

THE NEEDS FOR VOCATIONAL EDUCATION DATA

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Introduction

In this period of rapid change, society is constantly making new demands on our always limited public finances. We do not have the resources, however, to satisfy all these needs and although we live in the most promising period in recorded history discontent is growing. To resolve the problems facing society with perpetually limited resources makes rational planning and increased efficiency imperative.

In education, as in other areas of public concern, and in vocational education in particular there has been a demand for improvement and exploration. In response, we are probably developing and implementing more innovation in occupational education than at any time in the past.

But the multiplicity of experiments requires careful evaluation if we are to separate the meaningful from the inconsequential and succeed in improving vocational education and making it relevant to the needs of the individual and the community today.

To even attempt to implement the broad mandate for a meaningful vocational educational system with available resources demands effective program planning, program management, and program evaluation. Identifying information needs for planning more efficient and effective occupational education programs is, therefore, one of the first orders of business.

Defining Vocational Education

"In a broad sense, all education contributes to vocational competency, but vocational education refers to that part of a student's instruction intended specifically to fit the student for work."^{2/} For the purposes of this paper, the term "vocational education" refers to all formal instruction for both youth and adults, at the high school, post high school, and out-of-school levels, which prepares individuals for initial entrance into and advancement within an occupation or group of related occupations. The function of vocational education, then is twofold. It must provide the people it serves with an education and it must train skilled workers for the labor force.

Training in vocational education falls into seven major occupational program areas: agriculture, distributive, health, home

economics, office, technician, and trade and industrial. Within these seven broad categories, there are more than 130 areas of instruction designed to meet the needs of both the individual and the labor market. In agriculture, for example, there are approximately eight instructional areas, while in health occupations there are somewhere in the neighborhood of 18 areas. (Others are: technician, 26; trades and industry, 40; distributive, 20; home economics, 8; and office, 11.) The vocational training here defined is generally conducted in public institutions, administered and financed largely by the States and local school districts, and encouraged and supported by the Federal Government. ^{3/}

Briefly, our public vocational education systems involved, in 1967, seven million students--half of them at the high school level, 504,000 in postsecondary full-time programs, and almost 3,000,000 more in adult, part-time programs. In the system, these students overlap with regular high school enrollment, with junior and senior college enrollments and comprise a significant number of enrollees in adult education activities.

Reports from the States indicate that the expenditures in 1967 for the vocational education programs was a shade over a billion dollars, was slightly over one-quarter (26.5%) being provided by the Federal Government.

The growing impact of the Vocational Education Act of 1963 can be illustrated by the fact that since 1963 the Federal expenditure has increased fivefold and the State and local expenditure has increased threefold. About \$200 million of the 1967 expenditure was for the construction of new facilities.

The expected passage of legislation now pending will increase the level of Federal spending on these programs. On the basis of past behavior, State and local expenditure will also increase by at least similar amounts.

Relation to Other Occupational Training Programs

In putting these limits on our discussion of vocational education we do not intend to ignore other occupational training programs which make important contributions to our labor supply: courses in proprietary schools, projects of other Federal agencies, including the anti-

poverty programs and professional and technical training in the Armed Forces; the training conducted by business and industry; and other sources. In numbers, however, the vocational education programs make the largest contribution. Other Federally sponsored programs, such as those under the Manpower Development and Training Act, the Job Corps, the Office of Economic Opportunity, the military's Operation Mainstream and New Careers, have important impact, but these programs tend to concentrate on more difficult problem areas and involve smaller numbers than do the regular vocational education programs discussed here.

Since the present studies of labor supply and demand are largely institutional and somewhat general and since there is considerable geographic and occupational mobility, it is difficult to assess the contribution of vocational education to labor supply and to economic growth. Research aimed at such an assessment for specific population groups is now underway. A question on vocational training for the 5% sample of the 1970 Census is planned and, if plans persist, will provide information on vocational training in the background of the working population. The information furnished will permit further analysis of the long-term economic and social impact of vocational education programs.

Important revelations on the past relationship between education and occupation comes from the reports of the decennial Census of Population. In addition to the significant tabulations on educational attainment by occupation from the 1960 Census, a special supplement to the Current Population Survey in April 1963 provided information on the occupational training of Adult Workers.^{4/} Similar surveys in connection with recent Federal manpower and training programs obtained information for 1966 and 1967 and these data will soon be forthcoming.

Relation to the Total Educational System

Vocational education, as we have defined it, is an integral part of our public educational system and subject to the same pressures as affect the system as a whole. The increase of emphasis on vocational education is part of the demand for more effective education in general. This emphasis is reflected in the fourfold increase over a ten-year period in all Federal expenditures for education and training, in a sevenfold increase in the programs administered by the Office of Education, and in a sixfold increase in Federal funds for vocational education.

As the Advisory Council on Vocational Education points out, it is no longer possible to compartmentalize education into general, academic,

and vocational components. Education is a crucial element in preparation for a successful working career at any level. With rising average educational attainment and the changing technology which requires it, the less educated find that the opportunities for employment for them are becoming more scarce. On the other hand, employability skills are equally essential to the education of the individual. If education is preparation for life, and if practically everyone's life and opportunities for self-expression and self-fulfillment include work, then only the successfully employable are successfully educated.

As a consequence of these attitudes and the evaluations they require, it must be recognized that vocational education statistics without data on other education, will never be completely adequate. Vocational programs and students must be identifiable within the total educational framework. Definitions must apply to the entire system to properly measure any segment of our educational effort. Much of our present data suffer from this lack of common identification and comparability between various segments of our education community.

Coordination of Vocational Education with the Labor Market

With the enactment of the Vocational Education Act of 1963 and the recent amendments, the Congress of the United States has left no doubt about its concern for establishing a flexible vocational education system with services available to all Americans of all ages, of all backgrounds, and of all levels of ability, and in all communities. Special emphasis is also placed on providing high quality vocational training, or re-training, which is realistic in terms of the opportunities for employment. Federal funding in the new bills now in conference calls for approximately double the 1968 authorization in 1969 and substantial increases thereafter.

In planning vocational offerings, administrators at Federal, State, and local levels must consider the needs and desires of the individual, the community in which he lives, and the private and public agencies which might employ him. The planners must know the characteristics of the target populations to be served and of the local areas where they live and work. The planners must also be able to determine how local needs fit in with the requirements of the State, the region, and the Nation as a whole.

We need labor market information which will permit planning of vocational programs to be responsive to the needs of industry and to be useful in preparing students for viable

occupations and careers. Information needed includes a comprehensive description of the labor market structure in the local area and how it is changing. Data are needed to indicate the magnitude of the demand for workers in each occupational group and the nature of the demand--how much is due to turnover, or to growth, what is the probable impact on the demand by sex and age groups. We must also know the extent to which the occupational groups are diminishing or expanding, and the major factors influencing the changes.

Educational planners, however, must consider the requirements, desires, interests, and abilities of the individual, as well as the needs of the economic system. Basic manpower data of the type described are only the beginning. Education and training programs must be provided for various levels--those designed to prepare individuals to enter specific jobs, and those aimed at providing a basis for the eventual handling of more complex tasks, as well as provision for re-training, and for up-grading. More information is needed on the education and skill requirements of related job families at various levels, entry and beyond.

Moreover, there is urgent need to tie in occupational projections with information about job content and projected changes in job content. Educational planners must see far in advance where major changes are likely to be made because of the lead time involved in developing new curricula, in organizing programs and in recruiting and counseling students. In some cases, planners will have to estimate magnitudes and commit funds for the design of buildings and facilities, and for the purchase of machinery and equipment that will affect educational and training offerings far into the future. Plans for updating teachers or for hiring new teachers also have to be made far in advance. And for public education, allowances also must be made for the legislative requirements for funding and implementing any decision reached.

The Vocational Education Act of 1963 recognized this situation and provided for joint planning efforts by the Departments of Labor and of Health, Education, and Welfare. Reflecting this, local offices of the Bureau of Employment Security were called upon to furnish projections of needs so that educational agencies can plan activities to meet these needs. Data on both needs and training plans are to be summarized in an annual "Projected Activities Report." The total effort needed to provide such data is tremendous and only the first efforts are now visible. The Labor Department has prepared guidelines for making such projections. The Office of Education has prepared a taxonomy of

training programs. A manual is now in preparation which will provide a bridge between occupations listed in the Directory of Occupational Titles (DOT) and the educational programs defined in the OE Handbook, Standard Terminology for Instruction in Local and State School Systems.

Such steps, of course, are only beginnings. In order to determine what is to be taught, the best way to teach, and how to evaluate progress toward reaching objectives, much more data are needed on relationship of training to performance. Data on the characteristics of education (organizations, curricula, facilities, teachers, instructional methods, services to students) must be related to employment (placement and job performance) of the graduates from vocational education programs. To do this adequately, we need to know something about the personal and educational characteristics of these individuals--their abilities, aptitudes, educational levels, occupational training received, socio-economic origins, and performance in school. We need such information not only for full-time preparatory students, but also for adult trainees. We need to know much more about those who drop out of vocational programs and also about those who might have desired, but were unable to obtain, vocational education.

We know very little about the characteristics of the "disadvantaged" or "special needs" groups served by the vocational education programs or even precisely how persons included under the umbrella term "disadvantaged" should be identified so as to obtain meaningful information about them. Because of the variety of groups included, we must establish meaningful categories for study. For example, what are the similarities and differences between central city Negroes, Spanish-speaking Americans, and American Indians? What type of data would enable us to marshal our resources to provide them with the most meaningful training? What are the major obstacles to successfully bringing these groups into the mainstream of society? What use has already been made of Federal and other funds to help them? In short, how should we measure effectiveness and efficiency of programs for the disadvantaged?

More information is needed also about teachers, both short- and long-range supply and demand. The effectiveness of different types of teacher preparation needs evaluation in terms of both teacher and student performance.

We also need more information which cuts across programs. For example, to what extent do persons who receive training under the Manpower Development and Training Act or in Adult

Basic Education move into regular adult vocational classes or into other channels to continue their training? Because of various joint arrangements involving two or more programs, the little data we do have sometimes lose meaning, because we know there is duplication, but we do not know how much.

The Evaluation of Vocational Education Programs

Effective management of vocational programs whether at the Federal, State or local level, also requires an information system which will facilitate progress evaluation. If evaluation is viewed as the basis for improving administration of programs, the measurement phase on which judgments are based becomes especially important. In this sense, measurements include not only an established information system, but also special studies to supplement the basic system. Considerable effort is needed to strengthen concepts and to improve collection methods in order that both general and specific facts gathered may be more meaningful. If an objective is to study the efficiency of programs, more has to be done to determine just what should be included as measures of costs and benefits and how much weight to give them. For example, if funds were allocated on the basis of economic efficiency alone, all vocational education dollars available might be invested in post-secondary programs which, by certain criteria, yield the greatest marginal return per extra dollar invested. If this were done, funds for secondary vocational programs would be reduced. Such a decision would ignore completely the fact that the rate of teen-age employment is higher for those without vocational education and that the costs of aggravating this situation could be reflected both economically and socially.

The administrators and the school boards, faced with the problem of allocating limited resources, have difficult choices to make. Many factors enter into their decisions which become the objectives for educational programs. It may be observed that under the conditions that usually prevail, cost benefit comparisons are most useful for making choices between alternative programs serving the same group and must not be used for inter-group comparisons.

Congress has specified that considerable emphasis be placed on programs for the disadvantaged, particularly for young people who do not succeed in regular vocational programs. Such special-needs programs often require remedial services such as basic literacy instruction, counseling in depth, medical services, job development, and similar services.

Meeting these needs may also require the development of special curricula and methods. To evaluate this type of program our knowledge of what benefits to measure and how to measure them needs further analysis.

More needs to be known about what impact Federal support has on vocational education programs. Planning activities and policy determination at all levels of government are often based on evaluations of what they are getting for their money. The examination of the effectiveness and efficiency of the choices available to those responsible for allocating funds does not always consider issues broader than their immediate concern. Local issues may have priority over matters of national concern.

We have already noted that Federal funds in this area are more than matched by State and local funds. What would happen if Federal support for particular programs was reduced or withdrawn? Which programs would continue to flourish and which would begin to wither? Or to raise these questions from a different viewpoint--what are the key leverage points for change? Where would additional support make the greatest difference--teacher preparation or improvement in State planning? Would general aid to education be less or more effective than categorical aid to specific programs?

To effectively evaluate progress of vocational education more data are needed on outcomes of the programs. We need more follow-up information on individuals--not just on initial placement, but on job satisfaction, further education, advancement, mobility, employer satisfaction. This information should be related to the backgrounds and characteristics of the individuals.

The small amount of outcome research already available to us has been focused largely on what has happened to those persons completing vocational programs. Few of these studies have been designed to compare what happens to similar groups of students, as for example, to graduates of high school general or academic programs, or to those whose occupational training is entirely on-the-job. Techniques need to be developed which will allow us to evaluate various approaches to training. How do we measure public school vocational education in relation to other training programs--MDTA, Job Corps, and other OEO programs, welfare training programs, OJT? What are the relative costs of each type of program and which offer the greatest benefits?

We also need measurements to help us assess the relative effectiveness of vocational

and other programs in attracting and holding as well as placing students. We need to know more about vocational education as an alternative approach to learning as well as for skill development.

Finally, we must mention the need to evaluate the impact of vocational education on the broader social problems of the day--the urban problem, rural poverty, specific skill shortages, discrimination practices, and others. For each such problem area, the role of vocational education needs to be identified.

Data Available

Current national data on vocational education are produced (1) from the annual reports of the States to the U.S. Office of Education, (2) from broader population studies, either general or educational, such as the Census Bureau's Current Population Survey, AIR's (American Institute for Research) Project Talent, and the Equal Education Opportunities Survey and (3) from various research studies usually limited in scope and directed to a specific problem in vocational education. Data on less than a national basis are also available in State reports and in other special studies. Since our emphasis is on national data, the State studies are not covered here, but they should not be ignored as sources of important information.

The principal national data sources are the reports from the States to the U.S. Office of Education, summarized in the annual report, Vocational and Technical Education.

These annual reports are submitted by the States each fall and consist of summaries, aggregated to the State level, of the previous school year's finances, enrollment, programs, teacher training, and other activity. States are requested to summarize in these reports the combined figures for all federally reimbursed programs and for all non-reimbursed public programs meeting the same standards. The 1963 Vocational Education Act extended coverage of this reporting program to all types of occupational training and, therefore, made possible reporting of data on all occupational training in the public institutions of the State. One of the important tasks for the immediate future is the assessment of the quality of these data.

In addition to regular summaries of finances and enrollment by program, two reports recently added to the annual series might be mentioned. About three years ago a form was added asking for the employment status in October of those who had completed full-time programs during the previous school year ending

in June. The results are available only in State summary form and for the seven standard vocational programs. For all completions and for the completions by programs, information is available on such items as the extent to which those persons completing programs continue full-time education, the extent to which they are available for employment, and the initial employment and unemployment rates.

Also about three years ago a form was added on the States' projected activities in vocational education. Previously some of the planning had been reported in narrative form. The present form is developing into an instrument for planning vocational programs. Space is provided for projections of labor demand in pertinent occupational fields to be furnished by the State Employment Security Office; enrollment projections; and related information. Information obtained on these forms has already been used for legislative and other reporting. However, it must be recognized that it will be some time before the information systems needed to process these types of data will be adequate for more refined use. Both the Department of Labor and the Office of Education are preparing materials and working with the States to improve their ability to present this type of information. The Advisory Council has recommended that this report on projected activities replace the present State plan, that it be prepared with great care about once every five years, and that it be updated by the States each year.

The above reports give us no information on individual schools or on areas smaller than the States. Where analyses require such data, as in cost benefit analyses, research workers have had to engage in their own data collection on a special study basis, as is the case in the Pennsylvania State University studies reported elsewhere at these meetings.

Also missing from the State reports to the U.S. Office of Education is any information about characteristics of individual students, teachers, or programs. This need was noted in very specific terms in the 1968 report of the Advisory Council. To overcome this lack, in part, a project was undertaken by the Center for Studies in Vocational and Technical Education at the University of Wisconsin. With the cooperation of the State offices this project has already produced a Directory of Vocational Education Programs, 1966, which will be used as a basis for surveying graduates and drop-outs in secondary and postsecondary institutions.

Some data on vocational students can be extracted from broader educational studies, specifically Project Talent and the Equal Opportunities

Survey. The major problem in using such data is the definition and identification of the vocational education student. Most secondary vocational programs are given in comprehensive high schools or other schools along with other programs and the students' responses as to their principal programs may differ from those of the school. In the Equal Educational Opportunity Survey, 97,000 twelfth grade students were included in the sample. There were three ways of identifying vocational students: (1) self-identification as to their programs, (2) coursework taken in certain fields in half-year intervals, and (3) identification of the schools as vocational schools by the principals. Only about 40 percent of the responses were fully consistent.^{5/} Work is still underway with this body of data to try to clarify a consistent method for identification of students in this area.

Data on teachers will be available from another research project being conducted by the Bureau of Social Science Research. Other studies are available on specific areas of vocational education such as the study of graduates of trades and industrial occupation programs by the American Institutes for Research. Products of such research are reported through the U.S. Office of Education's Education Resources Information Center (ERIC). In this network, the clearing house for vocational and technical education is the Center at Ohio State University, which publishes quarterly "Abstracts of Research and Related Materials in Vocational and Technical Education" (ARM).

Plans for National Data

Present plans of the U.S. Office of Education for national statistics on vocational education are focused on improvement of current reporting; supplementing existing reports with other needed series such as those on characteristics of individual students, teachers, and programs; sponsoring special studies for information for program planning and evaluation; and continuing the sponsorship of research which will not only provide new information but will also help to sharpen concepts and definitions for measurement.

Current reporting will be affected by legislation now under consideration. The revised legislation should permit simplification of financial reporting. A thorough revision of the annual national education reports is expected this coming year. At that time it is intended to explore the possibility of collecting data by major cities and other geographic areas.

Much work has gone into the development of a taxonomy of educational programs. OE

Handbook VI, "Standard Terminology for Instruction in State and Local School Systems," names and defines the vocational education programs and has been used experimentally in reporting for the last two years. The comparability manual now in preparation, which will relate the OE Instructional Codes to the Dictionary of Occupational Titles, should provide an essential tool, not only for statistical reporting but for program planning, educational counseling, and many related activities at all levels of operation.^{6/}

Annual reporting on vocational education by the States should also benefit from another manual, now in preparation in the U.S. Office of Education which will give more specific instructions for filling out the required forms. Concepts will be related more closely to those currently in use in the general educational system as well as to labor market analysis and to State practices. The use of this manual should improve the comparability of reports from State to State.

To supplement the State reports, the U.S. Office of Education hopes to launch this winter, a sample survey which will cover the characteristics of students, of teachers, and of programs. The exact plans for this survey are dependent upon the availability of resources which have not yet been determined, but it is anticipated that a substantial start will be made during this fiscal year to inaugurate a regular series.

A series of evaluation studies is also planned but again, the extent of these studies will depend upon resources made available in the pending appropriations as well as upon competing claims for these resources. Now underway are such studies as the follow-up and characteristics of graduates and drop-outs from various types of vocational programs. Also underway are a number of cost benefit analyses to develop information on relative values of alternative programs, staffing patterns, and sizes of school districts.

We have mentioned more data needs than can possibly be produced in a single program or in a short period of time. Neither will we be able to satisfy all the Federal, State, and local needs at the same time. It is important, however, that we develop some perspective on our objectives so that our resources can be directed most efficiently. If this paper indicates some of the problems toward which our statistical resources might be directed, or if it stimulates more research in these areas, it will have achieved its purpose.

- 1/ The authors, all in the U.S. Office of Education, are in the National Center for Educational Statistics; the Bureau of Adult, Vocational and Library Programs; and the Bureau of Research, respectively. The paper reflects their personal experiences.
- 2/ Education for a Changing World of Work, Report of the Panel of Consultants on Vocational Education, U.S. Department of Health, Education, and Welfare, Office of Education, U.S. Government Printing Office, Washington, D. C., 1963, p. 5.
- 3/ The description of this local-State-Federal financing system and summary State data appear in U.S. Office of Education, Vocational and Technical Education Annual Report, Fiscal Year 1966, Document OE-80008-66, Washington, D. C., 1968. The system is reviewed and evaluated in the 1968 general Report of the Advisory Council on Vocational Education which is published in the 90th Congress Committee Print, "Notes and Working Papers Concerning the Administration of Programs Authorized Under Vocational Education Act of 1963, Public Law 88-210, as Amended," prepared for the Subcommittee on Education of the Committee on Labor and Public Welfare, United States Senate, March 1968.
- 4/ U.S. Department of Labor, Formal Occupational Training of Adult Workers, Manpower/Automation Research Monograph No. 2, Washington, D. C., Dec. 1964. See also U.S. Bureau of the Budget, Current Occupational and Past Training of Adult Workers, Statistical Evaluation Report No. 7, Washington, D. C., March 1968.
- 5/ Leslie J. Silverman and Katherine K. Wallman, "The Identification of Vocational Education Students in the Equal Educational Opportunity Survey Data" (multilithed), U.S. Office of Education, Washington, D. C., 1968.
- 6/ A specimen page of the comparability table is included as Appendix F in Annual Report for Fiscal Year 1966, Vocational and Technical Education, U.S. Office of Education, Washington, D. C., 1968.