Crosswalk Validation Project: Executive Summary

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Project Goal

In 2007, a set of seven tables was produced with the goal of providing a comprehensive and standardized mapping of Classification of Instructional Program (CIP) codes and O*NET Standard Occupational Classification (SOC) occupational codes into Career Clusters and Career Pathways.[1] This project was coordinated by DTI Associates, Inc., under contract with the Office of Vocational and Adult Education (OVAE), U.S. Department of Education.

Starting in 2010, the National Research Center for Career and Technical Education (NRCCTE) at the University of Louisville undertook the task of revising and updating the original 2007 crosswalks, specifically focusing on decision rules that connect the SOCs to the CIPs. The NRCCTE also sought to re-examine the underlying relationships between the SOCs, CIPs, Career Clusters, and associated Career Pathways. The overall purpose of the NRCCTE's Crosswalk Validation Project[2] was to capture the evolving multi-state, multi-institutional collaborative efforts being made to bring greater consistency and clarity to Perkins secondary and postsecondary data collection and reporting.

The Crosswalk Validation project is a joint effort by the NRCCTE and the National Association of State Directors of Career-Technical Education Consortium (NASDCTEc). The primary product created through this project was a national[3] crosswalk that links educational programs (CIPs) to occupations (SOCs) with Career Clusters and Career Pathways. The resulting crosswalks produced by this project have created a foundation for more standardized accountability requirements, which we believe should be a major focus of future Perkins legislation.

Overview of Crosswalk Validation and Update Process

The Crosswalk Validation project was divided into four stages.

1. Project staff reviewed the existing historical correspondence on decision rules that were used in the CIP2000 to Career Clusters assignments in Perkins Table 1 and made recommended revisions.
2. Project staff reviewed the SOC 2000 assignment in Perkins Table 5 and recommended assignments to Career Clusters and Career Pathways.

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[1] CIP codes are assigned to postsecondary educational programs by the U.S. Department of Education. The latest version of these codes is referred to as CIP 2010, although many are still using CIP 2000. SOCs provide a coding structure for all occupations within U.S. industry. The U.S. Department of Labor is responsible for developing SOC codes and is currently engaged in updating them.

[2] See http://www.nrccte.org/resources/studies/crosswalk-validation-project for more information.

[3] The revised tables produced by the Crosswalk Validation project are based on national data. The corresponding Excel tables provided on the NRCCTE (www.nrccte.org) and NASDCTEc (www.careertech.org) websites can be downloaded by individual states. These crosswalks can be customized to reflect the relationships between education programs, occupational information, Career Clusters, and Career Pathways specific to individual states.

3. Initial work was completed using the CIP 2000 and SOC 2000, which was then updated to the CIP 2010 and SOC 2010 taxonomies.
4. Using the current NCES CIP-SOC Crosswalk, the SOC-Cluster-Pathway was connected to the CIP-Cluster tables to create a linked crosswalk.

The Crosswalk Validation project used the original tables (Perkins Tables 1, 5, and 7) created by the 2007 crosswalk effort as its starting point. The CIPs and SOCs are each matched to one of the 16 Career Clusters and the 79 Career Pathways that are used by state education agencies (SEAs) and local education agencies (LEAs) when reporting their Perkins accountability results to the U.S. Department of Education. The matching of CIPs to SOCs was made possible through the use of the 2010 National CIP-SOC crosswalk.

This executive summary describes the process by which the Crosswalk Validation project developed a set of crosswalks that connected CIPs, SOCs, Career Clusters, and Career Pathways. The crosswalks produced by the project can be accessed electronically at the NRCCTE (www.nrccte.org) and NASDCTEc (www.careertech.org) websites. A full report on the project is forthcoming. In this summary, we offer a shorter description of each of the four stages of the project.

Stage 1: Revise Perkins Table 1 CIP 2000 Assignment to Career Clusters

At the commencement of the project, a process was developed to determine the best Career Cluster to which to assign individual CIPs. As a part of this process, guidelines or decision rules were developed to assist in the assignment of future CIP codes after reviewing the original CIP-Career Cluster assignments. This stage involved reviewing historical correspondence and revising and updating, as required, the CIP/Career Cluster matches from the original Perkins Table 1. Decision rule development and validation was accomplished by reconciling information previously produced by the National Crosswalk Center and the Occupational Supply Demand System (OSDS) project. Differences were discussed with the OSDS and Crosswalk Center staff. These discussions were helpful in identifying guidelines and information that could help make reasonable classifications offering the best fit. A revised Perkins Table 1 can be found the NRCCTE and NASDCTEc websites in Excel and PDF formats.

Stage 2: Revise Perkins Table 5 SOC2000 assignment to Career Clusters/Pathways

A process similar to Stage 1 was conducted to determine the best Career Cluster and Career Pathway to assign the SOCs. As a part of this process, guidelines or decision rules were developed to assist in the assignment of future SOC codes. The revision of Perkins Table 5 for SOCs was needed for two reasons. First, the Cluster/Pathway structure has changed since the original Perkins Table 5 was released. Consequently, there was a need to revise the Table to accurately reflect the current location and names. Second, questions have been raised regarding why certain SOCs were classified in a particular Cluster or Pathway. The Crosswalk Validation project attempted to develop a set of decision rules

that would bring consistency and establish a rationale for making assignments. As was the case in the assignment of Career Clusters and Career Pathways to CIPs, the process used for SOCs relied on a comparison of SOC occupational definitions to existing Career Cluster and Career Pathway definitions and determining the best fit. The following steps were undertaken:

- Project staff looked at SOC coding structures and definitions and compared these to Career Pathway definitions to make assignment.
- Pathways have changed since the production of Perkins Table 5, so adjustments of SOC to Career Clusters and Career Pathway relationships had to be made (e.g., *accountant* was formerly located in the Business Career Cluster but was moved to the Finance Career Cluster because a new Accounting Career Pathway was located under Finance).
- Project staff drew upon O*NET knowledge to verify the accuracy of assignments, particularly in STEM occupations.

The assignment process included deciding: (a) if there was a clear match to a Career Cluster and associated Career Pathway. If there was, the SOC was assigned to the Career Cluster/Pathway. If there was not, the SOC description was used to examine alternative Career Clusters/Pathways. This process required staff to make some basic assumptions based on the premise that "occupations are classified based on work performed and, in some cases, on the skills, education, and/or training needed to perform the work at a competent level."[4] A revised Perkins Table 5 can be found on the NRCCTE and NASDCTEc websites in Excel and PDF formats.

Stage 3: Update CIP2000 and SOC2000 to CIP2010 and SOC2010

The third stage of the project involved updating the CIPs and SOCs to the new 2010 taxonomies. The first two stages of the Crosswalk Validation Project focused on reviewing the accuracy of the assignment of the existing CIP and SOC codes in the original Perkins Tables 1 and 5, taking into account changes made to the Career Cluster/Career Pathway structures and definitions since the Perkins tables were constructed in 2007. The updating of the crosswalks to the 2010 CIP and SOC taxonomies took into consideration the deletion, addition, and renumbering of CIP and SOC codes. The assumptions, guidelines, and decision rules used in the project's first two stages to create a consistent process for assigning new programs and occupations to career Clusters/Pathways were again applied in order to update the crosswalks to the 2010 taxonomies.

Stage 4: Update the Perkins Table 7 Crosswalk

The decision was made to modify the original Perkins Table 7 so it would serve as a more robust crosswalk than the 2007 version. The 2007 version had adopted the

[4] See http://www.bls.gov/soc/soc_2010_class_prin_cod_guide.pdf, Page 1.

separate Career Cluster/Pathway assignments for CIPs from Perkins Table 1 and SOCs from Perkins Table 5 in order to create Perkins Table 7. However, the CIPs and SOCs were not directly linked. The OVAE website describing the use of Perkins Table 7 acknowledges that Table 7 "lists the CIP codes primarily assigned to each pathway but does not further assign them to particular occupations."[5]

In order to create a linked crosswalk, we used the 2010 National Center for Education Statistics (NCES) CIP-SOC crosswalk[6] to combine the CIP-recommended Career Cluster table with the SOC-Career Cluster/Pathway table. The validity of the revised Perkins Table 7 crosswalk is dependent on the completeness and accuracy of the CIP-SOC crosswalk. To learn how the new 2010 CIP-SOC crosswalk was developed, we refer the reader to the *Guidelines for Using the CIP to SOC Crosswalk*.[7]

Table 1, at the end of this executive summary, contains an excerpt from the Crosswalk Validation project's revised Table 7. We used cost estimators (SOC 13-1051) as a sample occupation to describe the contents of the table columns.

According to the NCES CIP-SOC Crosswalk, there are seven instructional programs that prepare individuals directly for jobs classified as cost estimators (in Table 1, Columns 1 and 2 provide the SOC code and title). The seven CIP codes and titles are listed in Columns 7 (*CIP 6 2010 Code*) and 8 (*CIPTitle_2010*).

Instructional programs are classified in three different career Clusters found in Column 9 (*REC CLSTR NO*) and Column 10 (*RecommendedCluster_2010*): These Clusters are 4: Business Management & Administration, 2: Architecture & Construction, and 15: Science, Technology, Engineering & Mathematics.

A key difference between the Crosswalk Validation project's revised crosswalk and the original Perkins Table 7 is the addition of the two indicators—*Mtch Clster* and *Crosswalk Rel Strength*—in the revised Table 7. Column 11—*Mtch Clster**—contains either a 0 or a 1. A value of 1 means the SOC Career Cluster and the CIP Career Cluster are identical. A value of 0 means the SOC Career Cluster does not match the CIP career Cluster. Column 12—*CrossWalk Rel Strength***—can have three values, 0, 1, or 2. If the value is 2, it means the SOC and CIP Career Clusters match *and* there is a SOC-CIP match in the NCES CIP-SOC Crosswalk. If the value is 1, it means there is SOC-CIP match in the NCES CIP-SOC Crosswalk, but the SOC and CIP Career Clusters do not match. The NCES CIP-SOC Crosswalk frequently lists a relationship for a program to postsecondary faculty and several high-level management occupations. Although it is possible that students in these programs may eventually earn a Master's degree or a doctorate and become postsecondary faculty, such an educational pathway would require many additional years of preparation; such occupations are also not as directly related to

[5] See http://cte.ed.gov/accountability/crosswalks.cfm, Perkins Table 7 Primary Occupations and Instructional Programs by Clusters/Pathways.
[6] See http://nces.ed.gov/ipeds/cipcode/resources.aspx?y=55, the CIP2010 to SOC2010 Crosswalk.
[7] See http://bit.ly/PjpHXL.

CTE. As a result, we have included these occupations but have given them a lower score of 0 to reflect a weak or remote relationship. A revised Perkins Table 7, the full crosswalk, can be found on the NRCCTE and NASDCTEc websites in Excel and PDF formats.

Unresolved Issues That Still Need Addressing

The Crosswalk Validation project has attempted to develop a more accurate and consistent classification of SOC and CIP codes in relation to the Career Clusters and Career Pathways. A set of guidelines and decision rules have been used that should facilitate the classification of future occupations and programs as they are added. It should be noted that the number of revised CIP codes in the Crosswalk Validation project's revised Table 1, as well as the number of SOC codes in the revised Table 5, are not the same in the revised Table 7. For example, the NCES CIP-SOC crosswalk shows that there is "NO MATCH" for some CIPs and SOCs because some occupations do not have a related academic program that prepares people for the occupation. The NO MATCH CIPs and SOCs are excluded from Table 7; consequently, the number of CIPs and SOCs differ in Tables 1 and 5, which include all SOCs and most CIPs, except for those mentioned earlier, like those that are not occupationally specific and non-academic credit CIPs (e.g., CIPs 32-37, 53). It is also the case that the differences in the numbers of CIP and SOC codes may be because of the assumptions used, guiding principles followed, and decision rules made in this project.

During the course of the Crosswalk Validation project, a number of issues arose that should be addressed in future efforts, including:

1. Whether to include some CIPs (e.g., 05, 16, and perhaps others) that are not typically associated with CTE.
2. Whether Health Residency programs (CIP 60) should continue to be included in the Perkins tables. These programs were included in the original Perkins tables and have been included in our update. According to NCES, however, these programs are not valid for IPEDS reporting. From an accountability perspective, if they are not valid for IPEDS reporting, their continued inclusion would seem unnecessary.
3. Whether Career Pathways with few or no SOCs should continue to be included in the Career Cluster/Pathway structure. Nine Career Pathways contain two or fewer occupations.
4. Whether a Social Science Career Pathway should be added to the STEM Career Cluster in order to allow a comparison of various STEM definitions.

One major issue needs immediate attention. A major reason for undertaking this project arose from the tensions that continue to exist regarding the ultimate utility of crosswalks—are they mainly to be used for career guidance and planning, or are they primarily a tool for accountability? The level of precision in matching CIPs, SOCs, Career Clusters, and Career Pathways should be much higher if crosswalks are to be used for accountability purposes, but for career guidance and planning, the latitude is much

wider. Although the Crosswalk Validation project has not completely resolved the tension between the two functions (career guidance and planning and accountability), the project's addition of two indicators in the revised Table 7—*Mtch Clster* and *Crosswalk Rel Strength*—offers a step toward resolving this tension. In general, this tension often results in the need to modify the crosswalk to suit particular purposes. If this is the case, we recommend that users begin by considering these two indicators—*Mtch Clster* and *Crosswalk Rel Strength*.

How to Use the Crosswalk Validation Project's Revised Tables 1, 5, and 7

As indicated, three crosswalk files that update, revise, and modify the original Perkins 2007 Tables 1, 5 and 7 have been placed on the NRCCTE and NASDCTEc websites. The Crosswalk Validation project labels these revised crosswalks similarly. The tables are presented in two file formats, PDF and Excel. The PDF format is for use by those who wish to apply the information presented without modifying it. For example, these revised crosswalks could be very useful in demonstrating the potential training connections for a given occupation, either to a single Career Cluster or to multiple Career Clusters.

The project offers downloadable Excel files for those states that wish to customize the information presented in the three crosswalks for their own purposes. For example, because of the unique way in which certain educational programs relate to occupations within an individual state, the associated crosswalk may have to be modified for that state.

In general, it should be noted that modifying the crosswalk for an individual state carries with it certain risks of non-comparability across states. Modifying the crosswalks makes sense when the crosswalks are used for guidance and career planning information, because in being modified they more accurately reflect the education programs, occupations, Career Clusters, and Career Pathways frameworks within a state. We caution users that modifying crosswalks to meet individual state needs may mean weakening the use of these crosswalks for presenting accountability information at the national level. We also note that because the revised crosswalks are based on national data, comparisons may be made among educational programs, occupations, Career Clusters, and Career Pathways only at the national level.

Table 1
A Segment of the Revised Perkins Table 7 Crosswalk: An Example

1	2	3	4	5	6	7	8	9	10	11	12
SOC CODE	SOC TITLE	SOC PTHWY NO	SOC PTHWY TITL	SOC Car Clstr No	SOC_Career Clusters	CIP 6 2010 Code	CIPTitle_2010	REC CLSTR NO	Recommended Cluster_2010	Mtch Clstr*	CrossWalk Rel Strength**
13-1051	Cost Estimators	2.1	Design/Pre-Construction	2	Architecture & Construction	52.0201	Business Administration and Management, General.	4	Business Management & Administration	0	1
13-1051	Cost Estimators	2.1	Design/Pre-Construction	2	Architecture & Construction	52.0101	Business/Commerce, General.	4	Business Management & Administration	0	1
13-1051	Cost Estimators	2.1	Design/Pre-Construction	2	Architecture & Construction	15.1001	Construction Engineering Technology/Technician.	2	Architecture & Construction	1	2
13-1051	Cost Estimators	2.1	Design/Pre-Construction	2	Architecture & Construction	14.3301	Construction Engineering.	15	Science, Technology, Engineering & Mathematics	0	1
13-1051	Cost Estimators	2.1	Design/Pre-Construction	2	Architecture & Construction	14.3601	Manufacturing Engineering.	15	Science, Technology, Engineering & Mathematics	0	1
13-1051	Cost Estimators	2.1	Design/Pre-Construction	2	Architecture & Construction	14.1801	Materials Engineering.	15	Science, Technology, Engineering & Mathematics	0	1
13-1051	Cost Estimators	2.1	Design/Pre-Construction	2	Architecture & Construction	14.1901	Mechanical Engineering.	15	Science, Technology, Engineering & Mathematics	0	1

Note. Mtch Clstr* = If the SOC Recommended Cluster matches the CIP Recommended Cluster, the number in this column is 1. If there is no match, the number is 0. Cross Walk Rel Strength** = If the NCES CIP-SOC Crosswalk shows a relationship and the Clusters match, the Crosswalk Related Strength is 2. If the NCES Crosswalk shows a relationship but the Clusters don't match, the Crosswalk Related Strength is 1.