



# Using CEDS Align For P-20 Collaboration

## A Reference Guide

November 2013

The purpose of this document is to serve as a reference guide for States involved in the P-20 effort to map data elements to the Common Education Data Standards (CEDS). It describes how one State used Align to assist in development of its P-20 system and describes in detail how this project could be replicated. The CEDS provide a shared vocabulary for education data elements used to streamline the exchange, comparison and understanding of data within and across P-20 institutions and sectors. This guide walks the user through the process for aligning to CEDS, including the mapping process, collection of data sources, formatting and uploading data sources to the Web-based tool, CEDS Align, and alignment to CEDS elements. It is based on the work that Reform Support Network (RSN) experts conducted with the North Carolina Department of Public Instruction (NCDPI) under an individual technical assistance request.

### Need

An Instructional Improvement System (IIS) and its components rely on data movement and sharing across many other data systems. The IIS requires access to student demographic data, student assessment data (summative, formative, curriculum-embedded assessments, etcetera), student attendance, student discipline data, student and teacher course assignments and many more data sources, all of which may reside in systems outside of the IIS. Movement of these data across these multiple systems is difficult under the best of circumstances. Considering that the IIS must have access to real-time data at the student level in order

to be useful in the classroom, the movement of data becomes ever more difficult to establish and sustain.

Adopting a common set of data standards across IIS components and other student systems would facilitate and improve the movement of these data over time. Mapping IIS data systems to CEDS is one way to promote the use of these data standards by vendors that supply IIS components. RFPs can specify such mappings and begin to push the vendor community to adopt standards that would ease IIS component implementation, foster data sharing across districts and systems and facilitate data mapping among agencies.

## Background of the Request

The NCDPI has provided key support for the CEDS and was among the first State education agencies to map its K–12 data to CEDS 1.0. As part of its PK–12 Statewide Longitudinal Data Systems (SLDS) effort and the North Carolina P-20 initiative, the NCDPI has worked closely with the following agencies and sectors to improve the capacity to share data across systems:

- The North Carolina Commerce Department, Labor & Economic Analysis Division
- The North Carolina Community College System
- The North Carolina Department of Health and Human Services
- The North Carolina Independent Colleges and Universities
- The University of North Carolina

A key task in preparation for the P-20 SLDS was to map data elements for each sector to CEDS Version 3. While the RSN experts performed the initial alignment, they transferred all ownership of the resulting maps to NCDPI staff with the understanding that the staff would be responsible for all subsequent maintenance and currency of the information within the maps.

Utilizing resources available through the RSN, NCDPI gathered existing data sources, uploaded them to the CEDS Align tool and aligned each data element within the data sources to the relevant CEDS elements. CEDS Align is a Web-based tool designed to assist education stakeholders in sharing data among educational sectors and across State lines. The tool enables users to import or input their data dictionaries, align their elements to CEDS, compare their data dictionaries with those of other users and analyze their data in relation to various other CEDS alignments. Tutorials for Align are available at <https://ceds.ed.gov/learnCedsAlignment.aspx>.

## Mapping Process

The mapping process consists of five major steps:

1. Data collection
2. Formatting and upload
3. Alignment to CEDS
4. Internal quality assurance
5. State training, validation and publication

This section of the guide will detail each of the five steps. Figure 1 illustrates North Carolina’s mapping process.

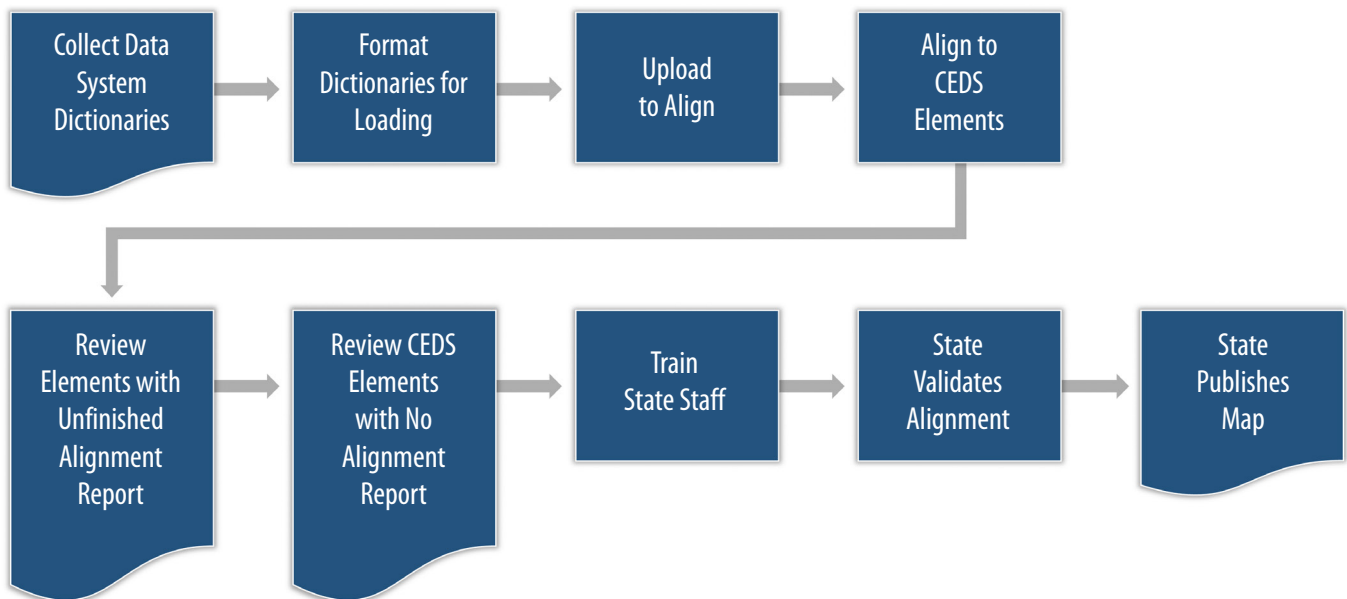


Figure 1. Mapping Process for North Carolina Project

## Collection of Data Sources

The mapping process begins with identification of the data system(s) to be mapped. States should consider the purpose of the mapping process. When the State plans to map multiple data sources, it needs to determine if the desired result is (1) a consolidated list of all data elements or (2) a list of common elements across data sources. If the former is the goal, the State would create a single map with naming conventions determining the data source. If the latter is the goal, the State would create multiple maps (one for each data source) to generate reports across maps.

North Carolina's goal was to view commonalities among the various educational sectors. With that in mind, the State created one map for each sector. To determine the data sources necessary for mapping, North Carolina worked closely with the five agencies and sectors identified previously that were pertinent to the P-20 project. These entities supplied the source information utilized during the mapping and alignment process. (Source information may contain all or part of a data system.) The State collected all data dictionary, file layout and other documents containing information about the data system from the appropriate entities.

## Formatting Data Sources for Uploading to Align

To populate CEDS Align with the data source information, users must either enter information manually or format the information in Microsoft Excel for upload. For this project, the State formatted the information in Excel for upload into Align as the data sources for each sector were collected.

The mapping process is the same, whether the user enters the information manually or formats it for upload. The user must gather as much information as possible about each individual element, including:

- Where the element resides in the system
- The element definition
- The element data type
- The element length
- The element code set and definitions

The North Carolina project dictated that all information uploaded into Align conform to the following:

- The element identifier, element definition and code description entries should be sentence case.
- The system name, database name, table name, element name, data type and valid values/code set should be upper case.

The conformity was necessary preparation for the generation of future reports. North Carolina wanted the capacity to produce professional reports with the same letter case across all maps.

Many of the data sources were provided in Microsoft Excel format. Others were provided in PDF or Microsoft Word format. In the latter cases, the information was copied and pasted into Microsoft Excel. Formatting for upload requires three steps:

1. Ensure the proper letter case (sentence case versus upper case) for each field, and modify when necessary.
2. Ensure separate columns for each field. For example, if data received included a table name and element name in one column, separate the information into two columns.
3. Ensure that the codes and definitions for any option sets are listed on separate rows. For example, for gender, "M" and "Male" would appear on one row with "F" and "Female" on a second row.

My Maps ► Manage Map

## Upload Map Elements (step 1 of 2)

**NEW!** Now you can upload your data dictionary AND CEDS alignment.

### How do I format my data dictionary?

You can upload your data dictionary into the CEDS alignment tool as an Excel or CSV file.

1. The **first row** of the worksheet you import must contain the column names.
2. The column names (first row) must be **text only** (they cannot contain any filters, formulas, etc.)
3. The worksheet name must **not** contain hyphens (-) or spaces.
4. If you are using your own Excel or CSV file rather than the template, you will still need to download the template to get the Element ID and Alignment Question Response IDs necessary to upload your alignment.

A template with instructions is provided to assist you in creating a file that can be processed by this website.

[Download the Excel template](#)  (569 KB)

### How do I load my data dictionary?

To start the process click the Upload a File button below. You will then choose the Excel or CSV file to upload. If the file is an Excel file and it contains more than one worksheet you will be asked which worksheet to import. Once this information is provided the import process will load your data dictionary and associate it to the current map.

[Upload a File](#)

Figure 2. Align Upload Screen

*Note: Before uploading a file, a map must be created in Align. See Module 1 of the Tutorials available at <https://ceds.ed.gov/learnCedsAlignment.aspx> for information on how to create a map.*

The Microsoft Excel template, found on the Align Upload Screen, includes instructions on how to format the Microsoft Excel file for upload (see Figure 2).

After the information was properly formatted, the State uploaded the Microsoft Excel file into Align. Once the upload was completed, the State could access map elements through “Add/Modify Elements” on the map’s main screen.

## Alignment to CEDS Elements

Once all information about the data source is added to the Align map, the next step is to align each map element to one or more CEDS elements. To do this,

the user must review each map element for context. Contextual clues include the element’s location in the data source, the element name and the element definition. This information helps determine the appropriate CEDS element to which to align the map element.

CEDS elements are divided into five domains—early learning, K-12, postsecondary, adult education and career and technical education. A map element’s location in the data source indicates which CEDS domain is most relevant. To determine the appropriate CEDS element, the user must navigate through multiple levels of categories until reaching the correct

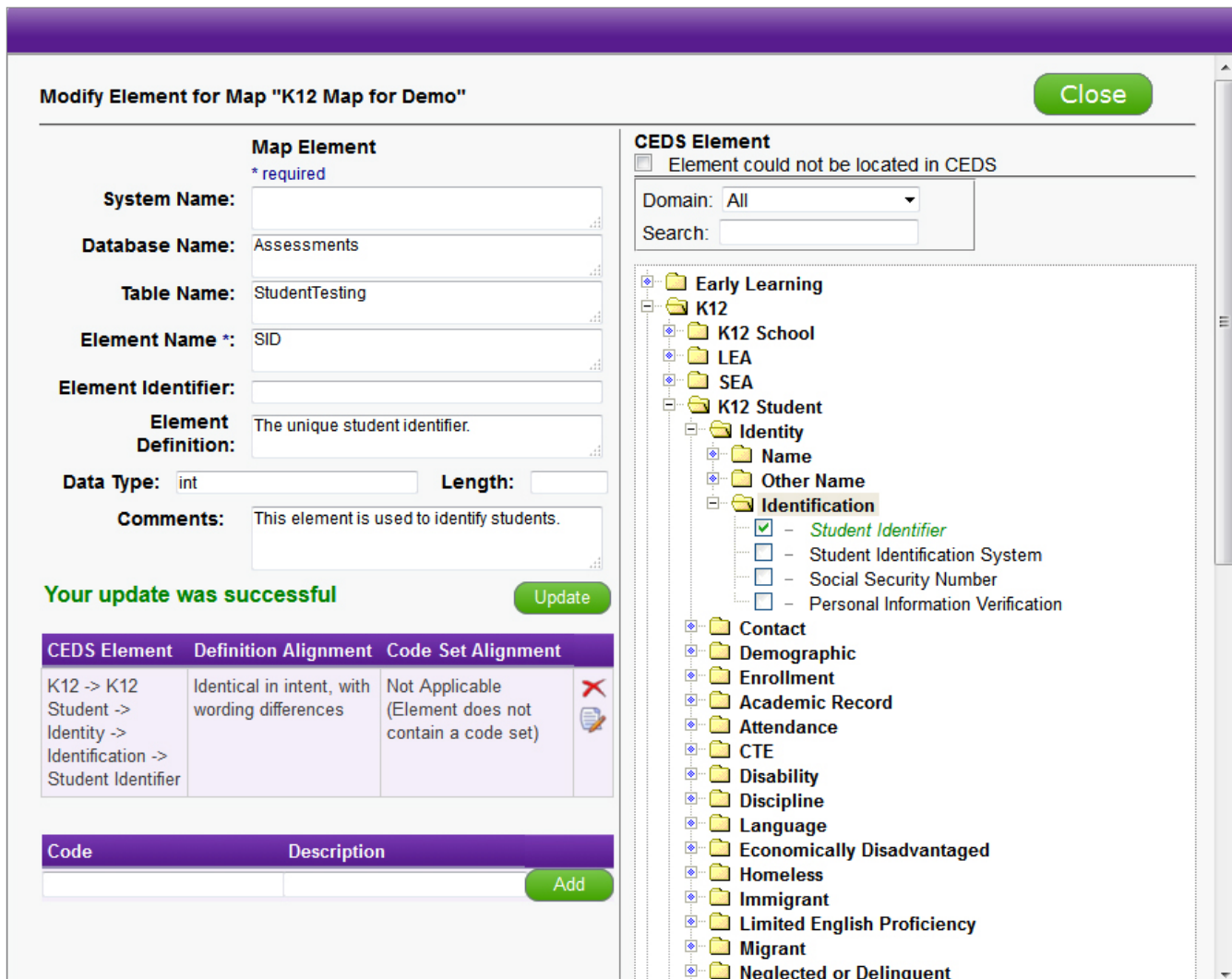


Figure 3. CEDS Element Tree View

set of elements (see Figure 3). CEDS element names are hyperlinked to a full description of the element. It is imperative that the user review the CEDS element definitions, particularly in cases where multiple CEDS elements are necessary to align to the map element.

Sometimes searching through the element tree view does not result in locating an appropriate CEDS element. The user can then use the search function to ensure that the correct CEDS element is selected or that no matching CEDS element exists. If, after exhausting

all options, no CEDS element is considered a match, the user must mark the map element "Element Could Not Be Located in CEDS."

When a CEDS element is considered a match, the user must review the map element's definition and the CEDS element's definition to confirm the alignment between the two definitions. Similarly, it must review the map element's code set and definitions and the CEDS element's code set and definitions to indicate the alignment between the two code sets. When the CEDS

element check box is selected, a pop-up box appears for use in determining the definition alignment and code set alignment (see Figure 4).

The definition alignment question has six possible options. The user must determine if the definitions of alignment are:

1. **Identical in wording.** The user should select this option if the definition is exactly the same as that of the CEDS element.
2. **Identical in intent, with wording differences.** The user should select this option if the definitions have exactly the same intent but are not worded exactly the same.
3. **Identical in intent when aggregated or disaggregated.** The user should select this option if the data source element is divided among multiple elements and the CEDS element is a

single element, or vice versa. A common example of this is race, where a data source collects race as one single element, and CEDS lists each race as a separate element.

4. **Similar in intent, with wording differences.** The user should select this option if the two elements have similar intent but are not close enough for identical intent; there are slight variations.
5. **Related only at a concept level, with differences in the intent.** The user should select this option if the two elements can be related conceptually, but the actual usage of the data source element would not be the same as that of the CEDS element. For example, the element "Age" may be aligned to the CEDS element "Birthdate." However, the elements are only related on a conceptual level; they have differences in intention.

**Alignment** (press "ESC" key to close) ✕

**Alignment** Cancel

You have aligned the Map K12 Map for Demo element with the CEDS element

Map K12 Map for Demo element	CEDS element
SID	Student Identifier

**What is the alignment?**

*The definitions of alignment are:*

- Identical in wording
- Identical in intent, with wording differences
- Identical in intent when aggregated or disaggregated
- Similar in intent, with wording differences
- Related only at a concept level, with differences in the intent
- No element definition available in the stakeholder data dictionary.

**The code sets have:**

- Exactly the same codes and definitions
- The same number of codes, but would require transformation on value to align with CEDS code set
- The same concepts, but would require aggregation or disaggregation of codes to achieve compatibility
- Very few or no codes that relate; e.g. one has more than the other and cannot be aggregated/disaggregated to make them the same
- Not Applicable (Element does not contain a code set)
- No code set definition available in the stakeholder data dictionary.

Submit Cancel

Figure 4. Alignment Questions

6. **No element definition available in the stakeholder data dictionary.** The user should select this option when the data source does not provide a definition for a given element.

For the alignment to be truly accurate, users cannot align to a definition that does not exist. So, while it may be tempting to infer a definition from certain element names (for example, "First Name"), when no definition exists, users should use the "No element definition available in the stakeholder data dictionary."

The code set alignment question also provides six options, many of which are similar to those for the definition alignment question. The user must determine if the option sets have:

1. **Exactly the same codes and definitions.** The user should select this option if the codes are exactly the same as those of the CEDS element.
2. **The same number of codes, but would require transformation on value to align with CEDS code set.** The user should select this option if both elements have the same number of codes for the same purpose, but the codes themselves are different. For example, the data source element "Gender" provides the codes "M" for Male and "F" for Female. The CEDS element "Sex," has "Male" for Male and "Female" for Female. To align the data source element to the CEDS element would require transformation from "M" to "Male" and "F" to "Female."
3. **The same concepts, but would require aggregation or disaggregation of codes to achieve compatibility.** Similar to definition alignment, the user should select this option when one element has more codes than the other, but the codes could be combined or separated to make them the same. To continue the race example, "Race" is collected in the data source as a single element with multiple codes (for example, African American, Asian, American Indian, Native Hawaiian, White). CEDS, on the other hand, has separate elements for race with "Yes," "No" and "Not Selected" as possible codes. The data source

element's codes would need to be disaggregated in order to match the CEDS element.

4. **Very few or no codes that relate; for example, one has more than the other and cannot be aggregated/disaggregated to make them the same.** The user should select this option when the data source element varies enough that its codes are entirely different from those of the aligned CEDS element. Any sort of combination or separation of the codes would not result in alignment with the codes in the CEDS element.
5. **Not Applicable (element does not contain a code set).** The user should select this option when an element does not have an option set. Examples of this are "First Name" or "Student Identification Number." These are elements for which an option set would not exist.
6. **No code set definition available in the stakeholder data dictionary.** When a code exists for an element, but no definition is provided for the code, the user should select this option.

The element alignment process is repeated for each data element in the map. While the alignment described here is a manual process in the CEDS Align tool, alignment can also be included in the Microsoft Excel file and uploaded to the tool. (Instructions for including alignment in the Microsoft Excel file can be found in the upload template.) Aligning elements via the tool has proven to be more efficient than alignment by way of Microsoft Excel. The Microsoft Excel template requires the user to enter codes specific to the CEDS element as well as codes for the two alignment questions. To upload alignment via Microsoft Excel, the user must use the CEDS website to find elements, definitions and code sets; use a Microsoft Excel spreadsheet to locate the appropriate CEDS element's ID; and then manually enter that element ID into the file to be uploaded. The process takes much longer than the Align tool process; it is generally recommended only when a data source to be uploaded has multiple instances of the exact same element, where the information can be copied and pasted to multiple rows.

## Reviewing CEDS Reports for Quality Assurance

Once all elements have been aligned, users may utilize several reports to ensure that each alignment was completed to the extent possible. Reports are located at Tools | View Published Maps. Users assigned to each map can access private maps in this area.

Users should run the report “Elements With Unfinished Alignment” to ensure that the alignment process did not miss any elements. This report lists all map elements without one or more CEDS elements aligned or designation as “Element Could Not Be Located in CEDS.”

Additionally, users should run the report “CEDS Elements With No Alignment” to ensure that the alignment process did not miss any CEDS elements. For this report, the tool first looks at the domain of the map. (Domains were chosen during map creation, from the choices early learning, K-12, postsecondary or P-20). Then the system looks through all elements in the map’s CEDS domain and reports any CEDS elements not aligned to the map elements.

If multiple maps are created, users can check for consistency by running the report “Data Dictionary Only” across all the maps. This report will display

elements across the maps that were aligned to the same CEDS element. The user can quickly see any incorrectly aligned elements.

## State Training, Validation and Publishing

For the North Carolina project, RSN experts mapped the identified data sources. To move ownership rights and responsibilities to the State, the map was assigned to users identified by North Carolina as owners/keepers of the map.

Two roles exist for map users in CEDS Align—map administrators and authorized users. As shown in Figure 5, map administrators have all rights available for maps. Authorized users can only add other authorized users, access “Upload Data Dictionary” and “Add/Modify Elements” and view the published version of the map.

Assigned users participated in training that explained how to use Align and how to validate the alignments. Assigned users were urged to validate the element information entered and then review the alignment between map elements and CEDS elements. Once assigned users make all corrections, they can publish the maps. For users creating their own maps, this last step is not necessary.

	Map Administrator	Authorized User
Map Administration	X	
Upload Data Dictionary	X	X
Add/Modify Elements	X	X
Manage User Access	X	
Release for Publication	X	
Archive Map	X	
Copy Map	X	

Figure 5. Align Map Roles



## Next Steps

Once alignment is completed and information validated, the map administrator can publish the map using the Manage Map screen (see Figure 6). The map is then available for the public to view, regardless of whether or not the user has a CEDS account. Should additional users need to be added to the map, they can be managed via “Manage User Access” on the Manage Map screen.

To ensure map currency, map administrators should consider the schedule and process for maintaining and updating the map. When necessary, users can make maps private in order to make changes and then publish them again once the maintenance is completed.

### Manage Map

Map Administration	<b>Map Name:</b> K12 Map for Demo
Upload Data Dictionary	<b>State:</b> Not Applicable
Add/Modify Elements	<b>Domain:</b> K12
Manage User Access	<b>Affiliation Type:</b> SEA
Release for Publication	<b>Affiliation Name:</b> Demo Department of Education
View Published Version	<b>Map Status:</b> Draft
Archive Map	<b>Release Status:</b> Publish for Public Viewing
Copy Map	<b>Archived:</b> False
	<b>Date Created:</b> 2/11/2012 2:00:31 PM
	<b>Last Modified:</b> 7/2/2013 3:07:33 PM

Figure 6. The Manage Map Screen

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