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# Updating the O\*NET®-SOC Taxonomy: Incorporating the 2010 SOC Structure

## Summary and Implementation

Prepared for

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## Executive Summary

The revision of the O\*NET®-SOC (Occupational Information Network-Standard Occupational Classification) occupational taxonomy is part of the O\*NET program's continuous improvement effort. The main goal of the revision is to align the O\*NET-SOC taxonomy with the 2010 SOC (Office of Management and Budget, 2010). This document provides a summary of the taxonomy revision process and describes the implementation of resulting changes. The current O\*NET-SOC taxonomy, O\*NET-SOC 2009, is to be replaced by the revised taxonomy, O\*NET-SOC 2010.

The O\*NET-SOC 2010 taxonomy is compatible with changes made to the SOC structure reflected in the 2010 SOC. Aligning these taxonomies is critical to the ability of the O\*NET system to take advantage of important SOC-based information collected by other government and private organizations. While the 2010 SOC revisions had not been finalized at the time of the O\*NET-SOC 2009 taxonomy update, information collected by the O\*NET Center on the 2010 SOC structure (e.g., occupational titles and definitions) were incorporated in the O\*NET-SOC 2009 taxonomy, where possible. That is, similar titles and definitions were aligned to allow for the transition to the 2010 SOC structure. The O\*NET-SOC 2010 taxonomy incorporates the finalized 2010 SOC taxonomy. After the release of the 2010 SOC, the O\*NET-SOC taxonomy was reviewed for compatibility and appropriate modifications were made, such as the nesting of more detailed O\*NET-SOC occupations under the appropriate 2010 SOC occupations. These changes to the O\*NET-SOC taxonomy, based on the conversion to the 2010 SOC taxonomy, are outlined in this paper.

The O\*NET-SOC 2010 taxonomy includes 1110 occupational titles, 974 of which represent O\*NET data-level occupations. Data-level occupations are those for which the O\*NET program collects data from job incumbents, occupation experts, and occupational analysts. Data are collected on a wide variety of variables and scales, such as occupational characteristics and worker requirements drawn from the O\*NET Content Model (<http://www.onetcenter.org/content.html>). The O\*NET-SOC 2009 taxonomy contained 1102 occupational titles, 965 of which represented O\*NET data-level occupations.

The O\*NET-SOC 2009 taxonomy included 159 new and emerging (N&E) occupations identified within 17 in-demand industry clusters. N&E occupations are defined as (a) occupations that involve work significantly different from that performed by job incumbents of other occupations and (b) are not adequately reflected by the existing O\*NET-SOC structure (National Center for O\*NET Development, 2006). Eleven N&E occupations from O\*NET-SOC 2009 were added to the 2010 SOC, decreasing the number of O\*NET-SOC N&Es. That is, once an O\*NET-SOC N&E occupation was added to the 2010 SOC structure, it was regarded as a SOC-level occupation. The O\*NET-SOC 2010 taxonomy includes the addition of 4 new N&E occupations, bringing the total to 152 for this release. Fifty-four of the 152 N&E occupations are breakouts of SOC occupations, and the remaining 98 are classified under SOC residual "All Other" categories.

The scheduled February 2011 release of O\*NET 15.1 will represent the sixteenth update of the O\*NET database since its initial release in 1998 and the fourth taxonomy modification. The first modification was the conversion from an Occupational Employment Statistics-based (OES-based) classification, O\*NET OU 1998, to a SOC-based classification, O\*NET-SOC 2000. O\*NET-SOC 2006 represented the second taxonomy modification, where the main goal was to ensure that O\*NET data were, and continue to be, collected at the appropriate level of specificity (National Center for O\*NET Development, 2006b). The third taxonomy modification, O\*NET-SOC 2009, reflected the addition of 153 N&E occupations. The current, fourth modification will represent the conversion of the O\*NET-SOC taxonomy to the 2010 SOC.

O\*NET 15.1 will incorporate the taxonomy revisions described in this paper, which include alignment of codes, titles, and definitions with the 2010 SOC and the addition of N&E occupations. As a result of the revisions, the O\*NET database and O\*NET products will be better able to meet the needs of customers by providing easy movement between the O\*NET system and other SOC-based data resources. In addition, customers will have continued access to occupational information for N&E occupations.

It is important to note that the O\*NET-SOC taxonomy is a continuous improvement effort. The changing world of work will require ongoing research efforts to ensure an up-to-date taxonomy. The National Center for O\*NET Development will monitor and evaluate O\*NET-SOC occupations, including N&E occupations during the course of sampling and data collection and make modifications, additions, and/or removals based on collected O\*NET data.

The O\*NET system was designed to adapt to changes in the world of work. With the alignment of the O\*NET-SOC 2010 taxonomy to the 2010 SOC and the continued identification of N&E occupations, the correspondence between the O\*NET system and the world of work promises to grow even stronger while meeting the immediate demand for more extensive occupational information within rapidly changing in-demand industry clusters.

## Introduction

The revision of the O\*NET-SOC (Occupational Information Network-Standard Occupational Classification) occupational taxonomy is part of the O\*NET program's continuous improvement effort. The O\*NET-SOC is based on the Standard Occupational Classification [(SOC); Office of Management and Budget, 2000; 2010] system. In some cases, the O\*NET-SOC describes occupations at a more detailed level than does the SOC to reflect needed occupational specificity. In the development of the O\*NET-SOC 2010 taxonomy, efforts were made to ensure its compatibility with the 2010 SOC. This included incorporating and aligning codes, definitions, and titles. This document provides a summary of the taxonomy revision process and describes the implementation of the fourth modification to the taxonomy. The O\*NET-SOC 2009 taxonomy is being replaced with the revised O\*NET-SOC 2010 taxonomy.

The main goal of the revision to the taxonomy is the alignment of the O\*NET-SOC taxonomy with the 2010 SOC. O\*NET-SOC taxonomy codes, titles, and definitions were aligned with the 2010 SOC to ensure compatibility with the SOC-based system. In addition, newly identified new and emerging (N&E) occupations were added to the taxonomy. N&E occupations are defined as (a) occupations that involve work significantly different from that performed by job incumbents of other occupations and (b) are not adequately reflected by the existing O\*NET-SOC structure (National Center for O\*NET Development, 2006). Identification of N&E occupations within in-demand industry clusters is a result of the O\*NET system's ability to adapt to changes in the world of work.

As a result of the revisions to the O\*NET-SOC taxonomy, the O\*NET database and O\*NET products are better able to meet the needs of customers, who will be able to move easily between the O\*NET system and other SOC-based data resources (National Center for O\*NET Development, 2006b).

As a frame of reference, the next section provides more detail about the O\*NET-SOC 2009 taxonomy to enable comparison to the revision and the implementation of the O\*NET-SOC 2010 taxonomy.

## O\*NET-SOC 2009 Taxonomy

The Office of Management and Budget (OMB) mandates that all government agencies collect occupation-related information via a classification compatible with the SOC. From a customer perspective, this allows movement across various information systems or data products with greater ease, while facilitating the integration of different types of information within systems. Changes made to the current O\*NET-SOC 2009 taxonomy ensured the O\*NET-SOC taxonomy not only represents the SOC structure, but reflects changes occurring in the world of work due to changes in technologies, business practices, and the organization of work. Therefore, 153 newly classified N&E occupations identified within 17 in-demand industry clusters were added to the O\*NET-SOC 2009 taxonomy to increase correspondence between the O\*NET system and the rapidly changing world of work.

The structure of the SOC system includes four levels of aggregation: 23 major groups, 96 minor groups, 449 broad occupations and 821 detailed occupations. All SOC occupations are assigned a six-digit code. The first and second digits represent the major group; the third digit represents the minor group; the fourth and fifth digits represent the broad occupation; and the sixth digit represents the detailed occupation. The 23 major groups of the SOC include:

- 11-0000 Management Occupations
- 13-0000 Business and Financial Operations Occupations
- 15-0000 Computer and Mathematical Occupations
- 17-0000 Architecture and Engineering Occupations
- 19-0000 Life, Physical, and Social Science Occupations
- 21-0000 Community and Social Services Occupations
- 23-0000 Legal Occupations
- 25-0000 Education, Training, and Library Occupations
- 27-0000 Arts, Design, Entertainment, Sports, and Media Occupations
- 29-0000 Healthcare Practitioners and Technical Occupations
- 31-0000 Healthcare Support Occupations
- 33-0000 Protective Service Occupations
- 35-0000 Food Preparation and Serving Related Occupations
- 37-0000 Building and Grounds Cleaning and Maintenance Occupations
- 39-0000 Personal Care and Service Occupations
- 41-0000 Sales and Related Occupations
- 43-0000 Office and Administrative Support Occupations
- 45-0000 Farming, Fishing, and Forestry Occupations
- 47-0000 Construction and Extraction Occupations
- 49-0000 Installation, Maintenance, and Repair Occupations
- 51-0000 Production Occupations

- 53-0000 Transportation and Material Moving Occupations
- 55-0000 Military Specific Occupations

SOC minor groups, broad occupations, and detailed occupations are assigned codes related to the corresponding major groups. For example:

- 19-0000 Life, Physical, and Social Science Occupations (SOC major group)
- 19-4000 Life, Physical and Social Science Technicians (SOC minor group)
- 19-4050 Nuclear Technicians (SOC broad occupation)
- 19-4051 Nuclear Technicians (SOC detailed occupation)

In the O\*NET-SOC taxonomy, an occupation that is directly adopted from the SOC system is assigned the six-digit SOC code, along with a .00 extension. If directly adopted from the SOC, the SOC title and definition are also used. Hereafter, these are referred to as SOC-level occupations.

If the O\*NET-SOC occupation is more detailed than the original SOC detailed occupation, it is assigned the six-digit SOC code from which it originated, along with a two-digit extension starting with .01, then .02, .03 and so on, depending on the number of detailed O\*NET-SOC occupations linked to the particular SOC detailed occupation.

For example, Nuclear Technicians is a SOC detailed occupation to which two detailed O\*NET-SOC occupations are linked. See the occupational codes and titles for this example below.

- 19-4051.00 Nuclear Technicians (SOC-level)
- 19-4051.01 Nuclear Equipment Operation Technicians (detailed O\*NET-SOC occupation)
- 19-4051.02 Nuclear Monitoring Technicians (detailed O\*NET-SOC occupation)

Both 19-4051.01 Nuclear Equipment Operation Technicians and 19-4051.02 Nuclear Monitoring Technicians are data-level occupations in the taxonomy. Data-level occupations are those for which the O\*NET program collects data from job incumbents, occupational experts, and occupational analysts on a wide variety of variables and scales, such as occupational characteristics and worker requirements drawn from the O\*NET Content Model (<http://www.onetcenter.org/content.html>).

In the example above, the two detailed O\*NET-SOC occupations, 19-4051.01 Nuclear Equipment Operation Technicians and 19-4051.02 Nuclear Monitoring Technicians, are data-level occupations, whereas the SOC detailed occupation, 19-4051.00 Nuclear Technicians, is not an O\*NET data-level occupation.

## O\*NET-SOC 2010 Taxonomy

The major goal of revising the O\*NET-SOC 2009 taxonomy is to reflect changes made to codes, titles, and definitions in the 2010 SOC. Additionally, to keep up with the changing nature of work, newly identified N&E occupations were added to the taxonomy. It is important to note that the O\*NET-SOC taxonomy is a continuous improvement effort. The changing world of work will require ongoing research efforts to ensure an up-to-date taxonomy. The National Center for O\*NET Development will monitor and evaluate occupations during the course of sampling and data collection and make modifications, additions, and/or removals based on collected O\*NET data. To view the entire O\*NET-SOC 2010 taxonomy, see Appendix A.

Several general types of changes to the O\*NET-SOC taxonomy were possible as a result of changes made to the SOC taxonomy.

- A total of 20 occupations were removed from the O\*NET-SOC taxonomy.
  - Fourteen SOC-level occupations were removed due to the 2010 SOC aggregating several occupations into one occupation, breaking out occupations into two or more occupations, or adding more detailed occupations to the taxonomy in place of residual “All Other” occupations (see Appendix B, Type 1).
  - Six detailed O\*NET-SOC occupations were removed from the taxonomy due to aggregation of detailed occupations with SOC-level occupations, removal of SOC-level occupations, or addition or removal of a portion of a detailed occupation by the 2010 SOC (see Appendix B, Type 2).
- A total of 28 occupations were added to the taxonomy.
  - Twenty-three SOC-level occupations were added by aggregating several 2000 SOC occupations, breaking out 2000 SOC occupations into two or more occupations, or incorporating brand-new occupations (see Appendix B, Type 3).
  - Five detailed occupations were added to the O\*NET-SOC taxonomy through the addition of new N&E occupations or by aggregating occupations removed from the taxonomy into a detailed occupation (see Appendix B, Type 4).
- Two SOC-level occupations removed from the 2010 SOC became detailed occupations in the O\*NET-SOC 2010 (see Appendix B, Type 5).
- Eleven existing detailed O\*NET-SOC occupations were added to the SOC taxonomy (see Appendix B, Type 6).
- One exceptional case (Human Resources Managers) was added to the 2010 SOC.
- Lastly, a number of code, title, and description changes were made based on changes made to the 2010 SOC (see Appendix B, Types 7-9).



The O\*NET-SOC 2009 taxonomy included 1102 occupational titles, 965 of which were data-level occupations. As a result of the taxonomy changes in the 2010 SOC structure, the O\*NET-SOC 2010 taxonomy includes 1110 occupational titles, 974 of which are data-level occupations (see Appendix C). The O\*NET-SOC 2009 taxonomy included 159 N&E occupations identified within 17 in-demand industry clusters. Four new N&E occupations were added to the O\*NET-SOC 2010 taxonomy and a total of 11 N&E occupations included in the O\*NET-SOC 2009 taxonomy were added to the 2010 SOC, decreasing our total number of N&Es to 152. Fifty-four of the 152 N&E occupations included in the O\*NET-SOC 2010 taxonomy are breakouts of SOC occupations and the remaining 98 are classified under SOC residual “All Other” categories (see Appendix D).

Table 1 provides a comparison summary of occupational titles from the O\*NET-SOC 2009 taxonomy and the O\*NET-SOC 2010 taxonomy. The detailed O\*NET-SOC level occupational count includes N&E occupations.

**Table 1. Summary of O\*NET-SOC 2009 and the O\*NET-SOC 2010 Taxonomies**

Type of Occupational Title	O*NET-SOC 2009	O*NET-SOC 2010
<b>SOC-Level</b>	821	840
<b>Exceptional Cases*</b>	2	1
<b>Detailed O*NET-SOC Level</b>	279**	269***
<b>Total</b>	1102	1110

\* Two occupations that correspond with higher level SOC occupations are included in the O\*NET-SOC 2009 taxonomy. These exceptional cases include 11-3040.00 Human Resource Managers and 19-1020.01 Biologists. Human Resources Managers was added to the 2010 SOC, decreasing our exceptional cases by one.

\*\* These 279 occupations are linked to 172 SOC-level occupations

\*\*\*These 269 occupations are linked to 170 SOC-level occupations

Table 2 provides a summary of the classification of the detailed O\*NET-SOC level occupations in the O\*NET-SOC 2010 taxonomy. Detailed O\*NET-SOC level occupations that are breakouts of SOC occupations include previously identified breakouts or N&E occupations. Only N&E occupations that could not be classified as a breakout under a SOC occupation are included in SOC residual “All Other” categories.

**Table 2. Summary of Detailed O\*NET-SOC Level Occupations**

Type of Occupational Title	O*NET-SOC 2006	O*NET-SOC 2010
<b>Breakout of SOC occupation</b>	172	170
<b>SOC residual “All Other”</b>	107	99
<b>Total</b>	279	269

## Objectives of the Revision

In summary, by revising the O\*NET-SOC taxonomy as described above, several objectives are achieved:

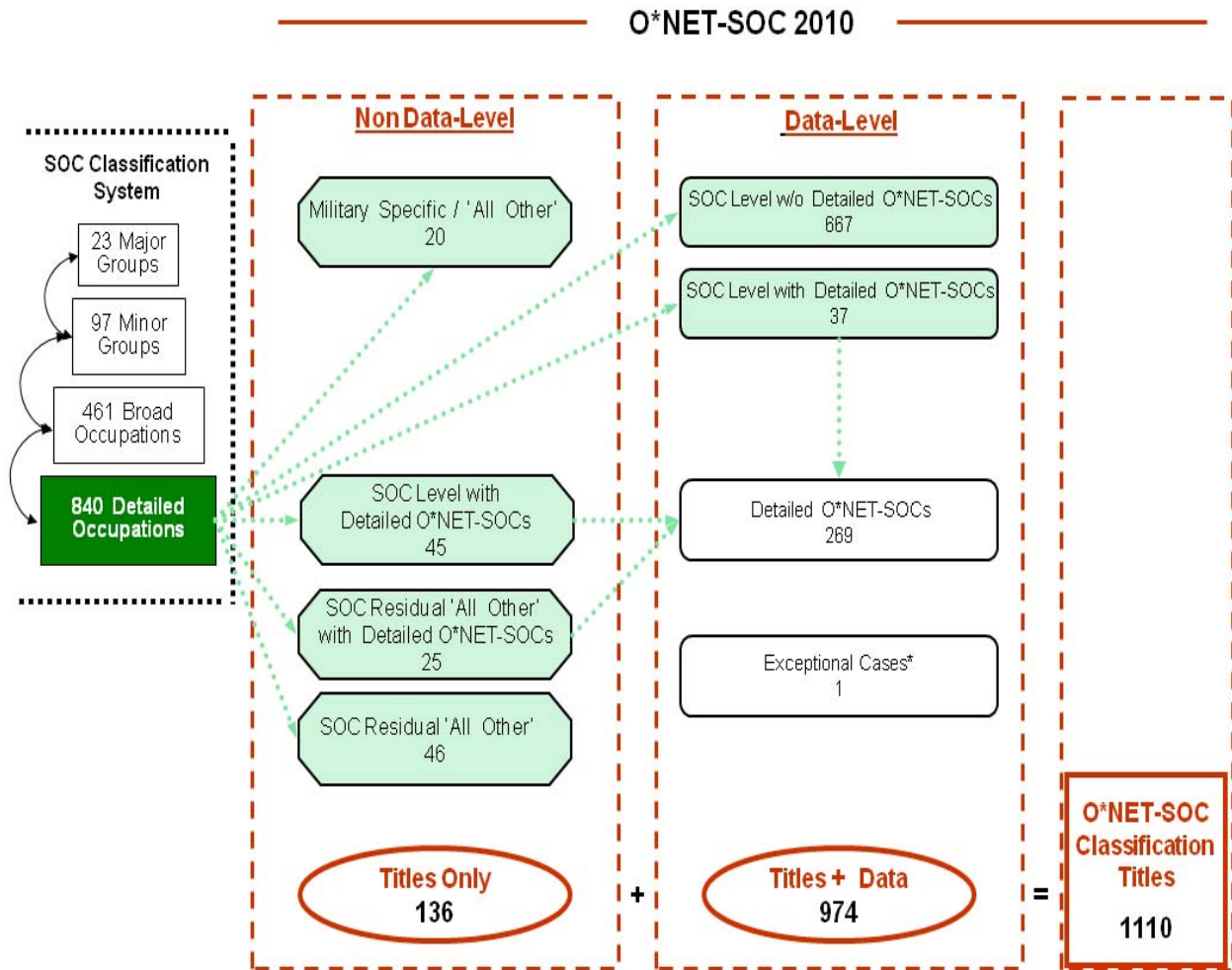
- The sampling of occupations in the O\*NET program continues to be efficient and precise, due to the use of SOC-based occupation employment statistics produced by the U.S. Bureau of Labor Statistics and the states.
- O\*NET data continue to have an increased correspondence with employment projections and other labor market information used in career exploration and other applications.
- The O\*NET-SOC taxonomy and database meet the demand for more extensive occupational information for workforce investment activities within rapidly changing in-demand industry clusters.
- In a rapidly changing economy, the revised classification more accurately reflects the many occupations found in today's world of work through the inclusion of N&E occupations.

The February 2011 scheduled release of O\*NET 15.1 will incorporate the changes made to the O\*NET-SOC taxonomy as a result of changes in the 2010 SOC and the addition of new occupations. Future updates will include additional N&E occupations found through continuous research efforts conducted on in-demand industry clusters and refined occupational listings based on data collection review.

## O\*NET Data Collection

As shown in Figure 1, the O\*NET-SOC 2010 taxonomy contains 1110 occupational titles, 974 of which represent data-level occupations. Of the 974 data-level occupations, 704 are SOC-level occupations (667 are SOC-level occupations adapted directly from the SOC, while 37 are SOC-level occupations adapted directly from the SOC and also contain more detailed O\*NET-SOC occupations), 269 are detailed O\*NET-SOC occupations, and 1 occupation is an exceptional case. The remaining 136 are non-data level occupations (occupational titles only): 20 military occupational titles (including military “All Other” titles), 46 SOC residual “All Other” occupational titles, 25 SOC residual “All Other” occupational titles to which more detailed O\*NET-SOCs are linked, and 45 SOC detailed occupations to which more detailed O\*NET-SOC occupations are linked.

**Figure 1. Summary of the O\*NET-SOC 2010 Taxonomy**



The O\*NET Data Collection Program is collecting and publishing updated data for 974 of the 1110 occupational titles contained within the O\*NET-SOC 2010 taxonomy. The majority of these occupations are SOC-level occupations (i.e., 704 SOC-level occupations compared to 269 detailed O\*NET-SOC occupations). Thirty-seven of the 704 SOC-level occupations are SOC-level occupations at the data-level that also contain more detailed O\*NET-SOCs for which data is collected. One occupation for which data is collected, 19-1020.01 Biologists, is an exceptional case because it is drawn from a broad-level SOC occupation. The remaining 136 occupations of the 1110 occupations are at the non-data level (occupational titles only).

Legislators (11-1031.00) are included in the 974 occupations with data. However, the updates for this occupation will be limited to tasks, interests, work values and job zone information due to challenges in collecting other O\*NET information for this occupation.

## The O\*NET Taxonomy and O\*NET Database Releases

The February 2011 release of O\*NET 15.1 represents the sixteenth update of the O\*NET database since its initial release in 1998. However, the O\*NET-SOC 2010 taxonomy represents only the fourth taxonomy modification. The initial O\*NET 98 release was based on the occupational classification used by the BLS Occupational Employment Statistics (OES) program at that time. The OES program has since also moved to a SOC basis.

Table 3 provides an overview of the correspondence of the O\*NET database releases and the O\*NET taxonomy.

**Table 3. O\*NET Database Releases and the O\*NET Taxonomy**

Database Release	Release Date	O*NET Taxonomy
O*NET 98	October, 1998	O*NET OU 1998 (OES-based)
O*NET 3.0	August, 2000	O*NET-SOC 2000 (SOC-based)
O*NET 3.1	June, 2001	
O*NET 4.0	June, 2002	
O*NET 5.0	April, 2003	
O*NET 5.1	November, 2003	
O*NET 6.0*	July, 2004	
O*NET 7.0	December, 2004	
O*NET 8.0	June, 2005	O*NET-SOC 2006 (SOC-based)
O*NET 9.0	December, 2005	
O*NET 10.0	June, 2006	
O*NET 11.0	December, 2006	O*NET-SOC 2009 (SOC-based)
O*NET 12.0	June, 2007	
O*NET 13.0	June, 2008	
O*NET 14.0	June, 2009	O*NET-SOC 2010 (SOC based)
O*NET 15.0	June 2010	
O*NET 15.1	February 2011	

\* A single O\*NET-SOC occupation was added to the O\*NET-SOC 2000 taxonomy (i.e., 39-9011.01 Nannies).

## Conclusion

In summary, the revisions to the O\*NET-SOC taxonomy offer many improvements to users of the system:

- The changes have increased the efficiency of the data collection effort through use of increased correspondence of SOC-based occupation employment statistics from the BLS.
- The correspondence between the O\*NET-SOC and labor market information has improved where possible, while the additional level of detail offered for some O\*NET-SOC occupations has been maintained, where necessary.
- The addition of N&E occupations to be included in data collection meets the needs for more extensive occupational information within rapidly changing in-demand industry clusters.

This update of the O\*NET-SOC taxonomy aligns the taxonomy with the 2010 SOC for continued correspondence with the SOC system. Additionally, with the addition of new N&E occupations, the O\*NET system continues to demonstrate its adaptability and accurate reflection of occupations found in the United States. As O\*NET data collection continues, N&E occupations will be evaluated and modified as new data is obtained. As the O\*NET program continues to identify N&E occupations, the correspondence between the O\*NET system and the world of work promises to grow even stronger.

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