Session 10

REINVENTING ECONOMIC CLASSIFICATION

Revising the Standard Occupational Classification System
Thomas J. Plewes
Bureau of Labor Statistics

I. Introduction

Current occupational data and their underlying classification structures have come under criticism for being fragmented, incompatible, outdated, and lacking in skills information. In response to these criticisms, the Office of Budget and Management (OMB) decided to revise the U.S. Standard Occupational Classification system (SOC) to develop a unified classification structure that maximizes the usefulness occupational information collected by the Federal government.

To conduct the revision, OMB founded the SOC Revision Policy Committee (SOCRPC) in 1994. The Bureau of Labor Statistics chairs the SOCRPC and the Bureau of the Census, the Employment and Training Administration (ETA), the Office of Personnel Management (OPM), and the Defense Manpower Data Center serve as Committee members. OMB, the National Occupational Information Coordinating Committee and the National Science Foundation participate as *ex officio* members. Since its founding, the SOCRPC has operated under the following OMB guidelines:

> The Policy Committee is charged with the examination of the Federal Government's various occupational classification systems for statistical and administrative uses, and with providing recommendations to OMB on the structure and implementation of a new SOC. The charge to the Committee includes: (1) identifying the major statistical uses of occupational classifications; (2) identifying and developing new concepts, structures, and methodologies to determine what constitutes an occupation; (3) developing and empirically testing a standard occupational system based on these concepts; (4) planning and the implementation of the new classification system; and (5) ensuring that there is ample opportunity for widespread public participation in the revision process.[1]

This paper examines the past history, current process, and expected future results of the SOC revision. The "History" section traces some of the past difficulties of earlier classification systems, identifies the issues that a comprehensive classification system must address, and describes two classification innovations that have influenced greatly the current revision effort. The "Process" section describes the SOCRPC's mission and classification principles, outlines the Committee's research efforts, and describes the work groups formed by the Committee to produce the building blocks of the revised SOC. The "Result" section describes the Committee's progress to date, outlines the schedule for completing the revision, and concludes by discussing the future of the revised SOC.

---

[1] *Standard Occupational Classification Revision Policy Committee Charter*. Office of Management and Budget (October 1994).

II. The History of the SOC

The need for a classification standard was recognized with the development of a *Convertibility List of Occupations with Conversion Tables* and *Industrial Classification for Reports from Individuals*. These publications served as a bridge between the occupational classification system of the 1940 Census and the system used by the U.S. Employment Service to classify its operating statistics. Modifications to the Census classification system and publication of the third edition of the Dictionary of Occupational Titles (DOT) rendered the convertibility tables obsolete.

The development of an SOC began in December 1966 on the recommendation of the Interagency Committee on Occupational Classification. While work began in the mid-sixties, the first SOC was not published until 1977. The system was revised three years later. The members of the 1980 SOC policy committee agreed to a common SOC structure and to maintain "crosswalks" from their individual systems back to the SOC. The committee expected to update the classification system every five years. No subsequent maintenance was performed, and Federal agencies did not embrace the system. Subsequently, Federal occupational classification systems again drifted apart. As the systems drifted, their "crosswalks" became increasingly difficult to use, just as the convertibility tables of the forties became obsolete with the DOT's publication.

Essentially the same problem exists in 1996 that existed when common development began in 1940. There is a fundamental incomparability between the Federal government's two major occupational classification systems. Further complicating statistical comparability, other agencies have developed separate classification systems to meet their specific needs. The issue of reconciliation to achieve comparability has taken on greater significance since 1940, as Federal laws and mandates have increased demand for occupational data. In this sense the mission of the present revision is clear: Integrate the existing systems in a way that is responsive to data-users' needs.

The 1993 International Occupational Classification Conference served as a clearinghouse of new ideas and alternative approaches to occupational classification. The Conference included many individuals and agencies directly involved with the occupational classification user community, as well as international occupational experts from numerous countries. The papers, discussions, and ideas generated at the conference have informed the current SOC revision process.

A major area of discussion at the conference was the alternative classification concepts of "work-performed" versus "skills-based" classification. The 1980 SOC employed a work-performed model that grouped occupations into a socio-economic hierarchy.[2] The "work performed" criteria did not necessarily take into account the

[2] A socio-economic hierarchy refers to classifying workers into occupational groups such as managerial, professional, technical, sales, clerical, service, agricultural-forestry, or production.

education, training, and certification of individuals. An individual was classified in an occupation by a perceived level of "work performed." Many experts suggested a skills-based approach as a replacement to the previous work-performed standard. Proponents claimed a "skills" model for occupational classification better reflects the changing structure of the economy and is more responsive to the needs of data-users.

The Canadian system received a lot of attention at the international classification conference for its use of a skills-based model. The Canadian system employs a two-dimensional matrix approach to skills classification. The system defines a skill type combined with a skill level to classify a given occupation.[3]

The Ohio Bureau of Employment Services presented their use of the skills-based Canadian system to aid job placement. The Ohio Bureau needed a system for matching job openings to candidates. The State agency previously had used the DOT, but found the dictionary had too many titles (making it difficult to find matches). Moreover, agency staff claimed the DOT was out-of-date, and the work-performed criteria made classifying occupations difficult. By comparison, staff and customers found the "skills-based" system easier to use in matching job seekers with employers. The system also cost less to maintain in terms of data entry and computer processing time. From their experience, Ohio concluded that the "skills-based" system better reflected current and changing job requirements and furthered their ability to conduct labor market analysis.

ETA presented the findings of the 1993 Advisory Panel for the Users of the Dictionary of Occupational Titles (APDOT). The panel is credited with recognizing the DOT's "identity crisis" and acknowledging the need for covering new occupations, for developing a representative occupational structure, and for identifying skill and skill transferability.[4] APDOT also outlined a list of classification issues that should be addressed in any comprehensive occupational system. A comprehensive system should define skill and worker distinctions, establish a common language for occupational information, and distinguish occupations that are measurable and collectible.

The success experienced by Canada and Ohio led to skills-based classification efforts by Federal producers and users of occupational information. Information on skills transferability is critical to understanding our labor market, which increasingly requires

---

[3] The Canadian system bases skill type upon the skills required to perform the tasks and duties of an occupation. Skills type can include work that is specific to an industry when that industry is the sole employer of those skills. The Canadian system developed ten skill type categories such as Health, Sales and Service, Manufacturing, Trade, Transportation, Equipment-operation, etc. The skill or preparation level is defined by the length of education, training, or experience that is required for employment. The Canadian system defined four skill levels. The highest skill level requires at least a Bachelors, Masters, or Doctorate degree; the lowest requires high school education with a small amount of on-the-job training. *Proceedings of the International Occupational Classification Conference,* Report 883, Bureau of Labor Statistics (1993).

[4] Pearlman, Kenneth. *Advisory Panel for the Users of the Dictionary Occupational Titles* (1993).

workers to move from occupation to occupation and from industry to industry. Two particularly innovative Federal skills-based classification schemes include the BLS Prototype Skills-Based Matrix and ETA's O*NET.

To make existing labor market information more useful to customers, BLS crafted a Prototype Skills-Based Matrix. The Matrix arranges Occupational Employment Statistics (OES) occupations by distinguishing work area and preparation level. From the Matrix, BLS developed job-search software called LASER. The LASER system provides labor market information on occupations requiring a skills mix similar to the customer's current occupation. By focusing on skills, the system shows customers the occupations to which they can most easily move.

In response to APDOT's call for skills information and common language, ETA began developing O*NET. O*NET has joined the descriptive language of the DOT to the labor market information developed by the OES system in a way that highlights skill and skill transferability. To create O*NET occupational units, analysts first mapped all DOT occupations to the OES structure. After evaluating the degree of "homogeneity,"[5] "belongingness,"[6] and "retraining time"[7] of the DOTs assigned to each OES, analysts subdivided OES occupations into subclusters to best fit assigned DOTs. This effort resulted in disaggregating the approximately 750 OES occupations into about 1100 O*NET occupational units. To date, the system has gone a long way towards meeting APDOT's call for establishing a common language and for distinguishing occupations that are measurable and collectible.

The BLS Prototype Matrix and ETA's O*NET process furthered the skills discussion presented at the International Conference. The BLS Prototype Matrix and Matrix-based LASER software showed that a single skills-based system could serve the analytical needs of the research community and the pragmatic needs of job counselors. O*NET has refined skill information existing in the DOT by linking it to statistical labor market information. Both applications gave the SOCRPC a base on which to build a unified, skills-based SOC system. What remained was a question of process. A process requiring inter-agency cooperation, broad consensus, and commitment to implementation.

---

[5] Homogeneity: "A consistent level of skill transferability between occupations within each occupational unit." John Nottingham and Jane Golec. *Prototype Development of the O*NET: The Occupational Information Network* (1995).

[6] Belongingness: "Work activities of the DOT occupation match the work activities described in the OES definition." *Id.*

[7] Retraining time: "The amount of time required by a worker in one DOT occupation to acquire the additional occupation-specific knowledge and skill required to perform proficiently in another DOT occupation." *Id.*

III. The SOC Revision Process

Given the OMB charge, the committee set about to fulfill its mission to integrate both household and establishment surveys and, to the greatest extent possible, meet the needs of the broad spectrum of occupational data users. The SOCRPC would meet these needs by adopting a common language for occupational classification that was skills-based and by developing a mechanism to accommodate occupational changes in the economy. To guide the development of the new classification structure, the SOCRPC crafted ten classification principles:

(1) The Classification should cover all occupations in which work is performed for pay or profit, including work performed in family-operated enterprises by family members who are not directly compensated. It should exclude occupations unique to volunteers.

(2) The Classification should reflect the current occupational structure of the United States and have sufficient flexibility to assimilate new occupations into the structure as they become known.

(3) While striving to reflect the current occupational structure, the Classification should maintain linkage with past systems. The importance of historical comparability should be weighed against the desire for incorporating substantive changes to occupations occurring in the work force.

(4) Occupations should be classified based upon work performed, skills, education, training, licensing, and credentials.

(5) Occupations should be classified in homogeneous groups that are defined so that the content of each group is clear.

(6) Each occupation should be assigned to only one group at the lowest level of the Classification.

(7) The employment size of an occupational group should not be the major reason for including or excluding it from separate identification.

(8) Supervisors should be identified separately from the workers they supervise wherever possible in keeping with the real structure of the world of work. An exception should be made for professional and technical occupations where supervisors or lead workers should be classified in the appropriate group with the workers they supervise.

(9) Apprentices and trainees should be classified with the occupations for which they are being trained, while helpers and aides should be classified separately since they are not in training for the occupation they are helping.

(10) Comparability with the International Standard Classification of Occupations (ISCO-88) should be considered in the structure, but should not be an overriding factor.

After reaching consensus on the classification criteria, the Committee initiated several actions to launch the revision process and to fulfill the OMB charge. To ensure ample opportunity for widespread public participation in the revision process, the SOCRPC invited outside comment through two Federal Register notices. The first notice invited comment regarding the classification criteria, and the second invited comment regarding the organizational model. The SOCRPC also sought input from the Federal Consultation Group -- a group of Federal agencies who use occupational classification systems. OPM headed-up this group, which met quarterly to discuss the SOCRPC's progress.

In researching the underpinnings of the revised SOC, the SOCRPC commissioned six papers, which were presented at a seminar on research findings to the SOCRPC, the Federal Consultation Group, and other interested parties. The SOCRPC also collaborated with the Joint Program in Survey Methodology[8] (JPSM) to develop a better understanding of how people perceive skills and training. The JPSM designed and conducted two focus groups to gain a qualitative understanding of how people potentially would react to a survey device seeking skills information. The JSPM found that since participants viewed concepts of skills in very different ways, questions designed to determine "general characteristics" of a job would be most effective. General questions, such as the degree of autonomy and level of education, may serve as good proxies for skill level.

Based on input from outside groups, Committee-commissioned research, and collaboration with the JSPM, the SOCRPC knew the kind of classification system it wanted to craft. To develop the detailed occupational units, which will comprise the SOC, the Committee organized six work groups based on skills groupings used in the BLS' Prototype Skills-Based Matrix.

Work Group 1--Administrative and Clerical Occupations;
Work Group 2--Natural Science, Law, Health, Education and Arts Occupations;
Work Group 3--Sales and Service Occupations;
Work Group 4--Construction, Extractive, Agricultural, and Transportation Occupations;
Work Group 5--Mechanical and Production Occupations; and
Work Group 6--Military Occupations.

[8] The JPSM is a survey practicum course taught at the University of Maryland.

The SOCRPC designated the current OES classification system as the starting point for the recommended SOC occupations.[9] These new SOC occupations would form the building blocks of the new skills-based system. The work groups conformed to the classification principles in bringing together three occupational classification systems: OES, O*NET, and the Census. The work groups invited input from experts in the field and solicited comments from professional and vocational associations to arrive at the recommended SOC occupations.

The SOCRPC chartered the secretariat to coordinate work group and policy committee interaction. The secretariat developed a report format for the review of the work group recommendations by the policy committee. The report incorporates the OES, O*NET, and Census components of each new SOC occupation presented, and maintains a historical record of decisions and changes to the occupations.

The policy committee is now in the process of reviewing the work group recommendations and converting the SOC to a skills-based job family matrix. At present, the SOCRPC has created 21 job family categories to serve as the structure for the revised SOC. The next step is to map the revised SOC occupations into the matrix structure.

Proposed Job Families

- Administrative and Financial
- Computer Related
- Engineering, Science
- Health Service
- Behavioral Science
- Community Service/Sports
- Education and Training
- Communications and Art
- Sales and Marketing
- Legal/ Protective Services
- Hospitality
- Cleaning
- Personal Care
- Extractive
- Construction
- Transportation/Material Moving
- Farming/Forestry/Landscaping
- Mechanical and Repair
- Production
- Plant and System Operation

[9] The OES structure was used by the new O*NET system as well.

- Military

The SOCRPC agreed to the following aggregation due to the foreseen difficulty for occupational surveys to produce publishable estimates of twenty-one job families.

Data Publication Aggregation

- Administrative and Financial
- Engineering, Science, and Computer Related
- Communications, Art, and Recreation
- Education and Training
- Sales and Marketing
- Service
- Construction, Extraction, and Crafts
- Transportation and Material Moving
- Farming, Forestry, and Landscaping
- Production, Repair, and Plant Operation
- Military

IV. The Result

The process is not complete but the policy committee can see the light at the end of the proverbial tunnel. The SOCRPC will observe the following revision schedule. The committee expects to publish a third Federal Register notice by the end of January, 1997 and respond to comments in a timely manner. OMB will publish the revised SOC hard bound version by the Autumn of 1997. The publication will include occupational definitions and a list of alternate titles organized into a job family skills matrix. The SOC will be made available on diskette and a version of the SOC will be posted on the World Wide Web. A complete list of Census index items will be developed for household collection of the year 2000 Census. OES expects to adopt the revised system for the 1998 survey round. The revised SOC will be incorporated into the Post-2000 Current Population Survey.

The revised SOC will integrate household and establishment surveys together in a skills-based system. This system will reflect a changing economy and respond to the needs of data-users. Among the accomplishments of the revised SOC, is the direct link the system will have with O*Net, Census, and OES. Another innovation of the new system will be a skills matrix incorporating military occupations and reinforcing the idea of public/private job skills transferability. Crucial to the success of the new system will be OMB's mandate of Federal compliance. This mandate ensures Federal agencies will adopt the revised SOC. The revised system will implement these changes while maintaining the ability to make historical comparisons.

A final note, once developed this system must be maintained to avoid becoming obsolete as have past systems. To this end, the SOCRPC will maintain a review and decision making tracking system. Efforts must be made to ensure this revised SOC will be kept current well into the next century. Because, to borrow from Robert Reich, "Good public policy [regarding the work force] depends on good data about the workforce."[10]

[10] Reich, Robert. *Proceedings of the International Occupational Classification Conference,* Report 883, Bureau of Labor Statistics (1993).

Reinventing Occupational Classification

Discussion by

David W. Stevens, Executive Director
The Jacob France Center, Merrick School of Business
University of Baltimore

Tom Plewes has provided a succinct description of the process followed and issues covered since 1994 by the Standard Occupational Classification Revision Policy Committee. Their effort will soon culminate in the release of a new SOC taxonomy. My comments reflect 30 years of interaction with both the users and producers of occupational information. This historical perspective underlies a prediction about the value that might be expected to emerge from use of a new SOC.

The concept of an *occupation* has evolved as the organization of work responds to the varied forces that determine how and where the nation's goods and services are produced. It is more difficult to agree about a practical definition of occupation today than before. This difficulty coincides with rising stakes in the classification that is adopted. Value gained or lost because of a particular classification decision is not uniform across all uses of the taxonomy. Education choices, training assignments, vocational rehabilitation strategies, and alien worker certification practices illustrate the transaction uses of employment statistics and descriptors that are released in occupational "buckets".

The collectability of accurate information is important here. There is a continuum of accuracy. A different cost is associated with achieving each point on this continuum. Compromises are inevitable in the process of reinventing an occupational taxonomy. The aggregation standard that is chosen at the data collection stage predetermines what can then be done with this information.

The current Congress is unlikely to appropriate sufficient funds to reach a level of accuracy in occupational statistics that would truly respond to the needs described above. The loss-of-value resulting from this underinvestment will be diffused across people and through time. This will jeopardize the nation's productivity and prosperity. Members of Congress and selected interest groups are challenged to think again about the future consequences of such casual parsimony.

The Federal government has made an irrevocable commitment to let the *Dictionary of Occupational Titles* be relegated to extinction. A relational database of occupational descriptors, now known as O*NET, will replace the DOT. Substantial thought and effort has gone into the design and pilot phases of this new approach. Routine public access to this modern approach to disseminating occupational information looms on the horizon. The value to the nation that can be expected to flow from this access will depend upon the accuracy of the descriptors contained in the database, and on the public's ability to use the database in a responsible manner.

The accuracy standard should not be set by default based on Federal funds availability. This standard is too important to individual and collective future well-being. It is expensive to collect useful data. It will be even more expensive not to meet an appropriate standard of accuracy. Poorly informed decisions will have such real consequences as mistaken career paths, improper vocational rehabilitation plans, and wrong alien certification decisions. Each, and all, of these will affect the nation's ability to take full advantage of its human capital potential.

Similarly, the Federal government should not walk away from its reponsibility to raise public awareness of the availability of occupational information and how to use it. A case can easily be made that profit-seeking vendors will eagerly enter a queue to market the basic O*NET database. Proprietary refinements can be expected to appear. This will create confusion among those who have long relied upon the *Dictionary of Occupational Titles*. Which substitute product and bundle of supporting services should be adopted? Some level of consumer protection and information will be needed. This will be a common need across the states. Partnerships among federal, state and local governments, and vendors, should be encouraged. Again, this should not be done as an afterthought with residual funds. A conscious decision should be made to move ahead aggressively and soon.

Under Tom Plewes' able leadership the SOC Revision Policy Committee has completed its work. Tom has moved on to Army Reserve leadership. Other committee members have turned to new challenges. The new SOC that is their collective legacy should trigger a renewed commitment by the Congress, affected Executive Departments, and such organizations as the National Occupational Information Coordinating Committee and its state affiliates, the National Skill Standards Board, and the Interstate Conference of Employment Security Agencies, to champion the interests of the users of their data and services. This is not a time in the nation's history to short-change those who seek, and should have an entitlement to receive, occupational information that can be understood and acted upon to better their own lives and the lives of others who would benefit from more informed education, training, rehabilitation, and alien certification decisions.