

International Computer and Information Literacy Study (ICILS) International Data Explorer Help Guide

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ICILS International Data Explorer Help Guide

I. Background on the International Computer and Literacy Study (ICILS) and the ICILS International Data Explorer (IDE)

The International Computer and Literacy Study (ICILS) International Data Explorer (IDE) is a web-based application for accessing data from ICILS, supported by the U.S. National Center for Education Statistics (NCES). ICILS is an international assessment that measures 8th-grade students' capabilities in information communications technologies (ICT) via two domains: computer and information literacy (CIL) and computational thinking (CT). ICILS is sponsored by the International Association for the Evaluation of Educational Achievement (IEA).

First conducted in 2013, ICILS assessed students' CIL with an emphasis on the use of computers as information-seeking, management, and communication tools. Thereafter, increasing international recognition of the importance of students' abilities to recognize and operationalize real-world problems using computational formulations led to the development of the CT component within ICILS. The second cycle of ICILS was administered in 2018; it continued to assess CIL and, in the newly added optional assessment component, assessed CT. In addition, it investigated how these abilities relate both to in-school and out-of-school contexts that support learning.

Besides assessing students on CIL and CT, ICILS administered questionnaires to students, teachers, principals, and ICT coordinators to collect contextual information. ICILS data were nationally representative of 8th-grade students as well as 8th-grade teachers in each participating jurisdiction. You may choose either Student or Teacher displays in the ICILS IDE, as shown below in **Section 1.B. Choose Display**.

Twenty-one education systems around the world participated in ICILS 2013. The United States participated in ICILS for the first time in 2018, along with 13 other education systems. Among them, nine, including the United States, participated in the optional CT component.

Exhibit 1 shows the ICILS domains currently available in the IDE, by year.

Exhibit 1. ICILS administration cycle

Assessment year	2013	2018
Subjects assessed	CIL	CIL CT (optional)

NOTE: CIL stands for "computer and information literacy";

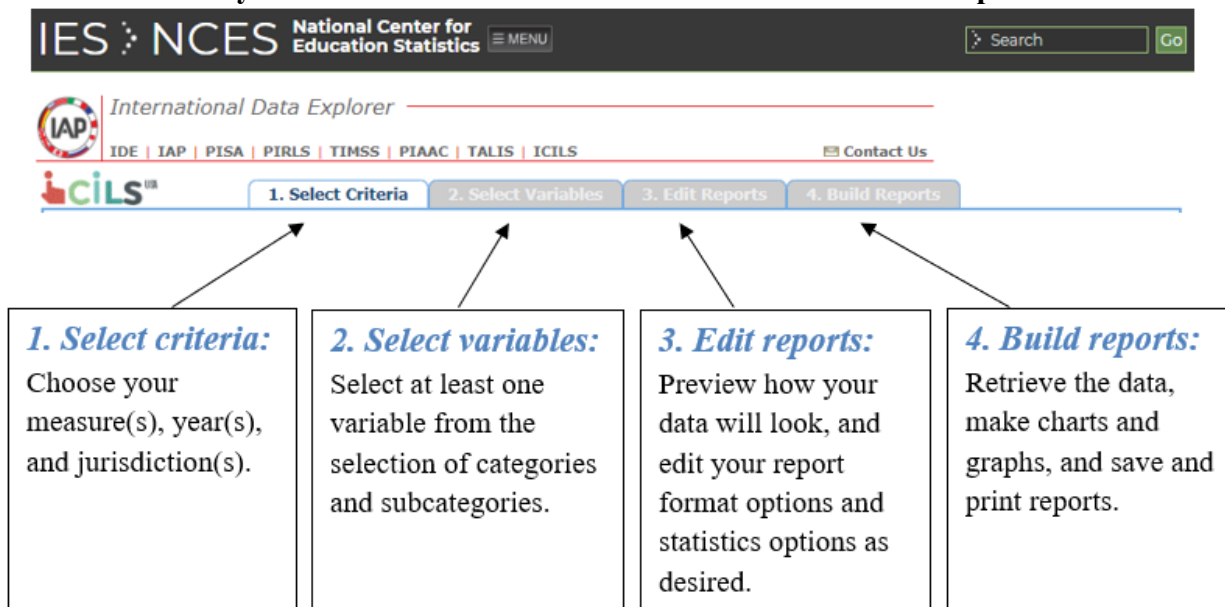
CT stands for "computational thinking".

SOURCE: International Association for the Evaluation of Educational Achievement, International Computer and Information Literacy Study (ICILS), 2018.

II. General Overview

There are four general steps for exploring ICILS data using the ICILS IDE (see exhibit 2). Each step is described in more detail starting in section IV.

Exhibit 2. What you will see in the IDE environment and what each step entails



III. Computer Requirements for the IDE

- Screen resolution should be 1024 × 768 pixels.
- Browsers: Internet Explorer (IE) (version 10 or higher), Firefox, Google Chrome, or Safari.
- Enable JavaScript and pop-ups in your browser.
- Exports of files to Microsoft Office require Office 2003 or later.
- Exports of files to PDF can be read with Adobe Acrobat Reader.
- Screen reader software should be Jaws 8.0 or higher.

If you encounter an error, please send us the details through **Contact Us** (located in the upper-right portion of the screen on each page of the IDE website). When writing, include your browser version and operating system version, and as many other details as possible. Be sure to provide an e-mail address so that we can contact you.

The screenshots throughout this Help Guide were made using Google Chrome. Other browsers may vary the way the IDE is displayed.

IV. Steps to Explore Data

To create your own custom tables, charts, and graphs, follow these steps when using the ICILS IDE:

1. Select Criteria
2. Select Variables
3. Edit Reports
4. Build Reports

Each of these steps is discussed in detail throughout the remainder of this guide, beginning with the selection of criteria.

1. Select Criteria

1.A. Overview

Your data query in the ICILS IDE begins on the **Select Criteria** screen (see exhibit 3).

Select a **Display** from the drop-down menu. Once the screen resets, you can choose one or more **Years, Measures, and Jurisdictions** for the data you wish to view or compare. Use the **Reset** button, located in the upper-right portion of the screen (just below the **Help** button), to cancel your selections and begin again.

Click on a blue sideways-facing arrow (▶) to open up a category and click on a blue downward-facing arrow (▼) to close a category.

1.D. Choose Measure

After choosing a display, you can choose one or more outcome variables under Measure, including the overall scales for CIL or CT (Student display only) and other continuous variables. These variables fall into different categories. For example, the variable “Age of student” can be found in the Student demographics category in the Student display, and the variable “About You/Year Teaching Started” can be found in the Teacher demographics category in the Teacher display.

Some of the continuous variables may have missing values if there are cases that did not answer the assessment or the questionnaire. In both the Student and Teacher displays, selecting the variable “Percentage across full sample” under the *Population* category will allow you to calculate percentage statistics based on the full sample.

1.E. Choose Jurisdiction

With your **Measure(s)** and **Year(s)** selected, next choose at least one **Jurisdiction**.

Jurisdictions are found under the following groups: **Countries** and **Benchmarking participants**. There is also a group category called **Average**, with options to display the **Average of Countries** and the **Average of the Selected Jurisdictions**.

The general procedures for selecting one or more jurisdictions are as follows:

1. To open or close jurisdictions, click on the arrow. Jurisdictions in the group are open and can be selected when the blue arrow points down (see exhibit 4).
2. Click the checkboxes next to the specific jurisdictions that you are interested in or uncheck those jurisdictions that you wish to deselect. If you click the checkbox next to the group name (e.g., “Countries”), you will select all the jurisdictions within that group. If desired, uncheck the group name to deselect all.
3. If you want to close a group (for example, close the list of countries in order to readily see the Benchmarking participant jurisdictions), click the blue arrow next to the group name. The closed group’s arrow points to the right. Be advised that closing the group will not deselect your choices.

Exhibit 4. Choosing jurisdictions

When using the ICILS IDE, you have the option to run either a student- or teacher-level analysis. Selecting the Student option in the display dropdown provides student or school information that is an attribute of the students (thus estimates reported, for example, as the "percentage of students"), while selecting the Teacher option provides teacher or school information that is an attribute of the teachers (thus estimates reported, for example, in terms of the "percentage of teachers").

STEP 1:
Select criteria from each drop-down menu to begin. Additional options related to your selections will appear. Then select measures, jurisdictions, and years based on available data. [Help](#)

Display: Student [Reset](#)

Category	Sub Category	Measure	All Years	2018	2013
▼ Scales	▼ Overall score	<input checked="" type="checkbox"/> ICILS Computer and Information Literacy: Overall details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
		<input checked="" type="checkbox"/> ICILS Computational Thinking: Overall details	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Population	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Student demographics	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/> Student home and family	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Group	Jurisdiction	All Years	2018	2013
<input type="checkbox"/> Average	<input type="checkbox"/> Average of Countries details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Average of the Selected Jurisdictions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
▼ <input type="checkbox"/> Countries	<input type="checkbox"/> Australia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Chile	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Croatia	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Czech Republic	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Denmark	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Finland	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> France	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
	<input type="checkbox"/> Germany	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

[2. Select Variables](#)

To continue in the IDE, click the **Select Variables** button at the bottom right of the page or the tab at the top of the page to go to the next screen (see exhibit 4).

2. Select Variables

2.A. Overview

Step 2, **Select Variables**, can only be accessed after choosing criteria at step 1, **Select Criteria**.

To continue your data query and edit a report, *you must choose at least one variable on this screen*. You can browse for variables using the **Category** and **Sub Category** lists or by using the **Search** function (see exhibit 5). You can return to this screen to change variable selections at any time.

Exhibit 5. Select variables overview

STEP 2:
Select at least one variable from the category list below. View the list of all available variables, view by selected variables only, or search variables by keywords. Years selected will override previous selections.

Subject, Display: Computer and Information Literacy, Student
Jurisdictions: Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay
Measures: ICILS Computer and Information Literacy: Overall, ICILS Computational Thinking: Overall
Year: 2018

View all (592) View Selected (0) Search: Go

Category	Sub Category	Variable	All Years	2018	2013
Total	Total	<input type="checkbox"/> All Cases details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
▶ Benchmarking Levels					
▶ Student demographics					
▶ Student home and family					
▶ Student use of computer and Internet					
▶ Student thoughts about computers					
▶ Principal demographics					
▶ Principal use of ICT					
▶ School characteristics					
▶ Principal report					

3. Edit Reports

2.B. Search Using Category and Sub Category Lists

On the **Select Variables** screen, choose at least one variable for your report. One way to do this is to search for variables using the **Category** and **Sub Category** lists. If you don't wish to choose from any of the specified categories and subcategories, then select **All students** in the **All Students** category.

The variables shown are tied to the criteria you selected at step 1 (**Measure**, **Year**, and **Jurisdiction**), which are indicated at the top of the screen. To change any of these criteria, return to step 1, **Select Criteria**.

To browse for variables, get details about them, select them, and view them:

1. Click the blue arrows to open and close categories and subcategories of variables (see exhibit 6).
2. Click **details** or **hide details** to show or hide the full title of a given variable, the ICILS ID, and the values (i.e., value labels). Note that some variables have the same or similar short titles, but comparing details will show you how they differ. See the example in exhibit 6, which shows two **Immigration status** variables (SIMMIG and SIMMBGR). The differences between these two variables are described in the details.

3. Click the checkbox next to a variable to select it for your analysis/report. You will see the count increase next to **View Selected**.
4. Click the **View Selected** tab to see the variables you have chosen. To return to the full list of variables by category, click the **View All** tab.
5. Remember to select the year for which you wish to build a report and make sure that data are available for your chosen year and variables.
6. Searching for variables is an option from the **Search** box. See **Section 2.C. Search Function** for more details about this function.

Exhibit 6. Select variables using category and sub category lists

STEP 2:
Select at least one variable from the category list below. View the list of all available variables, view by selected variables only, or search variables by keywords. Years selected will override previous selections. [Help](#)

Subject, Display: Computer and Information Literacy, Student
Jurisdictions: Chile, Denmark, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay
Measures: ICILS Computer and Information Literacy: Overall, ICILS Computational Thinking: Overall
Year: 2018 [Reset](#)

[View all \(592\)](#) [View Selected \(0\)](#) Search: [Go](#)

Category	Sub Category	Variable	All Years	2018	2013
Total	Total	<input type="checkbox"/> All Cases details	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Benchmarking Levels					
Student demographics					
Student home and family	Language and Immigration	<input type="checkbox"/> Test language spoken at home details			
		<input type="checkbox"/> Immigration status hide details Full Title: Immigration status ID: SIMMIG Values: Students and/or at least one parent born in country of test; Student born in country of test but both/only parent(s) born abroad; Student and both/only parent(s) born abroad			
		<input type="checkbox"/> Immigration status (dichotomous) details			
		<input type="checkbox"/> Your home and your family/What language do you speak at home most of the time details			
		<input type="checkbox"/> Your home and your family/In what country were you and your parents born/You details			
		<input type="checkbox"/> YOUR HOME AND YOUR FAMILY/In what country			

[3. Edit Reports](#)

When you have selected the variable(s) you want to include, continue by clicking the **Edit Reports** button at the bottom of the page or the tab at the top of the page to go to the next screen.

2.C. Search Function

The second way to search for variables is to use the **Search** function on the **Select Variables** screen.

Type a term in the **Search** box and click **Go** (or hit “Enter” on your keyboard) to find variables by keywords in the question and/or details for the variable (see exhibit 7). If you use multiple

keywords, “and” is assumed. You can narrow your search by using “or,” “not,” or “and not.” The search function operates on an exact phrase if it is contained in quotes. The variable(s) that include the search term(s) in the question or its details will be listed in the search results.

Exhibit 7. Select variables using the search function

The screenshot shows the ICILS IDE interface. At the top, there are four tabs: 1. Select Criteria, 2. Select Variables (active), 3. Edit Reports, and 4. Build Reports. Below the tabs, there is a 'STEP 2:' section with instructions: 'Select at least one variable from the category list below. View the list of all available variables, view by selected variables only, or search variables by keywords. Years selected will override previous selections.' There is a 'Help' button. Below this, there are fields for 'Subject, Display: Computer and Information Literacy, Student', 'Jurisdictions: Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay', 'Measures: ICILS Computer and Information Literacy: Overall, ICILS Computational Thinking: Overall', and 'Year: 2018'. There is a 'Reset' button. Below these fields, there are two buttons: 'View all (592)' and 'View Selected (0)'. To the right, there is a search bar containing 'Search: (2) immigration' and a 'Go' button. Below the search bar, there is a table with columns: Category, Sub Category, Variable, All Years, 2018, and 2013. The table contains two rows of variables: 'Immigration status details' and 'Immigration status (dichotomous) details'. Both rows have a checkbox in the 'Variable' column and a grid icon in the '2018' and '2013' columns. At the bottom right, there is a '3. Edit Reports' button.

When you have selected the variable(s) you want to include, continue by clicking the **Edit Reports** button at the bottom of the page or the tab at the top of the page to go to the next screen.

3. Edit Reports

3.A. Overview

You can access step 3, **Edit Reports**, after choosing criteria at step 1, **Select Criteria**, and choosing variables at step 2, **Select Variables**. The IDE will automatically build reports based on your selections from steps 1 and 2. However, at step 3, you may modify your selections for each report.

At this step, you can

- preview and edit the layout of your reports;
- copy reports or create new reports based on the variables selected;
- change formatting options, such as the number of decimal places to display, for all reports (these may also be changed in individual reports);
- change statistics options, such as averages, for all reports (these may also be changed in individual reports, but statistics options can overwrite previous edits);
- select reports to be built into tables and charts at step 4, **Build Reports**; and
- delete reports.

Using your chosen criteria, the IDE will return a separate data report for each variable you have chosen. If you have selected two or three variables (not counting **All Cases**), you will also see a cross-tabulated report for these variables. If you have chosen four or more variables, you will get tables for each variable, but you won't get the cross-tabulation. If your selected criteria include more than one measure (e.g., an overall scale and one or more continuous variables), a separate set of data reports will be generated for each measure (see exhibit 8).

Exhibit 8. Edit reports overview

STEP 3:
Preview and edit existing reports using the action links next to each report name. Create new reports, set format and statistic options. (New and copied reports will appear at the bottom of the report list.) [Help](#)

Subject, Display: Computer and Information Literacy, Student [Reset](#)

Jurisdictions: Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay

Measures: ICILS Computer and Information Literacy: Overall, ICILS Computational Thinking: Overall

Variables: Immigration status, Sex of student

Year: 2018

Report	All	Action	Measure	Variable	Year	Jurisdiction	Statistic
Report 1	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	ICILS Computer and Information Literacy: Overall	Immigration status	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Report 2	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	ICILS Computer and Information Literacy: Overall	Sex of student	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Cross-Tabulated Report 1	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	ICILS Computer and Information Literacy: Overall	Immigration status, Sex of student	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Report 3	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	ICILS Computational Thinking: Overall	Immigration status	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Report 4	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	ICILS Computational Thinking: Overall	Sex of student	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Cross-Tabulated Report 2	<input checked="" type="checkbox"/>	Preview Delete Edit Copy	ICILS Computational Thinking: Overall	Immigration status, Sex of student	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages

[4. Build Reports](#)

The **Edit Reports** step shows overview information of your reports. The **Report** column indicates the report, or cross-tabulation report, number based on the variable(s) chosen during the criteria selection. Under the **All** tab, reports may be chosen for the report-building phase, either by selecting **All** or selecting individual reports. The **Action** column gives you the option to

Preview, Edit, Delete, or Copy the report. The **Measure** column shows which measure the report will portray. The **Variable** column indicates the variable(s) included in the report. The **Year** column shows which years you have selected for comparison. The **Jurisdiction** column shows the countries and subnational education systems selected for comparison, and the **Statistic** column provides the type of statistic output that will be generated in the report-building phase.

3.B. Preview Report

Select **Preview**, in the **Action** column (see exhibit 8), to see how your report will be laid out. The preview will not provide actual data but will show how the data will be arranged in rows and columns (see exhibit 9). You can select **Preview** at any time to see how your changes will affect the report's final layout.

Exhibit 9. Using preview report

		Immigration status					
		Students and/or at least one parent born in country of test		Student born in country of test but both/only parent(s) born abroad		Student and both/only parent(s) born abroad	
Years	Jurisdictions	Averages	Standard Errors	Averages	Standard Errors	Averages	Standard Errors
2018	Chile						
	Finland						
	France						
	Germany						
	Italy						
	Kazakhstan						
	Korea, Republic of						
	Luxembourg						
	Portugal						
	United States						
	Uruguay						

3.C. Edit Report

To edit the report, select the **Edit** command, in the **Action** column, next to the report number (see exhibit 8). (Another way to edit a report is to select the **Edit** tab when you are previewing a report.) The following can be done using the edit function (see exhibit 10):

1. Name your report. You have the option of giving each report a distinctive name, up to a limit of 50 characters, using only letters, numbers, spaces, underscores, and hyphens. (Otherwise, by default, the report is named Report 1, Report 2, etc., or Cross-Tabulated Report 1, Cross-Tabulated Report 2, etc.)
2. Select a measure. You can choose a measure if more than one was selected at step 1.
3. Select which jurisdictions, variables, years (if applicable), and statistics to include (out of the selections previously made at steps 1 and 2). You can select up to two statistics options from the following: averages, standard deviations, percentages, and percentiles. (For further information, see **Section 3.G. Statistics Options**.)

4. To create a new variable while editing a report, click on **Create New...** under the **Variable** heading. Section 3.D. below explains the process for creating a new variable.
5. Change the table layout by dragging elements to determine which items will appear in rows and which will appear in columns. Some of the arrangements will not be permissible, but a pop-up alert will explain this.

Exhibit 10. Editing reports

Edit Report

1. Create a name and select a measure for the new report.

Name: Measure:

2. Select available options from each of the columns below, then preview results.

Jurisdiction	Variable Create new ...	Year	Statistic
<input type="checkbox"/> Select All <input checked="" type="checkbox"/> Chile <input checked="" type="checkbox"/> Finland <input checked="" type="checkbox"/> France <input checked="" type="checkbox"/> Germany <input checked="" type="checkbox"/> Italy <input checked="" type="checkbox"/> Kazakhstan <input checked="" type="checkbox"/> Korea, Republic of <input checked="" type="checkbox"/> ...	<input checked="" type="checkbox"/> Immigration status <input type="checkbox"/> Sex of student	<input type="checkbox"/> Select All <input checked="" type="checkbox"/> 2018	<input checked="" type="checkbox"/> Averages <input type="checkbox"/> Standard Deviations <input type="checkbox"/> Percentages <input type="checkbox"/> Percentiles

3. Drag and drop header elements between Row and Column to custom design the report.

TABLE LAYOUT	
Row	Column
<div style="border: 1px solid black; padding: 2px; margin-bottom: 5px;">Years</div> <div style="border: 1px solid black; padding: 2px;">Jurisdictions</div>	<div style="border: 1px solid black; padding: 2px;">Immigration status</div>

To save changes, make sure to select **Done** in the upper-right portion of the screen before closing the **Edit Report** window.

3.D. Create New Variables

The levels of a categorical variable can be collapsed to create a new variable. To do so, select **Edit**, in the **Action** column, and select **Create new...** under **Variable** (see exhibit 10). The new variable is created by combining values for an existing variable. The steps are as follows:

1. Click **Create new...** under the **Variable** heading.
2. Select the variable for which you wish to combine values.

3. Select the values you want to combine by checking the boxes to the left of the values (see exhibit 11).
4. Create a name for the new value, and press **Create**. The collapsed values will appear in gray to indicate that they have already been used.
5. Wait for the screen to refresh, and press **Done**.
6. The new variable will appear in the **Variable** list in the **Edit Report** window or **Create New Report** window, designated as “collapsed.”
7. Check the box next to the new variable to view it in the report. You can click **Preview** to see how the table will be laid out before retrieving data.

Exhibit 11. Creating new variables

The screenshot shows a 'Create Variables' dialog box with the following elements:

- Section 1:** 'Select a Variable group:' with a dropdown menu showing 'Immigration status' and a 'Help' button.
- Section 2:** 'Select values to create new Variable:' with three checkboxes:
 - Students and/or at least one parent born in country of test
 - Student born in country of test but both/only parent(s) born abroad
 - Student and both/only parent(s) born abroad
- Section 3:** 'Create a name for the new Value:' with a text input field labeled 'Name:' and a 'Create' button.
- Bottom:** 'Reset', 'Cancel', and 'Done' buttons.

A new variable that you create is applicable only to a specific report; it does not apply to the other reports listed on the **Edit Reports** screen. For example, if you selected multiple measures of the overall scale CIL for analysis, then you would need to create the new variable for each measure, or create a copy of the report and edit it accordingly. To do the latter, click on **Copy** report on the **Edit Reports** screen (see exhibit 8). The copied report will appear at the end of the list of reports. Then, for the new copy, click on **Edit** (using the above example, you can change the measure and give the report a new name).

You can repeat the process and combine different values of a variable to create additional new variables. Using the **Create New Report** function, you can create a new report for each new variable that you create. (For further information, see **Section 3.E. Create New Report**, below.)

If you selected two or three variables from which to create new variables, you can repeat the process for each of them. Using the **Create New Report** or **Edit Report** function, these collapsed variables will be listed and available for cross-tabulation (see exhibit 12). If you have chosen four or more variables (not counting **All Cases**), you won't get the cross-tabulation. You can click **Preview** to see how the table will be laid out before retrieving data.

Exhibit 12. Edit reports with collapsed variables

The screenshot shows the 'Edit Report' dialog box with the following configuration:

- Name:** Report 1
- Measure:** ICILS Computer and Information Literacy: Overall
- Step 2: Select available options from each of the columns below, then preview results.**

Jurisdiction	Variable	Year	Statistic
<input type="checkbox"/> Select All <input checked="" type="checkbox"/> Chile <input checked="" type="checkbox"/> Finland <input checked="" type="checkbox"/> France <input checked="" type="checkbox"/> Germany <input checked="" type="checkbox"/> Italy <input checked="" type="checkbox"/> Kazakhstan <input checked="" type="checkbox"/> Korea, Republic of <input checked="" type="checkbox"/> ...	<input type="checkbox"/> Immigration status <input type="checkbox"/> Sex of student <input checked="" type="checkbox"/> Immigration status (collapsed)	<input type="checkbox"/> Select All <input checked="" type="checkbox"/> 2018	<input checked="" type="checkbox"/> Averages <input type="checkbox"/> Standard Deviations <input type="checkbox"/> Percentages <input type="checkbox"/> Percentiles
- Step 3: Drag and drop header elements between Row and Column to custom design the report.**

TABLE LAYOUT	
Row	Column
<div style="border: 1px solid black; padding: 2px; margin-bottom: 2px;">Years</div> <div style="border: 1px solid black; padding: 2px;">Jurisdictions</div>	<div style="border: 1px solid black; padding: 2px;">Immigration status (collapsed)</div>

3.E. Create New Report

From the main **Edit Reports** screen, clicking on **Create New Report** brings up the same options as **Edit Report**, but with no checkboxes marked and without any new variables you may have created. Thus, **Create New Report** provides a clean slate for your selections from the first two steps, **Select Criteria** and **Select Variables** (see exhibit 13). Each new report you create will appear at the end of the list of reports. If you do not give the report a specific name, it will be called "New Report."

Exhibit 13. Creating new reports

New Report

1. Create a name and select a measure for the new report.

Name: Measure: [Help](#)

2. Select available options from each of the columns below, then preview results.

Jurisdiction	Variable Create new ...	Year	Statistic
<input type="checkbox"/> Select All <input type="checkbox"/> Chile <input type="checkbox"/> Finland <input type="checkbox"/> France <input type="checkbox"/> Germany <input type="checkbox"/> Italy <input type="checkbox"/> Kazakhstan <input type="checkbox"/> Korea, Republic of <input type="checkbox"/> ...	<input type="checkbox"/> Immigration status <input type="checkbox"/> Sex of student	<input type="checkbox"/> Select All <input type="checkbox"/> 2018	<input type="checkbox"/> Averages <input type="checkbox"/> Standard Deviations <input type="checkbox"/> Percentages <input checked="" type="checkbox"/> Percentiles

3. Drag and drop header elements between Row and Column to custom design the report.

TABLE LAYOUT	
Row	Column
<div style="border: 1px solid black; padding: 2px; width: fit-content; margin-bottom: 5px;">Jurisdictions</div> <div style="border: 1px solid black; padding: 2px; width: fit-content;">Years</div>	

3.F. Format Options

From the main **Edit Reports** screen, clicking on **Format Options** will allow you to make formatting changes applicable to all the reports listed. The following formatting options are available using this function (see exhibit 14):

1. **Variable Labels (Long)** displays a more detailed description of the variables selected in a query than the default short label. For variables from questionnaires, the full text of the question is displayed. Be advised that the length of the extra detail may sometimes interfere with table formatting.
2. **Show data for values categorized as “missing”** will include the percentage of students in the total sample or in a reporting group for whom membership in a particular response category is unknown because no response was given by the students, their teacher, or their school. The percentage of “missing” will be shown in the right-most table column. Missing data are available only for queries that involve percentages as the statistic type. Unless you check this option, the default is for missing responses not to be included in the percentage distribution shown.

3. **Year Order** gives you the option to display either the most recent year first or the oldest year first.
4. **Decimal Places** allows you to specify the level of precision for a particular statistic. Depending on the value range of the dependent variable—for example, the dependent variable “ICILS Computer and Information Literacy: Overall [PVCIL]” ranges from 100 to 700; the dependent variable “Computer experience in years [SEXCOMP]” ranges from 0 to 4—the default number of decimal places for a report can vary from zero to three. Also, standard errors will be shown to one more decimal place than is shown for their respective statistic. For example, if you request that average scores be displayed to one decimal place (by default, average scores are rounded to the nearest whole number), the corresponding standard errors will display two decimal places. If you export to Excel, you will be able to increase the number of decimal places in most cases. Note that only integer-level precision is allowed for percentages; that is, the number of decimal places is fixed at “none” for percentages, and the corresponding standard errors are shown to one decimal place.
5. **Include** gives you the option of showing standard errors. By default, standard errors are shown inside parentheses, but you can choose to show them without parentheses. You can preview the effects of your selection in the **Sample Display** area (see the blue-shaded box at the bottom of exhibit 14 below).

Exhibit 14. Format options

Format Options X

Choose options that will apply to all reports. View selected format in Sample Display. [Help](#)

Variable Labels:

Short (e.g. Gender)

Long (e.g. Gender of student as taken from school records)

Show data for values categorized as Missing (this applies only when percentages are displayed).

Show variable name in titles (e.g. [GENDER])

Year Order:

Most recent year first (default)

Oldest year first

Decimal Places: None 1 2 3 Default
(For row percents, the number of decimal places is fixed at "None")

Include:

Standard Errors none

Use parentheses/brackets

Sample Display: ### (#.##)

[Cancel](#) [Done](#)

Be advised that the choices you make in the **Format Options** window will apply to all reports and cannot be changed for individual reports. Use the **Reset** button, located in the upper-right portion of the main **Edit Reports** screen (just below the **Help** button), to restore the **Format Options** to the default settings (although caution is advised, as this will also delete any new reports that you have created).

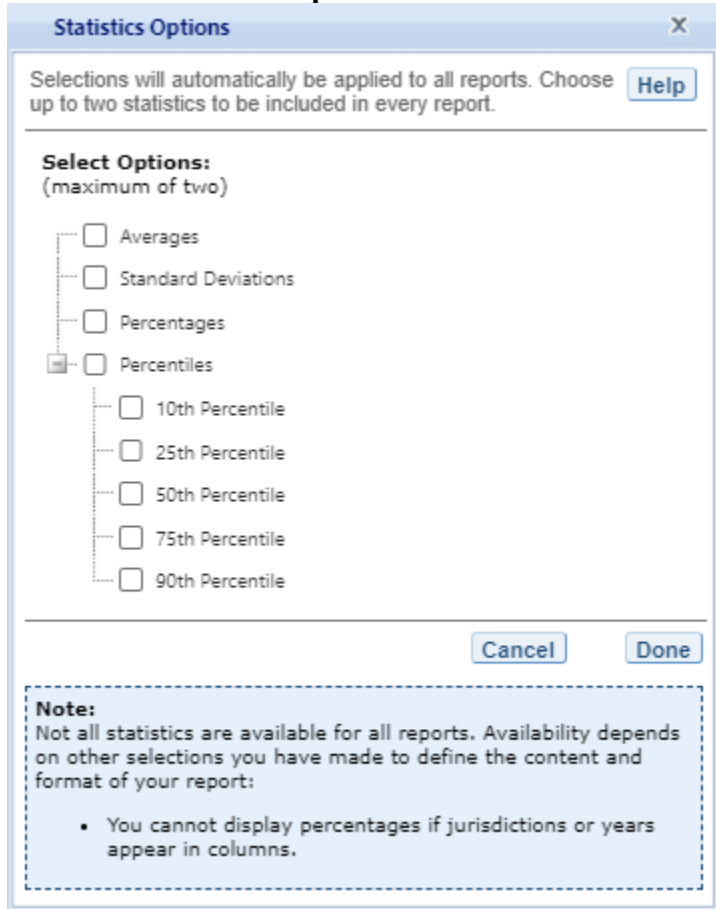
3.G. Statistics Options

Available only from the main **Edit Reports** screen, clicking on **Statistics Options** allows you to designate up to two statistics. The selections you make are applicable to all the reports listed, although you can also change the statistics for an individual report when you edit it. (For further information, see **Section 3.C. Edit Report.**)

The following statistics options are available (see exhibit 15):

1. **Averages.** This statistic provides the average value for a selected continuous variable or score (i.e., the overall scale for CIL or CT). For the ICILS assessment, student performance is reported on scales that range from 100 to 700. By default, the standard errors of the scores are shown in parentheses.
2. **Standard deviations.** The standard deviation is a measure of how widely or narrowly dispersed scores are for a particular dataset. Under general normality assumptions, 95 percent of the scores are within two standard deviations of the mean. For example, if the average score of a dataset is 500 and the standard deviation is 100, it means that 95 percent of the scores in this dataset fall between 300 and 700. The standard deviation is the square root of the variance.
3. **Percentages.** This statistic shows the percentage of students as a row percentage. For example, if the first column lists countries, then each country will display its own percentage distribution across its row. By default, percentage distributions do not include missing data. For information on how to show data for values categorized as missing, see **Section 3.F. Format Options.**
4. **Percentiles.** This statistic shows the threshold (or cutpoint) score for the following:
 - 10th percentile – the bottom 10 percent of students
 - 25th percentile – the bottom quarter of students
 - 50th percentile – the median (half the students scored below the cutpoint and half scored above it)
 - 75th percentile – the top quarter of students
 - 90th percentile – the top 10 percent of students

Exhibit 15. Statistics options



Selections will automatically be applied to all reports. Choose up to two statistics to be included in every report. [Help](#)

Select Options:
(maximum of two)

- Averages
- Standard Deviations
- Percentages
- Percentiles
 - 10th Percentile
 - 25th Percentile
 - 50th Percentile
 - 75th Percentile
 - 90th Percentile

[Cancel](#) [Done](#)

Note:
Not all statistics are available for all reports. Availability depends on other selections you have made to define the content and format of your report:

- You cannot display percentages if jurisdictions or years appear in columns.

As previously noted, the selections you make in **Statistics Options** will be applied automatically to all reports, although you can change the statistics for an individual report when you edit it. Be advised that if you use **Statistics Options** after editing the statistics in one or more of your individual reports, the statistics options selected will overwrite your previously edited selections. If you wish to use the same criteria and variables in a report with a different selection of statistics, consider using the **Create New Report** function to generate a new report with different statistics. (For further information, see **Section 3.E. Create New Report**.) You can also make a copy of an individual report.

You can use the **Reset** button, located in the upper-right portion of the main **Edit Reports** screen (just below the **Help** button), to restore the **Statistics Options** to the default setting, which is averages for all reports (this will also delete any new reports that you created).

Not all statistics are available for all reports. Their availability depends on other selections you have made to define the content and format of your report:

- Percentages will not display if jurisdictions or years appear in columns.
- If proficiency levels are selected in the variable section, only average scores and percentages will be displayed.

Please note that results obtained from the IDE might not always match those published by IEA or NCES. This is due to the use of different reporting standards, such as suppression rules related to sample size and suppression due to response rates.

3.H. Select Reports to Build

As you edit your reports, you can give them distinct names (up to 50 characters) to differentiate them, as well as make changes to the jurisdictions and variables previously selected, the statistics, and the layout of the rows and columns. (For further information, see **Section 3.C. Edit Report**.) You may make copies of reports with these changes. To proceed to step 4, **Build Reports**, each report for which you want to retrieve data should be previewed using the **Preview** function. To decrease processing time as you move to step 4, you can uncheck any reports for which you do not wish to retrieve data. By default, all reports are checked. To uncheck one or more reports, you can either uncheck the reports individually or click on the **All** box. (Doing the latter will uncheck all of the reports and allow you to check only those for which you wish to retrieve data.) In the example that follows (see exhibit 16), data will be retrieved for all reports.

Exhibit 16. Selecting reports to build

STEP 3:
Preview and edit existing reports using the action links next to each report name. Create new reports, set format and statistic options. (New and copied reports will appear at the bottom of the report list.) [Help](#)

Subject, Display: Computer and Information Literacy, Student
Jurisdictions: Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay
Measures: ICILS Computer and Information Literacy: Overall, ICILS Computational Thinking: Overall
Variables: Immigration status, Sex of student
Year: 2018

Create New Report		Format Options		Statistics Options			
Report	All	Action	Measure	Variable	Year	Jurisdiction	Statistic
Report 1	<input checked="" type="checkbox"/>	Preview Edit Delete Copy	ICILS Computer and Information Literacy: Overall	Immigration status	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Report 2	<input checked="" type="checkbox"/>	Preview Edit Delete Copy	ICILS Computer and Information Literacy: Overall	Sex of student	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Cross-Tabulated Report 1	<input checked="" type="checkbox"/>	Preview Edit Delete Copy	Computer and Information Literacy: Overall	Immigration status, Sex of student	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Report 3	<input checked="" type="checkbox"/>	Preview Edit Delete Copy	ICILS Computational Thinking: Overall	Immigration status	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Report 4	<input checked="" type="checkbox"/>	Preview Edit Delete Copy	ICILS Computational Thinking: Overall	Sex of student	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages
Cross-Tabulated Report 2	<input checked="" type="checkbox"/>	Preview Edit Delete Copy	ICILS Computational Thinking: Overall	Immigration status, Sex of student	2018	Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay	Averages

If you wish to delete a report from the list of reports, click **Delete** (see 1 above) in the **Action** column. Use the **Reset** button, located in the upper-right portion of the screen (see 2 above), to restore the deleted reports (although caution is advised, as this will also delete any new reports that you created and restore the **Format Options** and **Statistics Options** to the default settings).

To continue to the last step in the IDE, click the **Build Reports** button at the bottom of the page (see 3 above) or the tab at the top of the page to go to the next screen.

4. Build Reports

4.A. Overview

You can access step 4, **Build Reports**, after choosing criteria at step 1, **Select Criteria**, in which case the default report built will provide data for just averages and for the **All Cases** variable. After step 1, you may also go on to steps 2 and 3, where you can select additional variables and edit reports, before moving on to **Build Reports**. In **Build Reports**, you can do the following:

1. Generate a data table for each report as shown in the **Select Report** drop-down feature (see 1 in exhibit 17). By default, all reports are checked at step 3, although you can uncheck any reports for which you do not wish to retrieve data. (For further information, see **Section 3.H. Select Reports to Build.**)
2. Export and save data tables into various formats using the **Export Reports** button (see 2 in exhibit 17). The output formats include HTML (print-friendly), Microsoft Excel, Microsoft Word, and Adobe PDF.
3. Select the **Chart** tab (see 3 in exhibit 17) to create and customize charts for each report and save them for export in the above formats.
4. Select the **Significance Test** tab (see 4 in exhibit 17) to run a significance test on your results, customize it, and export it.
5. Select the **Gap Analysis** tab (see 5 in exhibit 17) to run a gap analysis on your results, customize it, and export it.
6. Select the **Regression Analysis** tab (see 6 in exhibit 17) to run a regression analysis on your results, customize it, and export it.

Exhibit 17. Building reports overview

2018
 Chile | 478 | (3.5) | * | (†) | 460 | (12.2) || Finland | 535 | (2.8) | * | (†) | * | (†) |
France	506	(2.2)	473	(6.4)	464	(8.6)
Germany	531	(3.0)	507	(5.9)	462	(17.4)
Italy	464	(3.0)	452	(6.2)	426	(12.0)
Kazakhstan	400	(5.5)	390	(10.9)	362	(15.7)
Korea, Republic of	544	(3.0)	*	(†)	*	(†)
Luxembourg	495	(1.4)	467	(2.2)	475	(3.1)
Portugal	518	(2.8)	518	(5.9)	494	(10.4)
United States	522	(1.9)	*	(†)	502	(7.7)
Uruguay	453	(4.2)	*	(†)	*	(†)

 The table also includes a 'Notes' section with footnotes and a source reference.
 </div>

4.B. View Reports as Data Tables

Some reports will take longer than others to process, so do not hit the “Back” button on your browser once you have clicked on **Build Reports** (see exhibit 18). Your table will appear once the processing is complete. To select a different table to view, go to the **Select Report** drop-down menu (see 1 in exhibit 17) and choose the table of interest. To change the formatting or statistics options of a table or to generate a table from a report not included in your selection, return to step 3, **Edit Reports**.

Exhibit 18. Processing data

The screenshot shows the '4. Build Reports' tab in the ICILS interface. At the top, there are four tabs: '1. Select Criteria', '2. Select Variables', '3. Edit Reports', and '4. Build Reports'. Below the tabs, the interface displays the following information:

- STEP 4:** View each report table by selecting the report name from the drop-down menu. Create report types to edit and preview, each tab created represents one report type to export.
- Subject, Display:** Computer and Information Literacy, Student
- Jurisdictions:** Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay
- Measures:** ICILS Computer and Information Literacy: Overall, ICILS Computational Thinking: Overall
- Variables:** Immigration status, Sex of student
- Year:** 2018

Below this information, there is a 'Select Report:' dropdown menu set to 'Report 2', a 'Link to this Page' link, and an 'Export Reports' button. At the bottom, there are four buttons: 'Table', 'Chart', 'Significance Test', 'Gap Analysis', and 'Regression Analysis'. The 'Chart' button is highlighted with a red circle. In the center of the screen, there is a progress bar showing 'Progress: 0%' and a 'Cancel' button. Below the progress bar, there is a loading icon and the text: 'Some queries may take up to two minutes to process. Please do not hit the "Back" button while processing.'

4.C. Charts

To create a chart, go to **Select Report** on the **Build Reports** screen to choose the report of interest from the drop-down menu, and then click the **Chart** link (see exhibit 19).

You will be able to create many types of charts and customize them. **Section 4.E. Create Charts – Chart Options** provides a summary of the available features and how they can be customized.

Exhibit 19. Viewing reports as charts

This screenshot is similar to Exhibit 18, showing the '4. Build Reports' tab. The 'Chart' button in the bottom navigation bar is highlighted with a red circle, and an arrow points to it from the left. The rest of the interface, including the report details and progress bar, is identical to the previous screenshot.

4.D. Create Charts

When you click **Chart**, you will first make selections of **Jurisdiction, Year, and Statistic** (see exhibit 20). All **Jurisdictions** and **Years** are selected by default, while you can only choose one **Statistic**. Uncheck any of the criteria that you do not wish to chart, as long as you have one selected in each category.

Only the statistics option(s) used to report data in the previous step will be presented, and only one statistics option can be selected at a time. For example, **Percentiles** will appear as the only data option to build the chart if the table created in the previous step is reporting data with only percentiles selected as the statistics option.

Once you are finished with the Data Options, click the **Create Chart** button in the lower-right corner of the screen.

Exhibit 20. Data options for charts

Table
Chart 1 X

Chart
Significance Test
Gap Analysis
Regression Analysis

Select a single statistic and any combination of jurisdictions and years. Continue to Chart Options.

JURISDICTION


- Countries
 - Chile
 - Finland
 - France
 - Germany
 - Italy
 - Kazakhstan
 - Korea, Republic of
 - Luxembourg
 - Portugal
 - United States
 - Uruguay

YEAR


- Year
 - 2018

STATISTIC


- Averages



Bar Chart



Column Chart



Line Chart

BAR VALUES: Sex of student

VALUES GROUPED BY: None

CREATE CHART

4.E. Create Charts – Chart Options

Next, you can make selections regarding the chart options located at the bottom of the same window.

1. Select **Bar Chart**, **Column Chart**, or **Line Chart** (see 1 in exhibit 21). If the Percentages Statistic is selected, you can select from a **Percentage Chart** option. If the Percentiles Statistic is selected, you can also select from a **Percentiles Chart** option.
2. After selecting a chart type, change any data dimensions from the drop-down menus for **Bar**, **Column**, or **Line Values** and **Values Grouped by** (see 2 in exhibit 21). Any new variables that you created at step 3, **Edit Reports**, will be available for selection, but only if you selected the variables (by clicking the checkbox next to them) and clicked **Done** after you edited the report.
3. Create your chart by clicking the **Create Chart** button in the lower-right corner (see 3 in exhibit 21).

Exhibit 21. Chart options

The screenshot displays the 'Chart Options' interface. At the top, there are tabs for 'Table', 'Chart 1', 'Significance Test', 'Gap Analysis', and 'Regression Analysis'. Below the tabs, a message reads: 'Select a single statistic and any combination of jurisdictions and years. Continue to Chart Options.'

The interface is divided into three main sections:

- JURISDICTION:** A list of countries with checkboxes: Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, and Uruguay. All are checked.
- YEAR:** A list with checkboxes for 'Year' and '2018'. Both are checked.
- STATISTIC:** A list with a radio button for 'Averages', which is selected.

Below these sections are three chart type icons: 'Bar Chart', 'Column Chart', and 'Line Chart'. A box labeled '1.' points to the 'Column Chart' icon. Below the icons are two dropdown menus: 'BAR VALUES:' set to 'Sex of student' and 'VALUES GROUPED BY:' set to 'None'. A box labeled '2.' has arrows pointing to both dropdown menus. At the bottom right is a 'CREATE CHART' button, with a box labeled '3.' pointing to it.

While previewing your chart, you can do the following (see exhibit 22 as an example of a **Percentile Chart** and exhibit 23 as an example of a **Bar Chart**):

1. Use the drop-down menus to change the jurisdiction and other variables as applicable.
2. Place your cursor over the bars of the chart to see the data points and value label(s).

Exhibit 22. Percentile chart

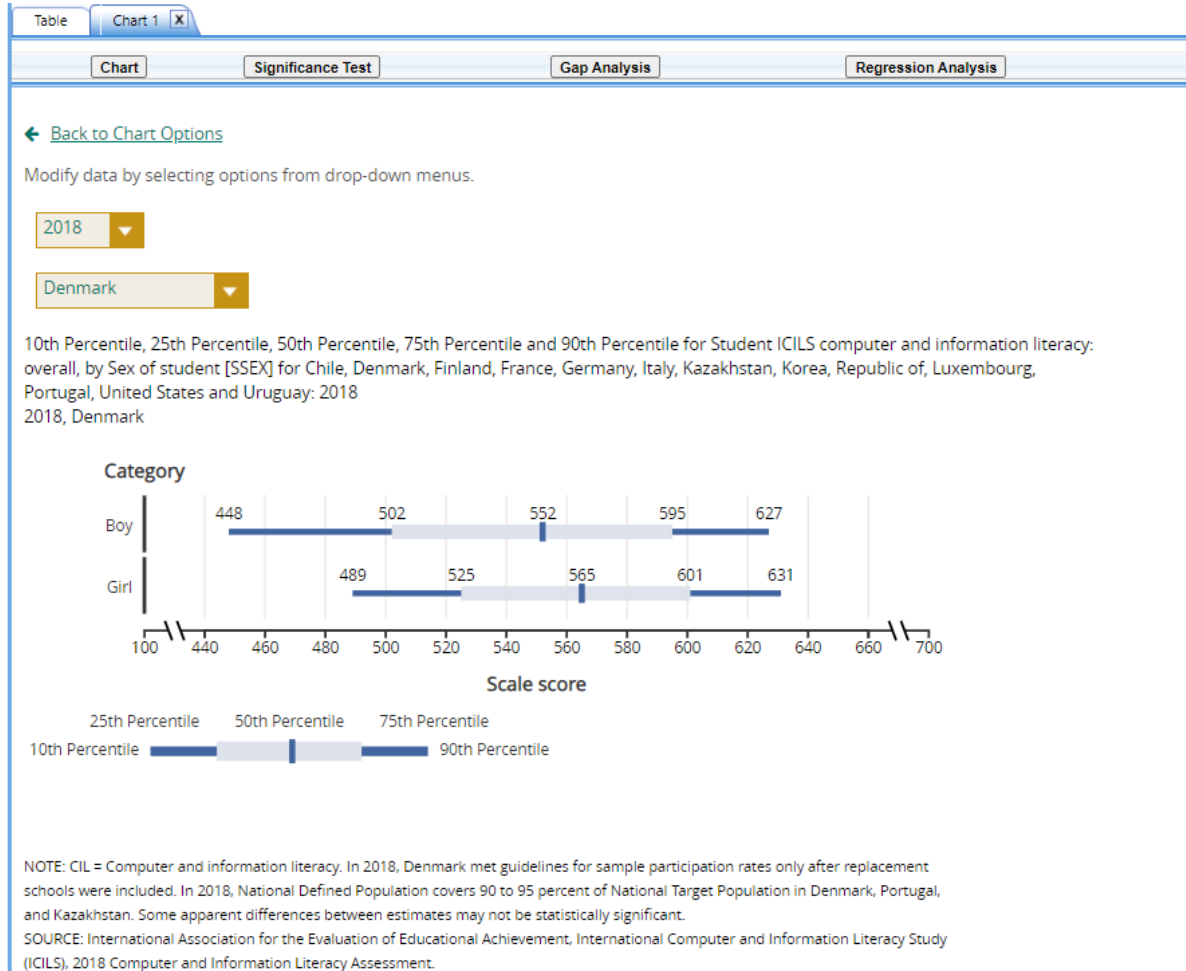
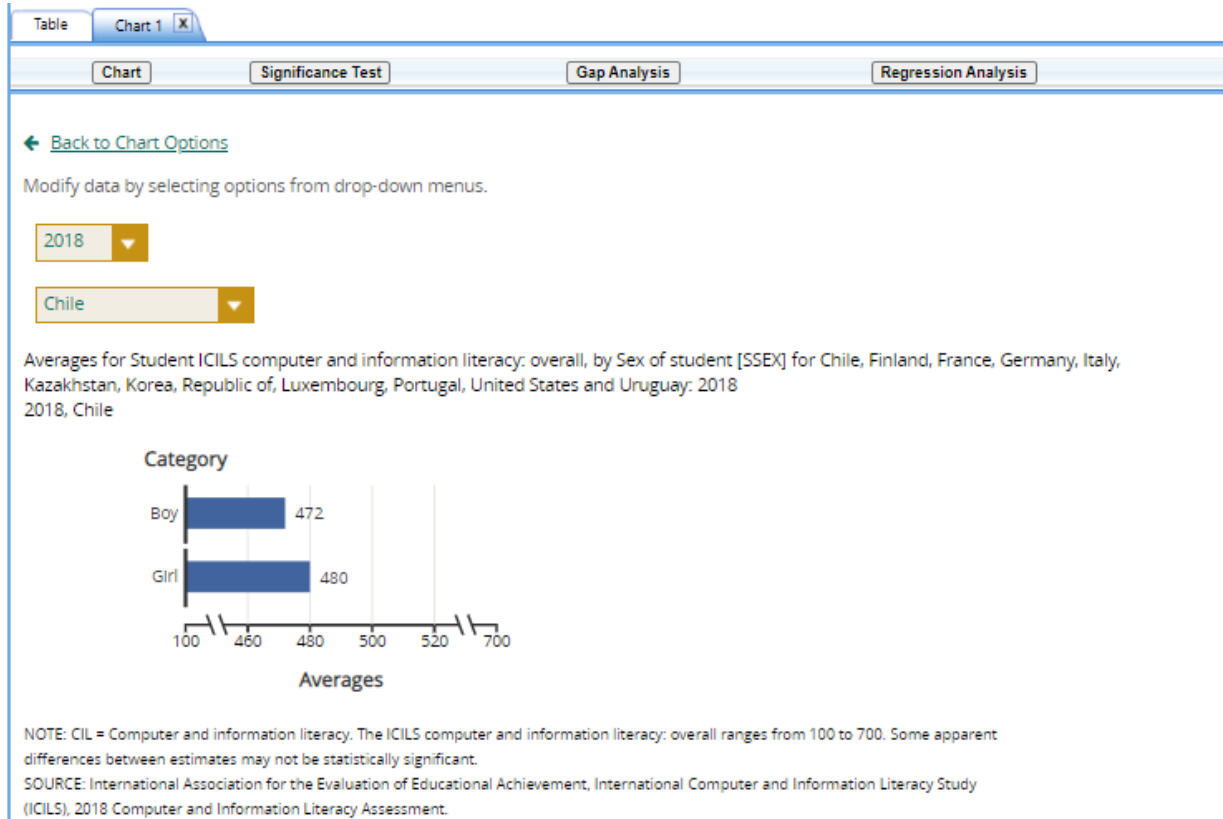


Exhibit 23. Bar chart



You can choose “**Back to Chart Options**” (located in the upper-left corner, below the **Chart** link) to make more changes.

To make an additional chart from the same report or table, click the **Chart** link on the **Build Reports** screen. It is recommended that you provide a new chart name (the default is Chart 1, Chart 2, etc.). If you don’t start the process again by clicking the **Chart** link, the new chart will overwrite the previous one.

If you wish to make charts from other reports, select another report in the **Select Report** drop-down list. If other reports were not checked in step 3, **Edit Reports**, go back to step 3, and check the ones you want. Then, when you advance to step 4, **Build Reports**, the reports will appear in the **Select Report** drop-down list. If you need to create new reports, go back to step 1, **Select Criteria**, and/or step 2, **Select Variables**. Remember to export any completed charts you want to save by clicking **Done** and using the **Export Reports** function before leaving the **Build Reports** screen. (For further information, see **Section 4.I. Export Reports**.)

4.F. Significance Tests

Tests for statistical significance indicate whether observed differences between estimates are likely to have occurred because of sampling error or chance. “Significance” here does not imply any judgment about absolute magnitude or educational relevance. It refers only to the statistical

nature of the difference and whether that difference likely reflects a true difference in the population.

With your report of interest selected, click the **Significance Test** link, which is located to the right of the **Chart** link (see exhibit 17), which will take you to the **Significance Test** window (exhibit 24). You first need to decide which variable you want to test and the criterion by which you want to test it (i.e., between jurisdictions, within variables, or across years). You will compare or look across the variable's range of values, so it must have more than one value. You can look across jurisdictions for a variable (that is, compare between two or more jurisdictions) or you can look across the values within a variable for a single jurisdiction. For example, with the variable shown in exhibit 24, you could choose to compare scores of female students between countries and subnational education systems, or you could choose to compare scores of female students and male students.

The general steps for running significance tests are as follows (see exhibit 24):

1. In the **Significance Test** window, select either **Between Jurisdictions**, **Within Variables**, or **Across Years**. Then, select the appropriate jurisdiction(s), variable(s), year(s), and statistic(s). For **Between Jurisdictions**, select at least two jurisdictions. For **Within Variables**, select at least two variables. For **Across Years**, more than one year needs to be selected.
2. You can enter a **Test Title** limited to 25 characters, using only letters, numbers, spaces, underscores, and hyphens (otherwise, by default, the test is named "Sig Test 1").
3. Select the output type as either **Table** or **Map**. The table option will show the significance test results as a matrix. The map option will show the significance test results on a world map, highlighting the countries and subnational education systems that have been selected. The map output is only available when **Between Jurisdictions** is selected in the first step.
4. Additional options allow you to select **Show Table Details** to display the estimates and standard errors for the table cells. If you selected a map, this option is not applicable, as the map will automatically show score details.
5. Click the **Preview** tab located in the upper-left corner or the **Preview** button located in the bottom-left corner.
6. Click the **Edit** tab in the upper-left corner of the screen if you wish to go back and make changes to the selections you made for running the significance tests.
7. Click the **Done** button in the upper- or lower-right corner of the screen to run the significance tests.

Exhibit 24. Significance test options

Significance Test

1. Select one category to compare significance from the choices available below.

Between Jurisdictions Within Variables Across Years

2. Create a name for this significance test. Name:

3. Select the output type. Table Map

4. Select additional options. Show table details

5. Select available options from each of the columns below, then preview results.

Jurisdiction	Variable	Year	Statistic
<input checked="" type="checkbox"/> All Jurisdictions <input checked="" type="checkbox"/> Chile <input checked="" type="checkbox"/> Finland <input checked="" type="checkbox"/> France <input checked="" type="checkbox"/> Germany <input checked="" type="checkbox"/> Italy	<input checked="" type="checkbox"/> Immigration status <input checked="" type="checkbox"/> Students and/or at least one parent born in country of test <input checked="" type="checkbox"/> Student born in country of test but both/only parent(s) born abroad <input checked="" type="checkbox"/> Student and both/only parent(s) born abroad	<input type="checkbox"/> 2018	<input checked="" type="checkbox"/> Averages <input type="checkbox"/> Percentiles

Preview Cancel Done

When the table option is selected, you will get a significance test matrix in which you will see the differences and p values. Using the symbols shown in the legend of the matrix, an indication is also provided of whether one estimate is significantly lower or higher than another estimate or whether there is no significant difference (see exhibit 25).

The alpha level for all t tests is .05. All comparisons within a jurisdiction, within the same year, are made using dependent t tests. Comparisons between jurisdictions are treated as independent, and comparisons of achievement scores across years are made using independent t tests with a linking error taken into account.

ICILS assessments are linked across years. That is, the sets of items used to assess computer and information literacy (CIL) across years include a subset of common items, referred to as link items. To establish common reporting metrics for ICILS, the difficulty of the link items, measured on different occasions, is compared. The comparison of the item difficulties on the different occasions is used to determine a score transformation that allows the reporting of the data on a common scale. As each item provides slightly different information about the link transformation, it follows that the chosen sample of link items will influence the estimated

transformation. The consequence is an uncertainty in the transformation due to the sampling of link items, just as there is an uncertainty in the country means due to the sampling of students. The uncertainty that results from the link-item sampling is referred to as the linking error, and this error must be taken into account when making certain comparisons using the ICILS assessment data. As with sampling errors, the likely range of magnitude for the errors is represented as a standard error. Significance tests for scores across years within the IDE take into account the linking errors applicable to each display.

Exhibit 25. Significance test table output

Table Sig Test 1 X

Chart Significance Test Gap Analysis Regression Analysis

To see how one value compares with the others, read across the row for that value. The displayed symbols indicate whether that value is significantly higher, significantly lower, or not significantly different from the focal jurisdiction. In some cases the significance test may have not been possible for statistical reasons.

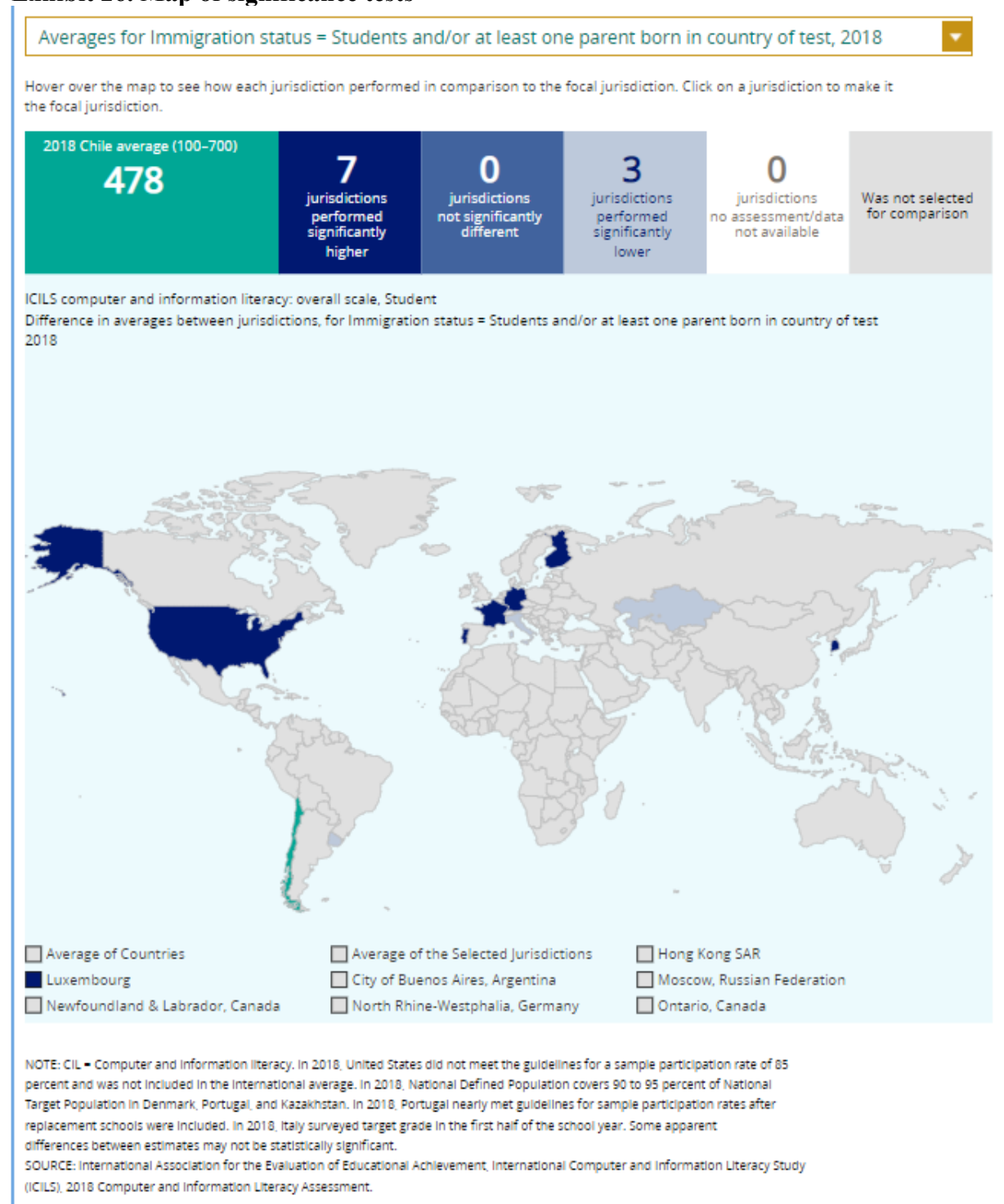
ICILS computer and information literacy: overall scale, Student
Difference in averages between jurisdictions, for Immigration status [SIMMIG] = Students and/or at least one parent born in country of test
2018

	Chile (478)	Finland (535)	France (506)	Germany (531)	Italy (464)	Kazakhstan (400)	Korea, Republic of (544)
Chile (478)		< Diff = -57 (4.5) P-value = 0.0000	< Diff = -28 (4.1) P-value = 0.0000	< Diff = -53 (4.6) P-value = 0.0000	> Diff = 14 (4.6) P-value = 0.0017	> Diff = 78 (6.5) P-value = 0.0000	< Diff = -65 (4.6) P-value = 0.0000
Finland (535)	> Diff = 57 (4.5) P-value = 0.0000		> Diff = 28 (3.6) P-value = 0.0000	x Diff = 4 (4.1) P-value = 0.3901	> Diff = 71 (4.1) P-value = 0.0000	> Diff = 135 (6.1) P-value = 0.0000	< Diff = -9 (4.1) P-value = 0.0323
France (506)	> Diff = 28 (4.1) P-value = 0.0000	< Diff = -28 (3.6) P-value = 0.0000		< Diff = -25 (3.7) P-value = 0.0000	> Diff = 42 (3.7) P-value = 0.0000	> Diff = 106 (5.9) P-value = 0.0000	< Diff = -37 (3.7) P-value = 0.0000
Germany (531)	> Diff = 53 (4.6) P-value = 0.0000	x Diff = -4 (4.1) P-value = 0.3901	> Diff = 25 (3.7) P-value = 0.0000		> Diff = 67 (4.2) P-value = 0.0000	> Diff = 131 (6.2) P-value = 0.0000	< Diff = -12 (4.2) P-value = 0.0035
Italy (464)	< Diff = -14 (4.6) P-value = 0.0017	< Diff = -71 (4.1) P-value = 0.0000	< Diff = -42 (3.7) P-value = 0.0000	< Diff = -67 (4.2) P-value = 0.0000		> Diff = 64 (6.2) P-value = 0.0000	< Diff = -80 (4.2) P-value = 0.0000
Kazakhstan (400)	< Diff = -78 (6.5) P-value = 0.0000	< Diff = -135 (6.1) P-value = 0.0000	< Diff = -106 (5.9) P-value = 0.0000	< Diff = -131 (6.2) P-value = 0.0000	< Diff = -64 (6.2) P-value = 0.0000		< Diff = -143 (6.2) P-value = 0.0000
Korea, Republic of (544)	> Diff = 65 (4.6) P-value = 0.0000	> Diff = 9 (4.1) P-value = 0.0323	> Diff = 37 (3.7) P-value = 0.0000	> Diff = 12 (4.2) P-value = 0.0035	> Diff = 80 (4.2) P-value = 0.0000	> Diff = 143 (6.2) P-value = 0.0000	
Luxembourg (495)	> Diff = 16 (3.8) P-value = 0.0000	< Diff = -40 (3.2) P-value = 0.0000	< Diff = -12 (2.6) P-value = 0.0000	< Diff = -37 (3.3) P-value = 0.0000	> Diff = 31 (3.3) P-value = 0.0000	> Diff = 94 (5.6) P-value = 0.0000	< Diff = -49 (3.3) P-value = 0.0000
Portugal (518)	> Diff = 40 (4.5) P-value = 0.0000	< Diff = -16 (4.0) P-value = 0.0000	> Diff = 12 (3.6) P-value = 0.0008	< Diff = -13 (4.1) P-value = 0.0016	> Diff = 55 (4.1) P-value = 0.0000	> Diff = 118 (6.1) P-value = 0.0000	< Diff = -25 (4.1) P-value = 0.0000
United States (522)	> Diff = 44 (4.0) P-value = 0.0000	< Diff = -13 (3.4) P-value = 0.0002	> Diff = 16 (2.9) P-value = 0.0000	< Diff = -9 (3.5) P-value = 0.0089	> Diff = 58 (3.5) P-value = 0.0000	> Diff = 122 (5.8) P-value = 0.0000	< Diff = -22 (3.6) P-value = 0.0000

When the **map option** is selected, a global map is shown with the countries and subnational education systems selected shaded in different colors (see exhibit 26). The focal jurisdiction is shaded in teal green, with all other countries compared to it. The other countries are shaded in colors that indicate whether they are higher, lower, or not significantly different from the focal jurisdiction on whatever measure has been selected. (Note that a light shade of gray is the default color for jurisdictions not selected for comparison.) When you hover over a jurisdiction, a text bubble displays the numerical difference in estimates between that jurisdiction and the focal

jurisdiction. At any point, you may choose a different focal jurisdiction by clicking on another country. You may also choose a different variable category for comparison by using the drop-down menu above the map.

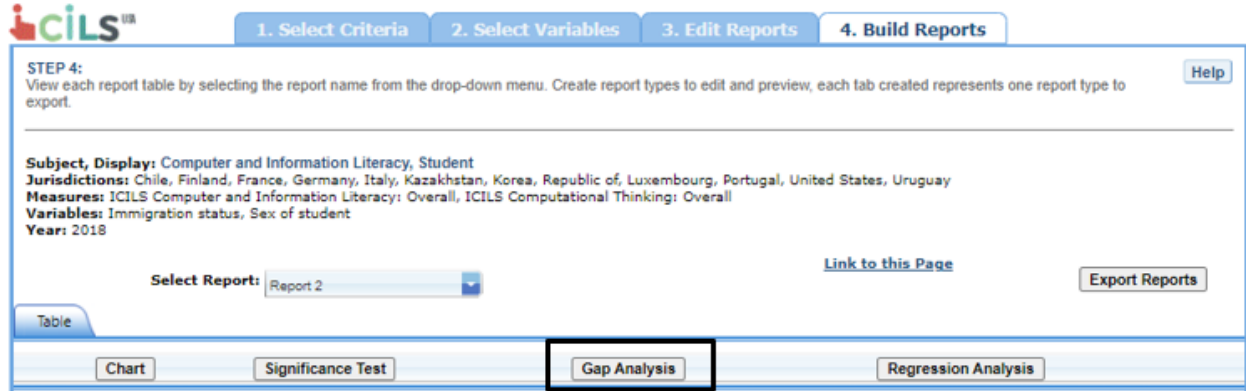
Exhibit 26. Map of significance tests



4.G. Gap Analysis

Gap analysis is included in the IDE to compare differences in gaps shown in a map, table, or chart. Gap differences can be compared between jurisdictions and/or across years.

Exhibit 27. Gap analysis link selection



With your report of interest selected, click on the **Gap Analysis** link, which is located to the right of the **Significance Test** link (see exhibit 27). You will need to decide which variable you would like to test (e.g., gender) and the criterion by which you want to test it (i.e., between jurisdictions or across years). The difference measure, or gap, can be viewed between groups, between years, between groups and years, or between percentiles within the selected variable. For example, if you compute average CIL scores for two countries at two time points for males and females, you can:

- at one time point, compare the male-female gap in one country to the male-female gap in another country;
- compare the male-female gap at two time points within a country;
- compare the difference between the male-female gap at two time points in one country to the difference between the male-female gap at two time points in another country; or
- compare the gap for females at two time points in one country to the gap for females at two time points in another country.

Exhibit 28. Gap analysis options

The screenshot shows the 'Gap Analysis' dialog box with the following configuration:

- 1. Select the basis to use for comparison (Between Jurisdictions, Across Years):** Between Jurisdictions, Across Years
- 2. Create a name for this gap analysis:** Gap Test 1
- 3. Select the difference measure (gap) to analyze:** Between Groups, Between Years, Between Groups and Years, Between Percentiles
- 4. Select the output type:** Table, Map
- 5. Check to show table details:** Show table details
- 6. Select available options from each of the columns below, then preview results:**

Jurisdiction	Variable	Year	Statistic
<input checked="" type="checkbox"/> All Jurisdictions	<input checked="" type="checkbox"/> Immigration status	<input checked="" type="checkbox"/> 2018	<input checked="" type="checkbox"/> Averages
<input checked="" type="checkbox"/> Chile	<input checked="" type="checkbox"/> Students and/or at least one parent born in country of test		<input type="checkbox"/> Percentiles
<input checked="" type="checkbox"/> Finland	<input checked="" type="checkbox"/> Student born in country of test but both/only parent(s) born abroad		
<input checked="" type="checkbox"/> France	<input checked="" type="checkbox"/> Student and both/only parent(s) born abroad		
<input checked="" type="checkbox"/> Germany			
<input checked="" type="checkbox"/> Italy			

The steps for running a gap analysis are similar to those for conducting a statistical significance test (see exhibit 28). Thus, to run a gap analysis, follow the instructions under **Section 4.F. Significance Tests**, noting the following differences:

1. The **Gap Analysis** link should be selected, not the **Significance Test** link.
2. The gap analysis does not have a **Within Variables** option for analysis; the options are **Between Jurisdictions** and **Across Years**.
3. The difference measure (gap) of analysis must be selected from the following: **Between Groups**, **Between Years**, **Between Groups and Years**, and **Between Percentiles** (if variables are selected for which a difference measure is not feasible, the difference measure option will not appear as available in the Gap Analysis menu).

The gap analysis output is presented in a format similar to that of the significance test output, with one difference: the difference estimate shown in the output is the difference between the gaps selected for analysis. Note that you will still see the significance of these differences, just like in a significance test. For example, exhibit 29 shows cross-national differences between male-female score gaps.

The gap analysis function computes and statistically tests differences between score, percentage, or percentile gaps. For gap analysis tables, all comparisons are independent tests with an alpha level of .05. Note that the reference group for the gaps is kept constant during the analysis, as opposed to taking the absolute value of the gaps. Therefore, the gap analysis tests whether the magnitude of the gaps differ from each other only when the gaps go in the same direction (e.g., comparing a 5-point gender gap favoring females in one country with a 15-point gender gap favoring females in another country).

Exhibit 29. Gap analysis output

ICILS computer and information literacy: overall scale, Student Differences between jurisdictions for gaps in averages between Sex of student [SSEX]=Boy and Sex of student [SSEX]=Girl 2018					
	Chile (-8)	Denmark (-16)	Finland (-29)	Korea, Republic of (-39)	United States (-23)
Chile (-8)		x Diff = 8 (7.2) P-value = 0.2688	> Diff = 21 (7.9) P-value = 0.0087	> Diff = 30 (8.1) P-value = 0.0002	> Diff = 14 (6.9) P-value = 0.0395
Denmark (-16)	x Diff = -8 (7.2) P-value = 0.2688		> Diff = 13 (6.0) P-value = 0.0345	> Diff = 22 (6.3) P-value = 0.0004	x Diff = 6 (4.7) P-value = 0.1797
Finland (-29)	< Diff = -21 (7.9) P-value = 0.0087	< Diff = -13 (6.0) P-value = 0.0345		x Diff = 10 (7.1) P-value = 0.1726	x Diff = -6 (5.7) P-value = 0.2601
Korea, Republic of (-39)	< Diff = -30 (8.1) P-value = 0.0002	< Diff = -22 (6.3) P-value = 0.0004	x Diff = -10 (7.1) P-value = 0.1726		< Diff = -16 (6.0) P-value = 0.0074
United States (-23)	< Diff = -14 (6.9) P-value = 0.0395	x Diff = -6 (4.7) P-value = 0.1797	x Diff = 6 (5.7) P-value = 0.2601	> Diff = 16 (6.0) P-value = 0.0074	
LEGEND:					
<	Has a significant negative difference.				
>	Has a significant positive difference.				
x	No significant difference.				
NOTE: Standard errors are in parentheses in the table body. For gap analysis tables, all comparisons are independent tests with an alpha level of 0.05. In 2018, National Defined Population covers 90 to 95 percent of National Target Population in Denmark, Portugal, and Kazakhstan.					

Note that a gap analysis across years cannot be combined with the Between Years or Between Groups and Years difference measures, so you will select the difference measure Between Groups, or, if you have selected percentiles as one of your statistics, you may choose Between Percentiles.

4.H. Regression Analysis

Regression analysis is included in the IDE to test for the relationship between one or more independent variables with a dependent variable, with the independent variables controlling for each other. The type of analysis performed in this feature of the IDE is referred to as linear regression, with the dependent variable being a continuous variable selected at step 1. To run a regression, first, go to **Build Reports** and choose the report of interest from the drop-down **Select Report** menu. Then click on the **Regression Analysis** link, which is to the right of the **Gap Analysis** link (see exhibit 30).

Exhibit 30. Regression analysis link selection

STEP 4:
View each report table by selecting the report name from the drop-down menu. Create report types to edit and preview, each tab created represents one report type to export. [Help](#)

Subject, Display: Computer and Information Literacy, Student
Jurisdictions: Chile, Finland, France, Germany, Italy, Kazakhstan, Korea, Republic of, Luxembourg, Portugal, United States, Uruguay
Measures: ICILS Computer and Information Literacy: Overall, ICILS Computational Thinking: Overall
Variables: Immigration status, Sex of student
Year: 2018

Select Report: Report 2 [Link to this Page](#) [Export Reports](#)

Table [Chart](#) [Significance Test](#) [Gap Analysis](#) [Regression Analysis](#)

The general steps for running a regression analysis are as follows (see exhibit 31):

1. In the **Regression Analysis** pop-up window, you can enter a **Name** limited to 25 characters, using only letters, numbers, spaces, underscores, and hyphens (otherwise, by default, the test will be named “Regression 1”).
2. Select the appropriate jurisdiction, year, and variable(s) for analysis. Please note that you may only choose one jurisdiction and year at a time, but you may choose up to three independent variables to be in your report. In order to use up to three independent variables, you must have already created and selected a cross-tabulated report (by selecting three variables in Step 2, **Select Variables**).
3. Click the **Preview** tab located in the upper-left corner to view the table format into which your output will be populated. In the Preview tab, an “X” denotes where the output will display.
4. Click the **Edit** tab in the upper-left corner of the screen if you wish to go back and make changes to the selections you made for running the analysis.
5. Click the **Done** button in the upper- or lower-right corner of the screen to run the regression analysis.

Exhibit 31: Regression analysis options

1. Create a name for this regression analysis.

Regression 1

2. Select available options from each of the columns below, then preview results.

Jurisdiction	Year	Variable
<input type="radio"/> Germany <input type="radio"/> Italy <input type="radio"/> Kazakhstan <input type="radio"/> Korea, Republic of <input type="radio"/> Luxembourg <input type="radio"/> Portugal <input checked="" type="radio"/> United States <input type="radio"/> Uruguay	<input checked="" type="radio"/> 2018	<input type="checkbox"/> All Variables <input checked="" type="checkbox"/> Immigration status

After you have clicked **Done**, your regression analysis output will load onto the screen (see exhibit 32). A 0-1 contrast coding is used to code the independent variable, where the first subgroup of the independent variable is the reference group. Using dummy-coded variables in linear regression is useful for comparing each subgroup against a reference group. For example, in exhibit 32, if the subgroup “Students and/or at least one parent born in country of test” is the reference group for the independent variable **Immigration status (SIMMIG)**, the IDE creates a “Student born in country of test but both/only parent(s) born abroad” dummy variable (1 if yes, 0 if no) and a “Student and both/only parent(s) born abroad” dummy variable (1 if yes, 0 if no). The reference group is excluded from the regression analysis.

Exhibit 32. Regression analysis output

Computer and Information Literacy, Student 2018
 Dependent Variable: ICILS Computer and Information Literacy: Overall
 Independent Variable(s): Immigration status [SIMMIG]
 Contrast Coding Reference Group: Students and/or at least one parent born in country of test
 United States

Multiple Correlation	0.06						
R Squared	0						
	Degrees of Freedom	Mean square	F Ratio	P Value			
Model	2	45415651.15	3.49	0.03			
Error	1757.79	12997003.21					
	Standardized Regression Coefficients	S.E. of Standardized Coefficients	Regression Coefficients	S.E. of Regression Coefficients	T Statistic	Probability	Significance
Intercept	0	0	522.0007	1.9051	273.9959	0	>
Immigration status							
Student born in country of test but both/only parent(s) born abroad	-0.027	0.0142	-40.2344	19.6801	-2.0444	0.0444	<
Student and both/only parent(s) born abroad	-0.0568	0.0199	-20.0819	7.428	-2.7036	0.0085	<

NOTE: A 0-1 contrast coding has been used where the first subgroup of the (independent) variable is the reference group. Except for the reference group, each subgroup is contrasted (code 1) in a separate dummy variable against all the other subgroups of the variable (code 0). For more details about contrast coding with multiple variables see the help documentation. CIL = Computer and information literacy. In 2018, United States did not meet the guidelines for a sample participation rate of 85 percent and was not included in the international average.

SOURCE: International Association for the Evaluation of Educational Achievement, International Computer and Information Literacy Study (ICILS), 2018 Computer and Information Literacy Assessment.

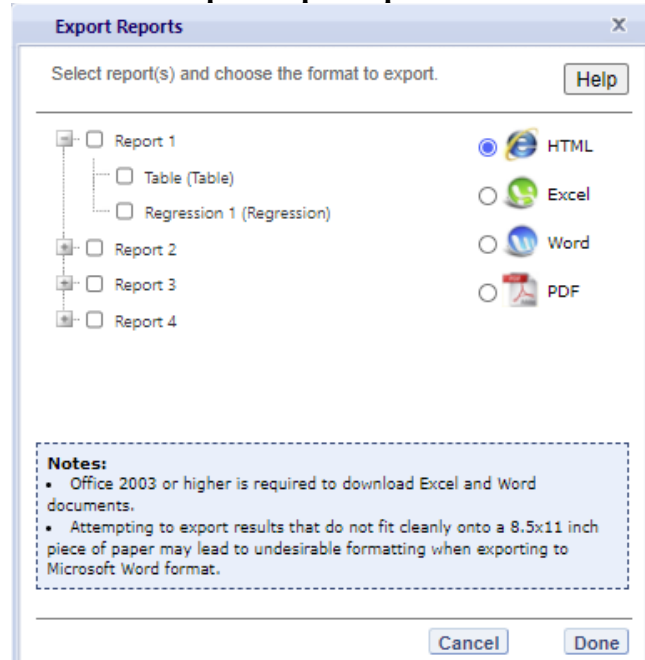
Using the output from the regression analysis, you can compare the average CIL scores of first-generation (Student and both/only parent(s) born abroad) and second-generation (Student born in country of test but both/only parent(s) born abroad) students to scores of native-born (Students and/or at least one parent born in country of test) students. When a single dummy-coded variable is used in a regression, the *intercept* is the mean of the reference group (e.g., 522.0007), and the *regression coefficient* is the difference between the mean of the reference group and the group identified (coded 1) with the dummy-coded variable (e.g., -40.2344 for second generation and -20.0819 for first generation). Since the regression coefficients are presented with a standard error and a *t* value, they can be used to test whether a difference between means is statistically significant. Under the Significance column in the output, you will see three possible signs: (1) < signifies a significant negative difference, (2) > signifies a significant positive difference, and (3) x signifies the difference is not statistically significant.

4.I. Export Reports

Click on the **Export Reports** button/arrow located on the right side of the **Build Reports** screen to save or print your tables, charts, and significance tests. The report names that appear in the **Export Reports** window are those that were checked off at step 3, **Edit Reports**.

Check the files you want to export and select one of the file formats: **HTML** (print-friendly), **Excel**, **Word**, or **PDF** (see exhibit 33). All reports that you select at the same time will be exported in one file. In the Excel format, you will be able to increase the decimal places visible wherever more precision is available. Because there are many different operating systems in use, you may get an error message with Excel or one of the other formats. Usually, this will not affect your ability to export, so please wait for the software errors to resolve.

Exhibit 33. Export report options



V. ICILS International Data Explorer Definitions

This section describes the kinds of criteria and variables that are used to form data queries, as well as the kinds of data available and the statistical methods used to assess them.

These topics include the following:

1. Criteria

- a. Display
- b. Measure(s)
- c. Year(s)
- d. Jurisdiction(s)

2. Variables

3. Statistics options

- a. Averages
- b. Percentages
- c. Standard deviations
- d. Percentiles

4. Cross-tabulations

5. Statistical notations and other notes

1. Criteria

Each data query must include at least one selection from five criteria choices: subject, year(s), measure(s), and jurisdiction(s). Shown below is an outline of these selection criteria followed by a brief description.

- a. Display:
 - Student
 - Teacher
- b. Measure(s):
 - Computer and Information Literacy (CIL): Overall
 - Computational Thinking (CT): Overall
- c. Year(s):
 - 2018 (data available for CIL and CT)
 - 2013 (data available for CIL)
- d. Jurisdiction(s):
 - Average of Countries
 - Average of the Selected Jurisdictions
 - Countries
 - Benchmarking participants

Display

ICILS participating countries selected a nationally representative sample of 8th-grade students and teachers. As a result, when using the ICILS IDE, you have the option to run either a student- or teacher-level analysis. Selecting the Student option in the display drop-down list provides student or school information that is an attribute of students (thus estimates are reported, for example, as the “percentage of students”), while selecting the Teacher option provides teacher or school information that is an attribute of teachers (thus estimates are reported, for example, in terms of the “percentage of teachers”).

Measure(s)

The ICILS IDE includes measures for each display when selected, including overall scales (Student display only) and continuous variables.

There are continuous variables other than scale scores that you may choose as a measure of analysis. These variables fall under different categories, such as *Population* and *Student demographics*, and include variables such as student age in years, ratio of school size and teachers, and an index of computer experience in years.

Some of the continuous variables may have missing values if there are cases that did not answer the assessment or the questionnaire. In both the Student and Teacher displays, selecting the variable “Percentage across full sample” under the *Population* category will allow you to calculate percentage statistics based on the full sample.


Year(s)

Data from ICILS 2013 and 2018 are available in the IDE. Currently, data availability in the IDE is dependent on the measure selected. For example, if the measure chosen is CIL: Overall scale, you can choose one or both years: 2018 and 2013. If the measure chosen is CT: Overall scale, you can choose 2018.

Jurisdiction(s)

All listed jurisdictions can be selected for any analyses, provided data are available for the selected year. In 2018, a total of 12 countries and 2 benchmarking participants took part in the ICILS CIL assessment. Of those participants, 8 countries and 1 benchmarking participant opted into the ICILS CT assessment.


In 2013, some 18 countries and 3 benchmarking participants took part in the ICILS CIL assessment.

Jurisdictions for which data are not available for a selected year are identified by the icon representing “no data”—. Note that the IDE contains a few U.S.-specific background variables (e.g., race/ethnicity, or NAT\DERIVED RACE-COLLAPSED) that, when selected, will not yield information for any non-U.S. jurisdictions.

2. Variables

In the ICILS IDE, variables from the student, teacher, principal, and ICT coordinator questionnaires are organized into categories that have shared characteristics. Content category and subcategory titles may overlap, but specific variables appear only once in a subcategory. Use **Search** in the **Select Variables** step to locate variables.

Note that some variables might be similar in content, but not comparable over the years, either due to differences in the question asked or differences in their response categories. For example, a student background questionnaire variable, “In what country were you and your parents born/Mother or [female guardian]”, which is only available in 2013, is similar but not comparable to the variable “In what country were you and your parents born/[Parent or guardian 1]”, which is only available in 2018.

The icon representing “no data”——will help in identifying the year for which the variable has data available for analysis.

Proficiency levels

Achievement results for ICILS are reported using discrete proficiency levels for CIL and CT. Higher levels represent the knowledge, skills, and capabilities needed to perform tasks of increasing complexity. Based on the statistics option chosen, IDE can report the average scores of students at each proficiency level or the percentage of students performing at each of the predefined levels for the chosen jurisdictions. Two statistics options, standard deviations and percentiles, will not generate reports as proficiency levels are not reportable using these statistical analyses. Proficiency levels for any subject should be analyzed with the scale of that same subject; for example, the CIL proficiency levels should be analyzed with the overall CIL scale.

Computer and Information Literacy: Administered in 2013 and 2018. In both years, CIL results were reported using four proficiency levels (levels 1–level 4); the IDE shows five categories (below level 1, level 1, level 2, level 3, level 4).

Computational Thinking: Administered in 2018. CT results were reported using three proficiency levels (lower region, middle region, upper region); the IDE shows these three categories.

Descriptions that characterize typical student performance at each proficiency level are shown in the following tables for CIL and CT. For more information about the development of the proficiency levels, please see the [ICILS 2018 Technical Report](#).

Exhibit 34. Description of ICILS Computer and Information Literacy (CIL) proficiency levels: 2013 and 2018

Proficiency level and lower cutpoint score	Task descriptions
Level 1 407	Students working at Level 1 demonstrate a functional working knowledge of computers as tools and a basic understanding of the consequences of computers being accessed by multiple users. They apply conventional software commands to perform basic research and communication tasks and add simple content to information products. They demonstrate familiarity with the basic layout conventions of electronic documents.
Level 2 492	Students working at Level 2 use computers to complete basic and explicit information gathering and management tasks. They locate explicit information from within given electronic sources. These students make basic edits and add content to existing information products in response to specific instructions. They create simple information products that show consistency of design and adherence to layout conventions. Students working at Level 2 demonstrate an awareness of mechanisms for protecting personal information and some consequences of public access to personal information.
Level 3 577	Students working at Level 3 demonstrate the capacity to work independently when using computers as information gathering and management tools. These students select the most appropriate information source to meet a specified purpose, retrieve information from given electronic sources to answer concrete questions, and follow instructions to use conventionally recognized software commands to edit, add content to, and reformat information products. They recognize that the credibility of web-based information can be influenced by the identity, expertise, and motives of the creators of the information.
Level 4 662	Students working at Level 4 select the most relevant information to use for communicative purposes. They evaluate the usefulness of information based on criteria associated with need and evaluate the reliability of information based on its content and probable origin. These students create information products that demonstrate a consideration of audience and communicative purpose. They also use appropriate software features to restructure and present information in a manner that is consistent with presentation conventions. They then adapt that information to suit the needs of an audience. Students working at Level 4 demonstrate an awareness of problems that can arise regarding the use of proprietary information on the internet.

NOTE: ICILS technical reports contain information about the procedures used to set the proficiency levels for each cycle and are available on the IEA [ICILS page](#).

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), International Computer and Information Literacy Study (ICILS), [2018 International Report](#).

Exhibit 35. Description of ICILS Computational Thinking (CT) proficiency levels: 2018

Proficiency level and lower cutpoint score	Task descriptions
Lower region 100	Students showing achievement corresponding to the lower region of the scale demonstrate familiarity with the basic conventions of digital systems to configure inputs, observe events, and record observations when planning computational solutions to given problems. When developing problem solutions in the form of algorithms, they can use a linear (step-by-step) sequence of instructions to meet task objectives.
Middle region 459	Students showing achievement corresponding to the middle region of the scale demonstrate an understanding of how computation can be used to solve real-world problems. They can plan and execute systematic interactions with a system so that they can interpret the output or behavior of the system. When developing algorithms, they use repeat statements effectively.
Upper region 589	Students showing achievement corresponding to the upper region of the scale demonstrate an understanding of computation as a generalizable problem-solving framework. They can explain how they have executed a systematic approach when using computation to solve real-world problems. Furthermore, students operating within the upper region can develop algorithms that use repeat statements together with conditional statements effectively.

NOTE: ICILS technical reports contain information about the procedures used to set the proficiency levels for each cycle and are available on the IEA [ICILS page](#).

SOURCE: International Association for the Evaluation of Educational Achievement (IEA), International Computer and Information Literacy Study (ICILS), [2018 International Report](#).

Exact cut scores for the CIL proficiency levels are as follows:

1. Below level 1, less than 407;
2. Level 1, equal to or greater than 407 and less than 492;
3. Level 2, equal to or greater than 492 and less than 576;
4. Level 3, equal to or greater than 576 and less than 661; and
5. Level 4, equal to or greater than 661.

Exact cut scores for the CT proficiency levels in the IDE are as follows:

1. Lower region, less than 459;
2. Middle region, equal to or greater than 459 and less than or equal to 589; and
3. Upper region, greater than 589.

3. Statistics Options

The IDE reports ICILS data with several statistics options:

- a. Averages
- b. Percentages
- c. Standard deviations
- d. Percentiles

Averages

This statistic provides the average value for a selected continuous variable or overall scale.

For the ICILS assessment, student performance is reported on scales that range from 100 to 700. ICILS scales are produced using item response theory (IRT) to estimate average scores for CIL and CT for each jurisdiction. IRT identifies patterns of response and uses statistical models to predict the probability of answering an item correctly as a function of the student's proficiency in answering other questions. That is, student responses to the assessment questions are analyzed to determine the percentage of students responding correctly to each multiple-choice question and the percentage of students achieving each of the score categories for constructed-response questions.

Percentages

This statistic shows the percentage of students as a row percentage. For example, if a categorical variable is selected and the jurisdictions are listed in the table stub, the percentage data for the response categories will sum to 100 percent in each jurisdiction. By default, percentage distributions do not include missing data, although there is an option to include them.

Standard deviations

The standard deviation is a measure of how widely or narrowly dispersed scores are for a particular dataset. Under general normality assumptions, 95 percent of the scores are within two standard deviations of the mean. For example, if the average score of a dataset is 500 and the standard deviation is 100, it means that 95 percent of the scores in this dataset fall between 300 and 700. The standard deviation is the square root of the variance.

Percentiles

This statistic shows the threshold score (or cut point) for the following:

- 10th percentile – the bottom 10 percent of students
- 25th percentile – the bottom quarter of students
- 50th percentile – the median (half the students scored below the cut point and half scored above it)
- 75th percentile – the top quarter of students
- 90th percentile – the top 10 percent of students

4. Cross-tabulations

Cross-tabulation is a method of combining separate variables into a single table. Normally, each variable has its own table. If you have selected two or three variables (not counting **All Cases**) and when you go to the **Edit Reports** step, you will automatically get a list with one table for each variable (including one for **All Cases**); at the end of that list, you will get one cross-tabulation for the two or three variables selected.

If you have chosen four or more variables (not counting **All Cases**), you will get a table for each variable, but you won't get the cross-tabulation.

Be advised that if you go back to add another variable without subtracting one to keep the total under four, you will lose any edits you might have made to the cross-tabulation.

5. Statistical Notations and Other Notes

Statistical notations and other notes are found at the end of a data table, as applicable to that table:

- — Not available.
- † Not applicable. (For instance, the standard error for the statistic cannot be reported because the statistic does not meet reporting standards.)
- # The statistic rounds to zero.
- ‡ Reporting standards not met. (For instance, the sample size is insufficient to permit a reliable estimate.)
- NOTE: A general note pertains to any special characteristics of the data in the table.
- SOURCE: Source information is listed for all ICILS data and should be cited when data are used in a publication or presentation.

Statistical Comparisons

Comparisons of achievement scores across years are made using independent *t* tests with a linking error taken into account. Comparisons between jurisdictions are also treated as independent. All comparisons within a jurisdiction, within the same year, are made using dependent *t* tests. The alpha level for all *t* tests is .05.

Data Suppression

Data suppression may be handled slightly differently in the ICILS IDE and the reports from IEA or NCES. For the IDE, the Rule of 62 is applied to suppress data to avoid reporting results for groups about which little of interest could be said due to lack of power. The Rule of 62 is borrowed from the IDE's counterpart, the National Assessment of Educational Progress (NAEP) Data Explorer (NDE). This rule states that statistics for a group are suppressed if they are based on less than 62 cases. These statistics are means, standard errors, standard deviations, and a set of percentiles. The rule serves to assure a minimum power requirement to detect moderate differences at nominal significance level (.05). The minimum power is 0.80 and the moderate effect size is 0.5 standard deviation units. A design effect of 2 is assumed to derive an appropriate complex sample standard deviation. In addition, the IDE does not support the calculation of the coefficient of variation.

6. Index Variables

In addition to scale scores representing performance in various subjects, ICILS uses indices derived from the student, teacher, principal, and ICT coordinator questionnaires to contextualize ICILS results or to estimate trends that account for demographic changes over time.

Information on indices for each year of administration can be found in the IEA publication chapters referenced in the summary table below.

Exhibit 37. ICILS IEA publication summary chart

Year of ICILS administration	ICILS IEA User Guide chapters	Links
2018	Appendix C	https://www.iea.nl/publications/user-guides/icils-2018-user-guide-international-database
2013	Appendix 3	https://www.iea.nl/publications/user-guides/icils-2013-user-guide-international-database