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ABSTRACT

Studying the employment outcomes expected from educational programs at the National Technical Institute for the Deaf (NTID) can aid planners of other occupational programs. The main barriers to planning education for work are the inaccessibility or unavailability of information, the arbitrary nature of occupational classification, and insensitivity to planning problems. To overcome these barriers, NTID specified expected employment outcomes of their programs in terms of the "Dictionary of Occupational Titles" (DOT) occupational names and codes. NTID program managers met to revise these names and codes and to match DOTs to U.S. Census occupational classifications. A total of 211 DOTs were identified for NTID's 14 programs. The list has a number of implications for practice. For instance, the NTID catalog could be updated without reference to worker age or sex, and the public internal and external to NTID would find it easier to use the catalog. This use of DOT classifications has also facilitated research and development efforts in the areas of data collection, data analysis, and comparative analysis. Although this procedure for specifying employment outcomes could be adopted in planning other occupational programs, caution is suggested due to the vagueness of the occupational classifications system applied. (MN)

Stating Expected Employment Outcomes of Occupational Programs: A Case Study

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Running head: Employment Outcomes

Stating Expected Employment Outcomes of Occupational Programs: A Case Study

A case study is presented in this essay of an attempt to describe the expected employment outcomes from educational programs at the National Technical Institute for the Deaf (NTID). These expectations were expressed as occupational names and numerical codes as they are listed in the Dictionary of Occupational Titles (DOT) and in the U. S. Census of the Population. The statement of expected NTID employment outcomes in these terms facilitated the planning of NTID programs in response to employment demands by allowing access to occupational data collected by government agencies and private organizations under these names and codes. Another benefit of this process was that NTID programs could be portrayed to various publics, including prospective students, in terms of widely-accepted occupational classifications that are free from reference to the age and sex of workers. The usefulness of this case study is in the applicability of the processes outlined for planning and describing other occupational programs

The remainder of this essay is divided into four major sections. In the next section, some of the barriers to planning education for work are described which affect the ability of occupational programs to conduct comprehensive analyses of the employment outlook for their program completers. The second section contains a description of the processes and products of NTID's attempt to specify expected employment outcomes for each of its educational programs. The implications of the information provided in this report for practice and for additional research and development are listed in the third major section of this essay. In the last major section, a number of cautions are listed which limit the usefulness and generalizability of the information provided through the process described in this essay. Extended tabulations of expected employment outcomes from NTID educational programs are displayed in Passmore and Marron (1978).

Barriers to Planning Education for Work

The educational institution has many, sometimes opposing, uses for society and individuals. Education has been seen as a means for achieving an equitable

distribution of wealth and rewards, for socializing the young to diverse adult roles, and, most traditionally, for allowing unfettered consumption of the process and product of knowledge generation. Another aim of the U. S. educational institution has been to supply educated labor to contribute to the production and distribution of goods and services. With this aim, educational activities are successful to the extent that they supply the desired quantity and quality of labor to the U. S. economy. Educational planning, within this point of view, focuses on the design of educational programs to fulfill these desires. What barriers to successful planning exist?

Unavailable or Inaccessible Information

Data needed to plan educational programs in response to the U. S. economy's need for labor are often unavailable or, when available, inaccessible. Data on the hiring conditions, demand, and, especially, the supply of workers in most occupations often lack reliability, validity, and timeliness for use in educational planning. Moreover, available data, inadequate as they are, are frequently inaccessible because, in some cases, planners lack the technical expertise necessary to use these data during decision-making. In other cases, as Evans and Marshall (1975) claimed:

> the educational planner is faced with occupational and educational classification systems which discourage a systematic matching of supply and demand data. (p. 1)

Arbitrary Occupational Classification

Crites (1969, Ch. 2) reviewed the most frequently used occupational classification systems. Scoville (1969) commented extensively on the validity of several of these classification systems. The problem of classifying persons uniquely by the work they perform is intractable because there is no natural taxonomy of occupations. All existing occupational classification systems have been socially defined--that is, these systems were developed to classify workers along one or two narrow dimensions and to conform with specific data collection and reporting needs. This attribute of occupational classification systems makes them arbitrary, although useful for the task at hand (compare Edwards, 1943, and Roe, 1956, for a contrast between socioeconomic and psychological approaches to the occupational classification problem).

Various government agencies and private organizations apply different classifications systems to organize occupational information, resulting in a corpus of frequently incomparable information. The Standard Occupational Classification Manual (U. S. Department of Commerce, 1977) may reduce some of this confusion if it ever is implemented in statistical work. However, two occupational classification systems currently influence the work of educational planners: the occupational classification system used in the U. S. Census of the Population (U. S. Bureau of the Census, 1971); the Dictionary of Occupational Titles (DOT) (U. S. Department of Labor, 1978).

The U. S. Bureau of the Census collects and publishes information about 441 occupational categories which are identified by a three-digit code and are arranged into 12 major groups (called socioeconomic groups) designated by a prefix letter. The Bureau of Labor Statistics' National/State Industry-Occupation Matrix System (U. S. Department of Labor, 1976, pp. 59-60) has adapted the U. S. Census occupational classification system to provide projections of future employment requirements by occupation and industry (U. S. Department of Labor, 1969a, 1969b, 1969c, 1969d). Most of the "hard" data related to employment is stored under these classifications.

Each occupation in the DOT is classified according to a six-digit number reflecting the kind and level of work performed. DOT numbers are used primarily by State employment services for classifying applicants and job openings and for other operating and reporting purposes. DOT architects also meant the information contained in the DOT to assist educators in defining occupational skills and training requirements.

Discrepancies between the two occupational classification systems described above are significant. The U. S. Census system is used to organize most of the data from the decennial U. S. Census of the Population and the monthly Current Population Survey of U. S. households that could be used by educational planners; however, the occupations selected for the Census system are not defined. In contrast, the DOT contains a brief description of the work performed in each of the listed occupations; however, occupations classified in the DOT are not generally linked to occupational supply and demand information (see, however, the description of the Bureau of Labor Statistics' Occupational Employment Statistics program in U. S. Department of Labor, 1976, Chapter 7). In addition to the

difficulties associated with the occupational classifications themselves, few, if any, educational planners have determined what occupations their programs are meant to supply.

Insensitivity to Planning Problems

The expected employment outcomes of educational programs are often stated in school catalogs as job names with which the faculty are familiar rather than as occupations extracted from some widely-used classification scheme. For instance, when the XYZ Business Institute advertises in its catalog that it can prepare a "bookkeeper," is that the same as the "bookkeeper" described under DOT number 210.388? Or, does XYZ really prepare a "bookkeeping machine operator" as described under DOT 215.388? And, is this the same kind of "bookkeeper" for which Census and other kinds of data are collected and organized under U. S. Census occupation code 305?

Without answers to these questions, XYZ planners and potential XYZ students cannot begin to determine whether investment in "bookkeeper" training at XYZ can be expected to pay off. Few educational programs, even those which sell themselves as "career-oriented," have answered these types of questions satisfactorily.

Specification of Expected NTID Program Outcomes

Processes

NTID was established to provide a "residential facility for the post-secondary technical training and education for persons who are deaf in order to prepare them for successful employment" (Public Law 89-36, 89th Congress, H. R. 7301, June 8, 1965, Sec. 2). The NTID Policies, Guidelines, and Applications Procedures (U. S. Department of Health, Education, & Welfare, 1966) indicated, among other things, that NTID should offer technical training in occupational areas which reflect current and expected human resource needs (pp. iii, 2, 4, 6) and which provide opportunities for successful employment of deaf persons (p. 1). NTID is located in Rochester, New York, on the Rochester Institute of Technology Campus.

As may be summarized from this description, NTID is intended to offer educational programs that are responsive to labor needs of the U. S. economy. With such a charge, NTID planning efforts are subject to many of the problems described previously.

In an effort to face these planning responsibilities and problems, managers of NTID educational programs were asked to state the expected employment outcomes of their programs in terms of DOT occupational names and codes. As a starting point for this effort, a provisional list of DOT occupational names and codes was compiled for each program by NTID Institutional Research personnel and, then, presented to appropriate NTID program managers for their review during a meeting. These lists were assembled by selecting DOT occupational names and codes that, in the judgment of NTID Institutional Research personnel, seemed to match the position titles for which, according to the NTID Catalog (Rochester Institute of Technology, 1976), NTID programs provided entry level training (see Appendix A to Passmore & Marron, 1978, for a list of these program and position titles). The lists were deliberately long in the sense that DOT occupational names and codes were selected which appeared even remotely related to the training content of the NTID programs under study.

The purposes of the meetings with NTID program managers were to: (a) revise the provisional lists of DOT occupational names and codes by adding (where the lists were not judged to be broad enough) and by deleting (where elements in the lists were not judged as necessary) DOT occupational names and codes; and (b) approve or reject the resulting revised lists of DOT occupational names and codes according to the program managers' assessments of the lists' match with expected student employment outcomes from their programs. Information from the DOT was used extensively during these meetings to provide sample job descriptions and to describe typical worker traits so that the appropriateness of specific DOT occupational names and codes could be evaluated.

Revisions in the provisional lists of DOT occupational names and codes were produced at each meeting. In addition, the revised lists of DOT occupational names and codes were endorsed tentatively, subject to review by program managers and, at their discretion, members of their staffs. Subsequent to these meetings, a few clarifying comments were received from program managers and incorporated in the revised lists. The revised lists were considered to be completed statements of expected employment outcomes of NTID programs after a date, pre-arranged through mutual consent between NTID program managers and Institutional Research personnel, was reached.

Many of the original position titles listed in the NTID Catalog failed to conform to recent legislation, policy statements, and instructions prohibiting reference to sex and age in job titles. Occupational classifications in the 4th edition of the DOT applied in this study contain occupational names purged of sex and age reference, a desirable spin-off from this effort.

Next, U. S. Census occupational classifications corresponding to DOT's specified by NTID program managers were obtained from a report prepared by the State of California, Employment Development Department (1976, Table 2). The DOT/Census correspondence table shown in the California report was produced in an unpublished study conducted by the U. S. Department of Labor's Employment and Training Administration (ETA) in which ETA occupational analysts in ETA Occupational Analysis Field Centers selected U. S. Census classifications in which each of the DOT classifications should be placed. The ETA correspondence table was derived solely from the pooled judgments of ETA occupational analysis. These judgments were based on the analysts' knowledge of both classification schemes and of the nature of work performed in jobs subsumed under elements of each classification scheme.

After this DOT/Census match was accomplished, it was determined whether the Census occupational classifications matched to DOT's specified by NTID program managers accounted for at least five percent of the employment within the Census category. This determination was made from tabulations from the April, 1971, Current Population Survey (CPS). The CPS is a monthly, national survey of 60,000 households conducted by the U. S. Bureau of Census; at the time the April 1971, CPS was conducted, there were 47,000 households in the CPS sample. A DOT/Census correspondence table meeting this criterion was provided by Evans and Marshall (1975).

Products

The expected employment outcomes for each NTID educational program are displayed in Appendix B of Passmore and Marron (1978) in terms of DOT's purged of age and sex reference, U. S. Census occupational names and codes matched to these DOT's from ETA judgments and from CPS tabulations. Briefly, 211 DOT's were identified for NTID's 14 programs. These DOT's were matched to 71 U. S. Census occupational classifications derived from ETA judgment and 44 U. S. Census

classifications based on CPS tabulations. Shown in Table 1 are expected employment outcomes for the NTID Civil Technology Program.

Insert Table 1 About Here

Note that only a small proportion of the related census classifications were verified with CPS data and that only the DOT names are free from reference to the age and sex of workers.

Implications

Subject to the cautions listed in the next section of this essay, the statement of expected employment outcomes for NTID educational programs provided through this study had a number of implications for practice and for future research and development.

For Practice

The list of positions shown in the NTID Catalog, for which entry-level training is provided in NTID programs could be updated with the information provided through this study. In particular, it was recommended that the DOT names and codes derived be substituted for the position titles shown as expected employment outcomes in the catalog.

An update of the catalog in this manner could yield several advantages. First, the expected outcomes of NTID educational programs could be portrayed in terms of occupational classifications that are free from reference to the age and sex of workers. Most of the previous copy for the catalog did not have this attribute; in cases where an update of this type has been tried, attempts to remove the original bias yielded unnecessarily cumbersome occupational names (e.g., the NTID Catalog refered to "draftspersons"; the DOT name is "drafters").

Second, the DOT is used by many publics internal and external to NTID. The DOT holds a vast amount of useful career information for NTID career counselors and instructors and counselors in pre-vocational settings to use with their clients. Therefore, statements of NTID expected employment outcomes in terms of DOT names and codes would help describe NTID programs in a less ambiguous manner than these programs could be described previously.

For Research and Development

The expected NTID employment outcomes developed have several uses in future research and development activities. First, information on the supply, demand, and hiring conditions for labor in occupations specified could be collected, organized, analyzed, and disseminated. Passmore (1979), Passmore and Marron (1979), and Passmore, Marron, Hamil, and Fowler (1979) describe such applications for NTID bookkeeping and medical record programs. This occupational information should serve many functions with a wide range of audiences. For example, NTID program managers could use this information to rank NTID programs in terms of the need to examine the programs' response to economic, social, and political trends.

Second, these expected employment outcomes can be used to judge whether NTID graduates find employment in occupations related to their NTID training. Judgements of this type are made during the coding of data from NTID's Alumni Feedback Questionnaire (see Welsh, Passmore, Marron, & Grant, 1980) and during the recording of graduates' placement status by the NTID Office for Career Opportunities. These judgements have not been made using consistent, operational criteria.

Third, the information developed through this study could support the work of curriculum development specialists and others concerned with the design and implementation of NTID curricula. The expected employment outcomes could provide an "anchor" to which curriculum development work can be tied. For example, without such an "anchor" instructional materials might be designed and implemented which are irrelevant to specific occupations that NTID curricula are meant to supply with labor.

A Few Cautions

Statements concerning the usefulness of the products of the research described in this essay for improvements in practice and for future research and development must be tempered by at least four cautions.

First, DOT and U. S. Census occupational classifications may not describe adequately the varieties of work actually performed by the U. S. labor force. Some of the occupational titles included in each classification system are dated. For instance, the title of Compositor and Typesetter (Census code 422) conjures

for many an image of hand composition of type, a process that has been replaced generally with various photocomposition and computerized methods. However, workers performing these newer operations are classified still under these outdated titles. To the consumer of occupational statistics who is not familiar with occupational coding practices, the outdated titles lack face validity.

Second, DOT and U. S. Census classifications may not describe adequately the varieties of expected employment outcomes envisioned by NTID program managers. There is a danger that the stated expected employment outcomes may have been limited to, and by, the classification systems currently available. Third, NTID program managers may not have had the time or experience with the DOT necessary to specify the expected employment outcomes of NTID programs appropriately.

And, fourth, as shown in Table 2 for the Civil Technology program, the Census classifications matched in this study with DOT's assigned by NTID program managers often were related to a number of DOT's that were not identified by the program managers. Thus, there was a "looseness" in the fit between the DOT/Census matches made for each NTID educational program. Wide variation among NTID programs in this "looseness" was observed.

Insert Table 2 About Here

Summary

Described in this essay were some of the barriers to planning education for work, with the focus on barriers erected by lack of specificity in the expected employment outcomes of occupational programs. Then, a case study was presented of processes, products, and implications for stating expected employment outcomes for educational programs of the National Technical Institute for the Deaf. Expected employment outcomes stated through this process were free from age/sex stereotypes and were linked to occupational classification and data systems used nationally. Although the processes described in this essay could be adopted in planning other occupational programs, caution is suggested due to the vagueness of the occupational classifications systems applied.

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Table 1

Expected Employment Outcomes of

the NTID Civil Technology Program as

Defined by Two Taxonomies of Occupations

NTID Program Manager Assigned DOT		Related U. S. Census Classifications Based on ETA Judgement		Related U. S. Census Classifications Verified With CPS Data	
Code	Title	Code	Title	Code	Title
005.281	Drafter, Civil	152	Draftsmen	152	Draftsmen
018.587	Surveyor Helper, Rod	605	Surveyor Helpers	605	Surveyor Helpers
018.687	Surveyor Helper, Chain	605	Surveyor Helpers	605	Surveyor Helpers
182.287	Highway Inspector	452	Inspectors, n.e.c.	452	Inspectors, n.e.c.
005.281	Drafter, Structural	152	Draftsmen		
018.188	Surveyor Assistant, Instruments	161	Surveyors		
	Surveyor Assistant, Level	161	Surveyors		
	Surveyor Assistant, Plane-Table	161	Surveyors		
	Surveyor Assistant, Transit	161	Surveyors		
018.288	Forest Mapper	161	Surveyors		
018.687	Lightkeeper, Triangulation	161	Surveyors		
017.281	Drafter, Detail	152	Draftsmen		
017.281	Drafter, Map	152	Draftsmen		
017.281	Drafter, Topographical	152	Draftsmen		
017.281	Drafter, Oil and Gas	152	Draftsmen		
017.281	Drafter, Junior	152	Draftsmen		

Table 1 (Continued)

NTID Program Manager Assigned DOT		Related U. S. Census Classifications Based on ETA Judgement		Related U. S. Census Classifications Verified With CPS Data	
Code	Title	Code	Title	Code	Title
182.287	Construction Inspector	452	Inspectors, n.e.c.		
	Building-Construction Inspector	452	Inspectors, n.e.c.		
	Ditch Inspector	452	Inspectors, n.e.c.		
	Masonry Inspector	452	Inspectors, n.e.c.		
	Reinforced-Concrete Inspector	452	Inspectors, n.e.c.		
	Rivit Inspector	452	Inspectors, n.e.c.		
	Rod Inspector	452	Inspectors, n.e.c.		
	Structural-Steel Inspector	452	Inspectors, n.e.c.		
	Tunnel-Heading Inspector	452	Inspectors, n.e.c.		

Note: The term "n.e.c." means "not elsewhere classified".

Table 2

Number of Matches Between Two Taxonomies of Occupations

and the Expected Employment Outcomes of the NTID Civil Technologies Program

Census Group Code	Total Number of DOT's in Census Group	Number of DOT's Identified by Program Manager (P. M.)	Number of DOT's Identified by P.M. and Matched to CPS	Number of DOT's Identified by P.M. and Not Matched to CPS	Number of DOT's Identified by P.M. and Matched to ETA	Number of DOT's Not Identified by P.M. but Part of ETA
152	64	7	1	6	7	57
605	5	2	2	0	2	3
452	120	10	1	9	10	110
161	15	6	0	6	6	9