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ABSTRACT

A project used the Occupational Information Network (O*NET) to assist eligible dislocated workers in determining whether training offered by the Toledo Dislocated Worker Consortium fit their needs. More specifically, O*NET was used to help the dislocated workers understand whether they had knowledge and skills that were transferable into the occupations for which training was offered. The project approach included the following general steps: (1) identify O*NET occupations related to training offered; (2) develop procedures for using O*NET in assisting clients; (3) develop knowledge and skill assessment; (4) develop individual knowledge and skill report and provide labor market information; (5) provide training to Consortium staff; and (6) analyze results. Findings indicated clients and staff were able to complete the self-assessment process; clients were successful in rating those knowledges and skills that were important to the occupation of their last job; and client ratings were similar to or not much different than the ratings in O*NET for the occupation of their past job. (Appendixes, amounting to over one-half of the report, include O*NET occupations related to target training; self-assessment instrument; sample knowledge and skills report from the self assessment; and sample labor market information report.) (YLB)

Using O*NET in Dislocated Worker Retraining:

The Toledo Dislocated Worker Consortium Project

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Center on Education and Training for Employment
College of Education
The Ohio State University

June 2002

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Introduction

In 2000, the Toledo Private Industry Collaborative received funding from the U.S. Department of Labor to provide services to dislocated workers in a ten-county region of northwest Ohio. In their proposal, the Collaborative committed to using the Occupational Information Network (O*NET) in its service delivery design. Specifically, the Collaborative proposed to use O*NET in the identification of transferable skills among dislocated workers as part of the process of identifying workers who would benefit from the training offered by the program.

The Collaborative provided training related to machining, metalworking, railroad conducting, tractor/trailer operation, and occupations requiring information technology skills. The Dislocated Worker Consortium (the Consortium), comprised of leaders in business, labor, education, training, and economic development, oversaw the program.

The Center on Education and Training for Employment (CETE), in the College of Education at Ohio State University, assisted the Consortium in using O*NET in the dislocated worker services funded by the grant. This report describes the design of the effort and examines the results. In addition, CETE staff made a presentation on the project concepts at the 2001 National Conference on Occupational Education.

Purpose

The purpose of the project was to use O*NET to assist eligible dislocated workers in determining whether the training offered by the Consortium fit their needs. More specifically, O*NET was used to help the dislocated workers understand whether they had knowledge and skills that were transferable into the occupations for which training was offered. Information on their transferable knowledge and skills would help dislocated workers select occupations for which they had some preparation, and for which their training time would be relatively short and their re-employment would therefore be quicker. Information about local labor market conditions was also provided so they could include employment and wage prospects in their decision-making.

About O*NET

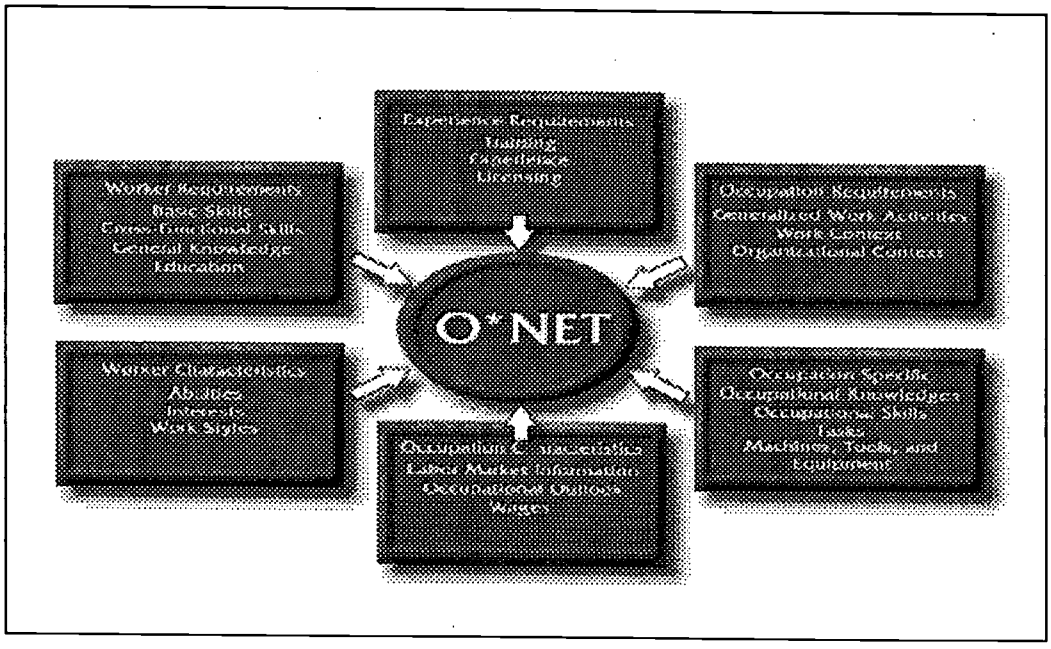
O*NET is the Occupational Information Network, developed by the U.S. Department of Labor, provides a comprehensive national database on skills and other characteristics of occupations. The version used for the project, O*NET 3.0, was released on the Internet (accessible at www.onetcenter.org) in the summer of 2000 and provided occupational information classified according to the Standard Occupational Classification.

O*NET's conceptual framework is depicted by the Content Model (see Chart 1). The Content Model identifies the most important types of information about work and integrates them into a theoretically and empirically sound system. The O*NET database either currently contains or will contain information on each portion of the content model, except for Occupational Characteristics, which is provided from labor market information databases.

Important for the Toledo Consortium project, the Content Model also allows occupational information to be applied across jobs, sectors, or industries (cross-occupational descriptors) and within occupations (occupational-specific descriptors).

For this project, the most relevant portion of the Content Model for this project is worker requirements, which represent developed or acquired attributes of an individual that may be related to performance. Knowledge represents the acquisition of facts and principles about a domain of information. Experience lays the foundation for establishing procedures, more commonly known as skills, to work with given knowledges. Skills may be further divided into basic skills (skills, such as reading, that facilitate the acquisition of new knowledge) and cross-functional skills (skills, such as problem solving, that extend

Chart 1. O*NET Content Model



across several domains of activities).

The Occupational Requirements domain also was of interest to the project. This domain includes information about typical activities required across occupations. Task information is often too specific to describe an occupation or occupational group. The O*NET approach is to identify generalized work activities (GWAs) or dimensions that summarize the kinds of tasks that may be performed within multiple occupations. Using this framework it is possible to use a single set of descriptors to describe many occupations.

Within the Occupational requirements domain, occupation-specific information details a comprehensive set of elements that apply to a single occupation or a narrowly defined job family. This domain parallels other Content Model domains in that it includes requirements such as knowledges, skills, tasks, and machines, tools, and equipment. This domain is particularly important when developing specific applications of O*NET information. For example, to specify training, develop position descriptions, or redesign jobs, it is necessary to refer to occupation-specific descriptive information.

O*NET is well suited to meet the purpose of this project. It provides information on knowledges and skills using systematic definitions and based on sound concepts and methods. Measures for each item are available across all occupations, allowing straightforward comparisons. Also, the O*NET data collection program provided the basic instrument for self-assessment of individual knowledge and skill levels.

In this project, we recognized a caveat: O*NET information should not be used by staff to rule a particular training choice "in" or "out" for an individual client. Instead, O*NET is designed to be used in a career exploration and counseling setting, allowing the client to make their own choices about training but will better information about how the available choices relate to their backgrounds and interests. This point was emphasized in training the Collaborative staff.

Approach

The project approach built on earlier work by the California Employment Development Department, Labor Market Information Division, to assist about 7,000 workers displaced by the closing of a Boeing Corporation plant. [1] In the Boeing case, project staff used the O*NET skills survey to interview workers and identify the skills used in their jobs. The results were used to produce a report specifically tailored to each employee, showing the skills used in their jobs and other occupations requiring similar skills.

The Toledo project was different than the California project in at least two respects. First, it was of much smaller scale, as the Collaborative served only a few hundred clients rather than thousands. Secondly, the need in Toledo was to identify whether workers displaced from many different employers had skills that were transferable to the limited

[1] Information about the Boeing project is available at http://www.doleta.gov/programs/onet/boeing.asp

number of occupations for which training was being offered. In the Boeing case, a broader range of target occupations was examined.

The general process used in the Boeing project was adapted for use in Toledo, taking into account the differences noted above, as well as the assessment and counseling procedures already in use by the Consortium.

The objective was to develop a method to compare the dislocated worker's knowledge and skills with the knowledge and skills required in the occupations related to the training offered. This information must be provided to the worker in an understandable format to be useful to them in making training choices. Along with the transferable knowledge and skills information, information on local labor market conditions was needed to help the worker assess their job and earnings prospects.

The project approach included the following general steps. Each step is discussed in more detail below.

1. **Identify O*NET occupations related to training offered.** The training offered by the Consortium was reviewed to identify the related O*NET occupations.
2. **Develop procedures for using O*NET in assisting clients.** CETE reviewed with the Consortium staff their existing process for assessment and counseling of dislocated workers on their training options. CETE then developed procedures that incorporated O*NET into the process.
3. **Develop knowledge and skill assessment.** CETE prepared a self-administered assessment of worker knowledge and skill. This assessment had the worker identify their level of knowledge and skill using O*NET's basic and cross-functional skill items and the knowledge items. The assessment instrument was based on the O*NET data collection instruments for these items. This approach allowed the project to take advantage of the extensive development and refinement work that has gone into the data collection instruments.
4. **Develop individual knowledge and skill report and provide labor market information.** CETE prepared a spreadsheet for use by the Consortium staff to enter the results from a worker's self-administered assessment. The spreadsheet provided a customized report for the worker, showing their results in comparison with the knowledge and skills for the occupations related to the training offered. Local labor market information for the training-related occupations was also prepared.
5. **Provide training to Consortium staff.** CETE conducted a training session for staff in the use of the self-administered assessment, the spreadsheet, and the customized reports.
6. **Analysis of results.** CETE reviewed the assessment results provided by the Consortium for twenty-nine dislocated workers. Because the self-assessment was introduced late in the program, the number of cases for analysis is small.

Identifying O*NET Occupations Related to Training Offered

This step was accomplished by reviewing the O*NET occupation titles and definitions and using the keyword search provided by O*NET Online to develop a list of related occupations. Consortium staff reviewed and confirmed this list.

In most cases the review was easily completed, as the training was specifically defined. The only general case was "occupations with Information Technology (IT) skills." In this case, some judgment was required as to including occupations outside the "computer and mathematics occupations" group in the O*NET classification. The training offerings and related occupations are presented in Appendix 1.

The Procedures

The Consortium already had a process in place for assessing eligible dislocated workers and providing them with information for use in making training choices. They were administering two specific assessments: the Test of Adult Basic Education (TABE) ™ and the Career Decision-Making System® (CDM), Level 2.[2] The CDM assesses interests and results in a list of compatible occupations.

CETE's original designed called for the use of the O*NET assessment tools:

- *Interests Profiler*, a self-administered tool for identifying the individual's interests and the related O*NET occupations. The Interest Profiler is available in both paper/pencil and computerized versions.
- *Work Importance Locator*, a self-administered tool for identifying the individual's work values and the related O*NET occupations. This assessment is available in both paper/pencil and computerized versions.
- *Abilities Profiler*, for assessing the individuals abilities and identifying related O*NET occupations. An optional "apparatus test" is available for identifying motor coordination and dexterity. The Abilities Profiler is given by a test administrator and provides a computerized score report.

Use of the O*NET Interest Profiler would provide a list of O*NET occupations related to the worker's interests. The use of the O*NET Work Importance Profiler and Ability Profiler was also discussed.

Timing unfortunately worked against using the O*NET assessment tools, as they did not become available in time for use in the project. Therefore, continued use of the CDM was recommended. During the training, CETE provided the Consortium staff with a crosswalk of the O*NET and CDM interest ratings. (See box on next page.)

[2] Test of Adult Basic Education (TABE) ™, CTB/McGraw-Hill, and Thomas F. Harrington and Auther J. O'Shea, *Career Decision-Making System, Level 2*, American Guidance Service, Circle Pines, Minnesota.

The following steps were recommended for the assessment and counseling procedure used by the Consortium:

O*NET and CDM Interest Ratings		
O*NET		**CDM**
Realistic	↔	Crafts
Investigative	↔	Science
Conventional	↔	Office Occupations
Enterprising	↔	Business
Artistic	↔	The Arts
Social	↔	Social

1. Administer the CDM interest assessment to identify client interests compatible with occupations related to the targeted training areas.

2. Administer the O*NET Knowledge and Skills self-assessment to identify each client's reported level of skill and knowledge in past jobs.

3. Enter O*NET Knowledge and Skill results into the spreadsheet software. The software generates a report that identifies occupations related to targeted training that provide a good "fit" with client knowledge and skills.

4. In a counseling setting, provide individual reports to clients on their interest, knowledge and skills results, including the report generated by the software.

5. Provide clients with labor market information on the occupations related to targeted training areas.

The Self-Assessment Instrument

The self-assessment instrument is an adaptation of the O*NET data collection questionnaires for knowledges and skills. [3] These questionnaires were designed to be completed by incumbent workers, and have received extensive review for clarity and understanding, including cognitive review, and testing.

O*NET collects level and importance ratings for thirty-three knowledge items and thirty-five skills items. Occupational skills are included in the O*NET content model, but are not yet available in the database. We made the following adjustments to the list of knowledges and skills:

- For knowledges, we eliminated from the self-assessment 8 O*NET knowledges that were not important in the occupations targeted for training by the Collaborative. Asking clients to rate these knowledges would not add anything to assist their selection among the training offerings. The self-assessment therefore includes 25 knowledges.
- For skills, the O*NET data collection questionnaires include some improvements that were not yet reflected in the O*NET 3.1 database. In several instances, skills appearing in the database had been consolidated into new skill items on the

[3] U.S. Department of Labor, Employment and Training Administration, O*NET Data Collection Program. Questionnaires are available at www.onetcenter.org/. For this project, the O*NET questionnaires cleared by the Office of Management and Budget in April 2001 were used.

questionnaire.[4] Because we used the improved questionnaire, we adjusted the skills information in the database by averaging the level and importance ratings for the skill items that were combined into a new item.

Because the Consortium's need was to assist workers in identifying their transferable skills related to the training being offered, it was clear that the O*NET self-assessment needed to include the basic and cross-functional skills components of the O*NET Content Model. Knowledges are closely related to skills and cut across occupations. Thus, knowledges also relate to worker transferability.

The individual questions, with the seven-point rating scale and scale anchors, were taken directly from the O*NET data collection questionnaire. An example question is shown Chart 2, and the complete instrument is presented in Appendix 2.

While the question content is the self-assessment was identical to the O*NET data collection questionnaire, the self-assessment's instructions and question format were different. In the O*NET data collection, the respondent is asked to rate the importance and level of the knowledge or skill in their current job, while the self-assessment asks about past jobs. As the dislocated workers are unemployed, asking about their current job is irrelevant. Therefore, in the self-assessment instrument, the worker was asked to rate his or her level of knowledge and skill needed to perform on past jobs. Asking about all of their past jobs, as opposed to their most recent job, allowed the respondent to indicate knowledge or skills they have but which may not have been relevant to their most recent employment.

If the knowledge or skill was not relevant in any of his or her previous jobs, the respondent was asked to indicate this and go on to the next question. If previous jobs required different levels of the particular knowledge or skill, the respondent was asked to

Chart 2. Example Self-Assessment Question

1. Administration and Management

Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

What level of ADMINISTRATION AND MANAGEMENT knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Sign a pay voucher		Monitor progress of a project to ensure timely completion		Manage a $10 million company	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

mark the highest level of that was required.

The O*NET questionnaire asks for two ratings for each knowledge or skill: a rating of the importance of the knowledge or skill in the individual's current job, and a rating of the level. If the knowledge or skill is not important, the respondent is asked to skip to the next knowledge or skill. In the dislocated worker project, the importance question is not asked, as we want to know all of the individual's knowledges and skills regardless of their importance. Also, a knowledge or skill may have been important in some but not all of their past jobs, leading to confusion over how to answer the question.

Conversely, the knowledge or skill may not have been relevant in any of their past jobs, so a level rating is not meaningful. Thus, the scale was changed to provide a zero point labeled "not relevant to my past jobs." Using this format instead of asking an additional question about whether the knowledge or skill was relevant to any of their past jobs, simplified the instrument by eliminating a separate question and instructions to skip to the next question.

Individual Knowledge and Skills Reports

After a dislocated worker completed the self-assessment, Collaborative staff entered the ratings into a spreadsheet developed for the project. This spreadsheet calculated average knowledge and skills scores for each occupation related to training offered, and summarized these averages for each training area. This information was then presented in both table and chart formats in a "Your O*NET Knowledge and Skills Report" produced for the individual. A sample report is provided in Appendix 3, and portions of the report are discussed below.

The average scores were computed as follows:

1. For each knowledge or skill and for each occupation related to training offered, the individual worker's level rating was subtracted from the O*NET level rating for the occupation. Then the constant "7" (the maximum value on the questionnaire scale) was added, so negative numbers in the scores could be avoided. In the example shown below, the individual rated themselves at level 4 on the first knowledge item, Administration and Management, and the O*NET level rating for the occupation Metal fabricators, structural metal products, is 2.83.

Respondent's score for this knowledge item and this occupation:

2.83	-	4	+	7	=	5.83
O*NET rating	**-**	**Respondent rating**	**+**	**Constant**	**=**	**Respondent's score**

2. The same calculation was performed for all knowledge and skill items and for all occupations related to the training offered.

3. The "average score for knowledges" for each occupation was then computed by taking the average of the respondent's scores for the occupation across all knowledge items. A similar computation was made to obtain the "average score for skills."

4. Average knowledge and skills scores for each training area were computed by averaging the score for all knowledges (or skills) for all occupations related to the training area, e.g., metal working.

These average scores show the difference between the respondent's overall knowledge and skill levels, and the required level or knowledge and skill in the occupations related to the training offered. If the score is less than seven, generally additional education and training in the O*NET knowledge and skills are needed. If the score for a training area is seven or higher, the respondent generally has the level of O*NET knowledge and skill needed to perform the related occupations. The report notes that the respondent may need training in the specific occupation knowledges and skills, however.

On the first page of the Knowledge and Skills Report, the overall results by training area are presented in a brief table and in a chart. The first page also provides information on how to interpret the scores. (See Chart 3, page 1.)

To assist the individual in comparing their knowledge and skill levels with those for individual occupations within each training area, the report also provides scores by occupation in both table and chart format. (See Chart 3, page 2.) For each occupation, the respondent's average score from step 2 above is listed.

In addition to the individual knowledge and skills report, each worker was provided with a brief labor market information sheet for each training area. This report covered what workers in the related occupations do, what the job outlook and wages are for Ohio and the Toledo area, and where to find more information. A sample of this report is shown in Appendix 4.

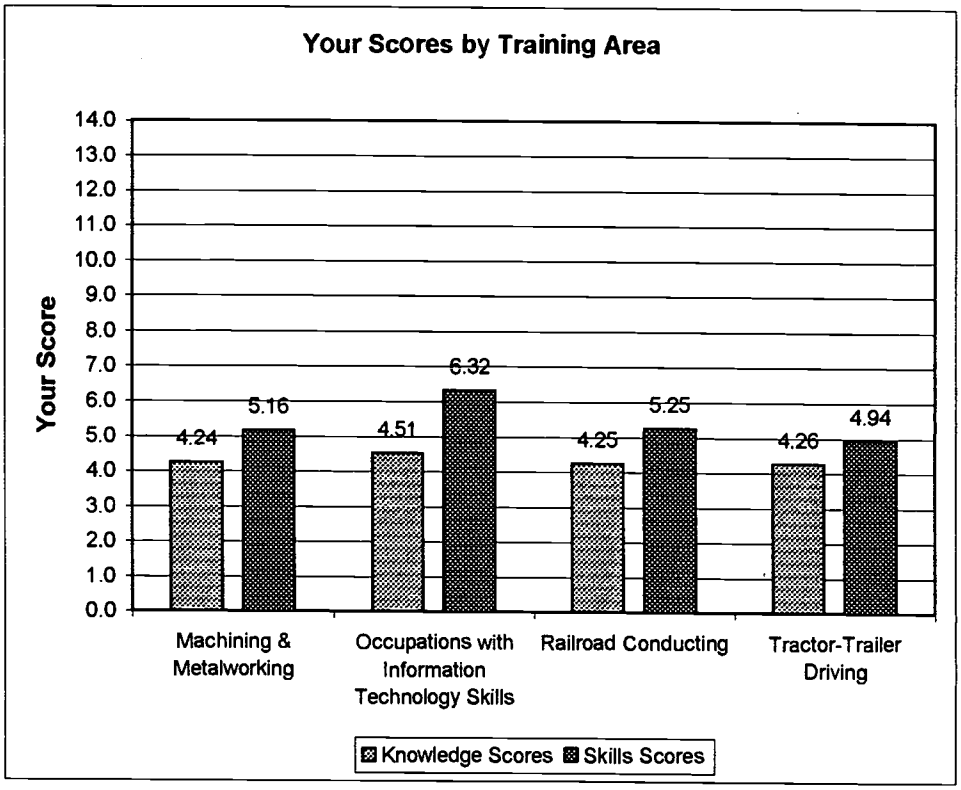
Chart 3. Sample Knowledge and Skills Report, Page 1

Your O*NET Knowledge and Skills Report

NAME Example

Your Results for each training area offered by the Toledo PIC:

Training Area	Your average score for Knowledges	Your average score for Skills
Machining & Metalworking	4.24	5.16
Occupations with Information Technology Skills	4.51	6.32
Railroad Conducting	4.25	5.25
Tractor-Trailer Driving	4.26	4.94



Your score shows the difference between your knowledge and skill levels, as measured by your responses on the O*NET Knowledge and Skills Questionniare, and the required level of knowledge or skill in the occupations related to the training areas.

If your scores for a training area are less than seven, you generally need additional education and training in the O*NET knowledge and skills to perform in the related occupations. You may also need training in knowledge and skills required in specific occupations.

If your scores for a training area are seven or higher, you generally have the level of O*NET knowledge and skills needed to perform in the related occupations. You may also need training in knowledge and skills required in specific occupations.

Chart 3. Sample Knowledge and Skills Report, Page 2

The following tables show your average score for each occupation related to the training areas.

Machining & Metalworking

Your Knowledge Score	Your Skills Score		Occupation Code	Occupation Title
4.24	5.20	Machining & Metalworking	51-2041.01	Metal Fabricators, Structural Metal Products
4.26	5.03	Machining & Metalworking	51-2041.02	Fitters, Structural Metal – Precision
4.24	5.35	Machining & Metalworking	51-4011.01	Numerical Control Machine Tool Operators & Tenders, Met Plastic
4.23	5.36	Machining & Metalworking	51-4021.00	Extruding & Drawing Machine Tool Setters, Operators & Tenders, Metal & Plastic
4.23	5.20	Machining & Metalworking	51-4022.00	Forging Machine Setters, Operators & Tenders, Metal & Pla
4.24	4.95	Machining & Metalworking	51-4031.01	Sawing Machine Tool Setters & Set-up Operators, Metal & Plastic
4.23	4.86	Machining & Metalworking	51-4031.02	Punching Machine Setters & Set-up Operators, Metal & Pla
4.25	5.41	Machining & Metalworking	51-4031.03	Press & Press Brake Machine Setters & Set-up Operators, & Plastic
4.25	5.34	Machining & Metalworking	51-4031.04	Shear & Slitter Machine Setters & Set-up Operators, Metal Plastic
4.25	5.35	Machining & Metalworking	51-4032.00	Drilling & Boring Machine Tool Setters, Operators & Tender Metal & Plastic
4.23	5.17	Machining & Metalworking	51-4033.01	Grinding, Honing, Lapping & Deburring Machine Set-up Operators
4.23	4.72	Machining & Metalworking	51-4033.02	Buffing & Polishing Set-up Operators
4.24	4.99	Machining & Metalworking	51-4034.00	Lathe & Turning Machine Tool Setters, Operators & Tender Metal & Plastic
4.24	4.85	Machining & Metalworking	51-4035.00	Milling & Planing Machine Setters, Operators & Tenders, M Plastic
4.26	6.70	Machining & Metalworking	51-4041.00	Machinists
4.26	6.40	Machining & Metalworking	51-4061.00	Model Makers, Metal & Plastic
4.25	5.37	Machining & Metalworking	51-4062.00	Patternmakers, Metal & Plastic
4.23	5.16	Machining & Metalworking	51-4072.03	Metal Molding, Coremaking & Casting Machine Setters & S Operators, Metal & Plastic
4.26	5.48	Machining & Metalworking	51-4072.04	Metal Molding, Coremaking & Casting Machine Operators & Tenders, Metal & Plastic
4.25	5.91	Machining & Metalworking	51-4081.01	Combination Machine Tool Setters & Set-up Operators, Me Plastic

Etc. (not all occupations shown. See Appendix 3 for complete report)

The Results

Because of the small number of workers who completed the self-assessment, it is difficult to draw firm conclusions about the effectiveness of the process or the impact of the use of O*NET on the training choices made by the workers or their subsequent employment experience. This project can be regarded as a modest pilot of the process, however, and useful lessons can be learned for later similar efforts.

The Consortium provided to CETE the results of the self-assessment for 30 individuals. Information was also provided for 29 of these workers on their previous job title and employer, education level, training start and completion dates, the training selected, the training goal, and training funding provided. The results were analyzed to see what could be learned about the following questions:

- Was the self-assessment successful in identifying the knowledges and skills of the dislocated workers?
- Were the worker's knowledges and skills reflected in the occupations related to the training they selected?

Was the self-assessment successful in identifying dislocated workers' knowledges and skills?

To explore how well the self-assessment instrument worked in identifying the knowledges and skills of the workers, we examined two questions:

- Were the individuals able to complete the instrument?
- Are the results reasonable in light of what we know about the worker's level of education and previous job?

Were the individuals able to complete the instrument? The results were reviewed for item nonresponse, assuming that workers would skip items they did not understand or would fail to complete the assessment if they became fatigued. The results were also reviewed for internal consistency, such as extreme variability of responses or consistently low or high responses across items. Item nonresponse was minimal. Out of the 1,740 total items administered (60 items and 29 individuals), only four items were not completed.

Are the results reasonable in light of the worker's education and previous job?

Reasonableness of the results was examined from two different perspectives:

1. Were the knowledges and skills that clients rated as "not relevant to my past jobs" also identified by O*NET as unimportant in the occupation of the client's last job?
2. Were knowledge and skill ratings by clients similar to the O*NET knowledge and skill rating for the occupation of the client's last job?

1. Knowledges and skills rated as "not relevant to my past jobs." If clients provided reasonably accurate ratings, we expect that the knowledges and skills they identified as not relevant in their past jobs would have low importance ratings in O*NET for the occupation of the client's last job. This expectation assumes that the client's last job, rather than jobs prior to the last job, had the most influence on their responses on the self-assessment. Note, however, that the self-instrument instructions referred to all past jobs, not just the most recent job.

Table 1 shows the distribution of the knowledge and skill elements rated as not important by the clients according to the importance rating in O*NET. These results are consistent with our expectation. The skills identified as not relevant were highly likely to also have low importance ratings in O*NET.

For knowledges, the vast majority (89.1 percent) of elements that client rated as not relevant had low importance ratings, from 1 to 1.99, in O*NET. Similarly for skills, about two-thirds of the skills rated as not relevant had low importance ratings in O*NET.

Table 1. Number of "Not Relevant" Ratings by Clients, by O*NET Importance Rating of Knowledges and Skills

	*O*NET Importance Rating*					
	1 to 1.99	*2 to 2.99*	*3 to3.99*	*4 to 4.99*	*5*	*Total*
			Knowledges			
Number	238	24	3	2	0	267
Percent	89.1%	9.0%	1.1%	0.7%	0.0%	100.0%
			Skills			
Number	174	67	25	8	0	274
Percent	64%	24%	9%	3%	0.0%	100.0%

2. Client knowledge and skill ratings similar to O*NET ratings for occupation of last job. The self-assessment was intended to identify these skills, so a strong correlation is expected. The comparison was limited to those knowledges and skills for which O*NET has an importance rating of 2.5 or more on a 5-point scale, thus excluding unimportant knowledges and skills that the worker may not be expected to have in their previous job.

Imposing this limit reduced the number of ratings that could be analyzed, as illustrated in Table 2. The number of knowledge ratings available for analysis declined from 454 to 140. Also, not shown on the table, no ratings are available for three knowledges: Sales and Marketing, Biology, and Fine Arts. The number of skill ratings for analysis dropped from 1,015 to 407. Information is available for all skills.

Table 2. Number of Knowledge and Skill Ratings

	Knowledges		Skills	
	All Knowledges	Important in Occupation of Last Job	All Skills	Important in Occupation of Last Job
Total Ratings Possible	725	151	1015	407
Knowledge or Skill Not Relevant to Past Jobs	267	11	274	46
Nonresponses	4	0	0	0
Total Ratings Provided	454	140	608	361

We assigned each client an O*NET occupation based

on the job title of their last job, assisted in some cases by information on the industry of their last employer. In most cases this could be done easily, although in a few cases some conjecture was required because of insufficient information. We also avoided assigning an "all other" occupation code, as O*NET provides no rating information for these occupations. We then extracted from the O*NET database the knowledge and skill level and importance ratings for each occupation.

These occupations, listed in Table 3, vary considerably in the type of job and their knowledge and skill importance and levels. Also, only one or two clients fell into each of the occupations listed, except for Adjustment Clerks with seven clients and Production Helpers with four clients.

Table 3. O*NET Occupations of Clients' Last Job, and Number of Clients

Occupation Code and Title		Number of Clients
11-3031.01	Treasurers, Controllers, and Chief Financial Officers	1
11-3031.02	Financial Managers, Branch or Department	2
11-9111.00	Medical and Health Services Managers	1
13-2011.01	Accountants	1
15-1051.00	Computer Systems Analysts	2
17-3011.02	Civil Drafters	1
35-2012.00	Cooks, Institution and Cafeteria	1
43-3011.00	Bill and Account Collectors	1
43-4051.01	Adjustment Clerks	7
43-6011.00	Executive Secretaries and Administrative Assistants	2
43-9051.02	Mail Clerks, Except Mail Machine Operators and Postal Service	1
51-2031.00	Engine and Other Machine Assemblers	2
51-9023.00	Mixing and Blending Machine Setters, Operators, and Tenders	1
51-9198.01	Production Helpers	4
51-9198.02	Production Laborers	1
53-7051.00	Industrial Truck and Tractor Operators	1
	Total Number of Clients	29

To compare client ratings with the knowledge and skill level ratings in O*NET for their last occupation, a difference score was computed using the formula on page 8, that is, for each knowledge or skill in each occupation, the client's rating was subtracted from the O*NET rating and the constant 7 was added. Mean difference scores then computed for each knowledge or skill element, each client, and each occupation. Appendix 5 presents detailed results by knowledge and skill.

The difference scores could range from 0 to 14, with a score of 7 indicating no difference between the client score and the O*NET score. A difference score from 6.0 to 7.0 indicates little difference. Scores of less than 5.0 mean the client rated themselves at least 2 points higher than the O*NET score, while scores of 9.0 or more mean they rated themselves at least 2 points lower than the O*NET score.

Difference Scores by Knowledge and Skill. Table 4 shows the results of this exercise for each knowledge element. The number of client ratings ranges from 21 for Mathematics to only one for six different knowledges. The average number of client ratings per knowledge element was 6.

The mean difference scores ranged from a maximum of 8.60 to a minimum of 3.91. The average of 5.96 across all knowledges suggests that clients generally rated themselves about one point higher on the scale than the level identified in O*NET. For ten of the 23 knowledges, the mean difference score was between 6.0 and 8.0, that is, indicating that for these knowledges, clients rated their knowledges similar to the O*NET level for the occupation of their past job. The mean difference rating was less than 5.0 in four cases, and in no case was 9.0 or more.

The standard deviations of the mean difference scores indicate that there is notable variation in client ratings in comparison with O*NET ratings for only a few knowledge elements. The standard deviations ranged from 2.13 or 51 percent of the mean difference

Table 4. Number of Client Ratings and Mean Difference Scores, by Knowledge Element

	Knowledge Element	Number of Client Ratings	Mean Difference Score	Standard Deviation of Difference Scores	Percent Standard Deviation
1	Administration and Management	7	5.81	1.50	26%
2	Clerical	15	4.58	1.86	41%
3	Economics and Accounting	13	6.73	1.34	20%
5	Customer and Personal Service	12	3.91	2.00	51%
6	Transportation	1	5.50		
7	Production and Processing	5	6.91	0.54	8%
8	Computers and Electronics	8	6.31	2.03	32%
9	Engineering and Technology	3	6.13	1.53	25%
10	Design	3	6.73	0.58	9%
11	Building and Construction	2	5.10	0.71	14%
12	Mechanical	3	5.91	2.03	34%
13	Mathematics	21	6.00	1.17	19%
14	Physics	1	7.20		
15	Chemistry	1	6.00		
17	Psychology	4	5.12	1.38	27%
18	Geography	1	8.60		
19	Education and Training	9	6.82	2.13	31%
20	English Language	19	5.20	1.89	36%
22	Public Safety and Security	1	4.33		
23	Law, Government and Jurisprudence	4	7.46	0.90	12%
24	Telecommunications	1	4.66		
25	Communications and Media	6	6.19	1.31	21%
	Total	140			
	Maximum		8.60	2.13	51%
	Minimum		3.91	0.54	8%
	Average		5.96	1.43	25%

score for Education and Training, to 0.54 or 8 percent of the mean for Production and Processing. The standard deviations were 2.0 or more for only four of the 16 knowledge elements for which a standard deviation was calculated (Customer and Personal Service,

Table 5. Number of Client Ratings and Mean Difference Scores, by Skill Element

	Skill Element	Number of Client Ratings	Mean Difference Score	Standard Deviation of Difference Scores	Percent Standard Deviation
1	Reading Comprehension	27	5.70	1.45	25%
2	Active Listening	20	5.18	1.45	28%
3	Writing	24	6.18	1.37	22%
4	Speaking	19	6.47	1.62	25%
5	Mathematics	23	6.06	1.50	25%
6	Science	6	4.35	0.21	5%
7	Critical Thinking	18	5.92	1.04	18%
8	Active Learning	17	5.61	1.22	22%
9	Learning Strategies	8	6.00	2.24	37%
10	Monitoring	13	6.08	1.94	32%
11	Social Perceptiveness	8	5.37	1.57	29%
12	Coordination	19	5.54	1.46	26%
13	Persuasion	4	6.30	2.96	47%
14	Negotiation	9	5.96	1.00	17%
15	Instructing	11	7.02	1.74	25%
16	Service Orientation	11	5.25	1.98	38%
17	Complex Problem Solving	21	6.30	1.60	25%
18	Operations Analysis	10	6.29	1.90	30%
19	Technology Design	5	5.56	0.52	9%
20	Equipment Selection	14	5.74	1.83	32%
21	Installation	5	5.89	2.11	36%
22	Programming	3	5.53	3.01	54%
23	Quality Control Analysis	6	7.13	3.04	43%
24	Operation Monitoring	7	6.46	1.65	25%
25	Operation and Control	13	7.02	1.49	21%
26	Equipment Maintenance	5	5.77	2.00	35%
27	Troubleshooting	5	6.00	2.18	36%
28	Repairing	4	5.50	2.83	51%
29	Systems Analysis	11	6.29	1.47	23%
30	Systems Evaluation	9	6.22	1.69	27%
31	Judgment/Decision-Making	19	6.55	1.62	25%
32	Time Management	7	4.85	1.50	31%
33	Management of Financial Resources	8	6.71	2.41	36%
34	Management of Material Resources	10	5.82	2.14	37%
35	Management of Personnel Resources	8	4.89	1.25	26%
	Total	407			
	Maximum	27	7.13	3.04	54%
	Minimum	3	4.35	0.21	5%
	Average	12	5.93	1.74	29%

Mechanical, Mathematics, and Education and Training).

For skills, the results were similar. As shown in Table 5, mean difference scores fell between 6.0 and 8.0 for 17 of the 35 skills. For another 15 skills, the scores fell between 5.0 and 5.99, and for three skills the score was less than 5.0. Thus, for nearly all the skills, the client ratings were on average either no different than the O*NET rating, or about 1 point higher than the O*NET rating.

The standard deviation of the mean difference scores for skills showed about the same amount of variability as for knowledges. The standard deviations ranged from 3.04 or 54 percent of the mean, to 0.21 or only 5 percent of the mean. The standard deviations averaged 1.74 across all skills, or 29 percent of the average of all mean difference scores.

Difference Scores by Client. Table 6 shows the number of knowledges that are important in the occupation of the client's last job, and the number of these knowledges that were rated by the client. The clients rated nearly all of the important knowledges: out of the 151 important knowledges only 11 were not rated.

For knowledges, the mean difference scores for individual clients ranged from 7.80 to 3.96, with an average of 6.10 across all clients. Mean difference scores were within one point of the "no difference" level of 7 for fifteen of the 28 clients who rated the important knowledges. No clients had mean difference ratings of more than 9.0, and seven had mean difference scores of less than 5.0. These results indicate that about half the clients rated themselves about the same as the O*NET levels for the important knowledges, while the remainder rated themselves somewhat higher than the O*NET levels. No clients rated themselves lower than the O*NET levels, on average.

The standard deviations show some variability among the clients in how much consistency they exhibited in the difference between their rating and the O*NET level ratings across the important knowledges. Low standard deviations indicate consistency. Five clients out of the 23 for whom standard deviations were calculated had standard deviations of less than one. Four clients had standard deviations of more than 2.0. The average of the standard deviations across all clients was a modest 1.57, suggesting that the client ratings were generally near the O*NET levels for important knowledges.

For skills (Table 7), the mean difference scores of individual clients ranged from 8.43 to 2.79, with an average of 6.11 across all clients. Thirteen of the 29 clients had mean difference scores that showed no difference from the O*NET scores. Six clients had mean difference scores of less than 5.0, while none had scores of 9.0 or more. Thus, the large majority of clients had rated themselves either the same as or somewhat higher than the O*NET ratings for skills.

Standard deviations of difference scores for skills were relatively small. They ranged from 1.07 or 36 percent of the mean, to 0.42 or 6 percent. The standard deviations averaged only 1.08 across all skills, showing that as clients moved from skill to skill in the self-assessment, they rated themselves fairly consistently in comparison with the O*NET ratings.

Table 6. Number of Client Knowledge Ratings and Mean Difference Scores, by Client						
Client	Number of Knowledges Important in Occupation of Last Job	Number of Client Ratings	Number of Important Knowledges Not Rated by Client	Mean Difference Score	Standard Deviation of Difference Scores	Percent Standard Deviation
1	6	6	0	6.07	1.69	28%
2	6	6	0	4.73	1.59	34%
3	6	6	0	3.73	0.96	26%
4	6	6	0	4.73	1.97	42%
5	6	6	0	7.57	1.01	13%
6	11	11	0	5.35	1.38	26%
7	7	7	0	6.28	1.36	22%
8	2	1	1	5.50		
9	1	1	0	6.80		
10	3	3	0	7.77	2.26	29%
11	5	5	0	4.52	2.65	59%
12	3	1	2	6.80		
13	8	8	0	5.73	0.95	17%
14	6	5	1	3.96	1.47	37%
15	7	7	0	6.57	0.72	11%
16	6	5	1	4.60	1.44	31%
17	1	1	0	7.80		
18	1	1	0	6.80		
19	1	0	1			
20	4	4	0	7.00	1.21	17%
21	4	4	0	5.50	1.29	23%
22	7	7	0	6.14	1.38	23%
23	6	6	0	6.23	1.97	32%
24	6	5	1	6.12	0.99	16%
25	6	5	1	4.84	2.94	61%
26	8	7	1	7.45	2.45	33%
27	5	5	0	5.80	0.86	15%
28	7	5	2	6.20	1.63	26%
29	6	6	0	5.02	1.78	35%
Total		140	11			
Max		11	2	7.80	2.94	61%
Min		0	0	3.96	0.72	11%
Average		5	0	6.10	1.57	28%

Table 7. Number of Client Skill Ratings and Mean Difference Scores, by Client						
Client	Number of Knowledges Important in Occupation of Last Job	Number of Client Ratings	Number of Important Knowledges Not Rated by Client	Mean Difference Score	Standard Deviation of Difference Scores	Percent Standard Deviation
1	13	12	1	7.01	1.41	20%
2	13	13	0	5.26	0.87	17%
3	13	13	0	4.88	0.73	15%
4	13	13	0	5.57	1.06	19%
5	9	8	1	8.43	0.88	10%
6	22	22	0	4.94	1.00	20%
7	21	21	0	6.50	1.25	19%
8	8	5	3	7.44	1.75	24%
9	4	4	0	5.50	0.62	11%
10	9	9	0	2.79	0.66	24%
11	15	13	2	5.19	1.66	32%
12	7	1	6	7.00		
13	26	25	1	6.02	0.74	12%
14	13	11	2	4.65	1.67	36%
15	18	18	0	7.32	1.09	15%
16	19	19	0	5.42	1.01	19%
17	4	4	0	6.25	1.68	27%
18	4	2	2	7.50	0.42	6%
19	4	4	0	7.00	1.52	22%
20	18	11	7	6.93	0.70	10%
21	18	18	0	4.20	1.01	24%
22	21	21	0	5.50	0.76	14%
23	13	11	2	6.87	1.23	18%
24	14	14	0	4.66	0.91	20%
25	13	12	1	5.83	1.42	24%
26	26	19	7	8.34	0.90	11%
27	8	5	3	6.43	0.68	11%
28	22	14	8	7.92	1.39	18%
29	19	19	0	5.94	1.34	23%
Total	407	361	46			
Maximum	26	25	8	8.43	1.75	36%
Minimum	4	1	0	2.79	0.42	6%
Average	14	12	2	6.11	1.08	19%

Differences by Occupation of Last Job. This information is of interest to see if the occupation affected the variability of the client ratings relative to the O*NET levels. The results are limited by the small number of clients in each occupation, especially the cases of only one or two.

Table 8. Number of Client Knowledge Ratings and Mean Difference Scores, by Occupation of Last Job						
Occupation of Last Job		Number of Clients	Number of Client Knowledge Ratings	Mean Difference Score	Standard Deviation of Difference Scores	Percent Standard Deviation
11-3031.01	Treasurers, Controllers, and Chief Financial Officers	1	7	6.57	0.72	11%
11-3031.02	Financial Managers, Branch or Department	2	14	6.21	1.32	21%
11-9111.00	Medical and Health Services Managers	1	11	5.35	1.38	26%
13-2011.01	Accountants	1	5	6.20	1.63	26%
15-1051.00	Computer Systems Analysts	2	15	6.53	1.95	30%
17-3011.02	Civil Drafters	1	5	6.12	0.99	16%
35-2012.00	Cooks, Institution and Cafeteria	1	3	7.77	2.26	29%
43-3011.00	Bill and Account Collectors	1	6	7.57	1.01	13%
43-4051.01	Adjustment Clerks	7	40	4.93	1.93	39%
43-6011.00	Executive Secretaries and Administrative Assistants	2	11	4.83	1.57	32%
43-9051.02	Mail Clerks, Except Mail Machine Operators and Postal Service	1	5	4.52	2.65	59%
51-2031.00	Engine and Other Machine Assemblers	2	8	6.25	1.41	23%
51-9023.00	Mixing and Blending Machine Setters, Operators, and Tenders	1	5	5.80	0.86	15%
51-9198.01	Production Helpers	4	3	7.13	0.58	8%
51-9198.02	Production Laborers	1	1	6.8		
53-7051.00	Industrial Truck and Tractor Operators	1	1	5.5		
	Total	29	140			
	Maximum	7	40	7.77	2.65	59%
	Minimum	1	1	4.52	0.58	8%
	Average	2	9	6.17	1.45	25%

For knowledges (Table 8), the mean difference scores ranged from 7.77 for Cooks, Institutional and Cafeteria, to 4.52 for Mail Clerks, Except Mail Machine Operators and Postal Service. Only three of the 16 occupations had mean difference scores of less than 5.0, and none had scores of more than 9.0. Thus, in the majority of cases, the client ratings were about the same as or somewhat higher than the O*NET knowledge ratings.

For skills (Table 9), the mean difference scores showed no difference from the O*NET ratings in half of the occupations. Scores were less than 5.0 in three occupations, and none had scores of more than 9.0. As with knowledges, in the majority of occupations, on average the clients rated themselves the same as or somewhat higher than the O*NET skill levels.

Table 9. Number of Client Skill Ratings and Mean Difference Scores, by Occupation of Last Job						
Occupation of Last Job		Number of Clients	Number of Client Knowledge Ratings	Mean Difference Score	Standard Deviation of Difference Scores	Percent Standard Deviation
11-3031.01	Treasurers, Controllers, and Chief Financial Officers	1	18	7.32	1.09	15%
11-3031.02	Financial Managers, Branch or Department	2	42	6.00	1.14	19%
11-9111.00	Medical and Health Services Managers	1	22	4.94	1.00	20%
13-2011.01	Accountants	1	22	7.92	1.39	18%
15-1051.00	Computer Systems Analysts	2	52	7.03	1.41	20%
17-3011.02	Civil Drafters	1	14	4.66	0.91	20%
35-2012.00	Cooks, Institution and Cafeteria	1	9	2.79	0.66	24%
43-3011.00	Bill and Account Collectors	1	9	8.43	0.88	10%
43-4051.01	Adjustment Clerks	7	91	5.71	1.45	25%
43-6011.00	Executive Secretaries and Administrative Assistants	2	38	5.68	1.20	21%
43-9051.02	Mail Clerks, Except Mail Machine Operators and Postal Service	1	15	5.19	1.66	32%
51-2031.00	Engine and Other Machine Assemblers	2	36	5.24	1.61	31%
51-9023.00	Mixing and Blending Machine Setters, Operators, and Tenders	1	8	6.43	0.68	11%
51-9198.01	Production Helpers	4	16	6.43	1.36	21%
51-9198.02	Production Laborers	1	7	7.00		
53-7051.00	Industrial Truck and Tractor Operators	1	8	7.44	1.75	24%
	Total	29	407			
	Maximum	7	91	8.43	1.75	32%
	Minimum	1	7	2.79	0.66	10%
	Average	2	25	6.14	1.21	21%

Differences by Education. Scores were examined by education level of the client to see whether clients with higher education levels are more likely than those with lower education levels to rate all important knowledges, and to rate themselves more closely to the O*NET levels. Table 10 presents these results.

The small number of important knowledges and skills that clients failed to rate were scattered among the five education levels, suggesting that ability to identify and rate important knowledges and skills did not vary by education.

The mean difference scores for knowledges were all in the 5.0 to 6.0 range, indicating that the tendency of clients to rate themselves close to, albeit higher than, the O*NET levels for important knowledges and skills also did not vary by education level.

Table 10. Number of Important Knowledges and Skills, Client Ratings, and Mean Difference Scores, by Client Education Level (Years of School Completed)							
Years of School	Number of Clients	Number of Elements Important in Occupation of Last Job	Number of Client Ratings	Number of Important Elements Not Rated by Client	Mean Difference Score	Standard Deviation of Difference Scores	Percent Standard Deviation
Knowledges							
12 or GED	15	61	57	4	6.01	1.77	29%
13	3	13	13	0	5.58	1.83	33%
14	5	32	28	4	5.05	2.36	47%
16	5	34	31	3	6.12	1.17	19%
18	1	11	11	0	5.35	1.38	26%
Total	29	151	140	11			
Max					6.12	2.36	0.47
Min					5.05	1.17	0.19
Average					5.62	1.70	0.31
Skills							
12 or GED	15	178	154	24	5.80	1.67	29%
13	3	30	28	2	5.93	1.24	21%
14	5	84	74	10	6.03	1.80	30%
16	5	93	83	10	6.54	1.51	23%
18	1	22	22	0	4.94	1.00	20%
Total	29	407	361	46			
Maximum					6.54	1.80	30%
Minimum					4.94	1.00	20%
Average					5.85	1.45	25%

Summary and Next Steps

This project represents a modest pilot application of O*NET for assisting dislocated workers in making training choices. This summary section is organized into the following parts. First, what did we learn from the results? Second, what did we not learn? Third and finally, how would we operate if trying this again?

What did we learn?

1. *Clients and staff are able to complete the self-assessment process.* It is clear from the results that clients were able to complete the self-assessment tool, and that staff were able to use the spreadsheet software to enter the results and produce reports for clients. Client ability to compete the self-assessment is shown by the lack of missing or out-of-range values over the entire set of responses on knowledge and skills level scales. Further examination of the client responses, which were either 0 or a number between 1 and 7, indicated sensible distributions. Recall that a 0 indicated that the knowledge or skill was not capable of rating by the respondent. Ratings of knowledge in Math and English language areas, for example, were rated by a majority of the 30 clients (20 and 28, respectively). More abstract knowledge and

skill areas were associated with smaller numbers of ratings, defined as more clients indicating to the counselor that a zero response was appropriate. Biology and Fine Arts knowledge, for example, had ratings for 7 and 9 respondents, respectively.

2. *Clients were successful in rating those knowledges and skills that were important to the occupation of their last job.* The results show that a large majority of the knowledges and skills important in the client's last job were rated, while those that were not rated were in large part not important. Thus, the self-assessment is picking up the needed information from the clients.
3. *Client ratings were, by and large, similar to or not much different than the ratings in O*NET for the occupation of their past job.* This conclusion is based on the mean difference score analysis, which showed that most of the time the client's ratings were scores were within one to two points of the O*NET rating for the occupation of their past job. This analysis was limited to the knowledges and skills important in those past jobs.
4. *Clients had a modest bias toward rating themselves higher than the O*NET ratings.* Where the difference scores indicated a difference between client ratings and the O*NET levels for the knowledges and skills important in occupation of the client's last job, the difference was almost always toward a higher rating from the client. This tendency may have occurred because the clients may have perceived some benefit from "good" scores. This result may not be representative, however, given the small number of clients.

What did we fail to learn from this project?

Our failure to learn was concentrated in three areas. One, the project was completed with a small sample size. Two, we were unable to calculate any sort of reliability index for the sample. Three, the number of occupations for which training was offered was small.

1. *Small sample size.* The sample size issue arose because of administrative delays, and therefore the results from the project are tentative because of the small number of workers involved. The reliability issue occurs because there was only one set of responses.
2. *Reliability index.* Internal consistency reliability is an inappropriate index in this context (i.e., the knowledge and skill scales are not intended to assess a single underlying construct). A retest reliability measure is appropriate and thus two separate completions of the instrument by the sample are needed.
3. *Small number of occupations for which training was offered.* We recommend *testing the process in a dislocated worker assistance program with more varied training opportunities*. Because the Toledo Dislocated Worker Consortium Project had a limited number of training offerings, the variation in results among the workers was also limited. A larger set of training options would provide a more robust demonstration of the use of O*NET.

What would be helpful if this project were extended in another setting?

Additional development and use of O*NET tools, some of not available in time for this project, would enable O*NET to play a more significant role in helping dislocated workers. This section assumes that we will repeat the use of the process and use the knowledge gained here to improve the procedures and process.

1. *Automating the Knowledge and Skill Self-Assessment.* Easier and more accurate use of the O*NET self-assessment could be achieved if it were developed into a self-administered computer-based tool. A computer-based tool would allow the dislocated worker to complete the responses and get the results immediately, eliminating the need for staff to enter the results and eliminating data entry errors. One way to do this would be to move to an assessment tool designed as a Microsoft Access form. Essentially, only the client would see only the front-end entry screen and the resulting reports. This tool would allow easier capture of the information, quick response to the client, and would free up counselors from data entry tasks. Counselors should still discuss the results of this and any other assessments with the clients, however.
2. *Client follow-up.* A second area of improvement for subsequent study would incorporate follow-ups of clients using measures of service satisfaction and labor market outcomes. Time and resources prevented inclusion of follow-up results in this project. Also, follow-up analysis would obviously require larger number of workers (say 200 or more, which is easily accomplished for most dislocated worker projects of this nature)
3. *Use the O*NET career exploration tools.* The initial plan for this project included use of the O*NET Interest and Work Values Profilers, which unfortunately did not become available in time. These career exploration tools, along with Abilities Profiler, are now available. Use of these tools along with the self-assessment of knowledges and skills would provide a more complete O*NET-based picture of worker "fit" with alternative choices. The career exploration tool results would also provide additional data for analysis of the effectiveness of the knowledges and skills self-assessments. By adding work interests, work values, and an independent assessment of ability to the knowledge-skill self-assessment, a more complete picture of worker "fit" could be developed.
4. *Explore the use of O*NET task and occupational skills information.* The project did not make use of the available O*NET task information, which potentially could help dislocated workers identify whether they had occupational-specific experience that might indicate transferable skills. Similar use of O*NET occupational skills information in assessing transferable skills should be developed when this information becomes available in future releases of O*NET.

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Appendices

Appendix 1. O*NET Occupations Related to Target Training

Appendix 2. Self-assessment instrument

Appendix 3. Sample Knowledge and Skills Report from the self-assessment

Appendix 4. Sample labor market information report

Appendix 5. Descriptive Statistics and Frequencies for Self-Ratings of O*NET Knowledge and Skill Elements

Appendix 1. O*NET Occupations Related to Training Offered

Training Offered	O*NET Code	O*NET Title	O*NET Definition
Machining and Metalworking	51-2041.01	Metal Fabricators, Structural Metal Products	Fabricate and assemble structural metal products, such as frameworks or shells for machinery, ovens, tanks, and stacks, and metal parts for buildings and bridges, according to job order or blueprints.
Machining and Metalworking	51-2041.02	Fitters, Structural Metal – Precision	Lay out, position, align, and fit together fabricated parts of structural metal products preparatory to welding or riveting.
Machining and Metalworking	51-4011.01	Numerical Control Machine Tool Operators and Tenders, Metal and Plastic	Set up and operate numerical control (magnetic- or punched-tape-controlled) machine tools that automatically mill, drill, broach, and ream metal and plastic parts. May adjust machine feed and speed, change cutting tools, or adjust machine controls when automatic programming is faulty or if machine malfunctions.
Machining and Metalworking	51-4021.00	Extruding and Drawing Machine Tool Setters, Operators and Tenders, Metal and Plastic	Set up, operate, or tend machines to extrude or draw thermoplastic or metal materials into tubes, rods, hoses, wire, bars, or structural shapes.
Machining and Metalworking	51-4022.00	Forging Machine Setters, Operators and Tenders, Metal and Plastic	Set up, operate, or tend forging machines to taper, shape, or form metal or plastic parts.
Machining and Metalworking	51-4031.01	Sawing Machine Tool Setters and Set-up Operators, Metal and Plastic	Set up or set up and operate metal or plastic sawing machines to cut straight, curved, irregular, or internal patterns in metal or plastic stock or to trim edges of metal or plastic objects. Involves the use of such machines as band saws, circular saws, friction saws, hacksawing machines, and jigsaws.
Machining and Metalworking	51-4031.02	Punching Machine Setters and Set-up Operators, Metal and Plastic	Set up or set up and operate machines to punch, crimp, cut blanks, or notch metal or plastic workpieces between preset dies, according to specifications.

Appendix 1. O*NET Occupations Related to Training Offered

Training Offered	O*NET Code	O*NET Title	O*NET Definition
Machining and Metalworking	51-4031.03	Press and Press Brake Machine Setters and Set-up Operators, Metal and Plastic	Set up or set up and operate power-press machines or power-brake machines to bend, form, stretch, notch, punch, or straighten metal or plastic plate and structural shapes, as specified by work order, blueprints, drawing, templates, or layout.
Machining and Metalworking	51-4031.04	Shear and Slitter Machine Setters and Set-up Operators, Metal and Plastic	Set up or set up and operate power-shear or slitting machines to cut metal or plastic material, such as plates, sheets, slabs, billets or bars, to specified dimensions and angles.
Machining and Metalworking	51-4032.00	Drilling and Boring Machine Tool Setters, Operators and Tenders, Metal and Plastic	Set up, operate, or tend drilling machines to drill, bore, ream, mill, or countersink metal or plastic work pieces
Machining and Metalworking	51-4033.01	Grinding, Honing, Lapping and Deburring Machine Set-up Operators	Set up and operate grinding, honing, lapping, or deburring machines to remove excess materials or burrs from internal and external surfaces.
Machining and Metalworking	51-4033.02	Buffing and Polishing Set-up Operators	Set up and operate buffing or polishing machine.
Machining and Metalworking	51-4034.00	Lathe and Turning Machine Tool Setters, Operators and Tenders, Metal and Plastic	Set up, operate, or tend lathe and turning machines to turn, bore, thread, form, or face metal or plastic materials, such as wire, rod, or bar stock.
Machining and Metalworking	51-4035.00	Milling and Planing Machine Setters, Operators and Tenders, Metal and Plastic	Set up, operate, or tend milling or planing machines to mill, plane, shape, groove, or profile metal or plastic work pieces.

Appendix 1. O*NET Occupations Related to Training Offered

Training Offered	O*NET Code	O*NET Title	O*NET Definition
Machining and Metalworking	51-4041.00	Machinists	Set up and operate a variety of machine tools to produce precision parts and instruments. Includes precision instrument makers who fabricate, modify, or repair mechanical instruments. May also fabricate and modify parts to make or repair machine tools or maintain industrial machines, applying knowledge of mechanics, shop mathematics, metal properties, layout, and machining procedures.
Machining and Metalworking	51-4061.00	Model Makers, Metal and Plastic	Set up and operate machines, such as lathes, milling and engraving machines, and jig borers to make working models of metal or plastic objects.
Machining and Metalworking	51-4062.00	Patternmakers, Metal and Plastic	Lay out, machine, fit, and assemble castings and parts to metal or plastic foundry patterns, core boxes, or match plates.
Machining and Metalworking	51-4072.03	Metal Molding, Coremaking and Casting Machine Setters and Set-up Operators, Metal and Plastic	Set up or set up and operate metal casting, molding, and coremaking machines to mold or cast metal parts and products, such as tubes, rods, automobile trim, carburetor housings, and motor parts. Machines include: die casting and continuous casting machines, and roll-over, squeeze, and shell molding machines.
Machining and Metalworking	51-4072.04	Metal Molding, Coremaking and Casting Machine Operators and Tenders, Metal and Plastic	Operate or tend metal molding, casting, or coremaking machines to mold or cast metal products, such as pipes, brake drums, and rods, and metal parts, such as automobile trim, carburetor housings, and motor parts. Machines include centrifugal casting machines, vacuum casting machines, turnover draw-type coremaking machines, conveyor-screw coremaking machines, and die casting machines.
Machining and Metalworking	51-4081.01	Combination Machine Tool Setters and Set-up Operators, Metal and Plastic	Set up or set up and operate more than one type of cutting or forming machine tool, such as gear hobbers, lathes, press brakes, shearing, and boring machines.

Appendix 1. O*NET Occupations Related to Training Offered

Training Offered	O*NET Code	O*NET Title	O*NET Definition
Machining and Metalworking	51-4081.02	Combination Machine Tool Operators and Tenders, Metal and Plastic	Operate or tend more than one type of cutting or forming machine tool which has been previously set up. Includes such machine tools as band saws, press brakes, slitting machines, drills, lathes, and boring machines.
Machining and Metalworking	51-4111.00	Tool and Die Makers	Analyze specifications, lay out metal stock, set up and operate machine tools, and fit and assemble parts to make and repair dies, cutting tools, jigs, fixtures, gauges, and machinists' hand tools.
Machining and Metalworking	51-4121.01	Welders, Production	Assemble and weld metal parts on production line, using welding equipment, requiring only a limited knowledge of welding techniques.
Machining and Metalworking	51-4121.02	Welders and Cutters	Use hand welding and flame-cutting equipment to weld together metal components and parts or to cut, trim, or scarf metal objects to dimensions, as specified by layouts, work orders, or blueprints.
Machining and Metalworking	51-4121.03	Welders-Fitters	Analyze specifications, lay out metal stock, set up and operate machine tools, and fit and assemble parts to make and repair dies, cutting tools, jigs, fixtures, gauges, and machinists' hand tools.
Machining and Metalworking	51-4121.04	Solderers	Solder together components to assemble fabricated metal products, using soldering iron.
Machining and Metalworking	51-4121.05	Brazers	Braze together components to assemble fabricated metal parts, using torch or welding machine and flux.
Machining and Metalworking	51-4122.01	Welding Machine Setters and Set-up Operators	Set up or set up and operate welding machines that join or bond together components to fabricate metal products or assemblies, according to specifications and blueprints.

Appendix 1. O*NET Occupations Related to Training Offered

Training Offered	O*NET Code	O*NET Title	O*NET Definition
Machining and Metalworking	51-4122.02	Welding Machine Operators and Tenders	Operate or tend welding machines that join or bond together components to fabricate metal products and assemblies, according to specifications and blueprints.
Machining and Metalworking	51-4122.03	Soldering and Brazing Machine Setters and Set-up Operators	Set up or set up and operate soldering or brazing machines to braze, solder, heat treat, or spot weld fabricated metal products or components as specified by work orders, blueprints, and layout specifications.
Machining and Metalworking	51-4122.04	Soldering and Brazing Machine Operators and Tenders	Operate or tend soldering and brazing machines that braze, solder, or spot weld fabricated metal products or components as specified by work orders, blueprints, and layout specifications.
Machining and Metalworking	51-4191.01	Heat Equipment Setters and Set-up Operators, Metal and Plastic	Set up or set up and operate heating equipment, such as heat-treating furnaces, flame-hardening machines, and induction machines, that anneal or heat-treat metal objects.
Machining and Metalworking	51-4191.02	Heat Treating, Annealing, and Tempering Machine Operators and Tenders, Metal and Plastic	Operate or tend machines, such as furnaces, baths, flame-hardening machines, and electronic induction machines, to harden, anneal, and heat-treat metal products or metal parts.
Machining and Metalworking	51-4191.03	Heaters, Metal and Plastic	Operate or tend heating equipment, such as soaking pits, reheating furnaces, and heating and vacuum equipment, to heat metal sheets, blooms, billets, bars, plate, and rods to a specified temperature for rolling or processing, or to heat and cure preformed plastic parts.
Machining and Metalworking	51-4194.00	Tool Grinders, Filers, and Sharpeners	Perform precision smoothing, sharpening, polishing, or grinding of metal objects.
Machining and Metalworking	51-9022.00	Grinding and Polishing Workers, Hand	Grind, sand, or polish, using hand tools or hand-held power tools, a variety of metal, wood, stone, clay, plastic, or glass objects.

Appendix 1. O*NET Occupations Related to Training Offered

Training Offered	O*NET Code	O*NET Title	O*NET Definition
Machining and Metalworking	51-9195.01	Precision Mold and Pattern Casters, Except Nonferrous Metals	Cast molds and patterns from a variety of materials except nonferrous metals, according to blueprints and specifications.
Machining and Metalworking	51-9195.02	Precision Mold and Pattern Casters, Nonferrous Metals	Cast metal patterns and dies, according to specifications, from a variety of nonferrous metals, such as aluminum or bronze.
Occupations with IT Skills	15-1021.00	Computer Programmers	Convert project specifications and statements of problems and procedures to detailed logical flow charts for coding into computer language. Develop and write computer programs to store, locate, and retrieve specific documents, data, and information. May program web sites.
Occupations with IT Skills	15-1041.00	Computer Support Specialists	Provide technical assistance to computer system users. Answer questions or resolve computer problems for clients in person, via telephone or from remote location. May provide assistance concerning the use of computer hardware and software, including printing, installation, word processing, electronic mail, and operating systems.
Occupations with IT Skills	15-1051.00	Computer Systems Analysts	Analyze science, engineering, business, and all other data processing problems for application to electronic data processing systems. Analyze user requirements, procedures, and problems to automate or improve existing systems and review computer system capabilities, workflow, and scheduling limitations. May analyze or recommend commercially available software. May supervise computer programmers.
Occupations with IT Skills	15-1061.00	Database Administrators	Coordinate changes to computer databases, test and implement the database applying knowledge of database management systems. May plan, coordinate, and implement security measures to safeguard computer databases.

Appendix 1. O*NET Occupations Related to Training Offered

Training Offered	O*NET Code	O*NET Title	O*NET Definition
Occupations with IT Skills	15-1071.01	Computer Security Specialists	Plan, coordinate, and implement security measures for information systems to regulate access to computer data files and prevent unauthorized modification, destruction, or disclosure of information.
Occupations with IT Skills	15-1081.00	Network Systems and Data Communications Analysts	Analyze, design, test, and evaluate network systems, such as local area networks (LAN), wide area networks (WAN), Internet, intranet, and other data communications systems. Perform network modeling, analysis, and planning. Research and recommend network and data communications hardware and software. Includes telecommunications specialists who deal with the interfacing of computer and communications equipment. May supervise computer programmers.
Occupations with IT Skills	17-3023.01	Electronics Engineering Technicians	Lay out, build, test, troubleshoot, repair, and modify developmental and production electronic components, parts, equipment, and systems, such as computer equipment, missile control instrumentation, electron tubes, test equipment, and machine tool numerical controls, applying principles and theories of electronics, electrical circuitry, engineering mathematics, electronic and electrical testing, and physics. Usually work under direction of engineering staff.
Occupations with IT Skills	41-4011.00	Sales Representatives, Electrical/Electronic	Sell electrical, electronic, or related products or services, such as communication equipment, radiographic-inspection equipment and services, ultrasonic equipment, electronics parts, computers, and EDP systems.
Occupations with IT Skills	43-9011.00	Computer Operators	Monitor and control electronic computer and peripheral electronic data processing equipment to process business, scientific, engineering, and other data according to operating instructions. May enter commands at a computer terminal and set controls on computer and peripheral devices. Monitor and respond to operating and error messages.

Appendix 1. O*NET Occupations Related to Training Offered

Training Offered	O*NET Code	O*NET Title	O*NET Definition
Occupations with IT Skills	43-9031.00	Desktop Publishers	Format typescript and graphic elements using computer software to produce publication-ready material.
Occupations with IT Skills	49-2011.02	Data Processing Equipment Repairers	Repair, maintain, and install computer hardware such as peripheral equipment and word processing systems.
Occupations with IT Skills	49-2011.03	Office Machine and Cash Register Servicers	Repair and service office machines, such as adding, accounting, calculating, duplicating, and typewriting machines. Includes the repair of manual, electrical, and electronic office machines.
Occupations with IT Skills	51-4012.00	Numerical Tool and Process Control Programmers	Develop programs to control machining or processing of parts by automatic machine tools, equipment, or systems.
Occupations with IT Skills	51-5022.05	Scanner Operators	Operate electronic or computerized scanning equipment to produce and screen film separations of photographs or art for use in producing lithographic printing plates. Evaluate and correct for deficiencies in the film.
Occupations with IT Skills	51-9061.04	Electrical and Electronic Inspectors and Testers	Inspect and test electrical and electronic systems, such as radar navigational equipment, computer memory units, television and radio transmitters, using precision measuring instruments.
Railroad Conducting	53-4011.00	Locomotive Engineers	Drive electric, diesel-electric, steam, or gas-turbine-electric locomotives to transport passengers or freight. Interpret train orders, electronic or manual signals, and railroad rules and regulations.
Railroad Conducting	53-4012.00	Locomotive Firers	Monitor locomotive instruments and watch for dragging equipment, obstacles on rights-of-way, and train signals during run. Watch for and relay traffic signals from yard workers to yard engineer in railroad yard.

Appendix 1. O*NET Occupations Related to Training Offered

Training Offered	O*NET Code	O*NET Title	O*NET Definition
Railroad Conducting	53-4013.00	Rail Yard Engineers, Dinkey Operators, and Hostlers	Drive switching or other locomotive or dinkey engines within railroad yard, industrial plant, quarry, construction project, or similar location.
Railroad Conducting	53-4021.01	Train Crew Members	Inspect couplings, airhoses, journal boxes, and handbrakes on trains to ensure that they function properly.
Railroad Conducting	53-4021.02	Railroad Yard Workers	Perform a variety of activities such as coupling railcars and operating railroad track switches in railroad yard to facilitate the movement of rail cars within the yard.
Railroad Conducting	53-4031.00	Railroad Conductors and Yard Masters	Conductors coordinate activities of train crew on passenger or freight train. Coordinate activities of switch-engine crew within yard of railroad, industrial plant, or similar location. Yardmasters coordinate activities of workers engaged in railroad traffic operations, such as the makeup or breakup of trains, yard switching, and review train schedules and switching orders.
Railroad Conducting	53-6051.04	Railroad Inspectors	Inspect railroad equipment, roadbed, and track to ensure safe transport of people or cargo.
Tractor-trailer driving	53-3032.01	Truck Drivers, Heavy	Drive truck with capacity of more than three tons to transport materials to specified destinations.
Tractor-trailer driving	53-3032.02	Tractor-Trailer Truck Drivers	Drive tractor-trailer truck to transport products, livestock, or materials to specified destinations.

Appendix 2. O*NET Self-Assessment Instrument

O*NET
Knowledge and Skills
Questionnaire

Completing this questionnaire will help you identify the knowledge and skills required in your past employment. This information will help you determine whether the training opportunities offered by the Toledo Dislocated Worker Consortium are right for you.

The knowledge and skills needed in your previous jobs may also be important in occupations related to the training offered by the Consortium. If so, you have "transferable" knowledge and skills and can benefit from training leading to a new job in one of these occupations.

Please enter your name and today's date below:

_____
Name

_____
Today's Date

Please follow the Instructions on the next page.
It should take about 30 to 40 minutes to complete the questionnaire.

O*NET, the Occupational Information Network, is provided by the U.S. Department of Labor. You can access O*NET on the Internet at www.onetonline.org.

Instructions for Making Knowledge and Skill Ratings

These questions are about work-related areas of knowledge and skills. **Knowledge areas** are sets of facts and principles needed to deal with problems and issues that are part of a job. A **Skill** is the ability to perform a task well. It is usually developed over time through training or experience. A skill can be used to do work in many jobs or it can be used in learning.

You will be asked about a series of different areas of knowledge and skill and how they relate to *your past jobs* - that is, the jobs you have held before now.

Each knowledge or skill area in this questionnaire is named and defined. For example:

Economics and Accounting

Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data.

You are then asked a question about each knowledge or skill area:

What level of the knowledge or skill was needed to perform your past jobs?

To help you understand what we mean by **level**, we provide you with examples of job-related activities at different levels. For example:

What <u>level</u> of ECONOMICS AND ACCOUNTING knowledge was needed to perform *your past jobs?*

Not relevant to my past jobs		Answer billing questions from credit card customers		Develop financial investment programs for individual clients		Keep a major corporation's financial records	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
						Highest Level	

Mark your answer by putting a circle around the number that represents your answer. Do not mark between the numbers.

If this knowledge or skill area was not relevant to any of your previous jobs, circle the number zero 0.

If your previous jobs required different levels of this knowledge or skill, mark the highest level that was required.

Questions about Knowledge

1. Administration and Management

Knowledge of business and management principles involved in strategic planning, resource allocation, human resources modeling, leadership technique, production methods, and coordination of people and resources.

What level of ADMINISTRATION AND MANAGEMENT knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Sign a pay voucher		Monitor progress of a project to ensure timely completion		Manage a $10 million company	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

2. Clerical

Knowledge of administrative and clerical procedures and systems such as word processing, managing files and records, stenography and transcription, designing forms, and other office procedures and terminology.

What level of CLERICAL knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		File letters alphabetically	Type 30 words per minute		Organize a storage system for company forms		
↓		↓	↓		↓		
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

3. Economics and Accounting

Knowledge of economic and accounting principles and practices, the financial markets, banking, and the analysis and reporting of financial data.

What level of ECONOMICS AND ACCOUNTING knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Answer billing questions from credit card customers		Develop financial investment programs for individual clients		Keep a major corporation's financial records	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

4. Sales and Marketing

Knowledge of principles and methods for showing, promoting, and selling products or services. This includes marketing strategy and tactics, product demonstration, sales techniques, and sales control systems.

What level of SALES AND MARKETING knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Sell cakes at a bake sale		Call a list of clients to introduce them to a new product line		Develop a marketing plan for a nationwide telephone system	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

5. Customer and Personal Service

Knowledge of principles and processes for providing customer and personal services. This includes customer needs assessment, meeting quality standards for services, and evaluation of customer satisfaction.

What level of CUSTOMER AND PERSONAL SERVICE knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Process customer dry-cleaning drop off		Work as a day care aide supervising 10 children		Respond to a citizen's request for assistance after a major disaster	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

6. Transportation

Knowledge of principles and methods for moving people or goods by air, rail, sea, or road, including the relative costs and benefits.

What level of TRANSPORTATION knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Ride a train to work			Steer a large freighter through a busy harbor	Control air traffic at a busy airport	
↓		↓			↓	↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

7. Production and Processing

Knowledge of raw materials, production processes, quality control, costs, and other techniques for maximizing the effective manufacture and distribution of goods.

What level of PRODUCTION AND PROCESSING knowledge was needed to perform *your Past jobs*?

Not relevant to my past jobs		Put a computer back into its packing materials		Supervise an appliance assembly line		Manage an international shipping company distribution center	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**

8. Computers and Electronics

Knowledge of circuit boards, processors, chips, electronic equipment, and computer hardware and software, including applications and programming.

What level of knowledge of COMPUTERS AND ELECTRONICS was needed to perform *your past jobs*?

Not relevant to my past jobs	Operate a VCR to watch a pre-recorded training tape		Use a word processor			Create a program to scan computer disks for viruses	
↓	↓		↓			↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

9. Engineering and Technology

Knowledge of the practical application of engineering science and technology. This includes applying principles, techniques, procedures, and equipment to the design and production of various goods and services.

What level of knowledge of ENGINEERING AND TECHNOLOGY was needed to perform *your past jobs*?

Not relevant to my past jobs		Install a door lock		Design a more stable grocery cart		Plan for the impact of weather in designing a bridge	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

10. Design

Knowledge of design techniques, tools, and principles involved in production of precision technical plans, blueprints, drawings, and models.

What level of knowledge of DESIGN was needed to perform *your past jobs*?

Not relevant to my past jobs		Draw a straight line 4 3/16 inches long		Draw plans for remodeling a kitchen		Develop detailed plans for a high-rise office building	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

11. Building and Construction

Knowledge of materials, methods, and the tools involved in the construction or repair of houses, buildings, or other structures such as highways and roads.

What level of BUILDING AND CONSTRUCTION knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Choose the proper type of wood for adding a deck onto a house		Fix a plumbing leak in the ceiling		Build a high-rise office tower	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

12. Mechanical

Knowledge of machines and tools, including their designs, uses, repair, and maintenance.

What level of MECHANICAL knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Replace the filters in a furnace		Replace a valve on a steam pipe		Overhaul an airplane jet engine	
↓		↓		↓			↓
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

13. Mathematics

Knowledge of arithmetic, algebra, geometry, calculus, statistics, and their applications.

What level of knowledge of MATHEMATICS was needed to perform *your past jobs*?

Not relevant to my past jobs	Add two numbers			Analyze data to determine areas with the highest sales		Derive a complex mathematical equation	
↓	↓			↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

14. Physics

Knowledge and prediction of physical principles, laws, their interrelationships, and applications to understanding fluid, material, and atmospheric dynamics, and mechanical, electrical, atomic and sub-atomic structures and processes.

What level of PHYSICS knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs	Use a crowbar to pry open a box			Calculate water pressure through a pipe		Design a cleaner burning gasoline engine	
↓	↓			↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

15. Chemistry

Knowledge of the chemical composition, structure, and properties of substances and of the chemical processes and transformations that they undergo. This includes uses of chemicals and their interactions, danger signs, production techniques, and disposal methods.

What level of CHEMISTRY knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs	Use a common household bug spray			Use the proper concentration of chlorine to purify a water source		Develop a safe commercial cleaner	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

16. Biology

Knowledge of plant and animal organisms, their tissues, cells, functions, interdependencies, and interactions with each other and the environment.

What level of BIOLOGY knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs	Feed domestic animals				Investigate the effects of pollution on marine plants and animals		Isolate and identify a new virus
↓	↓				↓		↓
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

17. Psychology

Knowledge of human behavior and performance; individual differences in ability, personality, and interests; learning and motivation; psychological research methods; and the assessment and treatment of behavioral and affective disorders.

What level of PSYCHOLOGY knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Monitor several children on a playground		Understand the impact of alcohol on human responses		Treat a person with a severe a mental illness	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

18. Geography

Knowledge of principles and methods for describing the features of land, sea, and air masses, including their physical characteristics, locations, interrelationships, and distribution of plant, animal, and human life.

What level of knowledge of GEOGRAPHY was needed to perform *your past jobs*?

Not relevant to my past jobs		Know the capital of the United States		Identify Turkey on a world map		Develop a map of the world showing mountains, deserts, and rivers	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

19. Education and Training

Knowledge of principles and methods for curriculum and training design, teaching and instruction for individuals and groups, and the measurement of training effects.

What level of EDUCATION AND TRAINING knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Show someone how to bowl		Lead a quality improvement seminar		Design a training program for new employees	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

20. English Language

Knowledge of the structure and content of the English language including the meaning and spelling of words, rules of composition, and grammar.

What level of ENGLISH LANGUAGE knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Write a thank you note		Edit a feature article in a local newspaper		Teach a college English class	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

21. Fine Arts

Knowledge of the theory and techniques required to compose, produce, and perform works of music, dance, visual arts, drama, and sculpture.

What level of FINE ARTS knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs	Attend a popular music concert		Play a minor part in a local theater play		Design an artistic display for a major trade show		
↓	↓		↓		↓		
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

22. Public Safety and Security

Knowledge of relevant equipment, policies, procedures, and strategies to promote effective local, state, or national security operations for the protection of people, data, property, and institutions.

What level of PUBLIC SAFETY AND SECURITY knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs	Use a seatbelt			Inspect a building site for safety violations		Command a military operation	
↓	↓			↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

23. Law and Government

Knowledge of laws, legal codes, court procedures, precedents, government regulations, executive orders, agency rules, and the democratic political process.

What level of knowledge of LAW AND GOVERNMENT was needed to perform *your past jobs*?

Not relevant to my past jobs		Register to vote in a national election		Prepare documents and title papers for the purchase of a new house		Serve as a judge. in a federal court	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

24. Telecommunications

Knowledge of transmission, broadcasting, switching, control, and operation of telecommunications systems.

What level of TELECOMMUNICATIONS knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs	Dial a phone	Install a satellite TV dish				Develop a new, world-wide telecommunications network	
↓	↓	↓					↓
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Highest Level

25. Communications and Media

Knowledge of media production, communication, and dissemination techniques and methods. This includes alternative ways to inform and entertain via written, oral, and visual media.

What level of COMMUNICATIONS AND MEDIA knowledge was needed to perform *your past jobs*?

Not relevant to my past jobs		Write a thank you note		Be a radio disk jockey	Write a novel		
↓		↓		↓	↓		
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**

Highest Level

Questions about Skills

1. Reading Comprehension

Understanding written sentences and paragraphs in work-related documents.

What level of READING COMPREHENSION was needed to perform *your past jobs*?

Not relevant to my past jobs		Read step-by-step instructions for completing a form		Read a memo from management describing new personnel policies		Read a scientific journal article describing surgical procedures	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

2. Active Listening

Giving full attention to what other people are saying, taking time to understand the points being made, asking questions as appropriate, and not interrupting at inappropriate times.

What level of ACTIVE LISTENING was needed to perform *your past jobs*?

Not relevant to my past jobs		Take a customer's order		Answer inquiries regarding credit references		Preside as judge in a complex legal disagreement	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

3. Writing

Communicating effectively in writing as appropriate for the needs of the audience.

What level of WRITING was needed to perform *your past jobs*?

Not relevant to my past jobs		Take a telephone message		Write a memo to staff outlining new directives		Write a novel for publication	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

4. Speaking

Talking to others to convey information effectively.

What level of SPEAKING was needed to perform *your past jobs*?

Not relevant to my past jobs		Greet tourists and explain tourist attractions		Interview applicants to obtain personal and work history		Argue a legal case before the Supreme Court	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

5. Mathematics

Using mathematics to solve problems.

What level of MATHEMATICS was needed to perform *your past jobs*?

Not relevant to my past jobs		Count the amount of change to be given to a customer		Calculate the square footage of a new home under construction		Develop a mathematical model to simulate and resolve an engineering problem	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

6. Science

Using scientific rules and methods to solve problems.

What level of SCIENCE was needed to perform *your past jobs*?

Not relevant to my past jobs		Conduct standard tests to determine soil quality		Conduct product tests to ensure safety standards are met, following written instructions		Conduct analyses of aerodynamic systems to determine the practicality of an aircraft design	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

7. Critical Thinking

Using logic and reasoning to identify the strengths and weaknesses of alternative solutions, conclusions or approaches to problems.

What level of CRITICAL THINKING was needed to perform *your past jobs*?

Not relevant to my past jobs		Determine whether a subordinate has a good excuse for being late		Evaluate customer complaints and determine appropriate responses		Write a legal brief challenging a federal law	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

8. Active Learning

Understanding the implications of new information for both current and future problem-solving and decision-making.

What level of ACTIVE LEARNING was needed to perform *your past jobs*?

Not relevant to my past jobs		Think about the implications of a newspaper article for job opportunities		Determine the impact of new menu changes on a restaurant's purchasing requirements		Identify the implications of a new scientific theory for product design	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

9. Learning Strategies

Selecting and using training/instructional methods and procedures appropriate for the situation when learning or teaching new things.

What level of LEARNING STRATEGIES was needed to perform *your past jobs*?

Not relevant to my past jobs		Learn a different method of completing a task from a coworker		Identify an alternative approach approach that might help trainees who are having difficulties		Apply principles of educational psychology to develop new teaching methods	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

10. Monitoring

Monitoring/Assessing performance of yourself, other individuals, or organizations to make improvements or take corrective action.

What level of MONITORING was needed to perform *your past jobs*?

Not relevant to my past jobs		Proofread and correct a letter		Monitor a meeting's progress and revise the agenda to ensure that important topics are discussed		Review corporate productivity and develop a plan to increase productivity	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

11. Social Perceptiveness

Being aware of others' reactions and understanding why they react as they do.

What level of SOCIAL PERCEPTIVENESS was needed to perform *your past jobs*?

Not relevant to my past jobs		Notice that customers are angry because they have been waiting too long		Be aware of how a coworker's promotion will affect a work group		Counsel depressive patients during a crisis period	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

12. Coordination

Adjusting actions in relation to others' actions.

What level of COORDINATION was needed to perform *your past jobs*?

Not relevant to my past jobs		Schedule appointments for a medical clinic		Work with others to put a new roof on a house		Work as director of a consulting project calling for interaction with multiple subcontractors	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

13. Persuasion

Persuading others to change their minds or behavior.

What level of PERSUASION was needed to perform *your past jobs*?

Not relevant to my past jobs		Solicit donations for a charity		Convince a supervisor to purchase a new copy machine		Change the opinion of the jury in a complex legal case	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

14. Negotiation

Bringing others together and trying to reconcile differences.

What level of NEGOTIATION was needed to perform *your past jobs*?

Not relevant to my past jobs		Present justification to a manager for altering work schedule		Contract with a wholesaler to sell items at a given cost		Work as an ambassador in negotiating a new treaty	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

15. Instructing

Teaching others how to do something.

What level of INSTRUCTING was needed to perform *your past jobs*?

Not relevant to my past jobs		Instruct a new employee in the use of a time clock		Instruct a coworker in how to operate a software program		Demonstrate surgical procedure to interns in a teaching hospital	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

16. Service Orientation

Actively looking for ways to help people.

What level of SERVICE ORIENTATION was needed to perform *your past jobs*?

Not relevant to my past jobs		Ask customers if they would like cups of coffee		Make flight reservations for customers, using airline reservation system		Direct relief agency operations in a disaster area	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

17. Complex Problem Solving

Identifying complex problems and reviewing related information to develop and evaluate options and implement solutions.

What level of COMPLEX PROBLEM SOLVING was needed to perform *your past jobs*?

Not relevant to my past jobs		Lay out tools to complete a job		Redesign a floor layout to take advantage of new manufacturing techniques		Develop and implement a plan to provide emergency relief for a major metropolitan area	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

18. Operations Analysis

Analyzing needs and product requirements to create a design.

What level of OPERATIONS ANALYSIS was needed to perform *your past jobs*?

Not relevant to my past jobs		Select a photocopy machine for an office		Suggest changes in software to make a system more user friendly		Identify the control system needed for a new process production plant	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

19. Technology Design

Generating or adapting equipment and technology to serve user needs.

What level of TECHNOLOGY DESIGN was needed to perform *your past jobs*?

Not relevant to my past jobs		Adjust exercise equipment for use by a customer		Redesign the handle on a hand tool for easier gripping		Create new technology for producing industrial diamonds	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

20. Equipment Selection

Determining the kind of tools and equipment needed to do a job.

What level of EQUIPMENT SELECTION was needed to perform *your past jobs*?

Not relevant to my past jobs		Select a screwdriver to use in adjusting a vehicle's carburetor		Choose a software application to use to complete a work assignment		Identify the equipment needed to produce a new product line	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

21. Installation

Installing equipment, machines, wiring, or programs to meet specifications.

What level of INSTALLATION was needed to perform *your past jobs*?

Not relevant to my past jobs		Install a new air filter in an air conditioner		Install new switches for a telephone exchange		Install a "one of a kind" process production molding machine	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

22. Programming

Writing computer programs for various purposes.

What level of PROGRAMMING was needed to perform *your past jobs*?

Not relevant to my past jobs		Write a program in BASIC to sort objects in a database		Write a statistical analysis program to analyze demographic data		Write expert system programs to analyze ground radar geological data for probable existence of mineral deposits	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

23. Quality Control Analysis

Conducting tests and inspections of products, services, or processes to evaluate quality or performance.

What level of QUALITY CONTROL ANALYSIS was needed to perform *your past jobs*?

Not relevant to my past jobs		Inspect a draft memorandum for clerical errors		Measure new part requisitions for tolerance to specifications		Develop procedures to test a prototype of a new computer system	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

24. Operations Monitoring

Watching gauges, dials, or other indicators to make sure a machine is working properly.

What level of OPERATIONS MONITORING was needed to perform *your past jobs*?

Not relevants to my past jobs		Monitor completion times while running a computer program		Monitor machine functions on an automated production line		Monitor and integrate control feedback in a petrochemical processing facility to maintain production flow	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

25. Operation and Control

Controlling operations of equipment or systems.

What level of OPERATION AND CONTROL was needed to perform *your past jobs*?

Not relevant to my past jobs		Adjust the settings on a copy machine to make reduced size photocopies		Adjust the speed of assembly line equipment based on the type of product being assembled		Control aircraft approach and landing at a large airport during a busy period	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

26. Equipment Maintenance

Performing routine maintenance on equipment and determining when and what kind of maintenance was needed.

What level of EQUIPMENT MAINTENANCE was needed to perform *your past jobs*?

Not relevant to my past jobs		Add oil to an engine as indicated by a gauge or warning light		Clean moving parts in production machinery		Conduct maintenance checks on an experimental aircraft	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

27. Troubleshooting

Determining causes of operating errors and deciding what to do about it.

What level of TROUBLESHOOTING was needed to perform *your past jobs*?

Not relevant to my past jobs		Identify the source of a leak by looking under a machine		Identify the circuit causing an electrical system to fail		Direct the debugging of control code for a new operating system	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

28. Repairing

Repairing machines or systems using the needed tools.

What level of REPAIRING was needed to perform *your past jobs*?

Not relevant to my past jobs		Tighten a screw to get a door to close properly		Replace a faulty hydraulic valve		Repair structural damage after an earthquake	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

29. Systems Analysis

Determining how a system should work and how changes in conditions, operations, and the environment will affect outcomes.

What level of SYSTEMS ANALYSIS was needed to perform *your past jobs*?

Not relevant to my past jobs		Determine how loss of a team member will affect the completion of a job		Determine how the introduction of a new piece of equipment will affect production rates		Identify how changes in tax laws are likely to affect preferred sites for manufacturing operations in different industries	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

30. Systems Evaluation

Identifying measures or indicators of system performance and the actions needed to improve or correct performance, relative to the goals of the system.

What level of SYSTEMS EVALUATION was needed to perform *your past jobs*?

Not relevant to my past jobs		Determine why a coworker has been overly optimistic about how long it would take to complete a task		Identify the major reasons why a client might be unhappy with a product		Evaluate the long-term performance problem of a new computer system	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7** Highest Level

31. Judgment and Decision Making

Considering the relative costs and benefits of potential actions to choose the most appropriate one.

What level of JUDGMENT AND DECISION MAKING was needed to perform *your past jobs*?

Not relevant to my past jobs		Decide how scheduling a break will affect work flow		Evaluate a loan application for degree of risk		Decide whether a manufacturing company should invest in new robotics technology	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

32. Time Management

Managing one's own time and the time of others.

What level of TIME MANAGEMENT was needed to perform *your past jobs*?

Not relevant to my past jobs		Keep a monthly calendar of appointments for the coming week		Allocate the time of subordinates to projects		Allocate the time of scientists to multiple research projects	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

33. Management of Financial Resources

Determining how money will be spent to get the work done, and accounting for these expenditures.

What level of MANAGEMENT OF FINANCIAL RESOURCES was needed to perform *your past jobs*?

Not relevant to my past jobs		Take money from petty cash to buy office supplies and recording the amount of the expenditure		Prepare and manage a budget for a short-term project		Develop and approve yearly budgets for a large corporation and obtain financing as necessary	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

34. Management of Material Resources

Obtaining and seeing to the appropriate use of equipment, facilities, and materials needed to do certain work.

What level of MANAGEMENT OF MATERIAL RESOURCES was needed to perform *your past jobs*?

Not relevant to my past jobs		Rent a meeting room for a management meeting		Evaluate an annual uniform service contract for delivery drivers		Determine the computer system needs of a large corporation and monitor use of the equipment	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

35. Management of Personnel Resources

Motivating, developing, and directing people as they work, identifying the best people for the job.

What level of MANAGEMENT OF PERSONNEL RESOURCES was needed to perform *your past jobs*?

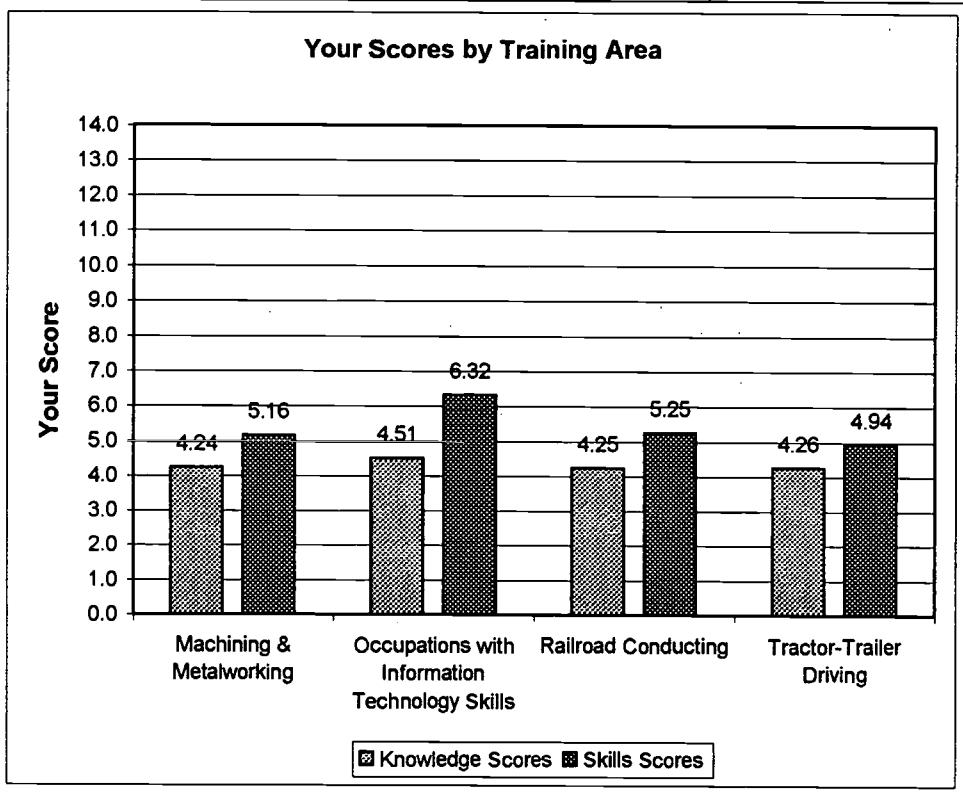
Not relevant to my past jobs		Encourage a coworker who is having difficulty finishing a piece of work		Direct the activities of a road repair crew with minimal disruption of traffic flow		Plan, implement, and manage recruitment, training, and incentive programs for a high performance company	
↓		↓		↓		↓	
0	**1**	**2**	**3**	**4**	**5**	**6**	**7**
							Highest Level

Your O*NET Knowledge and Skills Report

NAME Example

Your Results for each training area offered by the Toledo PIC:

Training Area	Your average score for Knowledges	Your average score for Skills
Machining & Metalworking	4.24	5.16
Occupations with Information Technology Skills	4.51	6.32
Railroad Conducting	4.25	5.25
Tractor-Trailer Driving	4.26	4.94



Your score shows the difference between your knowledge and skill levels, as measured by your responses on the O*NET Knowledge and Skills Questionniare, and the required level of knowledge or skill in the occupations related to the training areas.

If your scores for a training area are less than seven, you generally need additional education and training in the O*NET knowledge and skills to perform in the related occupations. You may also need training in knowledge and skills required in specific occupations.

If your scores for a training area are seven or higher, you generally have the level of O*NET knowledge and skills needed to perform in the related occupations. You may also need training in knowledge and skills required in specific occupations.

Appendix 3 Sample Knowledge and Skills Report from the Self-Assessment

The following tables show your average score for each occupation related to the training areas.

Machining & Metalworking

Your Knowledge Score	Your Skills Score		Occupation Code	Occupation Title
4.24	5.20	Machining & Metalworking	51-2041.01	Metal Fabricators, Structural Metal Products
4.26	5.03	Machining & Metalworking	51-2041.02	Fitters, Structural Metal – Precision
4.24	5.35	Machining & Metalworking	51-4011.01	Numerical Control Machine Tool Operators & Tenders, Metal & Plastic
4.23	5.36	Machining & Metalworking	51-4021.00	Extruding & Drawing Machine Tool Setters, Operators & Tenders, Metal & Plastic
4.23	5.20	Machining & Metalworking	51-4022.00	Forging Machine Setters, Operators & Tenders, Metal & Plastic
4.24	4.95	Machining & Metalworking	51-4031.01	Sawing Machine Tool Setters & Set-up Operators, Metal & Plastic
4.23	4.86	Machining & Metalworking	51-4031.02	Punching Machine Setters & Set-up Operators, Metal & Plastic
4.25	5.41	Machining & Metalworking	51-4031.03	Press & Press Brake Machine Setters & Set-up Operators, Metal & Plastic
4.25	5.34	Machining & Metalworking	51-4031.04	Shear & Slitter Machine Setters & Set-up Operators, Metal & Plastic
4.25	5.35	Machining & Metalworking	51-4032.00	Drilling & Boring Machine Tool Setters, Operators & Tenders, Metal & Plastic
4.23	5.17	Machining & Metalworking	51-4033.01	Grinding, Honing, Lapping & Deburring Machine Set-up Operators
4.23	4.72	Machining & Metalworking	51-4033.02	Buffing & Polishing Set-up Operators
4.24	4.99	Machining & Metalworking	51-4034.00	Lathe & Turning Machine Tool Setters, Operators & Tenders, Metal & Plastic
4.24	4.85	Machining & Metalworking	51-4035.00	Milling & Planing Machine Setters, Operators & Tenders, Metal & Plastic
4.26	6.70	Machining & Metalworking	51-4041.00	Machinists
4.26	6.40	Machining & Metalworking	51-4061.00	Model Makers, Metal & Plastic
4.25	5.37	Machining & Metalworking	51-4062.00	Patternmakers, Metal & Plastic
4.23	5.16	Machining & Metalworking	51-4072.03	Metal Molding, Coremaking & Casting Machine Setters & Set-up Operators, Metal & Plastic
4.26	5.48	Machining & Metalworking	51-4072.04	Metal Molding, Coremaking & Casting Machine Operators & Tenders, Metal & Plastic
4.25	5.91	Machining & Metalworking	51-4081.01	Combination Machine Tool Setters & Set-up Operators, Metal & Plastic
4.24	5.14	Machining & Metalworking	51-4081.02	Combination Machine Tool Operators & Tenders, Metal & Plastic
4.23	5.32	Machining & Metalworking	51-4111.00	Tool & Die Makers
4.23	5.03	Machining & Metalworking	51-4121.01	Welders, Production
4.24	4.86	Machining & Metalworking	51-4121.02	Welders & Cutters
4.24	5.09	Machining & Metalworking	51-4121.03	Welders-Fitters
4.23	4.86	Machining & Metalworking	51-4121.04	Solderers
4.22	4.94	Machining & Metalworking	51-4121.05	Brazers
4.24	5.26	Machining & Metalworking	51-4122.01	Welding Machine Setters & Set-up Operators
4.24	5.05	Machining & Metalworking	51-4122.02	Welding Machine Operators & Tenders
4.24	5.15	Machining & Metalworking	51-4122.03	Soldering & Brazing Machine Setters & Set-up Operators
4.23	5.14	Machining & Metalworking	51-4122.04	Soldering & Brazing Machine Operators & Tenders
4.25	4.90	Machining & Metalworking	51-4191.01	Heat Equipment Setters & Set-up Operators, Metal & Plastic
4.24	4.98	Machining & Metalworking	51-4191.02	Heat Treating, Annealing, & Tempering Machine Operators & Tenders, Metal & Plastic
4.24	4.61	Machining & Metalworking	51-4191.03	Heaters, Metal & Plastic
4.25	5.61	Machining & Metalworking	51-4194.00	Tool Grinders, Filers, & Sharpeners
4.24	4.41	Machining & Metalworking	51-9022.00	Grinding & Polishing Workers, H&
4.24	4.47	Machining & Metalworking	51-9195.01	Precision Mold & Pattern Casters, Except Nonferrous Metals
4.24	4.37	Machining & Metalworking	51-9195.02	Precision Mold & Pattern Casters, Nonferrous Metals

Appendix 3 Sample Knowledge and Skills Report from the Self-Assessment

Occupations with Information Technology Skills

Your Knowledge Score	Your Skills Score		Occupation Code	Occupation Title
6.09	7.14	Occupations with IT Skills	15-1021.00	Computer Programmers
5.98	7.43	Occupations with IT Skills	15-1041.00	Computer Support Specialists
4.28	7.45	Occupations with IT Skills	15-1051.00	Computer Systems Analysts
4.29	6.67	Occupations with IT Skills	15-1061.00	Database Administrators
4.30	6.35	Occupations with IT Skills	15-1071.01	Computer Security Specialist
4.28	7.24	Occupations with IT Skills	15-1081.00	Network Systems & Data Communications Analysts
4.25	6.30	Occupations with IT Skills	17-3023.01	Electronics Engineering Technicians
4.38	5.50	Occupations with IT Skills	41-4011.03	Sales Representatives, Electrical/Electronic
4.25	5.96	Occupations with IT Skills	43-9011.00	Computer Operators
4.25	5.00	Occupations with IT Skills	43-9031.00	Desktop Publishers
4.26	6.30	Occupations with IT Skills	49-2011.02	Data Processing Equipment Repairers
4.26	5.69	Occupations with IT Skills	49-2011.03	Office Machine & Cash Register Servicers
4.26	6.33	Occupations with IT Skills	51-4012.00	Numerical Tool & Process Control Programmers
4.25	4.97	Occupations with IT Skills	51-5022.05	Scanner Operators
4.30	6.49	Occupations with IT Skills	51-9061.04	Electrical & Electronic Inspectors & Testers

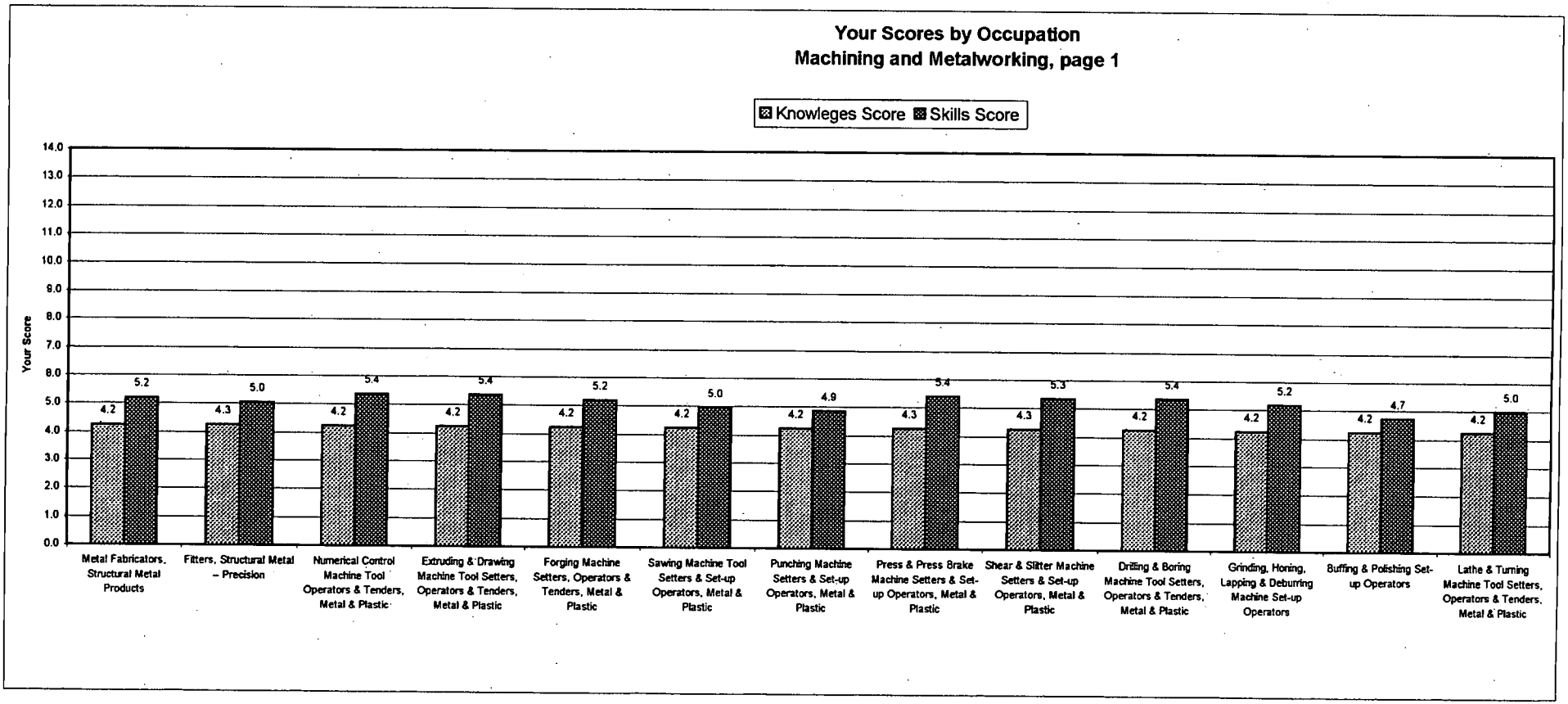
Railroad Conducting

Your Knowledge Score	Your Skills Score		Occupation Code	Occupation Title
4.26	5.23	Railroad Conducting	53-4011.00	Locomotive Engineers
4.24	4.92	Railroad Conducting	53-4012.00	Locomotive Firers
4.24	4.95	Railroad Conducting	53-4013.00	Rail Yard Engineers, Dinkey Operators, & Hostlers
4.25	5.19	Railroad Conducting	53-4021.01	Train Crew Members
4.23	4.57	Railroad Conducting	53-4021.02	Railroad Yard Workers
4.26	5.89	Railroad Conducting	53-4031.00	Railroad Conductors & Yard Masters
4.26	6.02	Railroad Conducting	53-6051.04	Railroad Inspectors

Tractor-Trailer Driving

Your Knowledge Score	Your Skills Score		Occupation Code	Occupation Title
4.26	4.81	Tractor-trailer driving	53-3032.01	Truck Drivers, Heavy
4.26	5.06	Tractor-trailer driving	53-3032.02	Tractor-Trailer Truck Drivers

Appendix 3 Sample Knowledge and Skills Report from the Self-Assessment



Machining and Metalworking Occupations

What do workers in machining and metalworking occupations do?

These workers set up, operate, or tend a wide variety of machines that cut, grind, drill, or perform other operations on metal. Some of these workers, such as Machinists and Tool and Die Makers, may also analyze specifications to determine how to make certain parts or tools and to maintain equipment.

Workers in machining and metalworking occupations generally work in manufacturing businesses that produce auto parts, hardware, cans, tools, and many other metal products.

What is the job outlook?

In 1998, there were about 11,300 jobs in machining and metalworking occupations in the Toledo area, and about 189,000 jobs throughout Ohio.

Although employment is expected to change very little over the 1998-2008 decade, there will be many job openings to replace current workers who will retire or die.

The number of jobs is expected to decline by about 1.4 percent in the Toledo area, to about 11,160 jobs. For Ohio as a whole, employment is expected to increase by 1.5 percent.

Between 1998 and 2008, about 324 job openings are expected annually in the Toledo area to replace current workers who will retire or die. Statewide, about 5,525 job openings are expected each year.

What are the wages?

The 1998 hourly wage rate averaged $10.63 for machining and metalworking occupations in the Toledo area, and $13.58 in Ohio.

Wage rates in the Toledo area ranged from $18.04 for Tool and Die Makers to $9.14 for Solderers and Brazers.

Wage and job openings information for machining and metalworking occupations in the Toledo area is shown in the table on the following page.

Where can I find more information?

More information about machining and metalworking occupations is available in the Occupational Outlook Handbook, which may be found on-line at www.bls.gov/oco/home.htm.

Appendix 5. Descriptive Statistics and Frequencies for Self-Ratings of O*NET Knowledge and Skill Elements

Machining and Metalworking Occupations
Annual Job Openings, 1998-2008, and 1998 Average Hourly Wages
Toledo Metropolitan Area

Occupation	Annual Job Openings, 1998-2008	Average Hourly Wage 1998
Tool and Die Makers	26	$18.04
Welders and Cutters	28	$15.67
Numerical Control Machine Tool, Metal and Plastic	21	$14.71
Combination Machine Tool Setters and Set-up Operators, Metal and Plastic	5	$14.65
Machinists	33	$13.89
Lathe and Turning Machine Setters/Operators, Metal and Plastic	3	$13.84
Grinding and Polishing Workers, Hand	9	$13.48
All Other Metal and Plastic Machine Operators	10	$13.46
Extrude/Drawing Setters/Operators, Metal and Plastic	9	$13.08
Shear, Slitter Machine Setters/Operators, Metal and Plastic	5	$12.84
Punching Machine Setters/Operators, Metal and Plastic	6	$12.78
Press Machine Setters/Operators, Metal and Plastic	10	$12.61
Soldering and Brazing Machine Setters/Operators	12	$12.58
Combination Machine Tool Operator, Metal and Plastic	16	$12.57
Machine Forming Operators, Metal and Plastic	33	$11.80
Metal Fabricators, Structural Metals	5	$11.61
Drilling and Boring Machine Setters and Set-up Operators, Metal and Plastic	6	$11.51
Welding Machine Operators and Tenders	8	$11.36
Heat Treating, Tempering Machine Operators	6	$10.99
Solderers and Brazers	6	$9.14
Machine Tool Cutting Operators, Metal and Plastic	41	NA
Molders and Shapers, Except Jewelry	15	NA
Metal Molding and Casting Operators/Tenders	6	NA
Forging Machine Setters/Operators, Metal and Plastic	5	NA

Source: Ohio Department of Job and Family Services, Labor Market Information Bureau, lmi.state.oh.us. Toledo area information is for the Toledo Metropolitan Area, consisting of Fulton, Lucas, and Wood Counties.

Appendix 5. Descriptive Statistics and Frequencies for Self-Ratings of O*NET Knowledge and Skill Elements

Appendix Table 5-1.
Descriptive Statistics and Frequencies for Self-Ratings of O*Net Knowledge Elements

	Response Frequencies								Summary Statistics			
Knowledge Element	Knowledge Not Important in Previous Job	1	2	3	4	5	6	7	Number of Responses with Knowledge Rating	Mean Knowledge Rating	Mode Knowledge Rating	Standard Deviation of Knowledge Ratings
Administration and Management	13	4			5	3	1	4	17	4.29	4	2.20
Clerical	5	6	1	2	1	4	3	8	25	4.48	7	2.43
Economics and Accounting	13	2	3	3	4	2		2	17	3.47	2	1.81
Sales and Marketing	13	4	2	3	2	3	3		17	3.41	1	1.87
Customer and Personal Service	7	2	1	1	2	4	5	8	23	5.26	7	1.94
Transportation	12	4	2	7	5				18	2.72	3	1.13
Production and Processing	8	2	3	9	2	2		4	22	3.68	3	1.89
Computers and Electronics	6		5	6	5	4	2	2	24	3.92	3	1.56
Engineering and Technology	16	1	5	2	1	4	1		14	3.36	2	1.60
Design	14	3	1	3	4	4	1		16	3.50	4	1.59
Building and Construction	20		2	1	1	4	2		10	4.30	5	1.49
Mechanical	10	3	4	7	2		2	2	20	3.30	3	1.87
Mathematics	1	1	4	7	8	6	3		29	3.79	4	1.32
Physics	17	2	3	3	3	1			12	2.83	2	1.27
Chemistry	13	4	2	6	5				17	2.71	3	1.16
Biology	23	3	1		2	1			7	2.57	1	1.72
Psychology	11	3		5	6	3		2	19	3.74	4	1.69
Geography	13	4	3	3	4	3			17	2.94	1	1.48
Education and Training	4	6	1	2	4	6	4	3	26	4.04	1	2.09
English Language	2	2	6	4	4	8	2	4	28	4.29	5	1.70
Fine Arts	21	3	2	2	2				9	2.33	1	1.22
Public Safety and Security	8	3	4	10	2	2		1	22	3.00	3	1.41
Law, Government and Jurisprudence	6	6	4	10	2	1	1		24	2.63	3	1.31
Telecommunications	8	7	6		3	3			19	2.42	1	1.54
Communications and Media	6	2	5	6	8	2		1	24	3.29	4	1.37

Appendix 5. Descriptive Statistics and Frequencies for Self-Ratings of O*NET Knowledge and Skill Elements

Appendix Table 5-2.
Descriptive Statistics and Frequencies for Self-Ratings of O*Net Skill Elements

	Response Frequencies								Summary Statistics			
Skill Element	Skill Not Applicable	1	2	3	4	5	6	7	Number of Responses with Skill Ratings	Mean Skill Rating	Mode Skill Rating	Standard Deviation of Skill Ratings
Reading Comprehension	1	2	2	1	5	11	4	4	29	4.69	5	1.65
Active Listening	2	3	1	1	4	12	1	6	28	4.71	5	1.80
Writing	2	3	1	4	5	8	5	2	28	4.32	5	1.70
Speaking	3	4	2	3	6	7	3	2	27	4.00	5	1.80
Mathematics	2	1	3	8	3	7	4	2	28	4.14	3	1.60
Science	19	1	2	4	1	3			11	3.27	3	1.35
Critical Thinking	7	3	2		5	10	3		23	4.13	5	1.60
Active Learning	4	3	3	2	8	4	4	2	26	4.04	4	1.78
Learning Strategies	2	1	4	5	4	9	4	1	28	4.14	5	1.53
Monitoring	6	4	3	3	4	5	2	3	24	3.88	5	1.98
Social Perceptiveness	7	2	1	4	5	6	5		23	4.17	5	1.53
Coordination	5	1	2	2	4	11	2	3	25	4.60	5	1.53
Persuasion	7	4		2	5	8	4		23	4.09	5	1.68
Negotiation	7	2	5	3	3	7		3	23	3.87	5	1.84
Instructing	3	5	3	1	4	10	2	2	27	3.93	5	1.90
Service Orientation	7	1	2	4	3	7	5	1	23	4.39	5	1.56
Complex Problem Solving	5	1	6	4	6	3	4	1	25	3.80	2	1.63
Operations Analysis	12	3	1	6	2	3	3		18	3.56	3	1.69
Technology Design	13	5	3	2	5	2			17	2.76	1	1.48
Equipment Selection	6	2	5	5	3	6	2	1	24	3.67	5	1.66
Installation	13	2	1	5	3	4	1	1	17	3.76	3	1.64
Programming	17	5	2	1	1	2	2		13	2.92	1	2.02
Quality Control Analysis	12	4	3	4		3	1	3	18	3.56	1	2.20
Operation Monitoring	9	5	4	3	3	1	3	2	21	3.38	1	2.09
Operation and Control	3	5	4	7	5	5	1		27	3.15	3	1.49
Equipment Maintenance	12	5	2	3	2	3	2	1	18	3.33	1	2.00
Troubleshooting	10	2	3	7	2	2	2	2	20	3.65	3	1.81
Repairing	12	3	5	4	2	3		1	18	3.06	2	1.66
Systems Analysis	13	2	3	3	3	5		1	17	3.59	5	1.66
Systems Evaluation	13	2	3	5		3	2	2	17	3.76	3	1.99
Judgment/Decision-Making	7	6	2	4	1	6	2	2	23	3.57	1	2.06
Time Management	4	2	6	4	2	5	3	4	26	4.04	2	1.99
Management of Financial Resources	10	3	2	4	7		2	2	20	3.65	4	1.81
Management of Material Resources	10	4	4	3	4	1	4		20	3.30	1	1.81
Management of Personnel Resources	9	3	2	2		8	3	3	21	4.38	5	2.01

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