usually from poor socio-economic backgrounds and have low academic abilities." [3]

The 1969 survey was undertaken to fill in gaps in information about the vocational students which had been pointed out in the 1968 Report of the Advisory Council on Vocational Education. [4] The report published in 1970 is the most recent and the most comprehensive analysis which currently is available describing the backgrounds of the students in the vocational programs.

There is reason to question parts of the data, and, therefore, the conclusions in the 1970 report. Occupation, income, and educational attainment make up the three primary indicators of socio-economic background. A comparison of the occupational data for the heads of the families from which the secondary level vocational

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[2] Vocational Education; Characteristics of Students and Teachers, 1969, U.S. Office of Education, 1970, p. 9

[3] An Analysis of Vocational Education in Our Secondary Schools, U.S. Office of Education, (unpublished), 1967, p. 1

[4] Characteristics of Students, op. cit., p. 40

students are drawn with the corresponding educational and income data in the report suggests major inconsistencies in the three indicators. The occupational data listed for the family heads, moreover, appears doubtful in the light of the overall occupational distribution of the employed labor force. The occupational information for the family heads and for the entire labor force is listed in Table 2 - 1.

TABLE 2-1

Occupational Distribution of Heads of Households of Secondary Vocational Education Students and Employed Labor Force in 1969

Occupational Group	Percent Distribution of Employment	
	Heads of Households (a)	Employed Civilian Labor Force (b)
Professional & Technical Workers	15.0%	13.8%
Managers & Officials	2.0	10.2
Clerical Workers	5.6	17.2
Sales Workers	2.2	6.0
Craftsmen & Foremen	47.5	13.1
Operatives	12.6	18.4
Laborers (a)	2.7	4.7
Service Workers	11.4	12.2
Farm Occupations	1.0	4.2
Total	100.0	100.0

Sources: (a) Characteristics of Students, op. cit., Table A-26, p. 32

(b) Manpower Report of the President, 1972, Table A-11, p. 172

The 1969 Office of Education survey indicates that the secondary vocational education students come from families with a somewhat greater concentration of professional and technical workers among the family heads than in the employed civilian labor force, and a far greater concentration of craftsmen and foremen. About five-eighths of the heads of families from which the vocational students were drawn in 1969 were in these occupations as compared with slightly more than one-fourth for the entire employed labor force. Nearly half of the family heads, according to the 1969 survey, were skilled craftsmen or foremen. This is nearly four times the proportion in the overall labor force. If the survey is correct, the less skilled and more poorly paid occupations, such as operatives and laborers, the farm occupations, and white collar workers other than those in professional and technical occupations, are substantially underrepresented among the family heads in the universe of families from which the vocational students are drawn.

The data on the occupational distribution of the heads of families listed in Table 2-1 is inconsistent with their reported earnings and level of educational attainment. Professional and technical workers and craftsmen and foremen have incomes which are typically considerably greater than the average earnings for all employees. In 1969 the median earnings of persons in these occupations exceeded the median earnings of persons in all civilian occupations by a range, varying with occupation, of from $1,000 to $4,000.[5/] By comparison, the incomes reported for the families of secondary vocational students in 1969 indicate a greater concentration in the low income brackets and a lesser concentration in the higher income brackets than for the population at large. For instance, only about a third,

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5/ U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 75, and Statistical Abstract of the United States, 1971, Table 360, p. 229

35 percent, of the families of the vocational students reported incomes of $10,000 or more in 1969.[6/] The corresponding percentage for all families in that year was 46 percent.[7/]

The data on educational attainment again show that the vocational students come from families concentrated in the less advantaged occupational and socio-economic strata than the overall population or students in other curricula. Table 2-2 describes the reported distribution of educational backgrounds of the heads of families of secondary vocational students in the 1969 survey, and of the fathers of students in vocational and academic curricula as reported by the Center for Vocational and Technical Education at the University of Wisconsin in an analysis based on a 1966 survey. This information is compared with the distribution of educational attainment for persons in the employed civilian labor force who were at least 18 years old in 1969.

6/ Characteristics of Students, op. cit., Table A-18, p. 26

7/ U.S. Department of Commerce, Bureau of the Census, Current Population Reports, Series P-60, No. 59, Statistical Abstract, 1971, Table 500, p. 316

TABLE 2-2

Selected Data on Educational Backgrounds of Families of Vocational Education Students and Comparison Groups, 1966 and 1969

ational Attainment	Percent Distribution of Educational Attainment			
	Heads of Households of Secondary Voc. Students, '69 (a)	Fathers, High School Vocational Students, '66 (b)	Fathers, High School Academic Students, '66 (b)	Employed Civilian Labor Force 1969 - (c)
8 years or less	27.5%	32.5%	25.7%	18.6%
Some high school	21.4	24.3	18.8	17.8
Completed high school	30.5	32.7	35.6	38.4
Some college or college degree	16.5	10.6	19.9	25.2
Other	4.1	--	--	--

Sources: (a) Characteristics of Students, op. cit., Table A-25, p. 31

(b) Somers, Gerald G., et. al., The Effectiveness of Vocational and Technical Programs, Center for Vocational and Technical Education, University of Wisconsin, 1970.

(c) Manpower Report of the President, 1972, Table B-9, p. 203

Professional and technical workers are characterized by a preponderance of persons with some or a full college education while craftsmen and foremen are typically high school graduates. The median number of years of school completed by professional and technical workers in 1969, for example, was over 16 years, or more than four years of college.[8] Both the 1969 survey and the Wisconsin study[9] show that the heads of the families from which the vocational students come have a lesser level of educational attainment than the employed civilian labor force generally or the fathers of high school students in the academic curriculum. There is a considerably smaller proportion of family heads with some college education in the families of the vocational students, and a considerably larger percentage of persons who did not complete high school or who had received eight years or less of schooling.

The Office of Education's analysis of the Project Talent data in 1967 supports the conclusion that the vocational education students are largely drawn from families in the less favored socio-economic strata. According to this analysis, nearly 80 percent of the male high school graduates from the vocational programs, and over 70 percent from the commercial programs, come from the two below average socio-economic quartile ranges.[10] The Project Talent data also suggest that the vocational programs include a substantial concentration of students with below average academic ability levels as measured by tests of verbal knowledge, visual reasoning, mathematical aptitude, general knowledge and similar indices. This information is summarized in Table 2-3.

8/ Manpower Report of the President, 1972, Table B-12, p. 207

9/ Somers, Gerald G. et. al., The Effectiveness of Vocational and Technical Programs, Center for Vocational and Technical Education, University of Wisconsin, 1970.

10/ Vocational Education in Our Secondary Schools, op. cit., Table 14, p. 23.

TABLE 2-3

Comparison of Ability Levels of
Male High School Graduates by Program

High School Program	Total	Ability Quartile I	II	III	IV
General	100%	30.3	33.7	27.0	8.9
College Preparatory	100%	8.3	16.0	30.0	45.3
Commercial	100%	36.4	36.8	23.0	3.8
Vocational	100%	50.4	29.5	17.3	3.0
Agriculture	100%	54.9	26.1	15.6	4.0

Source: An Analysis of Vocational Education in Our Secondary Schools, U. S. Office of Education, (unpublished), Table 17, 1967, p. 25

About four-fifths of the male graduates from the vocational programs, and nearly three-fourths of those from the commerical programs were in the below average ability quartiles. The Office of Education analysis concludes from the Project Talent data that "the combination of low ability and poor ocio-economic backgrounds makes vocational students a unique target population." [11]

Aggregative statistics such as those produced by the 1969 survey, Project Talent, or the Wisconsin study overlook the fact that the vocational students are not a homogeneous mass, and that there are marked differences in socio-economic backgrounds and ability levels among students in vocational education. Programs which are more

[11] Ibid., p. 23

technical in nature are likely to include a larger percentage of enrollees from families in which the fathers have received more education than was typical in the families of vocational students. For example, nearly two-thirds of the secondary vocational students in technical and distributive programs were from families in which the father had completed at least four years of high school as compared with slightly more than two-fifths of the fathers of all high school vocational students.[12/] Students in the special post-secondary programs established for young persons who are out of high school resemble high school vocational students in their family educational and socio-economic backgrounds more closely than they resemble the students in the regular junior college occupational programs.

The conclusion in the 1970 report that the vocational students are an approximate cross section of the total population of comparable age groups is unsupported by the data. The vocational education students differ from the general student population in their socio-economic background as measured by occupation, income, or education of the family heads. These findings are consistent with the emphasis in the Vocational Education Act Amendments on the role of vocational education as a social program concerned with expanding career opportunities for young people from disadvantaged backgrounds. In terms of policy and program options, the available information emphasizes the importance of special supporting services for vocational students ranging from remedial English and math courses to guidance, counselling, and placement services geared to the needs of students with limited aspiration levels who typically do not plan to go on to two-year or four-year colleges.

12/ Somers, G.G., et. al., op. cit.

III.

Changes in the Representation of Students from Disadvantaged Backgrounds in Vocational Education

Recent studies are beginning to supply a basis for a cross-sectional analysis of the socio-economic backgrounds of the student populations in the vocational programs in the past few years. The official reports and special studies are still insufficient to provide a basis for assessing the changes over time which have taken place in the backgrounds of the vocational education student body in the past five or ten years. The problems in attempting to assess these changes are illustrated by the information on nonwhites and on "special needs" students in the vocational programs.

The University of Wisconsin national survey of vocational education in 1966 reported that its sample of respondents "were overwhelmingly white, with only 8 percent nonwhite."[13/] The Office of Education 1969 survey indicated that about a fifth of the secondary vocational students were from minority groups including blacks, American Indians, Orientals, and Spanish-surnamed Americans.[14/] This estimate of 20 percent representation from minority groups would be significantly greater than their proportion in the 14 to 24 age group, 13 percent, or the percentage of minority group teen-agers and young adults who were enrolled in school, 12.5 percent.

The difference in the two estimates may be explained in part by differences in sample size. The Office of Education survey included more than 20,000 secondary

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13/ Ibid., p. 10

14/ Characteristics of Students, op. cit., Table A-20, p. 27, p. 11

students; the Wisconsin study was based on approximately 1,500 students. However, while there is some likelihood that the vocational education system was serving more students from minority backgrounds in 1969 than in 1966, there is little external evidence suggesting that the proportion of non-White students in the high school vocational programs more than doubled between 1966 and 1969.

The National Longitudinal Survey data show that in 1968 the same proportion of young, out-of-school black males as white males, 16 percent, were enrolled in vocational programs, including the commercial curriculum. The Survey findings are presented in Table 2-4.

TABLE 2-4

Distribution of the High School Curriculum of Out-of-School Males, Aged 16 to 26, by Race, Fall, 1968

	Percent Distribution	
High School Curriculum	White	Black
General	57.6%	69.5%
Academic	26.6	14.2
Vocational-Commercial	15.8	16.3
Total	100.0	100.0

Source: Unpublished data, National Longitudinal Surveys, Survey of Work Experience of Males, 16 to 26, 1968, U.S. Department of Commerce, Bureau of the Census. and Center for Human Resources Research, Ohio State University

The Longitudinal Survey follow-up covered too short a time period, two years, to provide insights into changes over time. The Survey data do show that the vocational curriculum appeared neither to exert a special attraction nor to repel the young Black males included in the sample when they were in school. The equal percentage representation of both races in the vocational curriculum, taken by itself, is a poor indicator of equality of opportunity in vocational education. The unemployment rate for Negro and other nonwhite males in the 16 to 19 age bracket in the high prosperity year 1968, for example, ranged between 19 and 27 percent. This was more than double the comparable range for white males in this age bracket in the same year, between 8 and 12 percent.[15/] With such dissimilar labor market prospects for the two groups, equality of representation in vocational programs is unlikely to encourage substantially greater equality of outcomes.

The Amendments to the Vocational Education Act adopted in the 1960's provide that students whose social or economic disadvantagement, or whose physical, mental, or emotional handicap prevents them from succeeding in regular vocational programs should be served by special programs or by additional inputs of resources in regular programs. It is important for policy and program planning, and for the allocation of Federal aid to state vocational education agencies, to know whether the number of these "special needs" students in vocational programs has increased or decreased in the past five or ten years and by how much. The official reports would appear on the surface to indicate that there has been a large-scale increase in the "special needs" students since 1966 and especially between 1969 and 1970. This information is presented in Table 2-5.

15/ Manpower Report of the President, 1972, Table A-16, pp. 178-179

TABLE 2-5

Enrollment of Disadvantaged and Handicapped Students in Special Needs Programs in Vocational Education, FY 1966, 1969, 1970

	1966	1969	1970
Total enrollments	6,070,000	7,979,000	8,794,000
In Special Needs Programs	49,000	143,000	805,000
(In regular programs)	53,000	144,000	115,000

Source: Trends in Vocational Education, Vocational Education Information, No. 3, U.S. Office of Education, 1971, Table 5, p. 10

Few conclusions about changes in the number of disadvantaged and handicapped students in the vocational programs between 1966 and 1970 can be reached from this data. The specific breakdown of persons with special needs into the disadvantaged and the handicapped was introduced into the vocational education reporting system for the first time in 1970. For the years 1966 (when the statistics on persons with special needs were first presented) to 1969 a breakdown was shown between those served in regular programs and those in special programs. For instance, the 287,000 persons with special needs served in 1969 were divided about equally between the two categories. The large increase shown in the number of special needs students between 1969 and 1970 reflects both changes in definition and also reclassification of students which were probably encouraged by the new requirements for obtaining Federal aid.

A study of the utilization of manpower and demographic information in educational planning in six selected local school agencies completed by the National Planning Association for the Office of Education in 1971 suggests some of the underlying reasons for the absence of adequate information about changes in the

number of disadvantaged and handicapped students, or about other items pertaining to the socio-economic background of students in vocational education. There was very little information available in the six local school agencies describing the social and demographic characteristics of the vocational education students as a separate group. Typically, to quote the report, "these schools did not know how many students from disadvantaged backgrounds they had been serving in the past year, and how this number compared with the number served three or five years ago." 16/

The six local school agencies cited represent case studies rather than a scientifically valid sample. However, there is reason to believe that the problem illustrated by the experience of these local systems is a general one. The policy issue this experience focuses on is the need for undertaking the measures necessary to assure the development of an accurate and comprehensive vocational education data system. Federal support to state school agencies specifically designated for developing this kind of system is probably the necessary condition if the states are to be required to submit reasonably reliable and detailed information about vocational education students in their reports to the Federal Government. In the many instances in which local education agencies lack the professional skills for obtaining this information, the Federal aid should encourage the states to assume responsibility in providing technical assistance to the local school agencies. For information which is unlikely to be included in regular education agency reports, i.e., the racial backgrounds of students, special national surveys, such as those to be undertaken in connection with the follow up of the 1972 cohort of high school

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16/ National Planning Association, Center for Priority Analysis, An Analysis of Manpower Requirements Information and the Availability of Vocational Education in Sclected Urban and Rural Areas, report submitted to the U.S. Office of Education, 1971, pp. 5-6

seniors, can serve as a source for information. Until changes similar to these are introduced and in operation, information about student backgrounds can supply little more than a limited and often uncertain input for planning and decision-making in vocational education.

Chapter 3

Changing Enrollments in Vocational Education

I.

Criteria for Assessing Changes in Enrollments

Three facts stand out in the data on enrollments in vocational education. One is the rapid increase in the reported enrollments, an increase of close to half, 45 percent, in the past decade. A second is the high growth rates in enrollments in individual programs closely related to areas of expanding employment opportunity, i.e., the health occupations. A third is the continued concentration of much of the enrollment in programs with a peripheral relationship to labor market needs such as agricultural production or homemaking. However, all of these statements require interpretation in the light of the criteria by which the data are assessed, including the confidence in the reliability of the data as one significant criterion.

Participation in vocational programs can contribute to many purposes. Courses in homemaking may add to the well being of the families of those who participate in them even if their contribution does not appear in the measures of Gross National Product. Courses in agriculture may provide preparation for leisure time activities or for careers in farming or in related fields, i.e., horticulture.[1/] The relationship between enrollments in vocational programs and job opportunities, therefore, is only one dimension to be considered in appraising these programs. This dimension figures heavily in an

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1/ The Office of Education reporting system in vocational education shows enrollments of approximately 47,000 in horticulture in fiscal 1970. U.S. Office of Education, Enrollment in Vocational Education Occupational Programs, Vocational Education Information No. II, 1970, Table A-1.

analysis of enrollments in vocational education because it supplies much of the rationale for the Vocational Act Amendments and the expanded Federal support for these programs in the 1960's. Manpower considerations are also apparent in the recent emphasis on career education, that is on providing students who leave the secondary schools with at least entry level job skills.

Conclusions drawn from an examination of vocational education enrollment data are surrounded by a substantial, if unknown, margin of uncertainty because of unresolved doubts concerning the reliability of the information. In many instances, the data on enrollments are reported in terms of course enrollments, a practice which encourages multiple counting of the same students. In others, the enrollment data refer to program areas or curricula which include several courses. The reported changes in enrollment over time may reflect underlying developments, or they may grow out of shifts in definitions of programs eligible for Federal support.[2/] For example, the Vocational Act Amendments of 1963 for the first time included office occupations among the occupational training programs which could receive the Federal aid provided through this legislation. Over two-fifths, 44 percent, of the reported increase in enrollment between 1960 and 1965 is accounted for by the inclusion of the office occupations beginning in 1965.[3/]

2/ In this respect the situation in 1972 is not substantially different from the situation five years earlier. So, the Advisory Council on Vocational Education reported in 1968 in discussing enrollments in vocational education that "one cannot escape the conclusion that the growth in enrollment, particularly at the high school level, reflects to a large degree the inclusion of persons who were not formerly counted as vocational students" in Education for Employment: Report of the Advisory Council on Vocational Education, 1968, Institute of Labor and Industrial Relations, the University of Michigan - Wayne State University, 1969, p. 23.

3/ Derived from U.S. Office of Education, Trends in Vocational Education, Vocational Education, Information No. 3, 1971, Table 4.

For many purposes, it is important to know whether the students enrolled in vocational programs represent an increasing or a decreasing proportion of the high school student population. The official reports would appear to indicate a substantial increase in the ratio of the students enrolled in high school vocational programs to the number of students enrolled in high school. According to these reports, the ratio increased from 24 percent in 1965 to over 38 percent in 1970.[4/] The vocational enrollments are concentrated in the twelfth grade where the vocational enrollment-student ratio reached 47 percent in 1970.[5/] The uncertainty surrounding these estimates is illustrated by a comparison of the ratios in the five states reporting the highest percentage of the 12th grade enrollments made up of vocational enrollments in 1969. The comparison is presented in Table 3-1.

Table 3 - 1

Reported 12th Grade Vocational Enrollment as a Percentage of 12th Grade Student Enrollment, Selected States, 1969

State	Percentage
Washington	95%
Utah	87
Georgia	83
New York	74
Alaska	71

Source: U.S. Office of Education, Statistics of Public Schools, Fall, 1969, Elementary and Secondary Education; and Vocational and Technical Education, Annual Report, Fiscal Year 1969.

4/ Ibid., Table 2.

5/ Estimate derived from sources listed in Table 3-1.

The vagueness attached to the concept of enrollment in the vocational enrollment data makes it difficult to appraise these percentages other than to express doubts concerning them. It is very unlikely that the students in vocational courses account for 80 or 90 percent of the total 12th grade student enrollment. Proportions of this magnitude imply that there are few nonvocational students and that the 12th grade students in these states spend little or no time in academic or general subjects such as English, social studies, arithmetic, or science. Moreover, the data on student enrollments is unsupported by the data on the representation of vocational teachers in the five states. Full-time vocational teachers, for example, made up between 24 and 30 percent of all full-time teachers in the secondary schools in these states in 1969.[6/] Since the amount of double counting involved in these estimates is unknown, the estimating error in aggregating the enrollment data or in comparing its components is also unknown.

II.

Enrollments and Completions in Vocational Programs During the 1960's

Most of the data in the vocational education reporting system refers to inputs. The periodic official reports contain extensive information on what goes into the system, about the number of students enrolled and the number of teachers who instruct them, and about capital outlays and expenditures for

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6/ Derived from U.S. Office of Education, Statistics of Public Schools, Fall, 1969, Elementary and Secondary Education; and Vocational and Technical Education, Annual Report, Fiscal Year 1969.

instruction or for supporting services. The reports on enrollments, for example, show a decrease in the share of the total vocational enrollments made up of enrollments in home economics and agricultural programs of from three-fifths in 1960 to about two-fifths in 1970. The more novel element in the reporting system is information about completions, about what comes out of the vocational programs.[7/] The outputs of the system in terms of completions are far smaller than the inputs in terms of enrollments, 1.7 million completions as compared to 8.8 million enrollments in 1970.[8/]

Table 3-2 summarizes the changes in the reported distribution of enrollments in vocational programs between 1960 and 1970.

Figured on the base of total reported enrollments, agriculture and homemaking declined from 63 percent of the total in 1960 to 37 percent by 1970. However, this decrease overlooks the shift in the base on which the percentages are calculated because of the inclusion of the office occupations beginning in 1965. Excluding the office occupations from the enrollment base, enrollments in agriculture and homemaking still accounted for nearly half, 49 percent, of the vocational enrollments listed for 1970. In absolute numbers, enrollments in agriculture grew moderately during the decade, by 7 percent, and in homemaking they increased by over half, by 52 percent. The persistence of these large enrollments in program areas with only a limited

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7/ Completions, of course, are only one measure of the outputs of the vocational system. They are more readily obtained than other measures such as work experience, job satisfaction, or further education since they require no follow-up of students after they have left school.

8/ Derived from Enrollments in Vocational Education Occupational Programs, op. cit., Table B. The data in this table, accepting their validity, imply that 4 out of 5 programs or courses, depending on the unit of measurement for enrollment, are not completed by the students who participate in them.

Table 3 - 2

Distribution of Enrollments in Vocational Education
by Program Area, Fiscal Years 1960 and 1970

Program Area	1960 No. (in 000)	1960 Percent of Total	1970 No. (in 000)	1970 Percent of Total	Percent of Total Excluding Office Occupations
Agriculture	796	21.1%	853	9.7%	12.8%
(off-farm)	---	---	(268)	(3.1)	(4.0)
Distribution	304	8.1	529	6.0	7.9
Health	40	1.1	198	2.3	3.0
Homemaking	1,588	42.1	2,419	27.5	36.2
(gainful)	---	---	151	1.7	2.3
Office	---	---	2,111	24.0	---
Technical	101	2.7	272	3.1	4.1
Trades and Industry	938	24.9	1,906	21.7	28.5
Other	---	---	354	4.0	5.3
Total	3,768	100.0	8,794	100.0	100.0

Source: Derived from U.S. Office of Education, Trends in Vocational Education, Vocational Education Information III, 1971, Table 4.

relationship to labor market considerations implies that these programs probably serve social, economic, and avocational needs which extend considerably beyond their potential for enlarging career opportunities. 9/

Side-by-side with these programs, other programs offering preparation for employment in areas characterized by manpower shortages showed high growth rates in enrollments during the 1960's. Enrollment in health programs, for instance, increased by nearly five times. These high growth rates, however, refer to a relatively small number of enrollments in the base year, so that rapid rates of increase go together with modest absolute growth. Accordingly, enrollments in both the health and the technical fields, both "shortage" areas for much of the 1960's, amounted to about 5.5 percent of all reported enrollments in vocational education in 1970.

The standard program categories in which the enrollment data are reported are frequently too aggregative and heterogeneous for appraising the significance of changes in enrollment in different instructional programs. Enrollment data in agriculture include students in the traditional agricultural production courses, and they also include the enrollments in courses in related fields such as horticulture or agribusiness. Distributive education covers programs in insurance and petroleum as well as in general merchandising, while health programs include dental hygienists and radiological technicians as well as nurses assistants. The inducements for students to enroll in different programs within the same area may differ radically, and career prospects in some specialties, i.e., horticulture, are substantially different

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9/ The three instructional programs reporting the largest enrollments in 1970, agricultural production, typing, and comprehensive homemaking, are among those with a minimal involvement as preparation for future gainful employment.

than in others, i.e., farming. The level of skill imparted by these programs also varies greatly from programs, for example, in custodial services to others in industrial atomic energy.

Enrollments in specific instructional programs within the major program areas are now reported by detailed Office of Education instructional code. This classification is a more functional system for assessing enrollment data in vocational education because the coding system is closely related to the occupational designations in the Dictionary of Occupational Titles, a standard source utilized by the Employment Service and other agencies for job placement purposes. In addition, the instructional coding system is utilized to list completions as well as enrollments, and the enrollments are shown by level as well as by total. One major drawback of the OE coding system is that it does not lend itself readily to comparison with the standard occupational classifications in the Census, or those related to it, i.e., the labor force data. These are the classifications in which employment and unemployment data are typically reported.

An indication of the range of programs for which instruction is offered, and the enrollments and completions in each, is shown in Table 3-3. The table lists the programs for which enrollments amounted to 50,000 or more in 1970.

Two instructional programs attracting the largest number of students in 1970 were agricultural production and typing. Each reported an enrollment of over half a million students in 1970. Comprehensive homemaking was third with nearly half a million enrollments. However, in many of these programs

Table 3-3

Enrollments and Completions in Major Instructional Programs, Fiscal year 1970
(in 000)

Program	Enrollment in 1970 a/	Completions in 1970
Agriculture		
Agricultural Production	585	73
Agricultural Mechanics	105	22
Distributive		
General Merchandising	133	35
Real Estate	51	6
Retailing, Other	67	19
Health		
Nurses Assistants	52	19
Practical Nurse	57	21
Homemaking		
Comprehensive Homemaking	493	81
Clothing and Textiles	194	42
Family Relations	92	27
Foods and Nutrition	83	25
Housing and Home Furnishing	51	8
Home Economics (Gainful)		
Food Management and Production	51	16
Office		
Accounting and Computing	301	71
Business Data Processing	166	37
Filing, Office Machines	382	125
Stenographic and Secretarial	470	129
Typing and Related	555	114
Technical		
Electronic Technology	58	9
Trades and Industry		
Auto Mechanics	131	40
Carpentry	57	12
Construction and Maintenance b/	87	19
Drafting Occupations	112	19
Electrical Occupations	62	9
Electronic Occupations	79	20
Fireman Training	99	2
Graphic Arts Occupations	54	12
Metalworking Occupations	242	47
Woodworking Occupations	51	9

a/ Enrollments are a mix of secondary, post-secondary, and adult.

b/ Other than in construction and maintenance occupations specifically listed.

Source: Derived from U.S. Office of Education, Enrollment in Vocational Education Occupational Program, Vocational Education Information No. 2, 1971, Table B.

the data refer to course enrollments while in others, especially in the trade and industry figures, they frequently relate to enrollment in programs or in curricula including several courses. In the programs which students regard as occupational preparation, the data on completions provides a significant, if rough measure, of the extent to which these programs may be adding to the supply of labor in their area. Again, comparisons must be tempered because some students leave programs prior to completions with marketable skills and others may complete courses for reasons other than their potential as preparation for careers.[10/]

After voicing these caveats, it is apparent that the ratio of completions to enrollments is related, although very imperfectly, to the role of the instructional programs as career preparation. Overall, the ratio of completions to enrollments is low, with the ratio exceeding one-third in only a few instances. In agricultural production, the course closely related to farming, completions amounted to an eighth of enrollments in 1970. In agricultural mechanics, a more specifically career-oriented program, the ratio was slightly above 20 percent. The highest ratios of completions to enrollments were in the health programs, i.e., for nurses assistants and practical nurses, where they came close to 40 percent. However, the completions to enrollments ratio was also high, about 30 percent or more, in some of the homemaking programs such as family relations and the foods and nutrition

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10/ The Office of Education report lists separately "prior completions", that is students who left prior to normal completion and presumably with marketable skills. These "prior completions" are a small percentage of enrollments and, according to the Office of Education's reports, they amounted to less than 10 percent of completions in the different major program areas. Enrollment in Vocational Education Occupational Programs, op. cit., Table B.

program. Equally striking are the wide range of these ratios within the same major program area. In the trades and industry area, for example, the ratio ranged from 30 percent for auto mechanics to 2 percent for firemen's training and 15 percent for the electrical occupations course. This heterogeneity makes it apparent that many variables influence the holding power of the vocational courses. These include relatedness to job opportunities and they also include appeal to avocational and homemaking interests.

III.

The Distribution of Vocational Enrollments by Level

Nearly three-fifths of the enrollments in vocational education are concentrated in secondary level programs. The most rapid growth in enrollments during the 1960's, however, has taken place in the programs at the post-secondary level, frequently in programs providing terminal training leading to employment in occupations requiring specific specialized training. Enrollment in the adult vocational education programs, programs intended for persons who are no longer full-time students has grown slowly in number and declined as a percentage of the total in the past five years.

The changes in the distribution of enrollments by level between 1966 and 1970 are described in Table 3-4.

The post-secondary programs increased by nearly two and a half times between 1966 and 1970 reaching a level of slightly more than a million in 1970. These programs cover a one or a two-year span, equivalent to the 13th

Table 3 - 4

Changes in Vocational Education Enrollments
by Instructional Level, Fiscal Years 1966 to 1970

(in 000)

Program Level	1966	1970	Percent Change, 1966 to 1970
Secondary	3,048	5,114	68%
Postsecondary	442	1,013	129
Adult	2,530	2,666	5
Other	49 a/	-----	---
Total	6,070	8,794	45

a/ Refers to students in "special needs" programs who were not included in instructional level data in 1966.

Source:
Derived from U.S. Office of Education, Trends in Vocational Education, Vocational Education Information No. 3, 1971, Table 5.

and 14th grades. Seventy percent of the enrollments are concentrated in the first year,[11] suggesting that many post-secondary students prefer to enter the labor market with the skills acquired with a year of post-high school training rather than to forego earnings and to engage in another year's training. The rapid growth in the post-secondary programs shows that vocational programs which appeal to highly specific career aspirations in areas of expanding employment opportunity can attract substantially larger numbers of students in a short span of years. Enrollments in the adult programs, by comparison, have grown least rapidly of all, so that in 1970 the total number enrolled in these programs was only about 5 percent greater than in 1966. Enrollment in the secondary level programs grew at slightly less than half the percentage rate of increase for the post-secondary programs.

There is considerable overlap in the distribution of enrollments in similar programs by instructional level. Some insight into the appeal of the secondary, post-secondary, and adult programs for students with different interest and aspirations is provided in Table 3-5. The table shows the instructional level with the greatest number of enrollments in each of the programs enrolling 50,000 or more students in 1970.

Since the secondary level programs account for about 60 percent of all enrollments, they also account for the largest enrollments in most of the individual instructional programs. The secondary level enrollments predominate in some programs in which career preparation is the primary appeal, i.e., the

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11/ U.S. Office of Education, Annual Report, 1969, p. 41.

Table 3 - 5

Instructional Level Concentrations in Major Instructional Programs, Fiscal Year 1970

Instructional Program	Total Enrollment in 1970 (in 000)	Instructional Level with Largest Enrollment	Enrollment in Instructional Level with Largest Enrollment (in 000)
Agriculture			
Agricultural Production	585	Secondary	338
Agricultural Mechanics	105	Secondary	84
Distributive			
General Merchandising	133	Secondary	67
Real Estate	51	Adult	34
Retailing, Other	67	Secondary	40
Health			
Nurses Assistants	52	Adult	26
Practical Nurse	57	Post-Secondary	41
Homemaking			
Comprehensive Homemaking	493	Secondary	457
Clothing and Textiles	194	Adult	116
Family Relations	92	Secondary	49
Foods and Nutrition	83	Secondary	69
Housing and Home Furnishing	51	Adult	34
Home Economics (Gainful) Food Management, Production, and Service	51	Secondary	26
Office			
Accounting and Computing	301	Secondary	184
Business Data Processing	166	Post-Secondary	67
Filing, Office Machines	382	Secondary	294
Stenographic-Secretarial	470	Secondary	254
Typing and Related	555	Secondary	402
Technical			
Electronic Technology	58	Post-Secondary	33
Trades & Industry			
Auto Mechanics	131	Secondary	83
Carpentry	57	Adult	28
Construction and Maintenance a/	87	Adult	44
Drafting Occupations	112	Secondary	70
Electrical Occupations	62	Adult	38
Electronics Occupations	79	Secondary	36
Fireman Training	99	Adult	91
Graphic Arts Occupations	54	Secondary	37
Metalworking Occupations	242	Adult	120
Woodworking Occupations	51	Secondary	40

a/ Other than construction and maintenance occupations listed separately.

Source: Derived from U.S. Office of Education, Enrollment in Vocational Education Occupational Programs, Vocational Education Information No. 2, 1971, Table B.

stenographic and secretarial program. They predominate even more markedly in programs with a peripheral relationship to labor market needs such as agricultural production or typing. The adult programs for persons who are no longer full-time students include a large number of enrollments in fields with primarily avocational appeal such as clothing and textile or housing and home furnishings. The adult programs also make up the largest component in the enrollments in other courses with a more specific career orientation. Instances include real estate, nurses assistants, and a number of trades and industry programs such as carpentry, electrical occupations, metalworking, and fireman training. In keeping with the greater vocational orientation of the post-secondary and adult programs, these two instructional levels predominate in both of the two health instructional programs enrolling 50,000 or more students in 1970.

The data on the distribution of vocational enrollments by instructional level are incomplete because they refer only to enrollments in the programs eligible for Federal support. At the secondary level this restriction is of minor significance since the occupational training offered very largely fits within the federal support categories. The lines of demarcation in programs beyond the high school level exclude many skill training courses which are taught in the schools. This is especially true of the programs offered in the junior and community colleges, programs often in similar areas to those available in post-secondary vocational training such as data processing or electronics technology. A survey of the students enrolled in publicly-supported institutional occupational training programs in 20 cities

in 1971 indicates that the student population served by the junior and community college vocational programs was nearly three-fourths as large as the number of students in the post-secondary programs included in the official reports on vocational education.[12/] Federal support for the post-secondary programs creates a reporting requirement on the part of the states receiving the Federal funds. As occupational education programs in junior and community colleges receiving little or no Federal support as vocational education continue to expand, an increasingly large segment of the occupational training taking place in the schools becomes overlooked in the official reports.

IV.

The Availability of Vocational Programs

The national data on enrollments and their distribution by programs and instructional levels reflect the vocational curricula that are available to students throughout the nation's school systems. The national programs tell little about the availability of programs to students who might wish to enroll in them.

There is, as yet, only limited evidence bearing on the availability of vocational programs to students. Because of economies of scale, it is a reasonable expectation that the larger the school and the number of vocational students, the larger the number of course offerings likely to be available.

12/ National Planning Association, Duplication and Gaps in Publicly Funded Occupational Training Programs in Urban Areas, Vol. I, (preliminary), 1972, Table 2.

A survey of 3 urban and 3 rural local school agencies undertaken by the National Planning Association for the Office of Education in 1971 showed that nearly half the secondary students in the rural areas surveyed went to small schools with five or fewer vocational course offerings.[13/] Since most secondary programs attract either mainly boys or mainly girls, this means a choice of only two or three vocational courses for more rural students. By contrast, nearly half of the urban students were in large schools with 10 or more course offerings. The variation in course offerings between the urban and the rural schools in the six local systems is summarized in Table 3-6.

Table 3 - 6

A Comparison of the Availability of Vocational Programs in Urban and Rural Areas in Six Local School Agencies, 1969-1970

	Percent of Secondary School Enrollment in Schools with the Number of Programs Listed	
No. of Programs	Urban Schools	Rural Schools
0 - 5	14%	46%
6 - 9	41	21
10 - 15	23	--
16 - 23	22	33

Source: National Planning Association, An Analysis of Manpower Requirements Information and the Availability of Vocational Education in Selected Urban and Rural Areas, Report submitted to the U.S. Office of Education, 1971, p. 53.

13/ National Planning Association, An Analysis of Manpower Requirements Information and the Availability of Vocational Education in Selected Urban and Rural Areas, Report Submitted to the U.S. Office of Education, 1971.

Students in rural school systems tend to attend schools which offer either a considerably smaller or a larger range of programs than in the urban systems. The larger range is to be found in the counties with a centralized secondary-level vocational school. However, only 2 of the 18 rural schools in NPA's survey offered 10 or more courses, and one of these, while included as "rural" for this comparison, was located in a town with a population exceeding 15,000. This portrayal of the narrow range of offerings in most of the rural vocational schools is consistent with the data in the 1969 survey of the characteristics of vocational students. The survey indicated that secondary vocational students in the rural areas frequently enroll in vocational programs in schools in the more urbanized areas, i.e., in the schools which offer the more extensive programs. According to the report based on this survey, only 40 percent of the secondary vocational students whose home was located in a rural area attended a school that was similarly located. More than half, 55 percent, were enrolled in a school in a neighboring small city.[14/]

While the urban schools typically offer considerably more choice of programs than the rural schools, there are also considerable differences in the program options open to students in the urban systems. A secondary student seeking to enroll in the office occupations programs in the urban schools in NPA's study would have found such courses in 80 percent of the urban schools with vocational education programs. A student attempting to enroll in a drafting course would have found these courses in about 50 percent

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14/ U.S. Office of Education, Vocational Education: Characteristics of Teachers and Students, 1969, 1970, p. 14.

of the urban schools. However, the prospect of finding a vocational program in electronics in these urban schools, was about 16 percent, and courses in auto mechanics were offered in less than one in four of the urban schools.[15/]

The literature on enrollments in vocational education exists in a small number of reports in the form of descriptive statistics. Unlike the literature in many other aspects of vocational education such as those dealing with program effectiveness or the backgrounds of students, there are few special studies which bear on enrollments nationally. However, the mode of presentation or the number of reports has little relevance for the significance of the materials presented for policy and planning. One of the underlying themes in the analysis of the enrollment data is the existence of substantial enrollments in programs with a peripheral relationship to job opportunities or labor market needs. The persistence of these enrollments throughout the 1960's suggests that the motivation of students in enrolling in vocational programs, or of the local school agencies in offering them frequently differs from the rationale in the amendments expanding Federal support for the programs. Labor market considerations, although in evidence at all levels of vocational education, receive considerably more weight in national legislation than in program enrollments.

15/ An Analysis of the Availability of Vocational Education, op. cit., Table 20.

Chapter 4

Career Opportunities, Manpower Projections, and Planning in Vocational Education

I.

Enrollments, Objectives, and Prospective Career Opportunities

While vocational education is more than skill training, the legislation providing Federal support for the vocational programs assigns a high priority to preparing students to leave school with marketable skills. The 1968 Amendments, for example, includes in its statement of purpose the objective of "providing ready access to vocational training...which is realistic in the light of the actual or anticipated opportunities for gainful employment."

There are several reasons for expecting that the relationship between vocational enrollments and prospective career opportunities will often be a loose one. Part of the problem is one of objectives. The objectives which motivate students to enroll in vocational courses and local education agencies to offer them frequently involve less emphasis on manpower considerations than is to be found in the statements of priorities in national legislation. Another part of the problem is one of information and planning. The Federally-supported vocational programs are only one of several sources of supply in the occupations in which the schools offer training. The scope for enrollments in secondary and post-secondary vocational programs requires appraisal in the light of these other sources of occupational preparation as well as the expected career opportunities. Moreover, the information needed for taking

manpower supply and future job openings into account in program planning is often unavailable, or it pertains to labor markets which differ from those which will offer opportunities for the graduates of the local vocational education programs. Accordingly, it is not surprising that a recent survey of practices in allocating vocational funds in fifteen states reported only two which treated manpower needs with specificity in the allocation process. 1/

Allowing for the limitations of data and the multiplicity of purposes, it is apparent that the relationship of the enrollments and completions in vocational courses to career opportunities makes up one widely used indicator for assessing the effectiveness of the vocational programs. Much of the Federal support for vocational education, especially for the handicapped and disadvantaged, is predicated on the assumption that the training will increase the earning capacity and employment opportunities of those who participate in them. Growth in the states' support for vocational education partially stems from the belief that vocational programs can help attract new industries to the state by increasing the skills of the local workforce. Some understanding of the uses and limitations of the available manpower information, and of the techniques by which this information is obtained, can, therefore, contribute useful insights into the planning and evaluation process in vocational education.

1/ Lindman, E. L., Financing Vocational Education in the Public Schools, National Educational Finance Project, Special Survey No. 4, University of California, 1970.

II.

Completions, Program Changes, and the Anticipated Job Openings in 1980

Perspective on the role of vocational education as occupational preparation can be obtained by comparing the completions in selected vocational programs in a recent year with the projected job openings in the occupations for which these programs are expected to constitute preparation. The comparison shows that completions in the high school vocational programs make up a substantially larger proportion of the expected job openings in some fields, i.e., the mechanical crafts or clerical occupations, than in others such as the health or the protective service occupations. Program changes, according to a recently completed NPA study, often provide an important vehicle for aligning enrollments more closely with job opportunities.

By 1980, according to NPA estimates, there will be an anticipated 2.1 million job openings in occupations which are expected to be held by persons with a median level of educational attainment of 12 years or less in which the high schools offer vocational courses which constitute entry level preparation.[2/] In other words, these are the projected job openings which are related to the training provided to the graduates of the high school vocational programs. The 2.1 million job openings are between $3\frac{1}{2}$ and 4 times the number of completions in the high school vocational programs offering preparation for these occupations in 1968, the base year for NPA's

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2/ Park, C. K. Economic Changes, Manpower Requirements, and Their Implications for Educational Policy in the Next Two Decades, Report submitted by the National Planning Association to the U.S. Office of Education, 1968. Dr. Park's estimates pertain to the projected employment. These have been modified to allow for the replacement of attrition losses. See footnote 7 for source of replacement estimates.

study. The relationship between the vocational program completions and the projected job openings is summarized in Table 4 - 1 (see p. 5).

High school vocational education courses are only one source of entry into these occupations, and many of the persons completing the vocational programs preparatory to employment in individual fields do not enter them. However, the differentials in the completions - job openings ratios are significant. The vocational program completions are equivalent to a fourth or more of the job openings anticipated by the end of the decade in the clerical and sales occupations and in the mechanical and construction crafts. In these craft occupations, the high school vocational courses often lead to further specialized training, as in apprenticeship programs, and they also frequently lead to employment after leaving school in entry level fields related to the skilled crafts, i.e., as carpenters helpers. The vocational program completions were considerably less important in occupations in the services sector of the economy. The health, personal, and protective service fields are instances. The secondary level vocational programs in these occupations made up less than a tenth of the projected job openings. Thus, the high school vocational programs are typically least well represented in the rapidly growing services sector. Post-secondary and junior college programs have grown rapidly in many of the service areas such as the non-professional health occupations.

There is some evidence from earlier NPA studies that program changes in vocational education are concentrated in the growth occupations, and more so at the post-secondary than at the secondary level. In a study of vocational

Table 4-1

High School Vocational Program Completions in 1968 in Selected Programs Compared with the Estimated Annual Job Openings by 1980 (in thousands)

Instructional Program	High School Vocational Program Completions in 1968 (a)	Estimated Annual Job Openings by 1980 (b)
Mechanical Crafts (trades and industry)	53	125
Construction Crafts (trades and industry)	30	109
Manufacturing Occupations	30	365
Vehicle Operators	1	108
Clerical Occupations	395	865
Sales Occupations	43	182
Protective Service Occupations	4	52
Personal Service Occupations	12	204
Health Occupations	9	100
Total	577	2,110

(a) based on unpublished data made available by the Division of Vocational and Technical Education, U.S. Office of Education.

(b) derived from Park, C. K., Economic Changes, Manpower Requirements, and Their Implications for Educational Policy in the Next Two Decades, Report submitted by National Planning Association Center for Priority Analysis, to U.S. Office of Education, 1968, Appendix Table 8. The estimates refer to occupations in which the median level of educational attainment in 1975 is projected to be 12 years or less.

program changes in three cities in 1970 and 1971, nearly two-thirds of the new and substantially expanded programs during the two years were in occupations whose projected growth rate over the next five years was greater than the anticipated growth in total employment during this period in which the cities were located. These findings are summarized in Table 4-2 (see p. 7).

Half or more of the program changes were in programs preparatory to employment in occupations with greater than average anticipated employment growth in their SMSA's. A significant differential is apparent between the high school and post-secondary programs in this regard. About half, 52 percent of the program changes in the high school vocational programs were in occupations whose estimated growth rates were above their SMSA average. Nearly three-fourths, 79 percent, of the changes in the post-secondary programs were in these growth occupations. While the experience in three urban school systems is a case study rather than a statistical basis on which to generalize, the indications of greater responsiveness of the post-secondary programs to labor market considerations is consistent with other evidence concerning these programs (see chapter 6).

Responsiveness to local job openings and, therefore, career opportunities was less apparent in program terminations in NPA's study. The most striking fact about the terminations was the small number of instances in which they took place. In the three urban systems in NPA's case study, program additions and major expansions outnumbered terminations by a 12 to 1 margin.[3/] Part of

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3/ Only four program terminations were reported by the planners in the three urban sites visited in NPA's study. National Planning Association, Center for Priority Analysis; An Analysis of Manpower Requirements and the Availability of Vocational Education in Selected Urban and Rural Areas, Report submitted to the U.S. Office of Education, 1971, p. 59.

Table 4-2

Vocational Program Changes in 1970 and 1971 Compared with Projected SMSA Employment Growth, Selected Urban Areas (a)

Estimated Five-Year Growth in Occupations Related to Vocational Education Programs Involving Program Changes	High School Level Program Changes	Post-Secondary Program Changes	All Program Changes
Greater than Overall SMSA Employment Growth	13	19	32
Less than Overall SMSA Employment Growth	12	15	17
Percentage of Program Changes Related to Occupations with Higher Growth Rate than Overall SMSA Employment	52%	79%	65%

(a) Source: National Planning Association, Center for Priority Analysis, An Analysis of Manpower Requirements Information and the Availability of Vocational Education in Selected Urban and Rural Areas, Report submitted to U.S. Office of Education, 1971, Table 25, p. 60.

the greater responsiveness shown by the post-secondary institutions to manpower considerations probably arises out of the fact that many of the post-secondary schools surveyed in NPA's case study, like most of these institutions nationally, were new and actively involved in expanding their program offerings. Accordingly, the post-secondary schools were less likely to be faced with the institutionalized resistances to change built into already established schools with on-going programs, frequently of long standing, and with facilities and tenured faculty built up around existing programs.

III.

Techniques for Anticipating Future Manpower Needs and Their Relevance for Planning in Vocational Education

Part of the problem in assigning a higher priority to manpower needs in vocational education is a problem of information. In many areas, there is an overflow of manpower information of limited applicability in vocational education, while in other areas there is a gross absence of the basic information which is required for planning. Educators and administrators seeking for information about future manpower needs are likely to encounter a maze of estimates indicating projected national requirements and job openings for electronic technicians, nurses assistants, carpenters, computer programmers and many others, and a shortage of information about local job openings in these occupations or the expected growth in their labor supply. To appraise the usefulness of this information for vocational education, the user needs some understanding of the uses and limitations of the projections and of the techniques by which they are prepared.

Three elements stand out in the manpower data which are available for planning in vocational education. One is that most of this information deals with manpower demand, or "requirements", in individual occupations. A second characteristic is that it very largely deals with the future. A third is that most of the comprehensive information deals with, or is derived from, national data. Each of these elements involves a series of problems in attempting to utilize manpower information in vocational education.

The occupational information in standard sources such as the U.S. Department of Labor's Tomorrow's Manpower Needs includes the projection of a complex

occupation-by-industry matrix indicating highly detailed manpower requirements within each industry in 1975 or 1980.[4/] Comparable data about occupational supply are necessary to appraise the significance of high or low ratios of vocational program enrollments or completions to future career opportunities in any specific field. At present, little is known about the additions to manpower supply from other than the Federally-supported training sources, i.e., from the proprietary schools, employers on-the-job training programs, apprenticeship programs, junior and community colleges, and similar sources, since there is no reporting requirement that this data be provided as a condition for obtaining the Federal Government's support. For example, the low enrollments in vocational programs in the health field may signify a need to substantially increase enrollments in existing programs and to establish new ones to meet anticipated manpower shortages. The low ratios of vocational enrollments or completions to the projected job openings in the nonprofessional health occupations may also indicate that manpower needs in these occupations are largely being met by proprietary schools, hospital training programs, junior colleges, veterans released from the Medical Corps and other nonschool sources. Each of these interpretations has its own implications for policy, and the choice of the more nearly correct interpretation requires more information on manpower supply than is currently likely to be available.

Data on future manpower supply in individual occupations is usually lacking because there is a less clear-cut basis for the supply projections. The occupations for which there are consistent supply estimates comparable

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4/ U.S. Department of Labor, Bureau of Labor Statistics, Tomorrow's Manpower Needs, Bulletin No. 1606, Vol. IV, 1970; Bulletin 1737, Vol. IV. Revised 1971.

to the demand projections are largely in the professional and technical fields or in the highly specialized crafts. The standard entrance requirement, i.e., completion of an educational program or a licensing examination, makes it possible to use information about degrees awarded, or examinations passed to anticipate the expected additions to the supply.[5] For most occupations, entrance requirements are far less specific, there is considerable interoccupational mobility, and there is little in the way of a clearly definable occupational supply. Vocational students trained in trades and industry programs may enter merchandising or sales occupations, or truck-drivers may become clerks, and vice versa, depending on the available alternatives, and on the incentives, economic and otherwise, that attract individuals to particular occupations.

The estimates of manpower requirements usually refer to employment growth over a period of time, say the next five or ten years. Employment growth is an inadequate indicator of career opportunities because it omits the job openings attributable to the need to replace attrition losses caused by deaths, retirements, and withdrawals from the labor force for other reasons. In occupations which are growing slowly, especially in those employing many older workers, job openings because of replacement needs frequently exceed the anticipated growth in employment. Printing craftsmen are an instance. In NPA's study, Manpower Needs for National Goals in the 1970's, employment growth for printing craftsmen is estimated at 8,000 over the 1965 to 1975 period, or about 3 percent beyond the 1964 level, the base year for these projections.[6] Job

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5/ For an example of these occupational supply projections see U.S. Department of Health, Education, and Welfare, Public Health Service, Health Manpower Source Book, 1964, Sec. 18.

6/ Derived from Lecht, L. A., Manpower Needs for National Goals in the 1970's, Praeger Publishers, 1969, Appendix Table B-4.

openings for printing craftsmen, very largely because of replacement needs, are expected to reach as high as 82,000 in this period. Because of the job openings arising out of replacement demand, there may be valid reasons for continuing vocational programs in occupations characterized by slow employment growth.

Adequate replacement rate estimates are just beginning to be developed in most nonprofessional occupations.[7/] For most occupations, a more or less adequate approximation can be arrived at by utilizing the replacement rate of working life tables which are available by sex and age group for the overall labor force and applying these rates to specific occupations. The age and sex distributions for specific occupations are published in the decennial Census.[8/] The limitation of this procedure is that it does not allow for the peculiarities of working life patterns associated with individual occupations. It is a reasonable, if untested hypothesis, for instance, that coal miners or construction workers have different death and retirement rates for most age-sex cohorts than stock clerks, teachers, or insurance salesmen.

Estimates of manpower requirements are very largely projections of future demand in a target year, i.e., employment by occupation in 1980. Essentially, these are trend estimates which abstract from the year-to-year fluctuations within the time horizon included in the projections. Local Employment Service offices frequently prepare estimates of current unfilled job vacancies in their areas, information often used as a basis for preparing

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7/ See Tomorrow's Manpower Needs, Bulletin No. 1606, Op. cit., Vol. IV, Table 20, Appendix A.

8/ See U.S. Department of Commerce, Bureau of the Census, Census of Population, 1960, Detailed Characteristics, United States Summary, PC (1) - 1D, PC (1) - 6D.

lists of "shortage" and "surplus" occupations. These estimates are likely to be heavily influenced by local business conditions at the time they were prepared. Accordingly, they can offer only limited guidance in planning vocational programs looking ahead to long-term career opportunities.

Estimates of future manpower requirements of necessity involve judgments which contain a large margin of uncertainty. They also require the use of techniques for translating the anticipated demand for goods and services 5 or 10 years from now into the derived demands for the workforce to be employed in producing these goods and services. The pivotal step in preparing the occupational projections are the estimates of employment by industry. The input-output analysis has become a standard technique for distributing the total employment consistent with a given level of Gross National Product into employment in individual industries. In the version of this system utilized by the U.S. Department of Labor in preparing employment estimates, the nation's industries are classified into some 80 sectors.[9/] This technique requires that the major GNP components -- consumption, investment, Government purchases, etc., -- be broken down into the goods and services entering into each component, and that these goods and services be allocated according to the industries which produce the end product. The chain of purchases entering into the production of the end products are then traced through to indicate the inputs required from all the industries supplying goods and services which enter into the end product. The final demand for new residential construction, for example, creates an intermediate demand for lumber, for glass, for roofing materials, for piping, and for transportation services. The outputs of the

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9/ U.S. Department of Labor, Bureau of Labor Statistics, Patterns of U.S. Economic Growth, Bulletin No. 1672, 1970, Appendix Tables D-1 - D 13.

industries which directly or indirectly contribute to the final demand are then translated into man-hours of work in each industry required to produce the anticipated output, and the number of workers implied by the man-hours estimate. These are usually expressed in terms of the total employment by industry for each million or billion dollars of delivery to final demand.

Many of the intermediate calculations in utilizing the input-output analysis to prepare manpower projections have been eliminated following the development by the U.S. Department of Labor of an employment matrix as a derivative of the input-output matrix.[10/] The employment matrix shows the employment requirement in each industry contributing to the production of a particular end product. The manpower requirements in different industries projected to be generated for each billion dollars of delivery to final demand in 1980 for chemicals and motor vehicles and equipment are illustrated in Table 4-3 (see p. 15). The table lists only the industries in which the anticipated employment in the industry is estimated at 1,000 or more.

For many end products, the bulk of the employment generated by purchases of the final output is the indirect employment generated in the industries which supply inputs to the end-product producers. For example, in industry 27, chemicals and selected chemical products, two-thirds of the 42,000 jobs generated per billion dollars of delivery to final demand are in industries other than the chemical industry. In industry 59, the motor vehicle and equipment industry, only about three-tenths of the employment required to produce this end product is in the motor vehicle industry itself. Once the figures on total employment in each industry have been arrived at by use of

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10/ Ibid., Appendix Table D14.

Table 4-3

Estimated Employment Per Billion Dollars of Delivery to Final Demand, Selected Industries, 1980 (a)

Industry Number and Title	27. Chemicals and Selected Chemical Products	59. Motor Vehicles and Equipment
27. Chemicals and Selected Chemical Products	14,217	
32. Rubber and Miscellaneous Plastic Products		1,778
37. Primary Iron and Steel Manufacturing		2,832
41. Stampings, Screw Machine Products and Bolts		1,401
42. Other Fabricated Metal Products		1,676
50. Machine Shop Products		1,040
59. Motor Vehicles and Equipment		15,049
65. Transportation and Warehousing	2,619	1,739
69. Wholesale and Retail Trade	5,393	6,585
70. Finance and Insurance	1,351	
73. Business Services	3,031	3,615
All Other Industries	15,595	13,847
Total	42,206	49,562

Source: U.S. Department of Labor, Bureau of Labor Statistics, Patterns of U.S. Economic Growth, Bulletin 1672, 1970, Table D-14.

the employment matrix they are distributed by occupation. The occupational distribution is based on the frequency per 1,000 represented by individual occupations in the industries considered in the recent past, say in 1960 and 1970, and by judgments concerning how these frequencies are likely to change in the future. To arrive at the economywide employment for individual occupations, the employment estimate for each occupation in all the different industries is aggregated into a national total.

The input-output analysis and the related employment matrix are widely used as the basis for preparing manpower projections for many purposes because this technique makes it possible to estimate the indirect employment created by private and public expenditures as well as the direct employment in the end product industries. This type of analysis has been utilized to estimate the manpower impacts of cutbacks, actual or proposed, in spending for national defense and the space program, and to anticipate the manpower needs likely to be generated by high priority programs in pursuit of national goals in such areas as urban development, research and development, mass transit, or health.[11/] An alternative technique which is often used for estimating the future employment in individual industries is to make use of regression analysis to provide projections derived from the combination of variables involving the least estimating error in accounting for changes in employment in the industries considered in the recent past.

Manpower projections derived from input-output analysis can supply a more comprehensive and internally consistent basis for making occupational information available for planning and decision-making in vocational education.

11/ For instances of this type of analysis, see Manpower Report of the President, 1971, Chapter 5.

However, improvements in analytic or computational techniques, even extensive ones making use of computers, do not eliminate the large element of judgment and assumptions which enter into these projections. These include judgments about the effects of technological change and price shifts, or changes in the organization of industry in altering the inputs and, therefore, the employment requirements to produce a particular end product. The occupational requirements created by expenditures for motor vehicles, to cite an instance, can be expected to differ substantially from present patterns if the technological advances spurred by nationwide concern with pollution were to lead to the development of an economically feasible steam or electrical engine in the place of the present internal combustion engine. Similarly, an assumed unemployment rate is built into the projections to determine the total level of employment and output to be distributed among the different industries. The particular rate chosen can significantly affect the projected requirements in most occupations. For example, the unemployment rate in the Department of Labor's study, Tomorrow's Manpower Needs, is taken to be 3 percent in 1980.[12/] This is a lower rate than has been experienced by the American economy in peacetime in the past generation. With an unemployment rate of 4½ percent, a rate considerably below the current close to 6 percent level but consistent with recent experience, there would be approximately 1½ million fewer persons employed in all occupations in 1980 than with the 3 percent rate. Thus, the projections available to vocational educators can supply many useful indications about the effects of future economic trends or alternative technological developments for career opportunities, such as the effects of continued growth

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12/ Tomorrow's Manpower Needs, Bulletin 1737, Vol. IV, Op. cit., p. 3.

in the output of the service industries for employment and training needs. But they are many light years away from an accounting or actuarial system for predicting tomorrow's manpower needs.

IV.

State and Local Manpower Projections

The employment matrix, the occupational distributions, and similar elements which enter into manpower projections are usually based on national data. A basic difficulty with the occupational information which is available for planning and program evaluation in vocational education is the limited quantity and quality of regional, state, and local projections. These are data relating to the labor markets likely to employ most of the graduates of the vocational programs. Recent developments can be expected to considerably increase the availability of this kind of information.

Since the industrial structure of individual states and localities often differs markedly from the national pattern, the career opportunities they offer can also be expected to diverge markedly. The projections which would be relevant for centers of manufacturing activity such as Michigan or Pennsylvania would differ significantly from those which can provide useful indicators in agricultural states such as Iowa, or for areas dominated by white collar employment, i.e., the District of Columbia. Each, in turn, would vary from the national pattern. The national projections, therefore, offer little more than a point of departure for taking manpower requirements into account in planning vocational programs in particular states and localities, and in some instances they would be misleading.

Similarly, it is often difficult to define the labor market which is relevant for planning purposes in vocational education. School districts and

states are political and administrative rather than economic units. Many of the people who live in New Jersey, Connecticut, or Long Island, for example, work in New York City. Students enrolled in vocational programs in rural Kentucky or West Virginia will frequently seek employment in cities elsewhere in the region or in rapidly growing metropolitan centers in other regions. An assessment of the relationship of vocational programs to career openings must involve a consideration of local labor markets and often, also of regional and national labor markets as well.

The development of regional, state, and local manpower projections based on data drawn from these labor markets constitutes a high-priority need in planning to improve the utilization of manpower information in vocational education. At the time the 1968 Amendments were adopted it was expected that the Employment Service offices would prepare these estimates for use in vocational education. The projections based on local data have not become available as anticipated, primarily because of a lack of funds. Those which are currently used by vocational program planners are frequently prepared by adapting national projections to state and local needs and, occasionally, by special studies based on local data undertaken by universities and nonacademic research groups. The studies which attempt to utilize the standard techniques such as the input-output analysis in preparing state or local labor market projections meet with serious data and conceptual limitations. The product mix in the local industries may differ from the mix in the national industry with the same title, the technology utilized may differ and, accordingly, the inputs for a million or a billion dollars of output, including manpower, can also be expected to diverge from the national pattern. Some of the inputs

required are produced and generate employment locally while others are "imported" from other areas. Some knowledge of the division between home-produced and imported inputs is necessary to use this technique for less-than-national area units.

In an attempt to surmount these difficulties, the U.S. Department of Labor has developed several techniques for adapting the national occupation-by-industry matrix presented in Tomorrow's Manpower Needs to local use.[13/] One technique involves the development on an historical base period occupation-by-industry matrix for the local area. The area matrix can then be projected forward to the target year by applying the changes assumed in the national projections for the occupational distribution in each industry to the same industry in the area matrix. A simpler technique involves utilizing information published in such sources as the Census to estimate local employment by industry and then distributing this employment among the different occupations according to the national pattern. The employment by occupation in the different local industries can then be aggregated to provide an estimate of the total employment in each occupation in the area. The anticipated national trend in employment in individual occupations provides the change factor for projecting local employment to the target year.[14/] For instance, if there were 15,000 auto mechanics and repairmen estimated to be employed in a particular state in 1970, and the national change factor for employment of auto mechanics and repairmen is projected at 1.5 between 1970 and 1980, an estimated 22,500

13/ See Tomorrow's Manpower Needs, Bulletin No. 1606, op. cit., Vol. I, 1969, Developing Area Manpower Projections.

14/ This is a less complex system than the alternative mentioned because it involves projecting total employment in each occupation rather than projecting each cell in an occupation-by-industry matrix.

auto mechanics and repairmen would be expected to be employed in the state under consideration in 1980.

The advantage of these techniques is that they can be utilized by persons with limited technical expertise working with limited local data; data which usually relates to employment by industry. Tests indicate a moderate range of error in utilizing the Department of Labor's suggested techniques to adapt national occupational patterns to local industry employment totals.[15/] In a study undertaken in the state of Ohio, the hypothetical estimate for a recent historical year obtained by applying the national occupational pattern to local industry data was between 90 and 110 percent of the actual employment in 27 out of 31 detailed occupations included in the study. In over half, in 18 occupations, the hypothetical value was between 95 and 105 percent of the actual. While the Ohio test is far from conclusive, it suggests that the national occupational patterns coupled with local employment-by-industry data, if used with awareness of its limitations, can provide useful manpower information for planning in vocational education. Thus, it is far less true than it was in the past that the absence of other than national manpower information constitutes a critical obstacle to forward planning in vocational education.

15/ Tomorrow's Manpower Needs, Bulletin No. 1606, Vol. I, op. cit., p. 13.

V.

Manpower Information and the Problem of Objectives in Vocational Education

Much of the discussion of the role of manpower information in vocational education has been concerned with the availability and the reliability of the information which was, or could readily be, at hand. For many purposes, it is at least equally relevant to know what the information is to be used for, how it is to be used, and who is to use it.

The emphasis on detailed occupational projections in vocational education presupposes that the purpose of the vocational programs is to train persons for rather narrowly defined specific occupations. These are occupations related to the instructional programs listed in the Office of Education instructional code system, a system containing highly specific occupational instruction programs such as Home Furnishings Distribution (04.1000) or Small Engine Repair (17.3100). In this approach to vocational education, the occupational projections become a planning tool to be used in conjunction with the instructional code system for matching the actual and target enrollments and completions in the vocational programs with the anticipated job openings in each field. Vocational education, according to this reasoning, "pays off" in terms of higher earnings or reduced unemployment because it enables young persons to enter specific occupations for which they have been trained.

There are many questions concerning the extent to which vocational education yields a return because its graduates enter the specific occupations

for which they have been trained. This is especially true of the high school vocational programs. The University of Wisconsin study, The Effectiveness of Vocational and Technical Programs: A National Follow-Up Survey, casts doubt on the economic benefits derived from focusing resources on training high school students for specific jobs.[16] For one consideration, the study shows that only a small proportion of the graduates of the high school vocational programs, about a fourth, enter jobs in their field of training on leaving school.[17] The lack of a close relationship between the training and the subsequent employment was most apparent for graduates of the agricultural programs. It was closest for the graduates of the health and technical programs. There was a substantial movement away from the field of training, especially for junior college and post-secondary graduates, between the first job held by students after leaving school and their employment at the time of the survey. The Wisconsin study reported that the students whose employment was closely related to their training showed few benefits in terms of greater earnings, higher wage rates, or reduced susceptibility to unemployment when compared to the students entering fields less closely related to their training. In many instances, regression analysis indicated a negative relationship between labor market experience and the relationship of the job to field of training, i.e., many students were able to earn higher wages by moving out of their field of training after they entered the labor market. Offsetting these findings, the data also showed that graduates who took jobs in the

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16/ Somers, G. G., et al., The Effectiveness of Vocational and Technical Programs: A National Follow-up Survey, Center for Studies in Vocational and Technical Education, University of Wisconsin, 1971.

17/ Over 30 percent of the high school graduates reported their first employment as in fields completely different from those in which they had been trained. Ibid.

fields they had trained for were more satisfied with their work than those who moved on to other fields.

These findings are the results of one study which, like many similar studies, was based on a small sample and involved complex problems of statistical control of variables such as learning ability. The significance of the Wisconsin study lies in the questions it raises about the role of vocational education as training for employment in specific occupations. The study suggests that the relationship, especially for the high school vocational programs, is a highly tenuous one. In reporting this finding, the study is consistent with the evidence from other sources, i.e., the distribution of enrollments in the high school vocational programs.

Vocational programs may serve many purposes related to career preparation other than offering training in specific detailed occupations. The programs could familiarize high school students with a family of related occupations--the health technologies or food service occupations are instances--or they could serve as orientation to opportunities in, the mode of entry into, and the attitudes and culture of the workworld. In an increasing mobile and impersonal society, the high school vocational programs also provide the entrance credentials needed to qualify for a job. More specific occupational training could be provided in post-secondary and college programs, including junior and community college programs, in employers' on-the-job training programs, in technical institutes, and in similar sources.

The manpower information requirements for this approach to vocational education are less stringent and involve fewer judgments about a mass of detailed local occupations than those involved in planning high school

vocational programs as training for specific occupations. Manpower information, including projections, would assume their major importance in the occupation information component of career education. Vocational educators, guidance counselors, teachers of social science, and others would be made more sensitive to the relationship between manpower information, career opportunities, and local vocational programs. Where specific occupational training is offered in post-secondary or similar sources, as for Inhalation Therapy Technicians to cite an instance, the program planning would entail the use of local projections of future employment opportunities joined with periodic surveys of local sources of supply for new entrants into the field. With this approach, the requirement for highly detailed local manpower projections matched with estimates of local occupational supply as a basis for assessing training targets in the state plans submitted to the U.S. Office of Education would become outmoded.

The manpower information which is needed in vocational education is the information which will be used. So far, only limited use has been made of a massive accumulation of manpower data because this information is little more than vaguely related to the objectives and needs which guide the participants in the vocational education system, including students, teachers, and administrators. The prerequisite for increasing the usefulness of the manpower data for vocational education is to relate it more closely to clearly defined operational objectives which influence decision-making within the educational system.

Chapter 5

Finances and Priorities in Vocational Education

I.

The Dollar Indicators

Dollar spending in vocational education, as elsewhere, is significant as an indicator of priorities, of the willingness to commit resources to implement the decisions which can facilitate change. Federal spending for vocational education in the past few years has amounted to about one-sixth, and State-local government expenditures about five-sixths of the total outlays for the Federally-aided programs. The Federal aid to the states in vocational education, accordingly, is likely to be mainly significant in changing priorities by inducing State and local governments to change their programs and expenditures.

One measure of the similarities and differences between national priorities in vocational education, as expressed by Congress in the 1968 Amendments and similar legislation, and the priorities of State and local governments is provided by the extent to which State-local government outlays undermatch or overmatch the Federal funds provided for the same purposes. For instance, it is apparent that many states assign a lesser priority to programs for the handicapped. In nearly half of the states for which information was available in 1971, the funds provided by State and local governments were less than half the Federal aid for these programs. All states reporting overmatched the Federal support for the post-secondary programs. Twenty-five states spent three or more dollars of their own funds for each dollar of Federal aid for this

program.[1] Some indication of priorities is probably also evident in the fact that in only 9 of the 43 states for which information has been reported for 1971 was the proportion of vocational education funds spent in the urban areas, the SMSA's, equivalent to or greater than the proportion of the state's population living in the SMSA's.[2]

In terms of the overall Federal effort for manpower programs, the nearly $400 million outlay for vocational education made up about 15 percent of the estimated $2.7 billion expenditure for manpower and vocational programs in 1971.[3] As one indication of the dimension of these outlays, the spending for vocational education in that year was about $60 million greater than the outlays for institutional training under the Manpower Development and Training Act. However, the comparison requires qualification because the vocational programs are the one element included in this total which is primarily financed by State and local funds.

The Administration's revenue sharing proposal would eliminate the present grants system in vocational education. This proposal would increase the options open to the State and local governments in determining the priorities to be implemented with the Federal aid. Essentially, the Administration's plan would only modestly increase the Federal aid for vocational education in the next few years since the funds for the special revenue sharing would largely

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1/ Derived from U.S. Office of Education Form 3131, "Expenditures for Vocational Education by Source, Purpose, and Level," for fiscal year 1971. 1971 data is preliminary.

2/ Derived from U.S. Office of Education Form 3131, op. cit.; and U.S. Department of Commerce, Bureau of the Census, Census of Population, 1970, Number of Inhabitants, United States Summary, PC(1)-A1, 1971.

3/ Special Analyses, Budget of the United States Government, Fiscal Year 1973. pp. 124, 140. 142.

come from shifting funds presently allotted through the grants system.[4/] The larger cities, those over 250,000, would probably increase the share of the Federal aid they received because of the shift to revenue sharing. These cities would become eligible to participate directly in the Federal funding by submitting a City Plan for Vocational Education to the Federal Government.

II.

The Relationship Between Federal and State-Local Spending in Vocational Education, 1960 to 1971

The Federal Government's spending for vocational education increased by about 550 percent between 1960 and 1970. The considerably larger outlays of State and local governments grew even more rapidly during this period, by nearly 700 percent. Thus, although Congress expanded and refocused Federal support for vocational education through the 1963 and 1968 Amendments, enactment of this legislation did not lead to an increase in the proportion of Federal funds in the outlays for vocational education.

The preponderant role of State and local governments in the financing of vocational education is illustrated by the data for selected years between 1960 and 1971 presented in Table 5-1 (see page 4). The figures for 1971 are preliminary and incomplete

The expenditures of State and local governments have exceeded the Federal outlays by a 4 or 5 to 1 ratio in each of the years shown in the Table. Judging from the data presented in the Table, the Federal share in the total has declined somewhat in the past decade, from about a fifth to a sixth. However,

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4/ However, the Federal aid to vocational education would increase more substantially if many states were to decide to allocate part of the more discretionary general revenue sharing funds they would receive to vocational education.

Table 5-1

Expenditures for Vocational Education, by Source of Funds, Selected Fiscal Years, 1960 to 1971 (a)

(in millions of current dollars)

	Year			
Source of Funds	1960	1969	1970	1971
Federal Government	$45.3	$254.7	$300.0	$396.0
State-Local Governments	193.5	1,141.1	1,541.8	1,951.0
All Sources	238.8	1,368.8	1,841.8	2,347.0
State-Local Expenditures per Dollar of Federal Spending	$ 4.27	$4.37	$5.14	$4.93
Federal Funds as Percent of Total	19.0%	18.6%	16.3%	16.9%

(a) Sources: 1960, 1969, 1970. U.S. Office of Education, Trends in Vocational Education, Vocational Education Information No. III, 1971, Table 6, p. 14. Figures for 1971 are preliminary, and they are derived from Office of Education Form 3131, "Expenditures for Vocational Education by Source, Purpose, and Level," 1971.

as with other vocational education program data, substantial caveats are in order before the significance of the figures can be assessed. The national figures are based on reports by individual states which differ considerably in their definitions, their reliability, and their comprehensiveness. The addition of new programs eligible for Federal aid, i.e., the office occupations in the mid-1960's, may well have affected the distribution between Federal and State-local funds by adding programs in which the Federal assistance represented a less-than-average contribution. Yet, after voicing these cautions, the overriding fact the expenditure ratios point to is the relative stability in the Federal share in a period when outlays at all levels of government were increasing rapidly.

While the funds from State-local sources exceeded the Federal outlays in all 48 States for which this information was reported for 1971, the range of variation in the ratios of State-local to Federal spending is large. At one extreme, Massachusetts spent over $11 in State-local funds for every dollar of Federal aid. At the other, State-local governmental units in Nevada spent only slightly more than one dollar of their own funds for every dollar of Federal assistance. The states with the high ratios of State-local to Federal outlays tend to be among the wealthier states as measured by personal income per capita. The states with the low ratios are predominantly low income states. Stated otherwise, the Federal aid is typically a larger proportion of the total expenditures for vocational education in the poorer states.

Table 5-2 lists the 10 states with the highest reported ratios of State-local to Federal expenditures for vocational education is 1971 and the ten

with the lowest ratios. The Table also lists per capita personal income in 1970 in each of these states and their position in the ranking of per capita personal income for the different states in that year (see page 7).

Six of the ten states with the high ratios of State-local to Federal expenditures were in the upper quartile of states according to their level of per capita personal income. Only one state, Vermont, was in the lower half of the listing by States. Seven of the ten states with the lowest expenditure ratios were in the bottom quartile in terms of their income per capita in 1970. The greater importance of the Federal funds in the poorer states probably reflects both the lesser State-local expenditures for vocational education in these states and the manner in which the Federal aid is distributed to the states. The allotments to the states by the Federal Government, for example, are adjusted by taking into account the ratio of per capita income in the state to per capita income nationally, an adjustment which increases the allocation to the poor states.[5/] While experience in a single recent year is inconclusive, the preliminary data for 1971 suggest that the Federal grants to vocational education introduce an element of fiscal equalization in the revenues available for vocational education in the different states.

5/ See Davie, B. F., and Patterson, P. D., Vocational Education and Intergovernmental Fiscal Relations in the Postwar Period, U.S. Office of Education, Bureau of Research, 1966.

Table 5-2

Ratio of State-Local to Federal Outlays for Vocational Education, and Selected Personal Income Data, Selected States, Fiscal Year 1971

Ten States with Highest Ratios of State-Local to Federal Outlays	Outlay Ratio in 1971 (a)	Per Capita Personal Income in 1970 (b)	Rank Among States in Per Capita Personal Income (b)
Massachusetts	11.54	$4,294	9th
Illinois	9.80	4,516	7
Maryland	9.72	4,247	10
New York	9.43	4,797	2
Ohio	7.84	3,983	14
Vermont	7.46	3,491	31
Connecticut	7.27	4,807	1
Pennsylvania	6.81	3.893	16
Wisconsin	6.63	3,722	21
Delaware	5.49	4,233	11
Ten States with Lowest Ratios of State-Local to Federal Outlays			
New Jersey	2.26	4,539	5
New Mexico	2.15	3,044	44
North Dakota	2.14	2,937	45
South Carolina	1.94	2,908	47
Indiana	1.84	3,773	19
West Virginia	1.73	2,929	46
Arkansas	1.72	2,742	49
Louisiana	1.60	3,065	41
South Dakota	1.58	3,182	40
Nevada	1.16	4,544	4

(a) Source: U.S. Office of Education, Form 3131, "Expenditures for Vocational Education by Source, Purpose, and Level," 1971. Figures for 1971 are preliminary.
(b) Source: Statistical Abstract of the United States, 1971, Table 497, p. 314.

III.

Goals, Priorities, and Dollars in Vocational Education

Federal aid to the states in vocational education is intended as a catalyst to induce State and local education agencies to change their priorities. The intent in providing the Federal funds is to encourage the states to assign a higher priority to particular goals, such as establishing special programs for the disadvantaged, by supplying financial aid which reduces the cost to the sponsoring agencies of undertaking programs in pursuit of these goals. However, the leverage effect of the Federal aid is frequently minimized because the Federal outlays are so substantially overmatched by the State-local expenditures.

The priorities the Federal aid seeks to implement are brought out by a comparison of the distribution of the Federal funds and of all funds by program category in vocational education. Since the Federal outlays make up only a sixth of the total, the all funds category very largely reflects the spending of State and local education agencies. The comparison is presented in Table 5-3 for fiscal year 1970, the most recent year for which this information has been reported by program category (see page 9).

The Federal outlays are considerably more concentrated on programs for disadvantaged and handicapped students than are the funds from all sources. Programs for these students accounted for nearly a fourth of the Federal funds in 1970 as compared with only a tenth of the spending by all levels of government. Similarly, spending for construction and for ancillary services such as research or demonstration projects are responsible for a larger share

Table 5-3

Distribution of Federal Outlays and of All Outlays for Vocational Education, by Program Category, Fiscal Year 1970

Category	Percent Distribution of Federal Outlays	Percent Distribution of All Outlays
Secondary Vocational Education	23%	41%
Post-Secondary Vocational	23	24
Adult Vocational Education	5	6
Disadvantaged Student Programs	16	7
Handicapped Student Programs	8	3
Construction	13	11
Ancillary Services	11	5
Other	1	3
Total	100	100

(a) Source: U.S. Office of Education, Form 3131, "Expenditures for Vocational Education by Source, Purpose, and Level," 1970.

of the Federal outlays than of the combined spending. By contrast, expenditures for secondary vocational programs make up a much smaller percentage of the Federal spending than of the outlays of all units of government, 23 percent as compared with 41 percent. The high school vocational programs, accordingly, are assigned a significantly higher priority by State and local governments than by the Federal government.

About four-fifths of the Federal aid in fiscal year 1971 was for the Part B programs, the basic school programs in vocational education. The 1968 Amendments specify that 40 percent of the Part B funds must be set aside for handicapped and disadvantaged students and for post-secondary programs for students who have left high school and are preparing to enter the labor markets. To induce the states to spend more than the modest Federal allotments, the law specifies that the total State and local contribution must match the Federal contribution on a dollar-for-dollar basis. In other programs such as research or consumer and homemaking education in depressed areas the maximum allowable Federal share can reach as high as 90 percent or more.

The extent to which the Federal aid is undermatched or overmatched by State-local government spending provides an important indicator of the extent to which the states are more or less committed to the priorities implied in the distribution of the Federal funds. Table 5-4 summarizes the preliminary information for 1971 for four programs with set aside and matching requirements. They are the aid for the disadvantaged students, for the handicapped students, for post-secondary programs, and for consumer and homemaking education in depressed areas.

Table 5-4

Comparison of State-Local Government Outlays with Federal Aid For Vocational Education Programs with Set-Aside and Matching Requirements, Fiscal Year 1971 (a)

State-Local Outlays per Dollar of Federal Aid	Disadvantaged Student Programs	Handicapped Student Programs	Post-Secondary Programs	Consumer Education in Depressed Areas
$.0 - .49	11	21	0	11
.50 - .99	16	5	0	2
1.00 - 2.99	14	19	22	8
3.00 or greater	5	2	25	27
Total Number of States	46	47	47	48

(a) Source: U.S. Office of Education, Form 3131, "Expenditures for Vocational Education by Source, Purpose, and Level," 1971. Figures for 1971 are preliminary.

The programs which encountered the greatest difficulty in attracting State-local funds were the programs for the handicapped. Spending by State and local governments for programs for disadvantaged students was less than half the Federal outlays in about one-fourth of the states. By contrast, State and local government spending for the post-secondary programs exceeded the Federal government's spending in all the states included in Table 5-4. The low priority for programs for the handicapped and disadvantaged students in many states, and the relatively high priority for the post-secondary and consumer education programs are evident in the distribution of the expenditure ratios.

IV.

The Availability of Vocational Education Funds in the Urban Areas

Taken as a whole, the present Federal grants-in-aid to State and local governments provide about the same proportion of funds to the urban population as the proportion of population living in urban areas. Defining urban in terms of the Standard Metropolitan Statistical Areas, close to 70 percent of the population live in the SMSA's, and slightly more than 70 percent of the grant aid is expected to be spent in the SMSA's in 1973.[6/] In vocational education, however, a smaller share of both the Federal aid and of the total outlays are spent in the urban areas than would be anticipated on the basis of population.

Table 5-5 summarizes the available information dealing with the share of the vocational education funds received by the cities in fiscal 1971 (see page 14). This relationship is expressed by a ratio comparing the proportion of funds spent in the SMSA's in each state and the proportion of the state's population living in these urban areas. A ratio of less than 1 indicated that the urban areas received a lesser share of the vocational education funds than would be expected on the basis of their population while a ratio of more than 1 would indicate they had received a larger share.

Allowing for the states for which there is no information, it is evident that in most states the proportion of the vocational education funds allocated to the urban areas is smaller than their share in the population. This was true for both the Federal funds and for the State-local government funds, and the rankings of the individual states were very similar for both. In about half

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6/ Special Analyses, Budget of the United States Government, Fiscal Year 1973, pp. 247, 248.

Table 5-5

The Proportion of the Vocational Education Spending in SMSA's as a Ratio to the Proportion of the Population in the SMSA's, by State, Fiscal Year 1971 (a)

	Distribution of States Reporting		
Ratio	Federal Funds	State Funds	All Funds
0 - .79	20	19	18
.80 - .99	15	15	16
1.00 - 1.19	4	6	6
1.20 - 1.99	4	3	3
Total	43	43	43

(a) Derived from U.S. Office of Education, Form 3131, "Expenditures for Vocational Education by Source, Purpose, and Level," 1971; and U.S. Department of Commerce, Bureau of the Census, Census of Population, 1970, United States Summary, PC(1) - A1, 1971. Outlay figures for 1971 are preliminary.

the states for which information is presented, in 22 states, the funds-to-population ratio ranged between .80 and 1.19 indicating a moderate deviation in the funds-population balance with the ratios generally less than 1.00. In 18 states the deviation was more marked, and the SMSA's received less than four-fifths of the funds which would have been expected on the basis of population alone. In only 3 states did the urban areas receive significantly more funds than would have been the case if population were the sole basis for their distribution.

Offsetting the underlying tendency in the funds-population ratios listed in Table 5-5, other data show that the larger cities, those of 250,000 or more population have been accounting for a growing share of the Federal outlays in the past few years. In 24 out of 37 of the larger cities for which this information is available, the cities received a larger percentage of the statewide Federal aid in 1971 than they had received in 1968.[7/] This evidence suggests that the criteria established for allocating funds to local education agencies by the 1968 Amendments, i.e., the emphasis on the disadvantaged and the handicapped, has served to increase the share of the Federal funds made available to the larger cities.

The ratio of funds to population in the urban areas is one element to be considered in arriving at a judgment about the equity of the present distribution of the vocational education funds. But it is only one element in a complex of factors. The significance of the funds-to-population ratios must be interpreted in the light of the data on the distribution of enrollments. In 1971, for instance, three-fifths of the total vocational education enrollments, including two-thirds of the post-secondary enrollments, were in the

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7/ Data for 1968 derived from U.S. Office of Education, Statistics of Local Public School Systems, 1967 ff, 1970; data for 1971 derived from U.S. Office of Education, Form 3131, op. cit., 1971.

SMSA's.[8/] This is equivalent to a somewhat lesser percentage than the seven-tenths of the population living in the SMSA's. For another consideration, economies of scale in the large urban school systems can make it possible to operate programs at a lesser per student cost than in smaller urban or in rural schools. But the economies of size may be offset in the central city schools by the greater cost of reaching and teaching students from disadvantaged backgrounds who often require costly supporting services in addition to regular program instruction. After allowing for the many variables about which our present knowledge is inadequate, the magnitude of the disproportion between the vocational funds spent in the urban areas and their share of the population suggests a bias in the mechanism for distributing vocational education funds favoring the nonurban areas.

V.

Revenue Sharing and Vocational Education

The present system of grants to the states provides one basis for distributing Federal aid for vocational education to State and local governments. The Administration has recently proposed substituting revenue sharing for the present grants system in many areas including vocational education. The significant feature of a shift to revenue sharing along the lines of the Administration's proposal would be the greater role for State and local governments in defining the priorities to be implemented by the expenditure of the Federal funds. To quote the Federal Government's budget report for

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8/ Unpublished estimate, Division of Vocational and Technical Education, U.S. Office of Education, 1972.

fiscal year 1973, "the programs recommended for conversion to special revenue sharing (including vocational education) deal with high priority national problems which require State and local solutions. In these areas, State and local governments are in a better position to design and implement responsive and effective programs."[9/]

Revenue sharing in education in the recent proposals would take the form of special revenue sharing or bloc grants. Funds for the special revenue sharing would come from the transfer of the funds now utilized for the present grants into the new programs, and from additional funds which might be requested by the Administration. At least initially, the increase in funding would probably be modest with special revenue sharing outlays for vocational education estimated by the Administration at $468 million in fiscal 1973[10/] as compared with the close to $400 million of Federal funding for vocational education in fiscal 1971.

A shift to revenue sharing would eliminate the present state grants mechanism together with the matching requirements and the specific set asides for such groups as the disadvantaged or the handicapped. Each state would distribute the Federal funds it received to programs and localities according to its own priorities. While it is impossible to predict which programs or population groups would be affected most by revenue sharing, if recent trends in State-local government funding in vocational education were to continue, there would probably be less emphasis on programs for the handicapped or the disadvantaged, and a greater emphasis on other programs such as post-secondary vocational education (refer back to Table 5-4 and p. 5-12 as basis for the above expectation).

9/ Special Analyses, Budget of the United States Government, Fiscal Year 1973, p. 244.

10/ Special Analyses, Budget of the United States Government, Fiscal Year 1973, p. 120.

The larger cities, those of 250,000 and over, would stand to benefit from more direct access to Federal funds because of a shift to revenue sharing. Cities in this category would become eligible for direct Federal funding by submitting a City Plan for Vocational Education to the Federal Government. The cities involved should obtain a larger proportion of the Federal funds than at present since the distribution of funds to the cities receiving this aid would be based on the same population formula used presently in the states. The participating cities would not be eligible for additional Federal funds from the State Vocational Education Agency. This approach, however, would eliminate the criticism that burdensome and costly delays occur in the receipt of Federal funds by cities under the current state grant mechanism.

A shift to revenue sharing in vocational education would increase the role of State and local governments in an area in which their role in decision-making is already the preponderant one. It would also do away with an array of difficult-to-administer programs. The problem is that State and local education agencies, in the past, have frequently been slow to innovate and to respond to the needs of students from disadvantaged groups or to changing labor market opportunities. Devising a substitute for the presently cumbersome grants system involves devising a substitute system for encouraging change in vocational education.

Chapter 6

Evaluations of Vocational Education

Issues: What are the methodological problems involved in evaluations?
What have been the findings of the major evaluations of vocational education based on national surveys and case studies?

During the 1960's, a new emphasis was placed on evaluating the results of vocational education. Much of this work was in the form of cost-benefit analysis, which Ernst Stromsdorfer defines as a quantitative analysis whose intent is to provide a criterion or standard for decision-making so as to allocate in a rational and optimal way a given set of scarce resources among numerous competing needs.[1/] Basically, this analysis asks the question: does vocational education return economic (in practice, monetary) benefits equal to, or greater than, its economic costs? Many of these evaluations were case studies, a few were large-scale and national in scope. The major works (Somers, Hu, National Longitudinal Survey, Eninger, etc.) are reviewed in this chapter. By way of preface, some of the major problems encountered in conducting this type of research, and the difficulties encountered in interpreting findings, are also discussed.

To determine whether vocational education makes a difference in terms of labor market experience requires that five logical steps be followed:

- The outcomes of vocational education must be specified
- Means of quantitatively measuring the identified outcomes must be established

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1/ See Appendix A, p. 2.

- The base against which vocational education is to be compared must be set
- Data must be collected
- The data must be appropriately analyzed

Each of these steps involves serious pitfalls. For example, vocational educators have traditionally measured the success of some programs in terms of completions and placement; these data pertain to a very limited indication of program outcomes, limited because earnings and duration of employment were not recorded. Any desired outcomes not associated with employment are particularly hard to measure. At the same time, as Ernst Stromsdorfer points out in Appendix A., measurements of earnings, wages or duration of employment do not provide a complete picture of labor market performance. Other factors, including how a graduate values leisure, job status and job security should be considered as part of the occupational reward. Collecting follow-up data is difficult and expensive; low response rates are likely to bias the results of analysis.

In Appendix A, Stromsdorfer outlines some of the major problems encountered when attempting to measure educational outputs. Specifically, he states that a benefit is any result of the vocational education process which increases individual or social well-being or welfare (the increase being either economic or noneconomic). Economic welfare benefits occur either directly by increasing productivity or indirectly by freeing resources for alternative uses. With noneconomic welfare benefits, the educational process results in an increased level or satisfaction or utility for those participating in the educational process.

But the problem of selecting and weighting relevant output indices becomes more complex, Stromsdorfer states, when one compares programs with varied mixes of general and vocational components. In most cases, the output indices selected are appropriate to vocational objectives, but slight the intended outputs of the general educational component, raising serious questions about the validity of resultant program comparisons. In a general sense, it illustrates the type of bias that often results when one judges a program on the basis of a narrowly conceived set of outputs without regard for the program's concomitant effect (positive or negative) upon other desirable outputs. Stromsdorfer also states that if the objectives of an educational or training program are to maximize one's total satisfaction, then both pecuniary and non-pecuniary income should be considered. In this regard, he notes that most previous empirical works have not fully explored the estimation of non-pecuniary income to supplement the money income estimates, although he then outlines a theoretical model which considered both types of income as measurements of program achievement.

Establishing an appropriate basis for comparison is particularly difficult. Ideally one would like to observe the outcomes of vocational education programs in terms of the subsequent behavior and experiences of students and compare those with the resulting behavior and experiences of the very same students in an alternative program. Since this is impossible the next best thing is attempted: collecting data on students in other programs and using such variables as race and family background to statistically control for differences in the two populations of students. This procedure permits the researcher to state that, given similar characteristics of students, those participating in the vocational education program experience (or fail to experience) a statistically

significant difference in some desired and measurable outcome such as earnings. It is possible that controlling the analysis for student characteristics does not even come close to duplicating the ideal experiment of exposing the same students to the two different programs, since students differ in their levels of motivation and their interests and tastes. Measurable characteristics such as race, family background, or IQ do not fully capture these differences. Interactions among these variables remain obscure and affect outcomes. Due to the expense involved in collecting data in national surveys, it is particularly difficult to control for all the variables associated with differences in earnings and employment so as to isolate the effects of educational programs.

Stromsdorfer cites the problem of nonresponse, indicating that almost every sample chosen will have nonrespondents (who either cannot be located or refuse to reply). In addition, he states that no response rate less than 100 percent will ensure that no bias exists in the end result, as long as nonresponse is not random. In many cases, studies will attempt to overcome this problem by imputing values for the missing observations or incomplete answers. Others impute sample weights to adjust for nonresponse. Most of the cost-benefit studies considered in this chapter test the sample for the presence of nonresponse bias by sampling a group of nonrespondents and applying a test for the significance of the differences between means of the response and nonresponse sample for each of a set of given critical characteristics. But as Stromsdorfer points out, this procedure obscures the fact that interactions among variables within samples can exist and bias the results even where the means do not differ between the samples. In testing for possible nonresponse bias, each crucial analytical model must be tested, which most studies (including Hu, et al.) fail to do.

Follow-up data impose a dilemma; a short period after training reflects experiences that may not be typical of the longer run; a longer period after training, say five years, provides data about programs in the past that may differ from current programs. The results of case studies are not generally applicable given the uniqueness of individual programs or peculiarities of local labor markets.

On the other hand, evaluations of vocational education efforts are often undertaken from the cost-effectiveness point of view, based upon the assumption that it is generally desirable to employ resources in those uses having the highest level of productivity. As Stromsdorfer states in Appendix A, marginal benefits of a program can be compared with the marginal costs of competing educational programs to discover which alternative is relatively more desirable. In addition, it is often important to measure a program's absolute level of efficiency (does it operate in the black, and for how long?). To do this, a measure of average costs (total costs divided by total units of output) and benefits must be performed. Here, total benefits are divided by total units of output and average costs are compared with average benefits.

Stromsdorfer points out that most evaluative studies of vocational education do not employ accurate models for determining this, however, and do not recognize distinctions between marginal and average costs and benefits. Thus, they are incomplete as evaluations. The model he outlines, which is quantitative, directly related to the specific purpose being served by the program, and which links benefits with costs, contains two key components:

- it examines the nature of the output process of competing programs; and
- it determines which program and its output process is most efficient.

As Stromsdorfer warns, treatment of either benefits or costs in isolation will not provide valid information in making choices among social programs. He points out that vocational education is not less efficient or less desirable simply because it costs more, both on the average and in marginal terms, to educate a student in a vocational program than it does to educate him in an academic program in a comprehensive high school.

Stromsdorfer's evaluation model (for vocational education or similar social programs) itself requires the following steps:

- specification of program objectives;
- specification of processes or activities (e.g. the production function or process)
- specification of cost function or cost relationship (based upon production function for each activity);
- specification of benefit functions (based upon a set of indices designed to measure program output); and
- comparisons of costs and benefits.

In this respect, several of the studies cited in this chapter fall short. For example, Stromsdorfer cites the Eninger study, which does develop a model containing the essence of a production function, yet fails to implement the function. Thus, the study can be considered only as preliminary and suggestive. With only one exception (Hu, et al), none of the major studies estimate total cost functions. While the Hu study does estimate a total cost function with respect to average daily attendance for two of the three cities involved in its analysis, it makes no effort to analyze the underlying production function.

Stromsdorfer cites the production function or process as a critical stage in any evaluation process, since it is only by understanding how program inputs affect outputs that rational changes in a program structure can be made. However, he finds no widely accepted theories as to how vocational capabilities are imparted, or what variables are critical to the efficiency and effectiveness

of the learning process. Because of this, many studies specify the production process through trial and error, attempting to statistically "fit" various empirical relationships, a method Stromsdorfer terms unsatisfactory (he does cite the Eninger study, which develops a model containing the essence of a production function yet which fails to implement the function).

Evaluations of vocational education, particularly at the secondary level, should not be based purely upon efficiency; that is, one should not only ask what programs return the greatest number of dollars of benefits for each dollar of cost. To do so ignores the equity questions involved. If one were concerned only with efficiency criteria, the probable implication would be to invest resources in the education of the most capable, and ignore the handicapped and the disadvantaged. One should still try to determine which educational programs best meet the needs of the disadvantaged or the handicapped and try to avoid an investment of resources yielding relatively low returns. But it may be socially and educationally desirable to provide services to some such groups based on other than efficiency considerations.

I. Do Graduates of Secondary Programs Find Worthwhile Earnings and Employment?

Comparisons of college preparatory, vocational and general curriculum students who enter the labor market are hampered by a number of factors. The basic conceptual issue is that students in these various curricula place different weights on such things as earnings, status, job security, working conditions and the like. This hinders comparisons among them when based upon a single measure of outcome such as earnings or employment. In addition, most labor market and economic analyses are case studies, so it is not possible to generalize from them to the whole population of students. Unfortunately, all but one of the studies based on national samples suffer from severe nonresponse rates. (Of course, nonresponse bias exists with case studies, too.) For

these reasons, and the fact that various studies use different evaluative methodologies and sampling designs, these studies present conflicting evidence. Other things equal, however, one should be able to make judgments on the basis of studies using national samples.

The most reliable set of national data on the employment and earnings experience of high school students is based on the National Longitudinal Surveys, which Stromsdorfer cites as the only survey attempting to provide data on the effects of educational processes upon career patterns (which, in itself, requires longitudinal data -- other surveys provide such data only retrospectively). 2 / Data on earnings, employment and educational experience can be related to high school curriculum and a variety of other educational and sociodemographic data. These data exist for the same individuals for 1966 and 1968. Our analysis is for out-of-school male youth only.

An analysis of these data indicates that the effects of high school curriculum on earnings are highly sensitive to the state of the labor market. In 1966, statistical analysis which controls for a variety of sociodemographic variables reveals that there is no statistically significant earnings difference between those students who follow the college preparatory curriculum and those who follow the vocational curriculum. (See Appendix Table B-2.) Analysis of the same sample with two additional years of labor force experience shows that vocational students earn about $7.05 more per week (or about $367 more per year)

2/ National Longitudinal Surveys, Survey of Work Experience of Males, 14-24, 1966 and Survey of Work Experience of Young Men, 1968. U.S. Department of Commerce, Bureau of the Census and Center for Human Resource Research, Ohio State University, Columbus, Ohio, 1966 and 1968. The 1966 and 1968 samples are for identical cohorts of young men. There is an interview completion rate of over 90 percent and the number of usable sample observations for the present analysis is only 80 percent. Thus, there is less than a 20 percent non-response rate. See "Sampling, Interviewing and Estimating Procedures, 1966 Young Men," U.S. Department of Commerce, Bureau of the Census, Washington, D.C. 20233. Appendix Table B-1 shows the characteristics of the sample.

than do academic students during the survey week, fourth quarter, 1968. This difference is statistically significant at the 10 percent level. That is, the chances are only one in ten that the observed difference is not different from zero (Stromsdorfer here cites the fact that the analyses of earning data from this survey show a strong cyclical response to different levels of aggregate unemployment, and asks whether one should allow measures of the value of human capital created by an educational program to reflect the phenomenon of cyclical unemployment? Thus, he asks which earnings estimate, that for 1966 or for 1968, is technically correct?). (See Appendix Tables B-4 and B-5.)

When the total sample is weighted to adjust for oversampling of blacks, however, the weekly differential earnings benefits attributable to the vocational curriculum vis-a-vis the academic curriculum increases to $7.77 (or about $404 per year) and is significant at above the one percent level of statistical significance. In fact, the probability is considerably less than one chance in 100 that the observed difference is not different from zero. In a comparison with the general curriclum, the differential in weekly earnings associated with the vocational curriculum is $5.31 per week, or about $276 per year. This differential is also statistically significant (See Appendix Tables B 2-5 for the detailed analysis of the statistical models discussed here). Thus, the pursuit of the vocational curriculum does pay off in money terms, although the amount of the payoff is apparently very sensitive to the level of unemployment and aggregate demand, a phenomenon which has been observed in evaluations of manpower training. In 1966, unemployment for the age groups in this study was rising during the sample quarter

(October-December) while it was falling in 1968.[3/] In the first instance, for males age 20 to 24, the unemployment rate rose by 23.8 percent from October to December while in 1968 it fell by 30.5 percent over the same time span. But, also important is the fact that the follow-up period increased by two years so that the average period of time the students had been in the

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3/ The relevant figures are as follows:

Rates of Unemployment for Males by Age, Seasonally Adjusted

Age and Year	October	November	December
1966			
18 and 19	9.7	9.9	10.4
20 to 24	4.2	5.0	5.2
1968			
16 and 17	14.5	14.1	14.2
18 and 19	10.6	8.8	9.3
20 to 24	5.9	4.9	4.1

Source: Employment and Earnings and Monthly Report on the Labor Force, Vol. 13, No. 7, January 1967, Table A-29, p. 36 and Vol. 15, No. 7, January 1969, Table A-33, p. 53.

labor market since leaving school was 3.77 years.[4] The sample has matured by two years, which, for this young cohort, implies an increase in the stability of their employment and occupational patterns (Note again the unemployment rates in the table in footnote 3). Unemployment rates drop by half between the ages of 18-19 and 20-24. This increase in employment stability may benefit vocational students more than their academic counterparts.

Although the cost data are not completely satisfactory, it is possible to estimate the rate of return to vocational education using the above beneft estimates based on the comparison with the academic curriculum and costs based on a study of the American Institutes for Research.[5]

If we assume a ten-year payback period for benefits, then, based on the unweighted regression model, the rate of return is 9.4 percent. Based on the weighted model, which we judge is a better estimate, the rate of return is 11.3 percent (See Appendix Table B-6).[6]

4/ This follow-up period compares with a six-year follow-up period in the Hu, et al., study and the three-year follow-up period in the Fernbach and Somers study. See Teh-wei Hu, et al., A Cost Effectiveness Study of Vocational Education: A Comparison of Vocational Education in Secondary Schools, University Park, Pennsylvania, March 1969 and Susan Fernbach and Gerald G. Somers, An Analysis of the Economic Benefits of Vocational Education at the Secondary, Post-Secondary and Junior College Levels, Preliminary Report, Madison, Wisconsin, May, 1970.

5/ American Institutes for Research, An Analysis of Cost and Performance Factors for the Operation and Administration of Vocational Schools for Secondary Programs, Pittsburgh, Pennsylvania, May 1967.

6/ These rates of return are likely to be underestimated since the impact of costs is overstated. The sample respondents only complete an average of 11.45 years of schooling, rather than the assumed 12 in this calculation. Also, not all vocational programs are three years in length. These two factors outweigh the fact that the reported costs for this male sample are underestimated since the cost data refer to males and females combined.

In contrast, the nationwide survey by Fernbach and Somers indicates that the annual before-tax earnings of secondary vocational education graduates were 667 dollars more than earnings of graduates from other secondary programs (See Appendix B-6). Total social costs, including direct operating costs, capital costs, and foregone earnings, amount to an average of about $720 per year. Thus, the average rate of return to vocational-technical education graduates is approximately 21.4 percent for the investment over a projected ten-year period.[7] The findings of the Fernbach-Somers study are qualified by the fact that the nonresponse rates were generally high -- in some areas as high as 75 percent for certain subgroups. And as Stromsdorfer points out, while careful attention was given to the development of benefit models, they should be re-estimated to test for the nonresponse bias. In addition, other cost-benefit comparisons could and should have been made.[8]

Stromsdorfer warns, however, that the use of a pay-back criterion suffers from a variety of conceptional flaws. It ignores the fact that costs and benefits of competing investments are distributed through time, and have different time profiles. Because education yields its benefits over an entire lifetime, he indicates that discounting is necessary to make the different benefit-cost profiles commensurable. He also states that the absolute size of net benefits between alternatives may differ, while the use of the ratio

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7/ Fernbach, Susan B. and Somers, Gerald G., An Analysis of the Economic Benefits of Vocational and Technical Education at the Secondary, Post-Secondary and Junior College Levels: A Preliminary Report on an Evaluation of Vocational and Technical Education in the U.S., University of Wisconsin, Center for Studies in Vocational and Technical Education, Madison, 1970.

8/ See Appendix A, pp. 95 ff.

will obscure this. Finally, he points out that as with the internal rate of return, the pay-back criterion breaks down completely in those cases where investment alternatives are mutually exclusive. Given all three, he warns that the pay-back criterion has serious conceptual limitations as a decision-making tool, and, as far as he is concerned, is not highly recommended.

Given their qualifications, the National Longitudinal Survey data and the Fernbach-Somers study indicate the average costs of vocational-technical education relative to alternative uses of social capital. For example, should additional funds be spent on vocational-technical education relative to competing secondary curricula? The answer to this question requires an estimation of the additional or extra benefits yielded by vocational-technical education for each additional dollar spent. In economica parlance, marginal (or extra) benefits must be compared to marginal (or extra) costs to determine which alternative is relatively more desirable.

Only case studies are available to estimate marginal returns to vocational education. These marginal rates vary over a wide range--from less than 10 percent to over 30 percent. In one case for females, the Taussig study of New York City, the estimated return is negative. But here, Sromsdorfer warns, the empirical results can only be considered suggestive due to the poor quality of the data. He states that Taussig was unable to adequately control for a variety of critical socio-demographic factors which influence net benefits; thus the conclusions are much too sweeping given the quality of the data.

How applicable these case studies are to the national experience is open to serious question. All that can be said is that rates are generally positive,

but an exact point estimate cannot be made. In addition, it is not possible to tell from these studies how much funding should be shifted from the academic to the vocational curriculum in our nation's school, though the generally positive results argue for some relative shift of funds to vocational education.

Here again, Stromsdorfer indicates that marginal cost-benefit calculations are far from sufficient in making complete decisions with respect to investments in vocational education. Augmenting the marginal cost-benefit findings must be an assessment of the absolute level of program effectiveness -- or, as he states, "in the long run, does the program operate in the black." Here a measure of average costs and benefits must be performed: average costs (total costs divided by the total units of output) being compared with average benefits, (total benefits divided by total units of output). Sromsdorfer concluded that most evaluative studies of vocational education do not employ such models, though consideration of this area must be implicit in their analysis. As noted earlier, he indicates that most studies do not recognize the distinction between marginal and average costs and benefits, and thus must be considered incomplete evaluations.9/

The various studies also fail to give any concrete impression of the relative benefits of vocational skill areas, either because the analysis was not performed or because of serious qualifications. The 1966 National Longitudinal Survey data show the effect on earnings of broad vocational skill areas (See Appendix Table B -3). Relative to the college preparatory curriculum, there is no difference in the earnings between this curriculum and the commercial, metal, wood, mechanical, other building trades, electricity and

9/ See Appendix A, p. 6.

"other" skill areas. There is no difference between the college preparatory and general curriculum for the other broad skill areas analyzed (commercial, metal, wood, mechanical, electricity, other building trades, and "other"). Young black males and young white males each have similar experience. However, these results are contaminated by the high and increasing unemployment which occurred during the 1966 survey period. The result could be to bias the returns to vocational skills downward.

The conflicting findings are nonetheless sufficient to indicate that, based on the national studies, vocational education apparently yields positive returns to students. These studies, however, suffer from either too short a follow-up period or significant nonresponse. On the whole, the National Longitudinal Survey data are the most reliable. Yet, these data provide a much less sanguine picture of the returns to vocational education. There is an 80 percent plus response rate and the national sample is carefully drawn and data were collected by trained interviewers under the control of the U.S. Bureau of the Census. Thus, we would judge that vocational education has a small effect on earnings vis-a-vis the secondary academic and general curriculums. With one exception, money benefits among the studies range from over $200 to over $800 per year, with most estimates centering around $400 to $600. However, the quality of the cost data is quite low and knowledge of the exact length of training is not known in all cases, especially the National Longitudinal Survey data. Hence, the wide variation in rates of return. Thus, no clear judgment can be made as to the amount of resources to shift from the academic and general to the vocational curriculum.

Also, the studies are too incomplete or methodologically weak to allow any judgment to be made concerning relative returns to skill areas within vocational education. We simply know that average and marginal rates of return are positive but the lack of precision forces us to suggest that both fall somewhere in a range from less than 10 percent to somewhat over 20 percent. And, just as important, data are needed to determine program benefits to given target groups, such as the disadvantaged. Economic and educational factors quite clearly suggest that no one program will aid all groups equally well. Finally, a judgment has to be made concerning the amount of weight to be placed on these types of money costs and benefits relative to other costs and benefits to these educational investments. In short, equity is also an important educational goal.

II. What About Special Target Groups?

While the enrollment figures reported earlier suggest that there is no intentional discrimination against women or blacks in vocational education generally, it is possible for some populations of students to benefit more than others from vocational training.

Although analyses of METRO study data are still incomplete, evidence suggests there is little difference in services provided to these groups as assessed by the students' rating of the adequacy of training in preparing them for employment.[10/] When it comes to employment measures, however, the differences between black and white graduates are similar to those found with black and white workers generally. It took black graduates longer than whites

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10/ Eninger, M., et al., Effectiveness Evaluation for Major City Vocational Education Systems in the U.S. - short title METRO I and II - for USOE (in process).

to find their first job (only 50 percent of black graduates found their job in less than two weeks after graduation while nearly two-thirds of white graduates obtained employment that soon). The METRO data report that white graduates earned somewhat more than blacks two years after graduation, and male earnings were significantly higher than female earnings. It is reasonable to assume that these results are due more to labor market discrimination and socially determined economic roles than to shortcomings in vocational education programs per se.

A more detailed analysis by Hu et al., which controlled for the graduate's IQ and his father's education (Stromsdorfer points out that this was used as a proxy for socio-economic status, and while a positive effect between a father's education and earnings was expected, the variable usually had a negative sign or else was not statistically significant from zero - an issue which has not been resolved.), suggest there is indeed an initial differential in wages which favors whites. Although the initial earnings differential may be explained by a larger proportion of black female graduates among blacks as compared with whites, given the lower earnings of females generally, it is not possible to trace precisely the cause of this differential. Certainly labor market discrimination, the quality of elementary education received by blacks and lack of remedial programs at the secondary level all play a part (See Appendix Tables B-7 and B-8).

The picture with respect to long term employment is not as unfavorable to nonwhites as initial labor market experience suggests. The Hu et al. study suggests that large initial employment differentials exist in favor of white vocational-technical graduates compared with nonwhites graduating from vocational high schools and comprehensive schools in the first year after graduation. The differentials are greater for graduates from vocational-technical schools

than those from comprehensive schools. However, by the sixth year after graduation, there is either no difference in employment rates between whites and nonwhites pursuing the same curriculum or else the differential is in favor of nonwhites due to the higher labor force participation rate of nonwhite females. These data apply to only a sample of graduates of three northern cities - but they are significant in that they display considerable labor market discrimination as late as 1966 for high school graduates having similar high school educations.[11/]

The National Longitudinal Survey data gives the best evidence on the effects of curriculum with respect to race. Table B.-9 in Appendix B indicates clearcut differences among the curriculums. Blacks in the general curriculum earn approximately $21 a week less than their white counterparts ($1,092 per year). This effect holds for both the 1966 and 1968 survey of young men. There is no difference in the earnings of blacks and whites in the academic curriculum in 1966 but in 1968, with the passage of time and improvement of the labor market (although the black high school graduation and college attendance rate improved), whites earned $16.50 a week more than blacks ($858 per year). In 1966, black vocational students also earned about $21 per week less than white vocational students. However, in 1968 with the improvement in the labor market, the relative position of black vocational students improved by about $2.50 per week ($130 per year). One should contract this with the general curriculum where the disadvantage to blacks remained static. When one combines the commercial with the vocational curriculum, the

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11/ Hu, et al., op. cit.

earning position of blacks improves from a disadvantage of $23 per week in 1966 to slightly over $15 per week in 1966 -- almost eight dollars per week (about $400 per year). These general findings are also supported by the Hu, et al. study, where the earnings position of black vocational males vis-a-vis whites improves from a loss of $144 per month in the first year after graduation to only $106 per month in the sixth year. However, for blacks graduating from comprehensive high schools, earnings losses increase from $99 per month in the first year to $145 in the sixth year. Thus, in terms of the absolute amount of differences in earnings there are smaller differences among the two races for the vocational curriculum.

Since secondary level programs are highly sex specific, and males have been found to constitute a much higher proportion of the enrollments in more expensive programs which lead to better paying occupations, the wage differences found between male and female graduates are not surprising.

The study by Somers et al., shows large wage rate differentials in favor of males. Male vocational high school students earn about $.38 more per hour on their first job than females, after controlling for several critical socio-demographic variables. Males specializing in Trades and Industry earn $.71 more per hour on their first job and even males in Office Occupations earn over $.34 more per hour than do their female counterparts. The Technical specialties showed a sex differential of over $.63 per hour but there was no difference in earnings in the Health and Distributive Education areas.[12/]

These earnings differentials undoubtedly represent the effects of both wage and occupational discrimination. However, what the role of vocational education should be to counteract this discrimination is unclear outside of the context of societal attack on racial and sex discrimination.

12/ Somers, et al., op. cit., Appendix Table 20 and 23.

The outputs of vocational education are multidimensional. Earnings is only one aspect of them. Employment and job security are another aspect. Do secondary vocational students enjoy greater employment stability and job security than academic students?

Among the available studies, usable analysis on employment experience can be drawn from the work of Hu, et al., and from the National Longitudinal Surveys. The Hu, et al. study showed that, for the three study cities combined, high school graduates from the vocational curriculum experienced signficantly higher percentages of time employed than graduates of academic programs who did not attend college. This was true both for the first year after graduation and for six years after graduation (See Appendix Table B-10). The differences ranged from 5.2 to 9.9 percentage points for the whole six-year follow-up period. The analysis showed these differences attributable to high school curriculums after controlling for the separate effects of socioeconomic variables.

The 1968 National Longitudinal Survey data show somewhat higher average employment rates during the survey week for young men whose high school curriculums were vocational or commercial than for those from general or academic curriculums. The difference was more marked among 21-26 year olds. However, these rates are not adjusted for other differences in socio-demographic characteristics. Appendix Table B-11a displays the results of regression models which control for the effects of age, ethnic origin, marital status, age when respondent left school, highest grade in school completed, whether or not a respondent attended some college, and post high school training other than college. The models show that consistently for a variety of major socio-demographic sub-groups there is no statistically significant difference between

vocational students and the other three high school curriculums -- college preparatory, general and commercial. Since these are national data, with low nonresponse rates, we are forced to conclude that there may be no net employment benefits to the vocational high school curriculum. Other specifications of the models could result in net differences (either positive or negative) being detected, however (See Appendix Table B-11).

III. Does Vocational Education Help with Socialization?

One of the goals of all education is to increase the ability of students to get along with each other, to improve their ability to communicate and work with each other, in other words, to become socialized. Does vocational education contribute to this goal more than other types of secondary curricula?

Socialization is a difficult goal to measure since it has many potential dimensions, not all of which are amenable to quantitative measurement. However, one index of socialization is citizenship and one index of citizenship is voting behavior. A study of voting behavior of graduates from various types of secondary curricula in the 1960's shows about eight percentage points fewer vocational-technical high school graduates than academic graduates voted in the 1964 presidential election. However, there was no difference between the two curricula with respect to voting behavior in the 1966 primaries.[13/]

While it appears from these limited data that vocational education may have a lesser impact on the aspect of socialization measured by voting behavior, it is mainly the low IQ (89 or less) and low socio-economic status (father's education less than 12 years) vocational graduates which contributed to this

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13/ Hu, et al., op. cit., pp. 205-207.

effect. Thus for the overall sample interactions between IQ and social status, the vocational curriculum may be responsible for the lower voting rate of vocational students. It would be instructive to determine if this differential in voting behavior is maintained in the 1970's with the advent of the lowered voting age. The forthcoming longitudinal study of high school seniors will help provide some answers to this question.

IV. Does Vocational Education Preclude Students from Further Education?

Vocational education is frequently differentiated by its proponents from training in industry or other federal skill training programs since it involves a broader educational exposure. One benefit of such education is the high school diploma which is often essential in pursuing continued education.

It is a mistake to think of the secondary vocational program as a terminal education program even though one of its major objectives is to prepare one for immediate entry into the labor market after high school graduation. As Table 1, page23 , shows, over half of the vocational high school graduates obtain some additional education. Those students who have attended a postsecondary technical vocational school program are 48 percent less likely than vocational high school graduates to acquire any additional education. However, junior college students are 11 percent more likely than secondary vocational education graduates to acquire additional education.[14/]

These figures represent the percentage of students attending college at some time after graduation, and there appear to be significant differences of different programs. Those in distributive, technical and agriculture programs are more likely to continue their education than those in health, office and

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14/ Somers, Gerald G., et al, op. cit., Table VII-4.

Table 1

Percent of Students Who Obtained Additional Education After High School, by Program

Program	Sample Size	Percent Obtaining Any Additional Formal Education
Trade & Industry	423	53.7
Distributive	192	68.2
Health	25	48.0
Agriculture	187	66.3
Technical	139	71.9
Office	566	53.4

Source: Somers, Gerald G. et al., The Effectiveness of Vocational and Technical Programs: A National Follow-up Survey (Madison, Wisconsin: Center for Studies in Vocational and Technical Education, University of Wisconsin, 1971), Table B-16.

trades and industry programs. This is probably due both to the characteristics of students in these programs, and to the degree to which the programs are focused on specific job skills.

The METRO study of selected urban secondary vocational programs indicates that 25.8 percent of graduates enter full-time college programs in the semester immediately following high school graduation. The figure is 25.5 percent for general education program graduates and 70.0 percent in the academic secondary programs.[15/] However, the data are not adjusted for socioeconomic differences among curriculums.

15/ METRO I and II, op. cit.

While the longer term success of vocational education graduates in college programs will only be known when results become available from the longtitudinal studies of high school seniors, the distribution of abilities of vocational education graduates suggests they should do nearly as well as all high school completers.

Should college attendance be one of the goals for vocational programs? Two arguments can be made for such an objective. First, the American ethic would not countenance an educational program which somehow prevented graduates from pursuing further education. Second, any given career ladder will have some optimal mix of on-the-job training and formal institutional training, depending upon the skill components of the job and so forth. While no research yet has been done on the nature of this optimum mix for different occupations and career ladders, it is clear that many but not necessarily all skills taught at the secondary vocational level can benefit from additional formal institutional training.

With this point in mind, it is useful to determine the net impact of high school curriculum on the probability of going to college. The National Longitudinal Surveys of Young Males, 1968, provides the necessary data. In regression models which control for effects of age, ethnic origin, marital status and acquisition of postsecondary education other than college, the vocational curriculum student acquires about 55 percentage points less college exposure (attendance in a college at any time) than does his college preparatory counterpart.[16] Young white males age 16 to 26 in the vocational curriculum obtain about 58.5 percentage point less college exposure than do their academic counterparts. The comparable figure for black youth is 44.4 percentage points. For those youth employed in professional and kindred occupations, those with

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16/ The study sample includes both high school graduates and non-graduates.

vocational curriculum have 22.9 percentage points less exposure to college. This figure ranges up to 66 percentage points for clerical and kindred workers. (See Appendix Tables B-12.) However, these samples include both high school graduates and non-graduates. Appendix Table B-13 reports the results for the same regression models for high school graduates only. As can be seen in comparing Appendix Tables B-12 and B-13, there is little difference in the expected probabilities of college attendance between the two different samples. In short, the students in the college preparatory curriculum are much more likely to be exposed to some college education than are the vocational students.

V. Does It Keep Them in School?

The argument for vocational education that the kind of "hands on" training it provides helps to keep certain kinds of students in school until they receive a diploma has not been subject to direct study. There are really two questions involved: does it prevent students from dropping out (1) until they complete the programs, or (2) until they have marketable skills? In an ideally structured curriculum these two situations would be the same. However, in an imperfect world, they may diverge.

The issue regarding the relative merits of vocational education in reducing or otherwise affecting the high school dropout rate is not completely resolved since dropout rates appear to be related to ability and occupational choice. Unpublished Project TALENT data indicate that students in the college preparatory curriculum who fall in the lowest (the first) ability quartile have a dropout rate of 22.5 percent while those vocational students in the same ability quartile

have a dropout rate of 29.8 percent.[17] General curriculum students in the lowest quartile have a dropout rate of 25.6 percent. For the third ability quartile (next to the highest), the dropout rate of vocational students is about a half a percent less than for general students but is more than four times greater than that of academic students. Those data are only standardized on the basis of ability, however, and the lowest quartile for vocational education may represent ability levels below a similar quartile for the academic curriculum. Other socio-demographic characteristics which have not been controlled for such as sex, race and socio-economic status would affect the net dropout rates for these curricula.

Data from the National Longitudinal Surveys for Young Males age 16 to 26 in 1968 indicate a clear-cut advantage of the college preparatory curriculum over the vocational curriculum in terms of increasing the likelihood of high school graduation. For the total sample no longer in high school, the graduation rate of the college preparatory curriculum was 21 percentage points higher than that of students in the vocational curriculum. For those 18 or younger, the differential is 25 percentage points. For those 19 and over, 20 percentage points. For whites, the differential is 18.4 percentage points and for blacks over 34 percentage points. There is no difference in high school graduation rates between the two curricula for those in professional, managerial, sales, clerical and operative occupations. But there are 32 and 21 percentage point differences respectively between the academic and vocational curricula for craftsmen and laborer occupations. Finally, among all these categories mentioned above there is no difference in the graduation rate of those in the

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17/ Unpublished data, Project TALENT, Howard Vincent, "An Analysis of Vocational Education...," op. cit.

general versus the vocational curriculum[18/] (See Appendix Table B-14).

What are the reasons for these phenomena? The student of lower socio-economic status may have a shorter time horizon--that is, he may value present economic gain more highly than future economic gain. This is often observed in behavior patterns of the disadvantaged person. Such an attitude may influence a student to enter a vocational program since he may value the immediate money income of a job more highly and the status of a job less highly than would a student who chooses an academic program. By entering a vocational program a student is training for a job in which he could be employed immediately upon leaving high school. Thus, this short range objective of immediate employment may be a reason for the earlier dropout average of these vocational students.

In addition, when labor markets are tight, he does not necessarily need to be a high school graduate to get a job as long as he has the skills necessary to meet the occupational minimum. His skills are marketable before he graduates. (There is a direct relation between the unemployment rate and the high school retention rate which backs up this hypothesis.) Thus, he may, in effect, be able to fulfill his own goals and the purpose of the program--placement in a job--by dropping out of school. In contrast, the college preparatory graduate usually must have a high school diploma in order to proceed to the next step in his career--college attendance. Also the ultimate job the college-bound student strives for is different from that for which the vocational graduate strives. One may be able to get such a job if he is a college dropout, but not is he is a high school dropout. In short, the combination of different

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18/ National Longitudinal Surveys, op. cit. This analysis controls for the effect of age, marital status, ethnic origin and postsecondary education other than college.

socio-demographic backgrounds, different values placed on income versus status, different time horizons, and different constraints on job entry (e.g., high school diploma necessary versus not necessary) may explain much of the higher gross dropout rates for vocational technical education. It may also be the case that there is self-selection into vocational courses of students who are more dropout prone. The really important question--does vocational education per se cause the observed gross higher dropout rate?--has not yet been effectively answered.[19]

Finally, one additional reason for higher gross dropout rates in secondary vocational education may be that the calendar time spent in a vocational-technical program may be too long. This possible excessive time may be the result of a curriculum mix that does not correspond to labor market realities or the needs and long-term plans of students. The MDTA program purports to give a man entry level skills after no more than 52 weeks, or one calendar year, of training. There is a possibility that the dropout rate from vocational-technical education might be reduced if the calendar time spent in high school were cut, by one year, from four to three years.[20] As the data in Appendix Table B -15 indicate, an additional calendar year of high school indicates a net economic loss for a number of occupations, such as electrician

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19/ Weisbrod estimates that existing methods of dropout prevention, especially if the child is 16 years old or older, are not an economically or socially efficient investment. See Burton A. Weisbrod, "Preventing High School Dropouts," in Robert A. Dorfman, editor, Measuring Benefits of Government Investments, Washington, D.C.: The Brookings Institution, 1965, p. 141 ff.

20/ A pilot study of secondary school graduates in Suffolk County, New York, found no difference in post-program experiences between two groups of students, one of which took all of its vocational training in an accelerated one year program, the other of which distributed its training over a two year time period. New York State Education Department, A Comparative Study of High School Graduates, From One-year Full Day and Two-year Half-Day Vocational Programs in Suffolk County, New York, Albany, New York: Bureau of Occupational Education Research, 1968.

and machinist. One should note, also, that most of the occupations listed represent skill specialities offered in vocational technical schools.

A study is required to reevaluate the dropout rate from various curricula. The important question may not be one of reducing the dropout rate but of determining why students drop out and what happens when they do. The current thinking which tends to regard an unemployed student as a success and an employed dropout as a failure needs revision for it may not necessarily reflect the perceived needs and goals of the students in question. Clearly there may be a conflict between the goals of individual students and those of society or of educational policymakers.

VI. What Are the Results of Postsecondary Vocational Education? How Do These Results Differ From Those of Secondary Vocational Education?

The pressure towards a college education and the increasing technology in American society have stimulated the growth of postsecondary vocational technical education in technical institutes and junior colleges. This chapter examines the results of such programs and how they differ from secondary programs, and from each other.

Although there is sometimes a tendency to lump all federally financed vocational education together, there are sharp distinctions between the school levels at which vocational education occurs. The difference between high school, postsecondary vocational-technical school, and junior college occupational programs begins at the point of selection, and it continues through the educational experience and attitudes of students to their post-graduation employment and educational experience. There are, as noted in Chapter II,

significant differences in the characteristics of those who enroll in vocational programs at the junior college, postsecondary, and high school levels, as compared with those who enter academic high school programs. Vocational programs at the postsecondary level not only serve different clientele but they also provide training for different occupations, even though they share a common core of program titles with secondary institutions.

Postsecondary programs have grown rapidly in the last decade and programs offered differ from those most frequently offered at the secondary level. While total enrollments in secondary vocational programs eligible for federal funds doubled between 1965 and 1970, similar postsecondary program enrollments in vocational technical institutes and junior colleges increased five times from just over 200 thousand to over a million. And this does not include all of the occupational offerings in community colleges.[21]

These increasing postsecondary enrollments often predominate in programs which are not large at the secondary level. As indicated in Chapter II, consumer homemaking and office programs make up over half the secondary enrollments. Homemaking programs are seldom offered at the postsecondary level. While office programs are also popular at the postsecondary level, technical, health and trades and industry programs enroll proportionately more postsecondary than secondary vocational students. Postsecondary enrollments in health and technical programs are three to five times as large as they are in secondary schools.

Even within program areas, the specific occupational preparation at the postsecondary level is generally for different types of jobs. For example, in the office occupations category, the bulk of the enrollments at the secondary

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21/ Trends, op. cit.

level are in filing, secretarial and typing programs, while postsecondary enrollments exceed those at the secondary level in business data processing, administrative management and personnel programs. The same trend appears in health programs where programs for nurse assistants are to a large degree on the secondary level whereas study for careers as practical or associate degree nurses are postsecondary programs.

Considering vocational programs in postsecondary institutes only, is it better for a student to start work upon the completion of his secondary program, or to continue training in a postsecondary vocational institute? Does a continuation of training at the postsecondary level yield benefits commensurate with the added costs given that one already has some training at the secondary level?

Although the data are not directly comparable it appears that the high school vocational graduate is much more likely to go on for further education than the graduate of a postsecondary institute, but of those attempting to enter the labor market, the percent unemployed and looking for work are about the same for both groups. However, a much higher percentage of postsecondary vocational graduates enter the field for which they are trained (75 - 80%) than the high school vocational graduates (50%). This difference holds up even several years after graduation, but differs considerably by field of training. This suggests that many students in secondary programs are either taking the course for nonvocational reasons, have not yet made a firm vocational choice, or have relatively greater difficulty in entering their chosen field.

One can ask, however, if the two extra years of schooling provide continued economic benefits to postsecondary students. The results of a nationwide study in the mid-1960's suggest that this initial differential does not continue, and that a graduate of a secondary vocational curriculum suffers a net economic loss if he undertakes two additional years of postsecondary vocational-technical education in the same field. However, studies also indicate that for college preparatory graduates not going on to college, postsecondary vocational programs increase their earnings. (More detailed information on cost-benefit comparisons of these levels of education are presented in Appendix Table B-17).

Just as vocational technical programs on the postsecondary level are attended by a population whose fathers' income and educational level is higher than those on the secondary level, so junior college attendance is more common for students whose fathers have had some college background. Prior to summarizing the results of studies comparing these two postsecondary programs, we must therefore bear in mind that students who complete their vocational education in high school, postsecondary vocational school or junior college have differing interests and backgrounds. Moreover, postsecondary technical programs in technical schools are likely to be terminal in nature. Students graduating from them are qualified to seek employment as technicians. In the junior colleges, however, a student may take a technical program essentially as a pre-engineering course, transfer credits, and go on in a four-year college to complete his bachelor of science degree. Therefore it does not follow that these three levels are always perfectly substitutable alternatives for any particular individual. More junior college graduates of occupational education programs go on to further education than graduates of postsecondary vocational-

technical institutes, so in this sense junior college seems to be preferable in terms of "keeping options open" for those students who may wish to continue their education.

For those entering the labor market after junior college, earnings are somewhat higher on their first job than for graduates of postsecondary vocational-technical institutes. At the post-high school and junior college levels, there was a notable shift away from the field of training between the first and the last job; and this shift was especially notable at the junior college level. In almost all cases, health program graduates tended to have a very high proportion of employment related to their field of training, as did graduates of technical programs.

Contrary to the views of a number of research investigators in the vocational education field, the relatedness of the job to the field of training appears to have no significant influence on the level of employment, wages and earnings following graduation from a vocational program. In a number of instances, regression analyses reveal a negative relationship between labor market performance and the relatedness of the job to training.[22/] It is clear that many students, at all school levels, were able to enjoy higher wages by moving out of their field of training when they entered the labor market.

In every economic measure considered, however, junior college vocational graduates experienced more success than graduates from other postsecondary vocational programs. They also experienced significantly higher wages, employment, and earnings than the secondary school vocational graduates with whom they were

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22/ Gerald G. Somers, et al., The Effectiveness of Vocational and Technical Programs: A National Follow-up Study, Madison, Wisconsin, 1970, Chapter VII.

compared; they also experienced better employment, higher wages, and earnings than postsecondary vocational-technical graduates. Some of the programs with the highest benefits may also have the highest costs, however, and the inability to get detailed cost data by program area has prevented the development of any solid cost-benefit analyses.

The disaggregation of each type of postsecondary education into its skill or course components would probably reveal that each has some skills that pay off well in economic terms and others that are of low economic value (in money terms). The point to be made here, however, is that the average mix of skills, courses and students taught in the junior college yields a higher rate of return than the average mix of skills and courses and the students taught in postsecondary vocational-technical institutions.

Moreover, there remains the problem, noted at the outset, that the populations served by the two types of schools differ. To the extent that this is so, cost-benefit comparisons between the two types of postsecondary education are not strictly valid.

Nonetheless, given the current student mix, the findings with regard to the option value of vocational education confirm the advantages of the junior colleges programs as compared with other postsecondary schools. A much larger proportion of junior college graduates go on to further education, often full-time four-year colleges as compared with those in other postsecondary institutions. Thus, if a high value is also placed on flexibility with regard to career goals and the possibility of continued education for even those who may consider themselves to be in a terminal vocational program, then higher marks must be given to vocational education at the junior college level.

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