

MAPPING WORKFORCE SKILLS

Designing the Future SOC to Help American Workers

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TABLE OF CONTENTS

EXECUTIVE SUMMARY	1
OCCUPATIONAL INFORMATION IN THE CONTEXT OF NATIONAL PRIORITIES ...	6
USES AND USERS OF THE NEW SOC	7
SURVEY OF LABOR MARKET EXPERTS	11
Profile of Respondents	12
User Characteristics (Table 1, Graph 1)	12-13
Problems with Occupational Classification Systems	14
Problems and Needed Improvements (Table 2, Graph 2)	15-16
Societal Objectives for Occupational Information	17
Priority Needs for New System (Table 3, Graph 3)	19-20
Necessary Information Identified by Users and Potential Users	21
Necessary Information for New System (Table 4, Graph 4)	22-23
Relationships between Societal Objectives and Suggested Improvements ..	24
Specific Suggestions	26
Conclusions from Economic Roundtable Survey	26
MEETING USER NEEDS THROUGH THE FUTURE SOC	27
Skill as the Basis for Occupational Definition and Classification	28
Fully Integrated, "Real Time" Information	28
RECOMMENDATIONS	30
POSTSCRIPT	31
SURVEY INSTRUMENT	33

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Executive Summary

Occupational Information in the Context of National Priorities

Access to opportunity for America's working men and women is determined by the quality of their skills and the chances they are given to improve those skills. The *Report on the American Workforce* recently released by the Department of Labor convincingly describes "a workforce composed of three groups — one with strong skills getting sharper, one with less developed skills that are rapidly losing their edge, and another with virtually no marketable skills at all." It concludes, "nothing is more vital to fulfilling our national ideals than equipping all Americans with the knowledge, skills, and abilities needed to lead meaningful, productive working lives."

Worker skills are at the heart of profound changes occurring in the labor market. The Department of Labor report states, "Occupations that have shown the most rapid growth over the past decade are those with relatively high requirements in terms of formal education, specific knowledge, and training. In contrast, some of the occupations requiring relatively low levels of formal education have either become declining in size or have shown little growth in recent decades. Projections of future employment developments envisage further movement in that direction."

American workers and employers are making massive investments and efforts to acquire skills that are essential for continued employment and competitive businesses. The Department of Labor report notes that, "in 1991, almost 65.3 million people or 57 percent of those employed said they needed specific skills to qualify for their jobs, up from 55 percent in 1983. The proportion of workers who said they took training to improve their job skills rose from 35 percent in 1983 to 41 percent in 1991."

America's interest in a competitively skilled workforce should be supported by the future Standard Occupational Classification System. It should be the central information resource for mapping existing workforce skills and areas in which new skills are required for changing and emerging occupations. To achieve this end, insights of knowledgeable users of occupational information should be used to redesign and integrate current systems to create strengthened capabilities for identifying skills workers need to obtain specific jobs, as well as jobs they might obtain based on skills they already possess.

Direct and Indirect Users of Occupational Information

A key question in designing the future Standard Occupational Classification system is how needs and insights of the relatively small group of users who understand tools of

occupational analysis, but whose vision of change rarely extends more than one step beyond the systems they have experienced, can be used to reshape a domain of information that is critically important for an issue at the heart of the nation's domestic agenda — full employment and optimal use of skills for American workers.

It is useful to think of consumers of occupational information in terms of both "Direct" and "Indirect" Users. Direct Users include the employment service staffs, the Department of Labor, educational institutions, rehabilitation counselors, economic analysts, businesses, and librarians.

Indirect Users include all those who are or should be beneficiaries of occupational classification systems. Benefit comes to Indirect Users by application of the data to the solution of their employment problems and life choices.

It is essential that wants and needs of both groups of users be explored and evaluated honestly. The classification data component requirements are similar to those of the financial tables of the stock market — they must be accurate, current, and subject to constant oversight for inclusion and exclusion of required data to protect their validity and credibility. Far too many government statistics are no longer used by some economists because they doubt their accuracy and credibility.

This paper is based on three assessments concerning the adequacy of currently identified user groups for defining public priorities to be served by the future SOC.

1. Occupational classification data is not an end in itself. It is a tool for obtaining answers to questions and solutions to problems that are important for aiding and improving working conditions of our society. The views of current users are valuable to the extent that they competently identify what occupational information is needed and how it should be used to address labor force issues.
2. Not all users are equally insightful. It appears that only 54% of respondents to previous surveys were individuals who consult an occupational classification system even once a week. This suggests that some organizations being surveyed may have been marginal users of occupational classification information, given the likelihood that organizations receiving previous surveys routed them to the individual in the organization most knowledgeable about occupational classification issues.
3. The SOC does not have an identifiable constituency of users. Its primary use is for identifying crosswalks between other systems. It offers no independent classification definitions or data. Consequently, it makes more sense to view it as an opportunity for a system yet to be created rather than a system with an existing constituency.

Survey of Labor Market Experts

To probe beyond boundaries of previous surveys, the Economic Roundtable initiated and sponsored an independent survey of expert users in 1993, to obtain views from highly knowledgeable individuals who use occupational information for employment and training programs and research, as well as labor organizers and personnel administrators in business who have informed perspectives and deal with workforce issues that should be illuminated by national occupation information. This survey focussed specifically on the relationship between the societal goals identified as important by individuals and the information they believe is needed in a revised system. To the best knowledge of the authors, this is the only survey that has investigated user views about the public interests (i.e., needs of indirect users) that should be served by an occupational classification information.

Conclusions from Economic Roundtable Survey

A wide net was cast to draw on the insights and opinions of expert individuals in diverse positions with rather different approaches to the potential use of an occupational classification system. Despite some diversity in origin, they share a remarkably strong consensus on the necessary information that an occupational classification system should contain, and the major problems currently experienced by users. There appears to be broad user support for changes that would transform the SOC into a classification system:

- that can help unemployed workers find new jobs that will utilize their skills as well as provide current labor market information;
- in which the most important classification variables are skill measurements;
- that provides information about tasks performed in occupations and industries that use each occupation; and
- in which information is up-to-date and accurate.

The primary use envisioned for the future system by users is to provide information useful to workers in their search for employment. By improving the quality and accessibility of information available to workers, and to those such as counselors who assist in matching workers with jobs, a broader social interest is enhanced. The most important kind of occupational information for supporting this end concerns skill transferability. Users place high priority on an accurate, up-to-date system with specific information that will offer workers:

1. A common language for enumerating the skills they possess.
2. An effective system for identifying jobs which require their combination of skills.

Fully Integrated, "Real Time" Information

The area in which user responses are least helpful is envisioning the architecture and capabilities of a system that is many steps beyond that with which they are already familiar. A new system that integrates multiple sources of data will have information outcomes and applications that have not been seen before and can transform the role of occupational information in serving workers. The possibilities for a classification system that fully integrates DOT, OES, Census, and public employment service data are not recognized by a majority of respondents — only 26% gave high priority, and another 42% medium priority, to integrating occupational and social information in the Economic Roundtable survey.

Issues of system architecture such as data integration and real-time information that are far removed from the actual experience of current users and difficult to visualize appear to be an area in which the needs of indirect users should take precedence over priorities expressed by direct users.

A potential strength of the new SOC is its capacity to fully integrate the wealth of occupational information collected by job analysis with the employment statistics and demographic information collected through OES surveys and the Census. An uncomplicated and widely accepted occupational classification which simplifies and aids the connection among these data sources will have a synergistic effect in increasing the power of the information.

A new SOC that supports integration of data from multiple sources should also have built-in capabilities for improving the integrity and labor market-relevance of its own classification structure by identifying cross-occupational linkages that indicate transferability of skills or experience.

Conclusion

A primary test of the usefulness of occupational information is its power to provide accurate, grounded insights that actually improve labor market outcomes for workers. Important public interests rest on the capacity of the future SOC to provide occupational information that is responsive to the needs of both Direct and Indirect Users. The preliminary assessment of Direct and Indirect Users presented in this paper suggests that in order for the future SOC to respond to their real wants and it should be designed to:

1. Serve the needs not only of Direct Users, but also Indirect Users, who are the intended beneficiaries of the public investment in producing occupational information.
2. Provide information that is tangibly helpful for achieving the highest priority societal interest for occupational information identified by all user groups, namely helping workers who need jobs become employed.
3. Use a classification system based on worker skills.
4. Provide current, accurate information, including descriptions of essential skills and competencies, tasks performed, and industries in which occupations are found.
5. Support projections of future employment.
6. Fully integrate all publicly produced employment information about workers and occupations, including occupational classification data from the DOT, industry employment data from the OES, worker demographic information from the Census, and earnings and employment data from the public employment services.

Occupational Information in the Context of National Priorities

There is an opportunity for the future Standard Occupational Classification system to transform the quality and types of information available to users by building on newly emerging information technologies and directing the interest of national policy makers toward integrating and restructuring current systems. This prospect is more than an incremental change in classification methodology; it represents a possible renaissance in labor market information. A key question in designing this new system is how needs and insights of the relatively small group of users who understand tools of occupational analysis, but whose vision of change rarely extends more than one step beyond the systems they have experienced, can be used to reshape a domain of information that is critically important for an issue at the heart of the nation's domestic agenda — full employment and optimal use of skills for American workers.

The *Report on the American Workforce* recently released by the Department of Labor offers convincing evidence that access to opportunity for America's working men and women is determined by the quality of their skills and the chances they are given to improve those skills. The report describes "a workforce composed of three groups — one with strong skills getting sharper, one with less developed skills that are rapidly losing their edge, and another with virtually no marketable skills at all." It concludes, "nothing is more vital to fulfilling our national ideals than equipping all Americans with the knowledge, skills, and abilities needed to lead meaningful, productive working lives."¹

Worker skills are at the heart of profound changes occurring in the labor market:

Occupations that have shown the most rapid growth over the past decade are those with relatively high requirements in terms of formal education, specific knowledge, and training. In contrast, some of the occupations requiring relatively low levels of formal education have either become declining in size or have shown little growth in recent decades. Projections of future employment developments envisage further movement in that direction.²

American workers and employers are making massive investments and efforts to acquire skills that are essential for continued employment and competitive businesses:

In 1991, almost 65.3 million people or 57 percent of those employed said they needed specific skills to qualify for their jobs, up from 55 percent in 1983. The

¹U.S. Department of Labor, *Report on the American Workforce*, 1994, pp. 1-2.

²Ibid, p. 28.

proportion of workers who said they took training to improve their job skills rose from 35 percent in 1983 to 41 percent in 1991.³

The future Standard Occupational Classification Systems should be the central national information resource for mapping existing workforce skills and new skills required for changing and emerging occupations. To achieve this end, insights of knowledgeable users of occupational information should be used to redesign and integrate current systems to create strengthened capabilities for identifying skills workers need to obtain specific jobs, as well as jobs they might obtain based on skills they already possess.

Important questions in deciding how to draw on the insights and priorities of expert individuals who use occupational information on behalf of workers are: What are the core needs of current users that the future system should be designed to serve more effectively? What are the needs of the larger universe of potential users who could benefit from improved occupational information but have little or no connection with current systems? And, in what way should user priorities be allowed to shape a future system that they do not now envision because it may well be an order of magnitude more powerful than current systems in terms of richness, timeliness and accuracy of data, and capability for fully integrating a wide range of data sources applicable to workers and the labor market?

Public information has value when it is wanted and used by, and useful for, a reasonably large and broad-based body of users. The value of an occupational classification system is found in its acceptance and application by its users and in the extent to which benefits for workers are derived from its use.

Uses and Users of the New SOC

Efforts to distinguish and enumerate the actual and potential users of the existing occupational classification systems, i.e., the DOT, SOC, and OES, have met with limited success⁴. Much research has been through the accounting of buyers of system manuals, although, according to Dr. Alan Moss, no records have been kept of customers purchasing the SOC manual.

The authors of "Work, Jobs, and Occupations" made very extensive efforts to collect data on DOT users outside the employment services, both federal and state, which are provided with copies of the manual on publication. They found that institutional buyers — primarily federal agencies and educational institutions, brought many copies in bulk

³Ibid, p. 81.

⁴"Consumer Criteria for the Next Standard Occupational Classification System," Allan Moss, Ph.D., Department of Labor Paper, 1993.

which ostensibly were distributed to relevant staff. Records were also available for direct sales to individuals and for bulk orders from government book stores and college text book distribution firms. This study was carried out for a one-year period following the publication of the fourth edition of the DOT in December 1977.⁵

This survey indicated that, of the non-Labor Department distribution, educational institutions purchased 42% of all the manuals sold, with other government agencies, e.g., the Army, Navy, Social Security Administration, buying another 20%. Libraries took 13%, private for-profit businesses 14%, and non-profit organizations (probably research, private counseling, and job training and placement agencies) took 10%. It might be noted that while the Navy was given copies by the Department of Defense, they were immediately warehoused and evidently not used. The types of work performed by purchasers were largely concentrated in career or vocational counseling, librarianship, and management/compensation.

Dr. Moss identifies probable customers for an expanded SOC as the "vital few," the "useful many," and the "workforce." The "vital few" represent the constituency which has expert knowledge of the occupational classification systems. The "useful many" concerns mostly professionals in counseling or placement, who develop labor market information or conduct planning or research into subjects which require occupational data. The "workforce" encompasses consumer experts--those who practice occupational analysis, or prepare tools and products of occupational classification.

Building on Dr. Moss's user categories, another grouping that is useful for thinking about the future SOC is "Direct" and "Indirect" Users. Direct Users fall into the three groupings noted above. They are the employment service staffs and the Department of Labor divisions such as the Bureau of Labor Statistics and other units directly involved in almost any aspect of labor market information. These Direct Users provide technical support to the field and to other government agencies such as the Bureau of the Census, and the Department of Commerce.

The Direct Users group also includes staff of educational institutions who provide vocational guidance and counseling, develop and prepare vocational and academic training courses, and plan educational programs leading to preparing students for the world of work. In addition, developers of career and occupational guidance systems have been major users and appliers of occupational information, and rely heavily on the job definitions and worker traits in the DOT, the groupings provided by the SOC, and all occupational labor market information provided by government agencies.

Rehabilitation counselors are regular users of occupational classification system data,

⁵"Work, Jobs, and Occupations: A Critical Review of the DOT," pp. 46 and ff, 1980.

especially those relating to worker traits which emphasize the ability of their clientele to obtain work. The Social Security Administration claims determination workers are mandated to use the DOT, and undoubtedly the new SOC, when available, in making decisions on benefits.

Businesses may, or should, use accepted and standardized occupational classification systems for classifying their employees, determining the validity of their own job and work requirements, planning the organizational structure of firms, and helping set up wage and salary standards by occupation. Librarians, while not exactly Direct Users, must know about and do provide the information to other Direct Users.

Economic analysts and researchers, while relatively few in number, are very intensive direct users. They must rely on certain of the data to make knowledgeable forecasts and to "read" the labor market when analyzing issues related to employment outcomes and labor market trends.

Indirect Users include all those who are or should be beneficiaries of occupational classification systems. The benefit and "profit" comes to Indirect Users by application of the data to the solution of their employment problems and life choices.

The Indirect Users are students, job seekers, new entrants to the labor market, and those wanting to change or improve their job situation. Occupational information, as interpreted to Indirect Users by Direct Users, can help in portraying the work place both realistically and literally. The Indirect User can be aided in finding a job opening, choosing a career path, or understanding what a job entails in the way of physical and mental demands, years of schooling, training, and experience.

Workers recently laid off, or in search of a first job, may be shown the width and breadth of the job market; how jobs are related by skills, and the potential and probability of their finding a job that is satisfying both financially and personally.

While the number and types of Direct Users are definitely restricted to the rather special few, the number and types of Indirect Users are limited only by the size and structure of the labor force plus those outside the labor force who want in. It is essential, therefore, that wants and needs of both groups of users be explored and evaluated honestly. The classification data component requirements are similar to those of the financial tables of the stock market — they must be accurate, current, and subject to constant oversight for inclusion and exclusion of required data to protect their validity and credibility. Far too many government statistics are no longer used by some economists because they doubt their accuracy and credibility.

Surveys and analyses of occupational information users conducted since 1980 include:

- The critical review by the National Academy of Science (1980).
- An analysis by Michael D. Dymmel (Aguirre International) of responses to a concept paper published in the *Federal Register* (1992).
- A survey of over 2,609 users, with 1,722 respondents, by Westat, Inc. (1993).
- A summary of user needs and wants prepared by Ruth Hoppe, Utah Occupational Analysis Field Center (1994).

These surveys and analyses provide a valuable overview of the current role of the existing SOC/DOT system and the range of user needs. It is possible, however, to read these studies and come away with the impression that users of existing systems represent the universe of users interests that should be satisfied by a new occupational classification system.

This paper is based on three assessments concerning the adequacy of currently identified user groups for defining public priorities to be served by the future SOC.

1. Occupational classification data is not an end in itself. It is a tool for obtaining answers to questions and solutions to problems that are important for aiding and improving working conditions of our society. The views of current users are valuable to the extent that they competently identify what occupational information is needed and how it should be used to address labor force issues.
2. Not all users are equally insightful. It appears that only 54% of respondents to previous surveys were individuals who consult an occupational classification system even once a week (Westat, 1993, p. 4-3). This suggests that some organizations being surveyed may have been marginal users of occupational classification information, given the likelihood that organizations receiving previous surveys routed them to the individual in the organization most knowledgeable about occupational classification issues.
3. The SOC does not have an identifiable constituency of users. Its primary use is for identifying crosswalks between other systems. It offers no independent classification definitions or data. Consequently, it makes more sense to view it as an opportunity for a system yet to be created rather than a system with an existing constituency.

The view of the authors is that the SOC does not need to be revised to satisfy a stable set of user requirements, but rather to become a better and more relevant tool for a workforce and economy that are severely challenged and undergoing rapid change. Public programs related to worker training and job placement, which are important users

of occupational classification data, are viewed critically in many quarters and may well be subject to fundamental restructuring as a result of national policy changes now being considered. Therefore, in designing a new SOC, the need is not to fit a stable pattern of existing uses but to assist current and new Direct Users, and a broadly defined constituency of Indirect Users, in achieving public interests related to an economically self-sufficient and globally competitive workforce.

Survey of Labor Market Experts

To probe beyond boundaries of previous surveys, the Economic Roundtable initiated and sponsored an independent survey of expert users in 1993. The purpose was to obtain views from highly knowledgeable individuals who use occupational information for employment and training programs and research, as well as labor organizers and personnel administrators in business who have informed perspectives about employment issues that should be illuminated by national occupation information. This survey focussed specifically on the relationship between the societal goals identified as important by individuals and the information they believe is needed in a revised system. A copy of the survey instrument can be found at the end of this paper. To the knowledge of the authors, this is the only survey that has investigated user views about the public interests (i.e., needs of indirect users) that should be served by an occupational classification information system.

Consistent with our emphasis on the societal purposes of the occupational classification system, inquiries were made of individuals who assist workers through counseling, education, job placement, labor union organizing, and other worker-centered activities. Our focus was also on individuals such as researchers and employees in state agencies who have a wide-ranging and inclusive understanding of the labor market and the role of occupational information in helping job seekers. By focussing on these groups, and contacting knowledgeable informants, it was possible to obtain incisive and thoughtful comments about issues that are central to this paper, but outside the scope of other surveys that have been conducted. Views and insights were obtained from sixty-six individuals through this independent survey to explore the concerns of potential users and to identify interrelationships between individuals' social priorities and the kinds of classification information they think are most important.

Profile of Respondents

Respondents to the survey came from all parts of the United States. Their institutional affiliations, duties, familiarity with classification system, and use of specific systems are profiled in Table 1 and Graph 1.

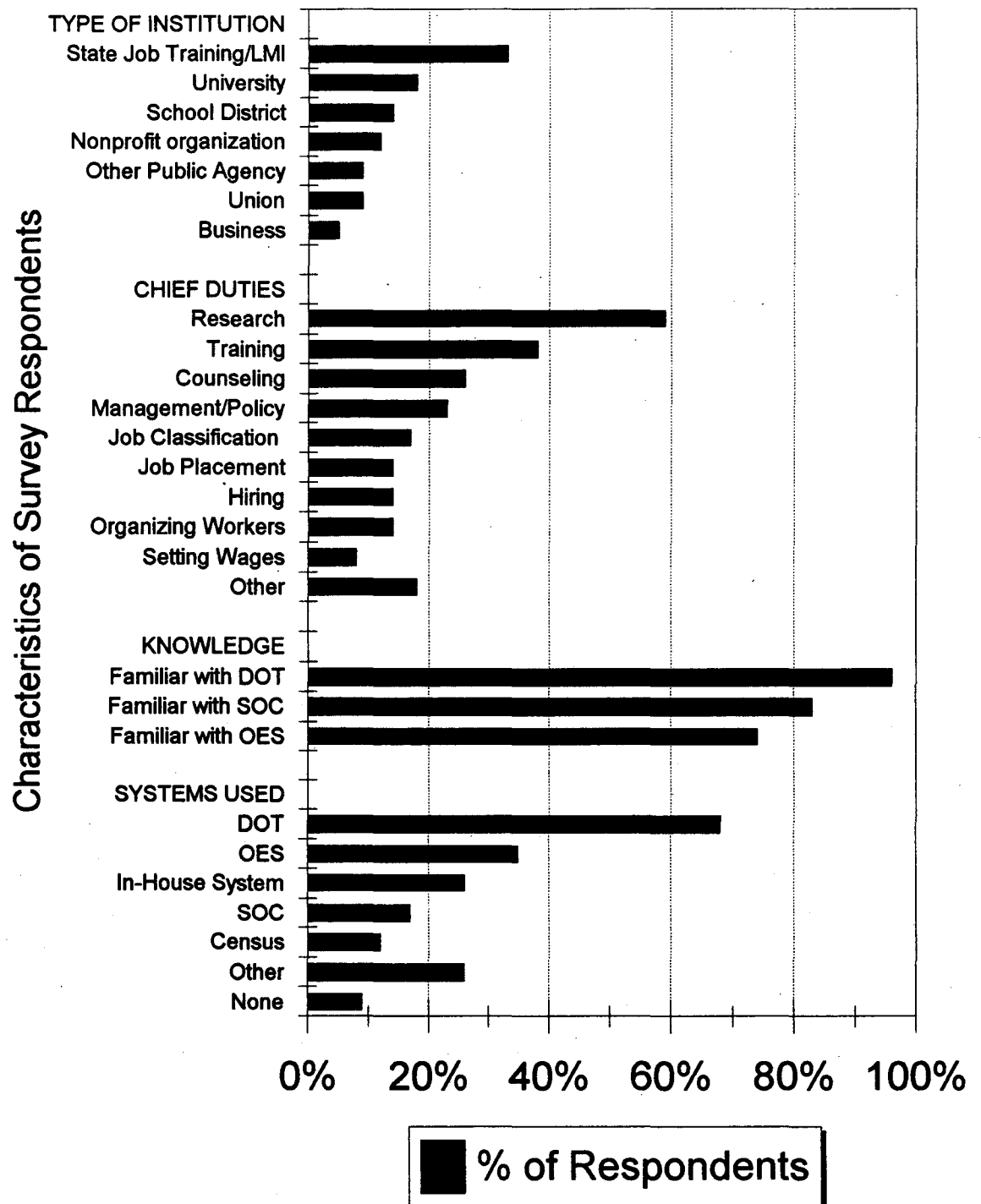
TABLE 1
USER CHARACTERISTICS
1993 Survey of Labor Market Experts

USER INFORMATION	TOTAL	PERCENTAGES
Respondents Completing Survey	66	100%
TYPE OF INSTITUTION		
State Job Training and/or LMI	22	33%
University	12	18%
School District	9	14%
Nonprofit Organization	8	12%
Other Public Agency	6	9%
Union	6	9%
Business	3	5%
CHIEF DUTIES		
Research	39	59%
Training	25	38%
Counseling	17	26%
Management and/or Policy Development	15	23%
Human Resource Activities	11	17%
Job Placement	9	14%
Hiring	9	14%
Organizing Workers	9	14%
Setting wages	5	8%
Other	12	18%
KNOWLEDGE OF OCCUPATIONAL CLASSIFICATION SYSTEMS		
Familiar with DOT	63	96%
Familiar with SOC	55	83%
Familiar with OES	49	74%
OCCUPATIONAL CLASSIFICATION SYSTEM(S) USED		
Use in-house system	17	26%
Use DOT	45	68%
Use OES	23	35%
Use SOC	11	17%
Use Census	8	12%
Use Other	17	26%
Use None	6	9%

Note: Some users reported more than one duty and use of more than one occupational classification system.

USER CHARACTERISTICS - GRAPH 1

1993 Survey of Labor Market Experts



Problems with Occupational Classification Systems

The survey asked respondents to indicate the kinds of problems they experience in using current occupational classification systems. The most common problem in using occupational classification systems, cited by over half the individuals surveyed, was that the information was out of date. In the words of one respondent,

The DOT is not based on a well-designed sample of employers. Most occupations probably have not been surveyed in years The entire DOT system, particularly the way in which the data are collected, is (as far as I can see) in disarray.

Another respondent said,

Jobs have changed over the years. Update and list jobs as they are today.

The next most common complaint, cited by almost a third of the individuals contacted, was that the system does not accurately describe jobs. One respondent commented,

None of the classification systems can adequately reflect or capture emerging technologies and industries. We need a complete, comprehensive data base with information that enables users to download what they need when they need it. To adequately reflect what the labor market is like, some information needs to be based on traditional occupational definitions (e.g., taxi drivers), some on industry association (e.g., some of the opportunities in health care), and some on changes in technology (e.g., materials fabrication, toxic waste cleanup).

Another third of the individuals indicated that there are too many job definitions. Other significant concerns were that jobs were not grouped together appropriately, and that important information is missing. Some specific deficiencies were noted, for example,

The current DOT does not have enough categories for all kinds of social service and nonprofit jobs, but has too many agricultural and manufacturing jobs.

These responses can be understood as reflecting two levels of reaction to the existing occupational classification system. At the first (and most common) level, individuals encounter concrete difficulties when trying to locate or define an occupation, and experience frustration at the out-of-date information, inaccurate job definitions, and lacking information. At the second level, individuals reflect on the limitations of the system and consider ways in which their frustration is related to system design; hence complaints about the number of job definitions and the grouping of jobs.

The survey also requested respondents to complete an open-ended question by describing the kinds of occupational information that would improve their ability to do

their work. Three closely ranked priorities were: First, better information about skill and certification requirements for jobs. Second, up-to-date, accurate, specific information about jobs. And, third, an integrated system that links worker, industry, and demographic data. Responses to both of these questions are profiled in Table 2 and Graph 2.

TABLE 2
PROBLEMS AND NEEDED IMPROVEMENTS
1993 Survey of Labor Market Experts

PROBLEMS EXPERIENCED USING OCCUPATIONAL INFORMATION

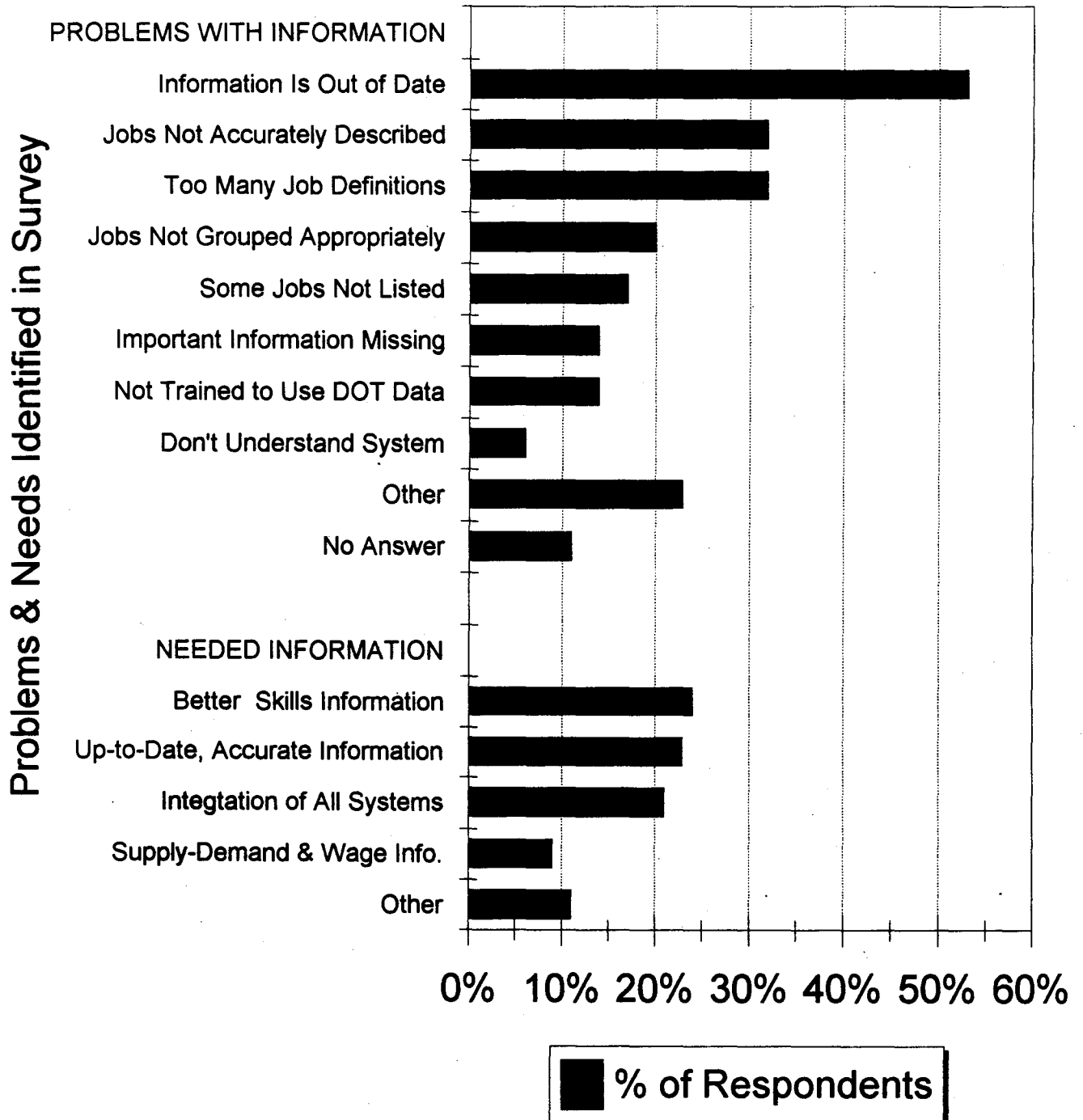
Information is out of date	35	53%
Does not accurately describe jobs	21	32%
Too many job definitions	21	32%
Jobs not grouped together appropriately	13	20%
Does not list some jobs	11	17%
Important information is missing	9	14%
Not trained to use DOT codes/traits data	9	14%
Don't understand the system	4	6%
Other	15	23%
No Answer	7	11%

NEEDED INFORMATION (open-ended question)

Better information about skill/certification requirements	16	24%
Up-to-date, accurate, specific information about jobs	15	23%
An integrated system that links worker, industry, demographic data	14	21%
Accurate supply-demand and wage or salary information	7	9%
Other	7	11%

PROBLEMS AND NEEDS - GRAPH 2

1993 Survey of Labor Market Experts



Societal Objectives for Occupational Information

The survey asked respondents, "What do you think are the highest priority needs that should be served by a new national standardized occupational information system?" A strong consensus emerged on the relative importance of some of the societal goals identified, while others evoked a greater diversity of responses. Informants overwhelmingly agreed that it is important to identify essential skills and competencies workers need to be job-ready and employer-acceptable, and to help displaced workers transfer their skills to new jobs. These two objectives of skill identification and skill transference were affirmed by over three-quarters of the informants. This finding is consistent with a survey of DOT users that found 58% considered skills transferability between occupations very important (Westat, 1993, p. 5-1). Commenting on the kinds of help needed by displaced workers one respondent said,

Work must be done to integrate emerging job requirements with satisfactory information systems which can [link emerging jobs] to the skills and abilities of current workers who may be in a completely different industry.

Another respondent asked for,

Better format for definition clustering – it should be easier to set up a system for identifying transferable skills We need more precise definition of SVPs, more information on requirements for general knowledge versus special knowledge requirements, and minimum skill standards.

Another respondent asked for,

More realistic clustering of similar jobs so that true skill transferability is possible, not just aptitude transferability.

Another respondent commented,

. . . . A redesign is badly needed, particularly with regard to identifying unique combinations of skills required in job performance . . .

Another respondent said,

Jobs should be classified according to skills and skill levels rather than functions.

A similar request from another respondent was,

Less task, more about cognitive abilities and transferability.

And another respondent asked for,

Better information on skill distinctions, especially for manual jobs.

One respondent with a dissenting view about skill information said,

Put more focus on the general personal attributes required in different occupations and industries, rather than on specific job skills, e.g., responsibility, adaptability, motivation, cooperativeness — the attitude dimension rather than specific mechanical skills and requirements that are either obvious or readily acquired on the job.

Respondents also showed a strong desire for an occupational information system that provides reliable, current labor market information, with nearly two-thirds giving this a high priority. In the words of one,

We need access to trends in an easily decipherable form. What's growing? What's shrinking?

This issue is closely related to interest in reliable projections of future employment, and so not surprisingly, this also received a high priority rating by over half the informants. One respondent asked for,

Accurate supply-demand and wage information based on more specific job descriptions.

Opinions were gathered on research uses for the system, including integrating social and occupational information, doing historical analysis, making comparisons with other countries, and investigating work-related health problems. However, these were not as popular as projecting employment, with one quarter or more of the respondents rating them as low priority.

Over half of the individuals responding indicated that helping workers make successful job and career choices was only a medium priority, although relatively few indicated it was unimportant. There was more disagreement about helping workers identify career advancement opportunities, with a strong divergence of opinion about the importance of this activity. A similar pattern of mixed responses was received with regard to the issue of helping people overcome barriers to employment. Responses concerning the highest priority needs that should be served by a new national standardized occupational information system are shown in Table 3 and Graph 3.

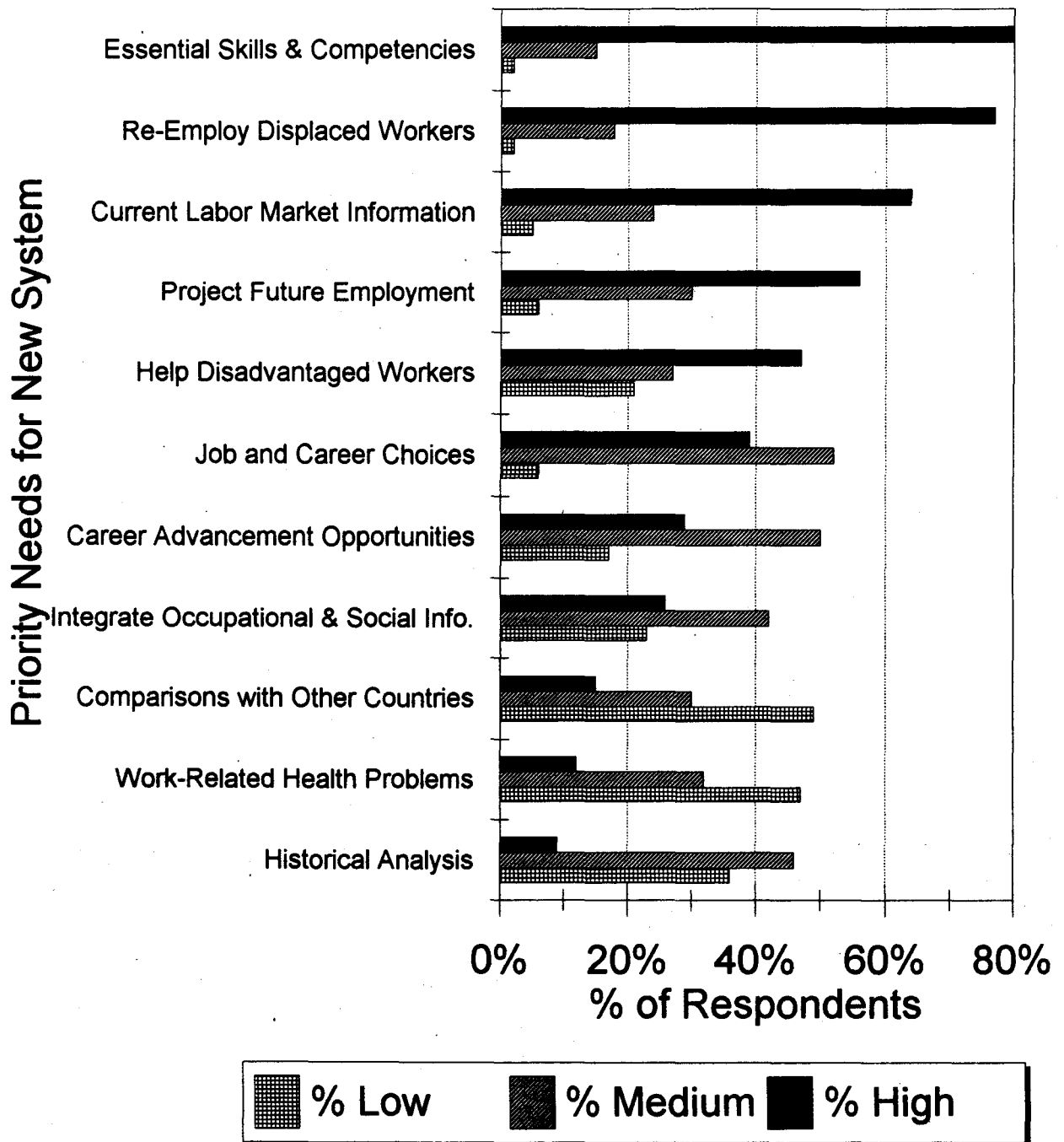
TABLE 3
PUBLIC NEEDS THAT SHOULD BE SERVED BY NEW SYSTEM

1993 Survey of Labor Market Experts

PRIORITY NEEDS FOR NEW SYSTEM	<i>Ratings by Survey Respondents</i>	
	Number	Percent
Identify essential skills and competencies	high 53	80%
	medium 10	15%
	low 1	2%
Help displaced workers transfer skills	high 51	77%
	medium 12	18%
	low 1	2%
Provide current labor market information	high 42	64%
	medium 16	24%
	low 3	5%
Support projection of future employment	high 37	56%
	medium 20	30%
	low 4	6%
Help people with barriers to employment	high 31	47%
	medium 18	27%
	low 14	21%
Help workers make job and career choices	high 26	39%
	medium 34	52%
	low 4	6%
Identify career advancement opportunities	high 19	29%
	medium 33	50%
	low 11	17%
Integrate occupational and social information	high 17	26%
	medium 28	42%
	low 15	23%
Enable comparisons with other countries	high 10	15%
	medium 20	30%
	low 32	49%
Support investigation of work-related health problems	high 8	12%
	medium 21	32%
	low 31	47%
Support historical analysis	high 6	9%
	medium 30	46%
	low 24	36%
Other	high 5	8%
	medium 2	3%
	low 0	0%
No answer	0	0%

NEEDS NEW SYSTEM SHOULD SERVE-GRAPH 3

1993 Survey of Labor Market Experts



Necessary Information Identified By Users and Potential Users

The survey explored the kinds of information users need by asking, "What kinds of information do you think it is most important to have about jobs?" An overwhelming consensus emerged regarding the priority of *skill requirements* as a central element in an occupational classification system, with 94% of informants indicating that this is of great importance. This was followed in magnitude by descriptions of tasks performed, which over three-quarters of the informants indicated was of great importance. The third most significant item was information about which industries use specific occupations, which nearly two-thirds of the informants indicated was important. This is consistent with the finding in the DOT user survey where 76% rated basic skills required as very important, and 79% regarded information on the duties and tasks performed as very important (Westat, 1993, p. 7-2).

Some specific suggestions were made about how to improve measurement of skill. One person called for GED (General Educational Development) scores with a "critical thinking" breakout, and SVP (Specific Vocational Preparation) scores with a breakout to include both formal education and training, plus on-the-job training and length of time. Others pointed to the need for information on actual certification requirements, as well as abstract summaries such as SVP. This would include licensing, registration, accreditation standards, and typical educational qualifications required, such as a high school diploma or a bachelor or better degree. Findings from a survey of DOT users (Westat, 1993) indicate that a majority believe changing the SVP code to a measure of hours of preparation and replacing the GED code with a listing of the actual technical knowledge required to be "very" or "moderately important."

Drawing on a factor analysis of the fourth edition DOT produced by the 1980 critical review of the DOT (National Research Council, 1980), the subject areas of motor skills, physical demands, management skills, interpersonal skills, and working conditions were identified as distinct from each other and from the subject area of substantive complexity or skills. On the whole, most informants believed that motor skills such as dexterity, physical requirements such as lifting, management requirements such as planning ability, and working conditions such as heat, were of medium importance. These findings are echoed in part in the DOT user survey which found that the rating of "very important" was assigned to physical requirements by 51% and to working conditions by 48% (Westat, 1993, p. 3-6, 3-7).

There was rather more diversity of opinion regarding the importance of information about interpersonal skills such as tact, organizational context of jobs such as firm size or level of unionization, and mobility potential or "lattice" career movement. In these three cases, assessments of the importance of these types of information ranged from low to high, with no single assessment of importance being supported by a majority of informants. The DOT user survey (Westat, 1993) also found that information on career

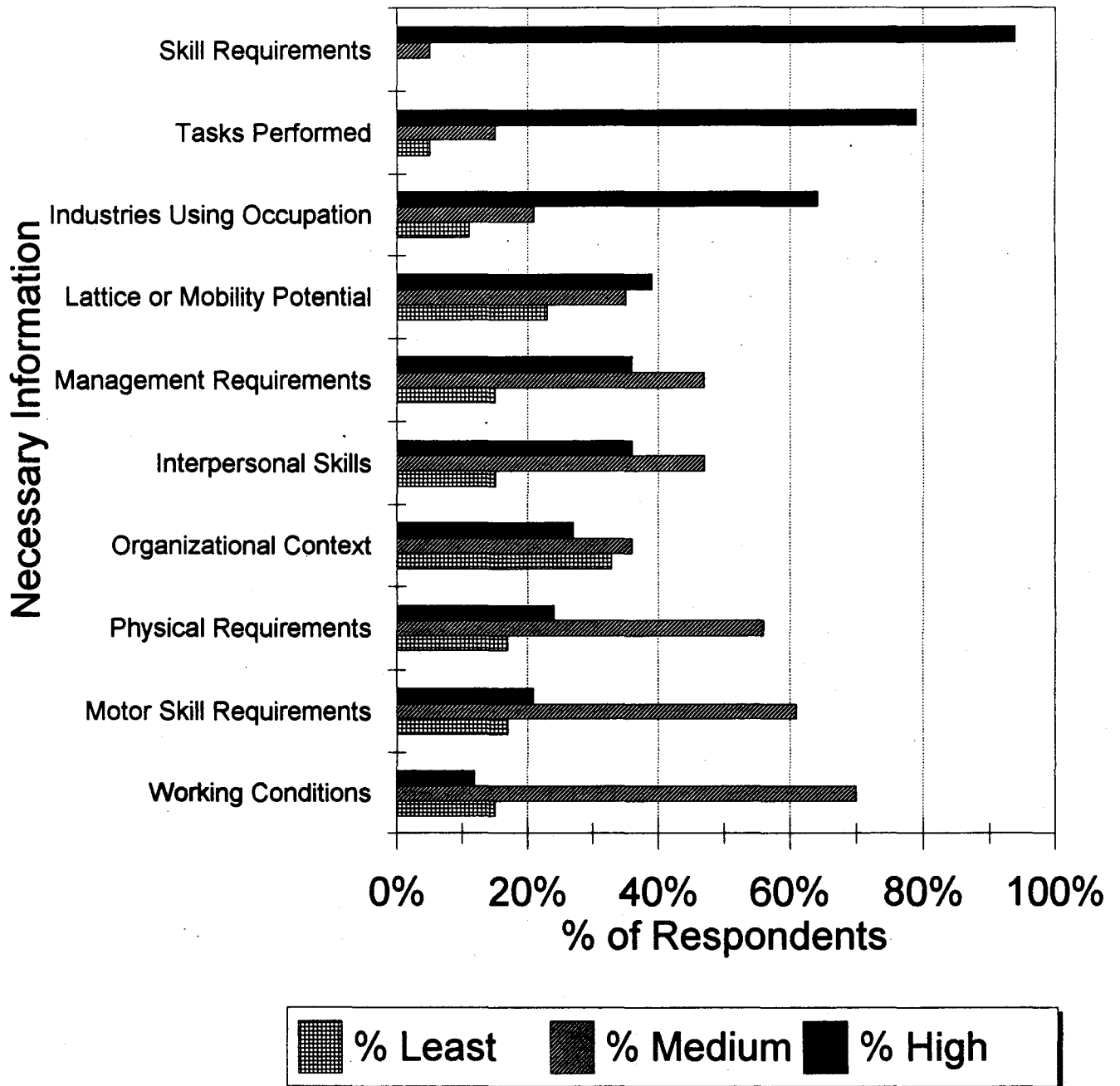
TABLE 4
NECESSARY INFORMATION FOR NEW SYSTEM
1993 Survey of Labor Market Experts

NECESSARY INFORMATION	Ratings by Survey Respondents	
	Number	Percent
Skill requirements	most 62	94%
	medium 3	5%
	least 0	0%
Description of tasks performed	most 52	79%
	medium 10	15%
	least 3	5%
Industries using the occupation	most 42	64%
	medium 14	21%
	least 7	11%
Lattice or mobility potential	most 26	39%
	medium 23	35%
	least 15	23%
Management requirements	most 24	36%
	medium 31	47%
	least 10	15%
Interpersonal skills	most 24	36%
	medium 31	47%
	least 10	15%
Organizational context of jobs	most 18	27%
	medium 24	36%
	least 22	33%
Physical requirements	most 16	24%
	medium 37	56%
	least 11	17%
Motor skill requirements	most 14	21%
	medium 40	61%
	least 11	17%
Working conditions	most 8	12%
	medium 46	70%
	least 10	15%
Other	most 9	14%
	medium 0	0%
	least 0	0%
No answer	0	0%

Percentages are calculated based on 66 respondents.

NECESSARY INFORMATION - GRAPH 4

1993 Survey of Labor Market Experts



progression or paths was valued relatively low, with only 33% rating it as "very important." Some informants argued that the changing economy calls for a focus on more generic skills, including greater attention to the supervisory requirements, responsibility, and cognitive abilities of occupations. For example, one informant called for,

Information on authority — supervisory responsibility.

Information about the organizational context of jobs elicited relatively little interest. One-third of respondents gave this low priority, although one person argued cogently for this information element, asking for,

Information that would help describe the organizational context of the work (supervisory relationships, position of job in promotion ladders, firm size, structure, policies etc.) and demographic characteristics (including turnover).

Table 4 and Graph 4 show how users rank the importance of different kinds of occupational information.

Relationships Between Societal Objectives and Suggested Improvements

The societal goals regarded as most important by individuals influence what they identify as essential information for an occupational classification system as well as their prescriptions for correcting perceived shortcomings. Consequently, it is important to examine the types of occupational information survey respondents want to have in the context of the societal goals they think should be served by this information.

There were five broad goals that each were regarded as very important by half or more of all informants. Three of the goals were directly related to concrete problems of counseling and assisting work-seekers, namely identifying essential skills, helping displaced workers transfer skills, and helping people with barriers to employment obtain skills that will enable them to find jobs. There was substantial overlap among individuals giving a high priority to these goals. These informants included a significant share of people engaged in job placement, counseling, training, hiring, setting wages, and organizing workers. Relatively few of these respondents were engaged in research, and they therefore tended to give slight support for research-related issues.

The other two goals that attracted a great deal of support referred to research activities that provide indirect assistance for worker needs. The goals were providing up-to-date information about labor market changes, and assisting researchers to project future employment. The group of respondents concerned about current information seemed to straddle the employment and research orientations, focussing on a research output that

would have direct utility for job placement. The respondents interested in predicting future employment were more sympathetic to the social benefits of all occupational research, such as historical analysis. Two-thirds of these respondents were engaged in research.

It is possible to identify some differences between the job-placement orientation on the one hand and the research orientation on the other (and sub-groupings within each), but more striking is the overall agreement among all respondents. For each of the five groupings defined above by their rating of high priority societal goals, the most common problem reported was out-of-date information, followed by inaccurate job descriptions and excess titles. The fourth problem cited was either inappropriately grouped jobs, or lack of training in understanding and applying DOT codes and traits data.

A similar agreement was evident in judgements about the most important information that an occupational classification system should include. Only small variations were observed among groups. For example, placement-oriented informants tended to give more weight to the need for specific information on interpersonal skills, probably derived from experience with problems in placing work-seekers. Information on interpersonal skills may be especially relevant to the service sector jobs drawing on 'emotional labor,' communication and social skills (especially jobs historically assigned to women) that have grown in recent decades.

Some variations between the placement orientation and the research orientation were also evident in the concrete suggestions made to improve the SOC/DOT system, although there was a fair amount of overlap among the five groups. Placement-oriented individuals suggested ways to link the occupational classification system more directly with real job and training opportunities. Suggestions were made to establish a data base on local level demand with wage/benefit summary, training requirements and occupational outlook. One specific proposition for a local data base was to list the telephone numbers and main office addresses for community college districts, adult schools, and other job training sites for training in specific skills. Another noted that we need to address confidentiality issues, and provide employer names and addresses, and what occupations they use, to the public. In his words,

We must start providing more than "symbolic" information.

The comments elicited from research-oriented individuals tended to call for greater links between different data bases and sources of information. Suggestions were made for more use of the DOT by government agencies collecting labor market information, for consideration of the SCANS initiative, and for a fully integrated classification system. One recommendation spelled out a method for surveying under-represented sectors to generate a weighted distribution of industries, and produce a distribution of DOT titles within each OES code. The need for more localized demand and wage information was

mentioned by several, as was the need to match occupational information with supply information from training programs.

Specific Suggestions

The wealth of expertise on issues of employment and occupational information among the informants generated a number of insights worth mentioning in detail. Some pointed to new kinds of information that could be collected to shed light on current problems. For example, one individual called for information on the key characteristics of workers who retain employment for one year or more. Another noted that we need to link worker characteristics to firm characteristics. He suggested a random sample of workers at the workplace (as done in Japan) rather than at home (as done in the US). Other individuals referred to the opportunities created by information-processing technology.

Due to the extensive number of occupations it is essential that the system be computerized.

Finally, the problems of designing a satisfactory occupational information system elicited some general comments.

Our main concern is that the DOT is no longer getting updated frequently enough. We believe that there is a need for a more generalized system like OES or SOC as well as a more detailed system like the DOT. If one system could combine both features, all the better. It would seem that the Data-People-Things designation of the DOT could be incorporated with a hierarchical system like OES using a greater number of digits in the code.

Eliminate the SOC and the old DOT, improving on the OES so that there is only one taxonomy of about 2000 job titles. Then, don't alter the codes for ten years.

Conclusions from Economic Roundtable Survey

A wide net was cast to draw on the insights and opinions of expert individuals in diverse positions with rather different approaches to the potential use of an occupational classification system. The dimensions of their different perspectives on the social goals to be served by the SOC/DOT system have been outlined above. However, the central finding of this survey is that despite some diversity in origin, they share a remarkably strong consensus on the necessary information that an occupational classification system should contain, and the major problems currently experienced by users. There appears to be broad user support for changes that transform the SOC to become a classification system:

- that can help unemployed workers find new jobs that will utilize their skills as well as provide current labor market information;
- in which the most important classification variables are skill measurements;
- that provides information about tasks performed in occupations and industries that use each occupation; and
- in which information is up-to-date and accurate.

The primary use envisioned for the future system by users is to provide information useful to workers in their search for employment. By improving the quality and accessibility of information available to workers, and to those such as counselors who assist in matching workers with jobs, a broader social interest is enhanced. The most important kind of occupational information for supporting this end concerns skill transferability. Users place high priority on an accurate, up-to-date system with specific information that will offer workers:

1. A common language for enumerating the skills they possess.
2. An effective system for identifying jobs which require their combination of skills.

Meeting User Needs Through the Future SOC

The SOC was developed as a top-down system. A conceptual structure was developed, occupations were defined and described, and DOT titles were then grouped together on the basis of those definitions. Yet in many ways the SOC was unable to establish a well-supported independent internal structure. A cursory examination of the occupational categories suggests several cases in which the delineation of unit groups appears to have been dictated by the range of existing DOT titles, rather than by an attempt to impose consistency.

One of the major problems with the SOC occupational definition derives from its construction from DOT titles. Since there are not adequate empirical data on the relative share within a SOC occupation of each component DOT title, there is no reliable way of characterizing the SOC in terms of DOT variables where the scores on variables differ among the component titles. This makes it particularly difficult to link labor market information (usually collected with SOC-equivalents) to job characteristics identified for the DOT. This is especially true with respect to the measures of skill.

Skill as the Basis for Occupational Definition and Classification

The central focus of the SOC is the aggregation of occupations into larger clusters or job families, consistent with its design as a comprehensive top-down descriptive classification system. Any aggregation is based on principles of clustering using given variables.

Much of the current discussion about revising the SOC revolves around the usefulness of placing a measure of skill or substantive complexity at the center of occupational definition and classification. In other words, skill would become the prime 'sorting variable' for occupations, at least to distinguish among the initial broad categories of jobs. The impetus for this derives from increased interest in issues of worker re-employment to deal with economic dislocation, and moves to develop more relevant educational curricula.

What implications does the priority users place on accurate, up-to-date skills and labor market information that helps workers find new jobs have for issues of system structure, information content, and application?

To meet these user priorities, the future SOC basic occupational unit should be defined by specific skill variables (scales for measuring specific skill attributes) rather than only in terms of its component DOT titles. A SOC unit group should be defined in terms of the common skill characteristics shared by the component occupations, expressed in both verbal descriptions and scores on measurement scales for key skill descriptors.

Fully Integrated, "Real Time" Information

The area in which user responses are least helpful is envisioning the architecture and capabilities of a system that is many steps beyond that with which they are already familiar. The potential for a new system to integrate multiple sources of data will have information outcomes and applications that have not been seen before and can transform the role of occupational information in serving workers. The possibilities for a classification system that fully integrates DOT, OES, Census, and public employment service data are not recognized by a majority of respondents — only 26% gave high priority to integrating occupational and social information in the Economic Roundtable survey. Issues of system architecture such as data integration and real-time information that are far removed from the actual experience of current users and difficult to visualize appear to be an area in which the needs of indirect users should take precedence over priorities expressed by direct users.

A potential strength of the new SOC is its capacity to fully integrate the wealth of occupational information collected by job analysis with the employment statistics and demographic information collected through OES surveys and the Census. An uncomplicated and widely accepted occupational classification which simplifies and aids

the connection among these data sources will have a synergistic effect in increasing the power of the information.

With the SOC as the primary occupational classification system in an overall system in which there is no need for crosswalks, occupational information and labor market information can be collected for the same occupational classification units. This will create a powerful new information resource in which information about workers and industries will be linked directly together through the same occupation groups.

It should be possible to obtain "real time" information about what happens to workers with specific skill attributes who are in specific occupations by integrating wage and claims data showing earnings and employment histories of workers with job service occupation coded data showing the previous and new placement occupations of individuals receiving public employment services. Policy-relevant issues about which this will provide information include the following:

- career transition paths
- outcomes for displaced workers
- job stability in specific occupations
- earnings patterns in specific occupations
- occupational distribution of unemployed workers and ratios of employed to unemployed workers in each occupation

By integrating this information with Census data it will be possible to obtain insights into:

- demographic characteristics of workers in specific occupations
- skill attributes of workers in specific geographic areas
- worker attributes associated with obtaining employment in specific occupations
- worker attributes associated with retaining employment in specific occupations
- worker attributes associated with upward mobility

Similarly, by integrating occupational matrices, jobs listed with the public employment service and quarterly employer reports showing employment by industry, it will be possible to provide information about:

- occupations in which job creation is occurring
- critical skill shortages which constrain industry growth
- changes in occupational composition of specific industries
- interrelationships between changes in occupational structure and changes in industry employment levels and skill requirements

A new SOC that supports this data integration will also have built-in capabilities for improving the integrity and labor market-relevance of its own classification structure by identifying cross-occupational linkages that indicate transferability of skills or experience. The 1980 critical review of the DOT (National Research Council, 1980, pp. 201, 207) noted:

Because the transferability of skills is generally regarded as the most appropriate criterion for assessing the similarity of occupations with a view to matching jobs and workers a mobility approach may provide . . . an empirical criterion for judging the similarity of occupations and the substitutability of labor In the mobility approach, occupations are grouped solely because of high degrees of movement between them [providing] a basis for constructing classifications.

The ability to offer accurate, timely and specific insight into workforce skills will transform labor market information from something that is now theoretical and generalized to into something that is strategically valuable and demonstrably improves the lives of workers. Even though these possibilities are far beyond the experience of current direct users, the design of the new SOC should ensure that these possibilities can be realized because of the important public benefits they will offer in terms of improved workforce opportunities and productivity.

Recommendations

A primary test of the usefulness of occupational information is its power to provide accurate, grounded insights that actually improve labor market outcomes for workers. Important public interests rest on the capacity of the future SOC to provide occupational information that is responsive to the needs of both direct and indirect users. The preliminary assessment of Direct and Indirect Users presented in this paper suggests that in order for the future SOC to respond to their real wants and it should be designed to:

1. Serve the needs not only of Direct Users, but also Indirect Users, who are the intended beneficiaries of the public investment in producing occupational information.
2. Provide information that is tangibly helpful for achieving the highest priority societal interest for occupational information identified by all user groups, namely helping workers who need jobs become employed.
3. Use a classification system based on worker skills.
4. Provide current, accurate information, including descriptions of essential skills and competencies, tasks performed, and industries in which occupations are found.

5. Support projections of future employment.
6. Fully integrate all publicly produced employment information about workers and occupations, including occupational classification data from the DOT, industry employment data from the OES, worker demographic information from the Census, and earnings and employment data from the public employment services.

Postscript

This report was presented on April 11, 1995, at the Seminar on Research Findings held by the Standard Occupational Classification Revision Policy Committee and the Federal Consultation Group. At that seminar, authors presenting papers were asked to give their assessment of whether the Policy Committee would be moving in the right direction if it designed the future SOC based on six readily measurable occupational characteristics, namely:

1. licensure and certification
2. work experience
3. generalized work activities
4. tasks performed (to the extent measurable)
5. formal education
6. formal training

Based on the information available to the authors of this report, it is our assessment that this would not be a move in the right direction. Occupational classifications created based on this limited range of measurements would offer much less information than the current DOT and would not be responsive to the highest societal priority identified by users, namely providing information which will improve the ability of unemployed workers to transfer their skills to new occupations. Important information about skills that would be missing includes:

7. required physical capabilities and motor skills (these are skill equivalents for low-skilled occupations)
8. occupation-specific skills and knowledge
9. essential competencies required to be job-ready and employer-acceptable
10. cross-functional (or generic) skills

In order to be responsive to user needs for skills information, the design, or super-structure, of the new SOC should give the last three information elements (items 8 through 10 above) more weight than the first four information elements (items 1 through 4 above). If the new SOC super-structure is designed without having access to these crucial new categories of skill information it may well be that it will not be possible to

incorporate this information at a latter date. This is because the new occupational classifications must be built by creating groupings of jobs with homogeneous characteristics.

If occupational classifications are created for the new SOC using old, rudimentary measurement scales, there is no assurance that workers within them will be homogeneous in terms of their ratings on new scales measuring more useful skill characteristics that are introduced at a later date. If workers within an occupation are not homogeneous in terms of their ratings on yet-to-be-introduced skill measurement scales those skill descriptors become unusable. An example of this would be if workers in an occupation were found to be equally divided in terms of those who have SVP ratings of 4, 5 and 6, or GED ratings of 2,3 and 4. This would make SVP or GED ratings inapplicable to that occupation because it would be impossible to apply a valid rating to workers in the occupational group. The solution to this problem is to have data from the new skill measurement scales available at the time that occupational groupings are being created, and using that data to assure that workers who are grouped together into occupations have similar ratings on the measurement scales for key skill factors.

The six skill measurements offered for assessment at the April 11 seminar have the advantage of being readily adaptable to data collection through household or employer surveys. This is an important consideration for the future SOC because it should provide a single classification system that will be used when collecting data for the Census, OES and DOT, the first two of which collect data through surveys. However, the need for skill measurement factors that can be used to classify occupational data collected through surveys does not need to limit the overall data content of the new SOC. More extensive and difficult-to-collect data related to skill factors can be obtained through supplemental interviews, tests, and job analyses with small samples of workers. In this way the new SOC can be an integrating frame of reference for information about the same set of occupations that is obtained through multiple data collection programs.

For the new SOC to be responsive to the needs of users, and through them needs of the nation's working men and women, it must incorporate a wide range of skills-related information including indicators of cognitive requirements, complexity, responsibility, training requirements, and specific hiring criteria. It is particularly important that the SOC basic occupational units contain information elements that help workers seeking re-employment transfer occupation-specific skills from their old jobs to new jobs.

USER INFORMATION

For National Occupational Classification System

Your Name: _____ Your Position: _____

Institution: _____ Telephone No. (____) _____

Please use an extra sheet of paper if you need more space for your answers.

1. Please check items which identify your chief duties:

- _____ Job placement
- _____ Hiring
- _____ Setting wages
- _____ Training
- _____ Counseling
- _____ Organizing workers
- _____ Human resources activities
- _____ Research (please specify) _____
- _____ Other (please specify) _____

2. Have you heard of the Dictionary of Occupational Titles (DOT)? ____ Yes ____ No
Standard Occupational Classification (SOC)? ____ Yes ____ No
Occupational Employment Statistics (OES)? ____ Yes ____ No

3. What system(s) for classifying occupations do you use in your work?

____ In-house system ____ DOT ____ Other _____ ____ None

What problems do you experience in using occupational classification system(s)?

- _____ Don't understand the system
- _____ Have not had training in the DOT numbering system or worker traits data
- _____ Does not accurately describe the jobs of workers
- _____ Information is out of date
- _____ Too many job definitions
- _____ Jobs are not grouped together appropriately
- _____ Does not list some jobs (please give an example) _____
- _____ Important information is missing (please specify) _____
- _____ Other _____

4. What kind of information about worker characteristics, job definitions, worker/employer demands, or skill requirements would help you in your work?

5. What do you think are the highest priority needs that should be served by a new national standardized occupational information system?

	High	Med.	Low
• Help people with barriers to employment get jobs?	_____	_____	_____
• Help displaced workers transfer their skills to new jobs?	_____	_____	_____
• Identify career advancement opportunities for workers?	_____	_____	_____
• Identify essential skills or competencies that workers need to have to be job-ready and employer-acceptable?	_____	_____	_____
• Help workers make successful job and career choices?	_____	_____	_____
• Provide up-to-date information about labor market changes?	_____	_____	_____
• Assist researchers to:			
• project future employment?	_____	_____	_____
• integrate occupational and social information?	_____	_____	_____
• do historical analysis?	_____	_____	_____
• make comparisons with other countries?	_____	_____	_____
• investigate work-related health problems?	_____	_____	_____
• Other _____	_____	_____	_____

6. What kind of information do you think it is most important to have about jobs?

	Most	Med.	Least
• Skill requirements (education, training and abilities)?	_____	_____	_____
• Description of tasks performed?	_____	_____	_____
• Motor skill requirements e.g. dexterity, coordination?	_____	_____	_____
• Physical requirements e.g. lifting and moving?	_____	_____	_____
• Management requirements e.g. planning, communicating?	_____	_____	_____
• Interpersonal skills e.g. tact, sensitivity?	_____	_____	_____
• Organizational context of jobs e.g. firm size, unions?	_____	_____	_____
• "Lattice" or mobility potential for the job?	_____	_____	_____
• Working conditions e.g. heat or job hazards?	_____	_____	_____
• Industries using the occupation	_____	_____	_____
• Other _____	_____	_____	_____

7. Please provide any comments or suggestions.

8. Please list the names, organization affiliations, addresses, and telephone numbers of other individuals who you think should be contacted as part of this survey.

THANK YOU FOR YOUR COOPERATION!

For further information, please telephone (213) 892-8104. Please return survey to: Economic Roundtable, 315 W. 9th Street, Suite 310, Los Angeles, CA 90015. FAX: (213) 892-8105.