English Learner State Accountability Resource (ELSTAR)

User Guide

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Introduction

The English Learner State Accountability Resource (ELSTAR) is a statistical analysis tool to support state educational agency (SEA) leaders in making data-based decisions about English learner accountability, checking the validity and reliability of the English language proficiency (ELP) indicator, and providing technical assistance to local educational agencies. This user's guide provides an overview of the ELSTAR tool. It is organized into four sections:

- Section 1 provides an overview of tool download and initialization.
- Section 2 describes the steps involved in data preparation.
- Section 3 discusses the procedure for data import into the tool.
- Section 4 focuses on data exploration by walking the user through key features of the tool interface to show how it can be used to explore and analyze data.

A complete list of variables needed for the data preparation is provided in Appendix A. Instructions for installing the ELSTAR tool using a MAC system are provided in Appendix B. Screen shots of the different tool features are provided in Appendix C.

Section 1: ELSTAR Download and Initialization

The ELSTAR is a statistical analysis tool developed using the open-source software[1] called R. It is stored in a self-contained ELSTAR folder on the user's machine. The user must download and unzip the contents of the folder from a secure folder in a cloud data platform (i.e., website) called Druva (for more information on system compatability requirements, see the next page on Downloading and Unzipping the ELSTAR tool). This section illustrates the process of accessing the secure folder, downloading, and unzipping the contents onto the user's machine.

Accessing the Secure AIR ShareFile Folder

1. Click on the following link to access the AIR ShareFile platform: https://air.sharefile.com/f/foh0e631-7517-4435-98e6-83295b47857e

2. Enter the following user name and password when the login screen appears on the right side under Guest Sign In:

    a. **Username:** elptool2018@gmail.com

    b. **Password (case-sensitive):** elstarDownload*2019*

Figure 1. Login page.

3. Follow the directions on the following page to download and unzip the material in the folder, "ELSTAR".

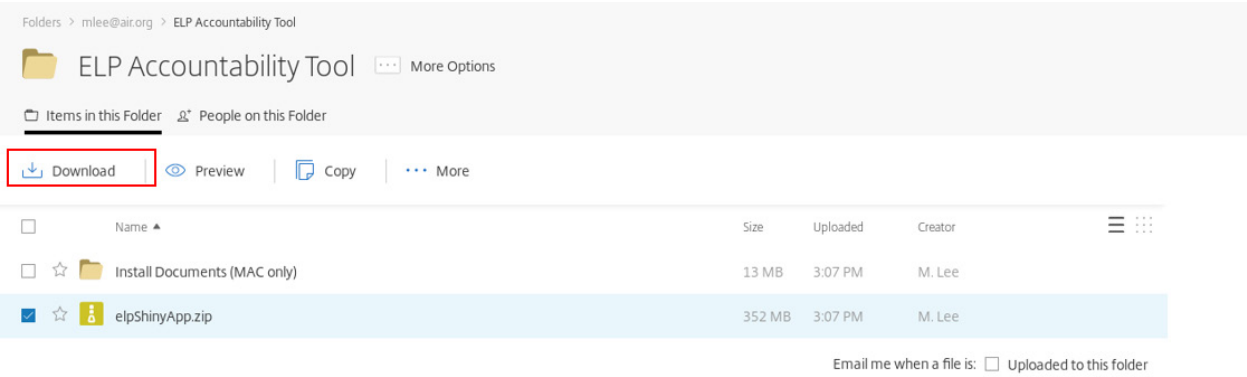
[1] For more information on R and RStudio, please visit https://cran.r-project.org and https://shiny.rstudio.com/.

Downloading and Unzipping the ELSTAR for Windows Operating Systems[2]

The following instructions will assist users in downloading and installing the necessary software and files to use the ELSTAR tool on a computer running a Windows operating system (OS). For Windows users, an Intel-compatible platform running Windows 7 or later is needed. For Mac users, OS X Yosemite 10.10 or later is needed. Instructions for downloading and installing the necessary software and files on Mac computers are found in Appendix B. For questions about system compatibility for other operating systems, please contact the State Support Network at statesupportnetwork@air.org.

1. Click on "ELP accountability tool".
2. Click the download button. Note that the software may take a few minutes to download.
3. Right click on the elpShinyApp.zip attachment and select "Open". Some computers will automatically unzip this file. This will open the WinZip software to unzip the folder for use.

Figure 2. Download the ELSTAR tool.

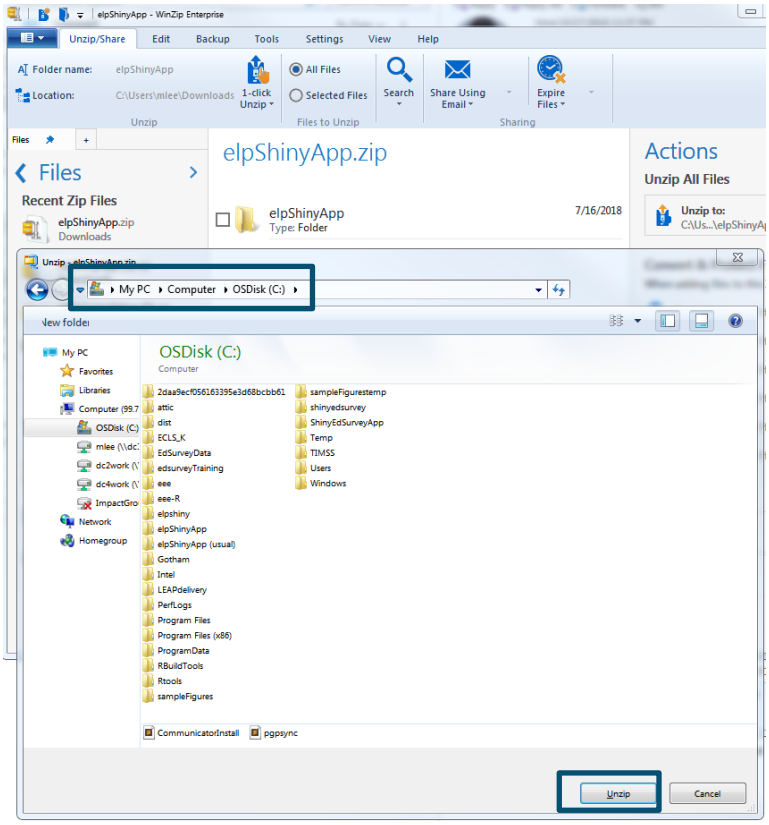


NOTE: If the file was automatically unzipped, copy the folder into your C:/ directory and continue to Step 5 on the next page (page 4).

4. Click Unzip, select the C:\ directory, and then click Unzip.

[2] Please reference Appendix B for installation instructions for Mac computers.

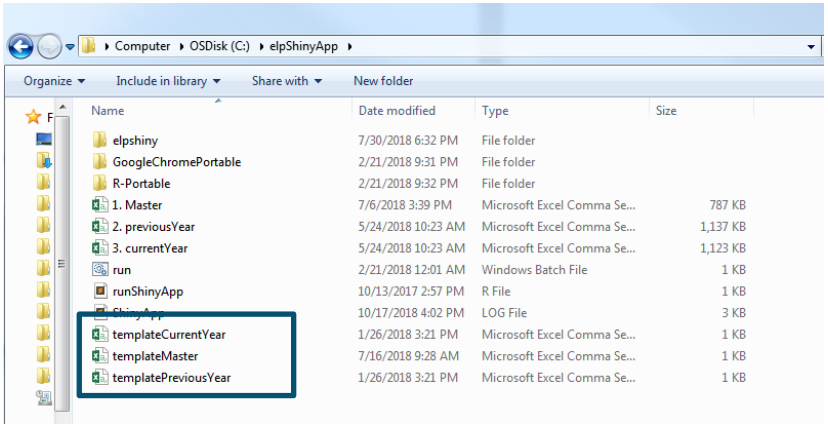
Figure 3. Unzip the ELSTAR tool.



It will then take a few minutes to unzip the folder. Note that once copied, this hyperlink (C:\elpShinyApp) should work to open the folder containing the ELSTAR.

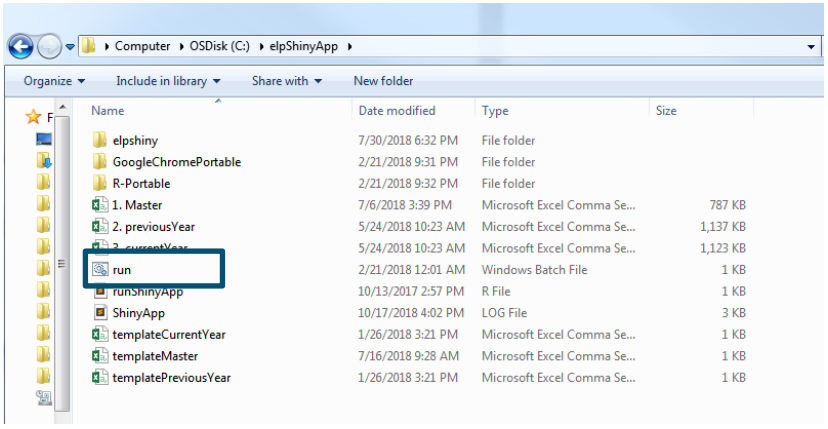
NOTE: The templates that will be used to prepare the data files for import (in Section 2 and Section 3) are located in this unzipped folder (called "templateMaster" and "templateYear"). If you have already prepared your data files, continue to Step 5.

Figure 4. Downloaded ELSTAR.



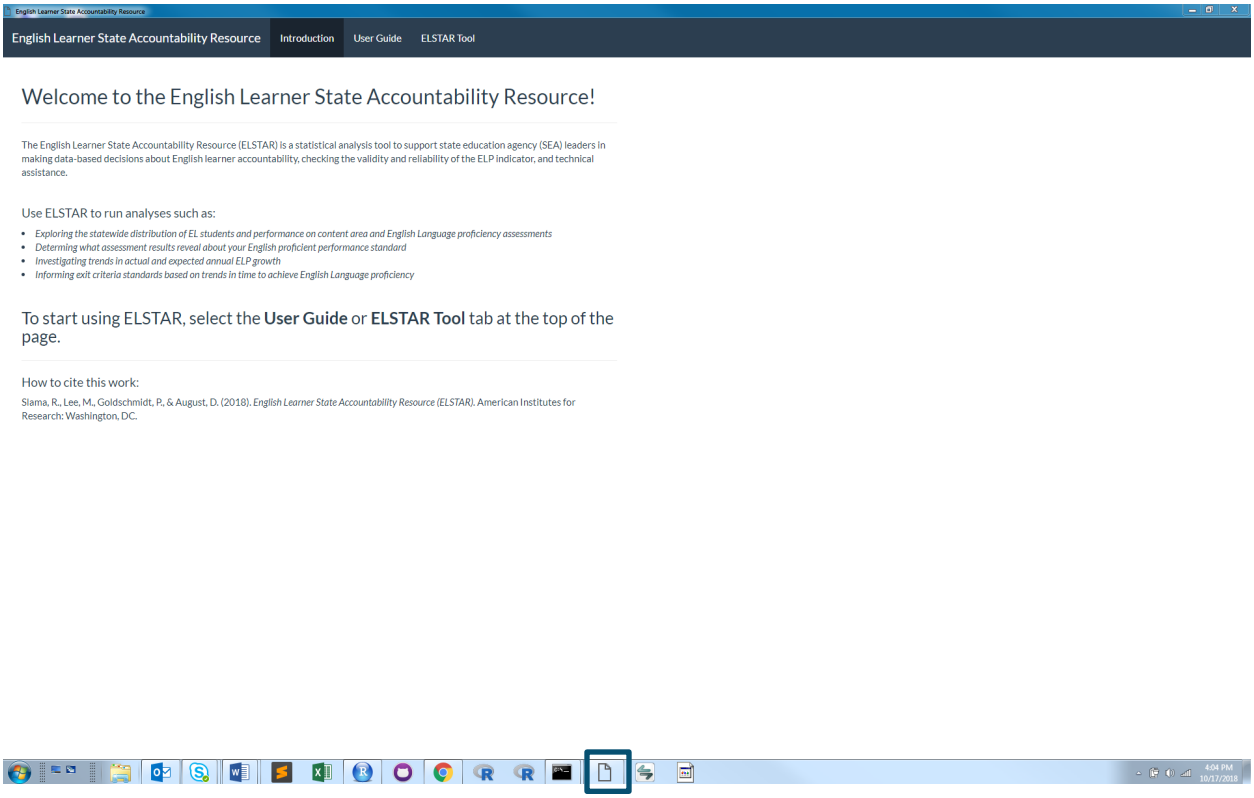
5. To load the tool, double-click *run*.

Figure 5. Run the ELSTAR tool.



Clicking run executes a Windows Batch File, loading the tool in a self-contained browser window.

Figure 6. Load the ELSTAR tool.



Section 2: Data Preparation

The ELSTAR is a statistical analysis tool that requires the preparation and upload of the user's data into a particular structure, saved as an Excel or .csv file. This section provides the user with an overview of the steps required for data preparation.

Note: If you have already prepared your data, please proceed to Section 3 on page 11.

Data Preparation for Master, Previous, and Current Year files

Detailed variable descriptions that correspond to the variable names in the following charts (Charts 1-3) are provided in Appendix A. There must be a common student identifier across all three files for the tool to function properly. The student identifiers and all other information provided in the charts are mock data.

Note that there should be a placeholder for all variables in the data set, even if the user does not collect a particular variable. Consult the Codebook in Appendix A for variable descriptions necessary for import.

The user will need to prepare the following three .csv files for import into the tool:

1. ELP master file: The ELP master file contains the **most recent demographic information** and baseline test information on a specific set of variables (please see Appendix A on page A-1).
2. Previous Year update file: The "Previous Year" file contains basic school, district, and assessment data for all the students in the state, for the **previous school year.** Assessment data include the statewide reading/language arts, mathematics, and English language proficiency assessments[3] (only applicable for current English learners).
3. Current Year update file: The "Current Year" file contains the same information contained in the "Previous Year" file but for the **current school year.** If the statewide assessment has not yet been administered, Previous Year data should come from two year's prior and Current Year data should come from the prior year.

Note: ELSTAR allows for the import of variables outside of those contained in the master, previous year, and current year codebooks. All variables described in the Codebook in Appendix A must be included in the data files in order for additional variables to import. More details on this feature are described in Section 4: Data Exploration. Details for importing additional variables are covered in the Data Preparation for Additional Variables portion of Section 2: Data Preparation (page 9).

Charts 1–3 on the following pages (pages 7–8) include sample tables based on mock data for each of the three files. As noted above, versions of the templates are located in the unzipped folder (highlighted in Figure 7).

[3] Future iterations of the tool may consider incorporating other statewide content area assessments.

Figure 7. Templates in unzipped folder.

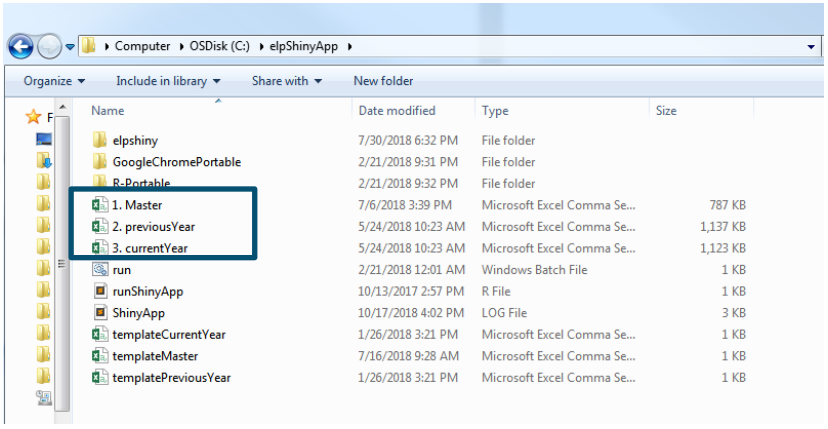


Chart 1. ELP master file.[4]

STID	Gender	Ethnicity	SWD	SWD_Category	FRL	EL	Parental_Opt_Out	Exited	NEL	SIFE	ELP_Level_Initial	ELP_SS_Initial
1	0	3	1	1	0	1	0	1	0	0	NA	NA
2	1	4	0	0	1	0	0	1	1	0	NA	NA
3	0	1	1	1	0	0	0	0	0	1	NA	NA
4	0	2	1	1	1	1	0	1	0	1	NA	NA
5	0	8	0	0	1	0	0	0	1	0	NA	NA
6	2	6	0	0	1	1	1	1	0	0	NA	NA
7	1	99	0	0	1	1	0	1	0	0	NA	NA

[4] Please refer to the codebook in Appendix A for variable definitions.

Chart 2. Previous Year data file one.

STID	School_ Code	District_ Code	Grade	ELP_Attained	ELP_Level	ELP_ SS	ELP_Test_ Occasions	Math_SS	Reading_SS	ELP_ Listening	ELP_ Speaking	ELP_ Writing	ELP_ Reading
1	321	1001	12	NA	NA	NA	8	NA	NA	3	3	3	2
2	324	1002	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
3	324	1002	12	NA	NA	NA	5	NA	NA	4.2	4.2	4.2	5.2
4	321	1001	12	NA	2.3	515	10	NA	NA	1.3	5.3	3.3	3.3
5	324	1002	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA
6	320	1003	12	NA	NA	NA	9	NA	NA	5.5	1.5	4.5	1.5
7	324	1002	12	NA	NA	649	9	NA	NA	2.6	1.6	5.6	2.6
8	322	1001	12	NA	NA	NA	NA	NA	NA	NA	NA	NA	NA

Chart 3. Current Year data file one.

STID	School_ Code	District_ Code	Grade	ELP_Attained	ELP_Level	ELP_ SS	ELP_Test_ Occasions	Math_SS	Reading_SS	ELP_ Listening	ELP_ Speaking	ELP_ Writing	ELP_ Reading
1	321	1001	11	NA	NA	NA	8	550	412	3	3	3	2
2	324	1002	1	NA	NA	NA	8	NA	NA	2	1	5	5
3	324	1002	3	NA	NA	NA	5	NA	NA	4	4	4	5
4	321	1001	11	NA	2	515	10	NA	NA	1	5	3	3
5	324	1002	4	NA	NA	NA	9	466	516	4	5	1	5
6	320	1003	6	NA	NA	NA	9	NA	NA	5	1	4	1
7	324	1002	5	NA	NA	649	9	NA	NA	2	1	5	2
8	322	1001	5	NA	4	NA	9	NA	NA	4	2	5	2

Data Preparation for Additional Variables

ELSTAR allows for the import of variables outside of those contained in the master, previous year, and current year codebooks. All variables described in the Codebook in Appendix A must be included in the data files in order for additional variables to import.

It is advised to collapse variables with a large number of unique values into smaller categories, as the ELSTAR tool is programmed to provide every unique value from each variable as options once uploaded. Collapsing values in categories will result in a more manageable set of selections. These variables can be used to drill down on your subset of data.

Charts 4–5 are two sample tables based on mock data for importing additional variables into the ELSTAR tool. The columns highlighted in green are hypothetical variables and values that could be imported into the tool. While it is advised to prepare values for ease of use, there are no technical limitations to the number of variables and values that can be imported.

Chart 4. Importing additional variables into the ELP master file.

STID	Gender	Ethnicity	SWD	SWD_Category	FRL	EL	Parental_Opt_Out	Exited	NEL	SIFE	ELP_Level_Initial	ELP_SS_Initial	Unique Status Code	504 Plan	State Transferred From
1	0	3	1	1	0	1	0	1	0	0	NA	NA	2	NA	AR
2	1	4	0	0	1	0	0	1	1	0	NA	NA	3	Yes	AL
3	0	1	1	1	0	0	0	0	0	1	NA	NA	5	NA	MD
4	0	2	1	1	1	1	0	1	0	1	NA	NA	1	NA	MD
5	0	8	0	0	1	0	0	0	1	0	NA	NA	4	No	IL
6	2	6	0	0	1	1	1	1	0	0	NA	NA	3	No	SD
7	1	99	0	0	1	1	0	1	0	0	NA	NA	2	NA	VT

Chart 5. Importing additional variables into the ELP current year file.

STID	School_ Code	District_ Code	Grade	ELP_Attained	ELP_Level	ELP_ SS	ELP_Test_ Occasions	Math_SS	Reading_SS	ELP_ Listening	ELP_ Speaking	ELP_ Writing	ELP_ Reading	Absences
1	321	1001	11	NA	NA	NA	8	550	412	3	3	3	2	2
2	324	1002	1	NA	NA	NA	8	NA	NA	2	1	5	5	5
3	324	1002	3	NA	NA	NA	5	NA	NA	4	4	4	5	5
4	321	1001	11	NA	2	515	10	NA	NA	1	5	3	3	3
5	324	1002	4	NA	NA	NA	9	466	516	4	5	1	5	5
6	320	1003	6	NA	NA	NA	9	NA	NA	5	1	4	1	1
7	324	1002	5	NA	NA	649	9	NA	NA	2	1	5	2	2
8	322	1001	5	NA	4	NA	9	NA	NA	4	2	5	2	2

Section 3: Data Import

Now that the user has downloaded the tool onto their machine (Section 1) and prepared the data set (Section 2), the user is ready to import the data into the ELSTAR. This section provides detailed instructions for importing the data into the tool.

Data Import Preparation

The following tips will help ensure that data are properly imported into the tool:

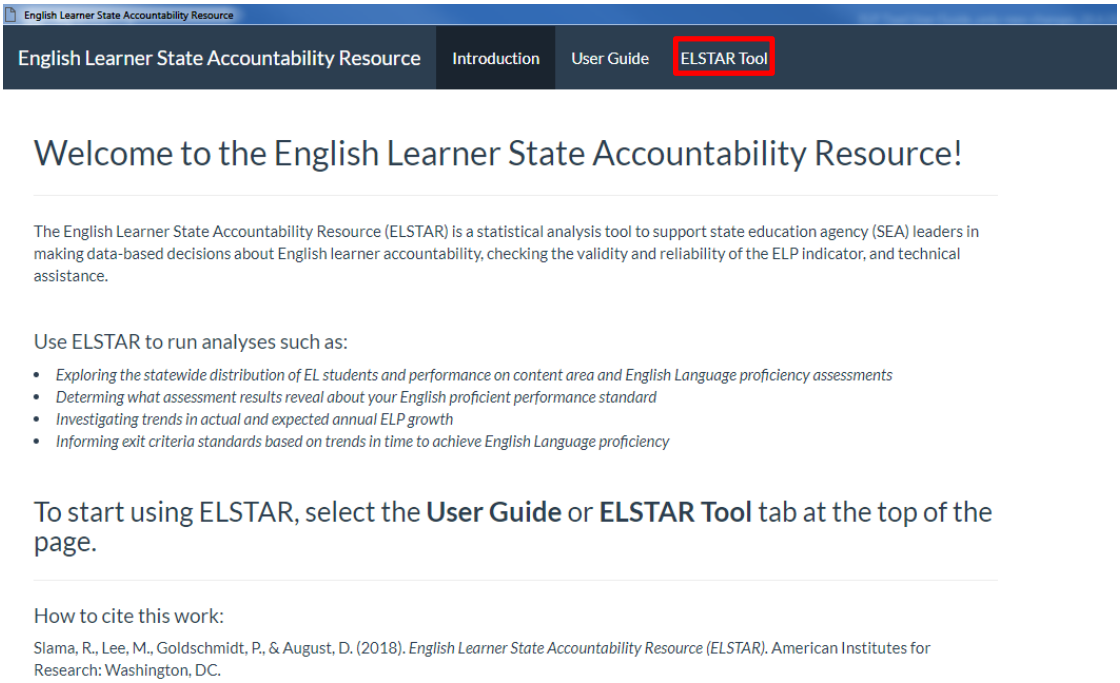
1. Prior to import, ensure that variable naming conventions are consistent with those in the template provided in Section 2. All variable names and values must match those expected by the tool across data sets.
2. Consult Appendix A for variable names, descriptions, and values for data import.

Data Upload

The following steps detail the procedure for uploading the prepared data into the tool:

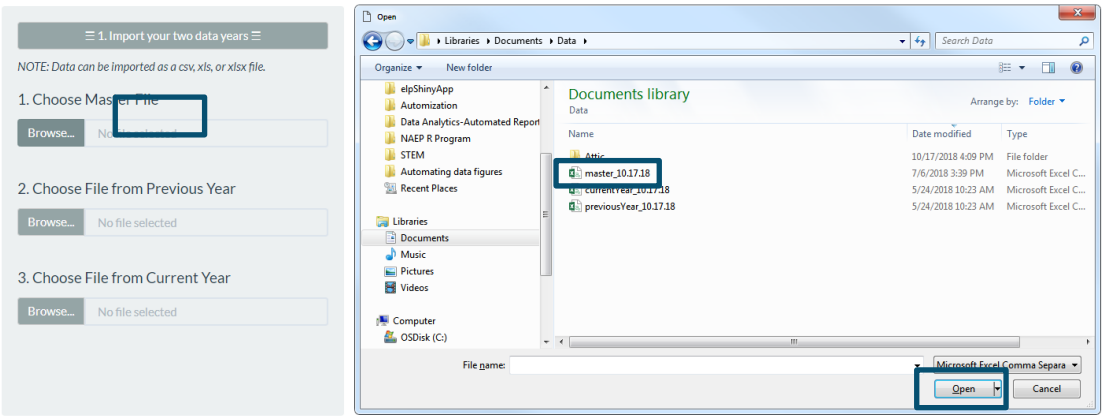
1. Click on "ELSTAR Tool".

Figure 8. ELSTAR Tool link.



2. Click on "Browse".

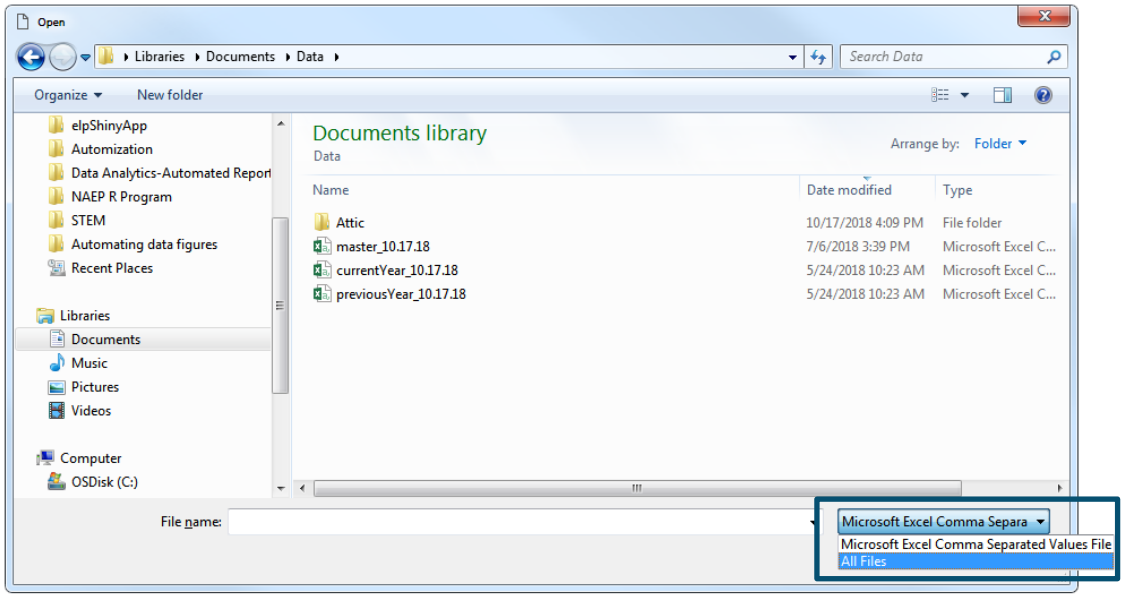
Figure 9. Data upload function.



3. Select data file to upload and click “Open”.

NOTE: Clicking “All Files” on the dropdown above “Open” shows all file types to import (.xlsx files or .csv files might be obscured by default)

Figure 10. Open data file.



4. Repeat for the other two required data files.

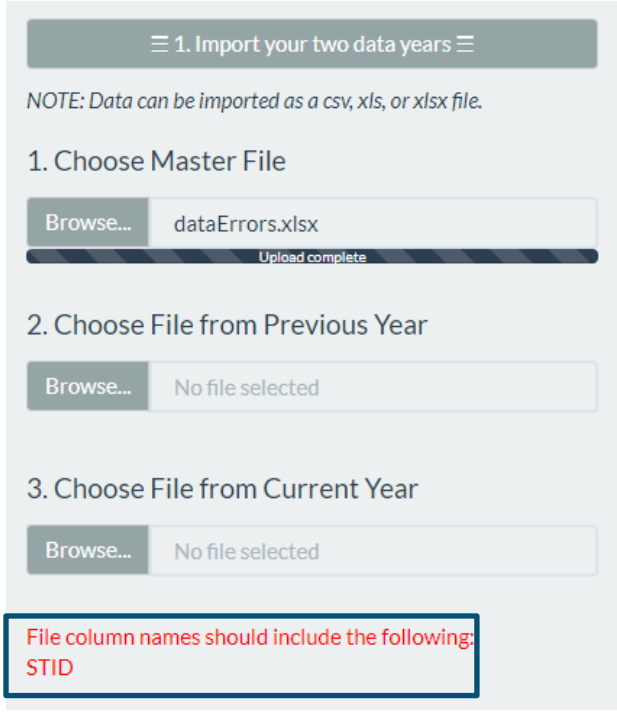
Troubleshooting Data Error Messages

The tool features several safeguards to ensure data are properly formatted during the data upload process. See the Codebook in Appendix A for a full list of variable names and their acceptable values. The following are some common errors that the user might encounter.

Variable Name Errors

The tool checks all variable names in the file to ensure that they match the names that the tool expects (i.e., the variable names in the codebook). The following image shows a sample warning message that a user would receive after attempting to upload a data file containing incorrect variable names. The message indicates that the column names are incorrect.

Figure 11. Incorrect column names.



To correct the variable names, open the data file and make the necessary corrections or remove any unnecessary columns. In the following example table, the variable name StudentID should be changed to STID.

Figure 12. Student ID naming.

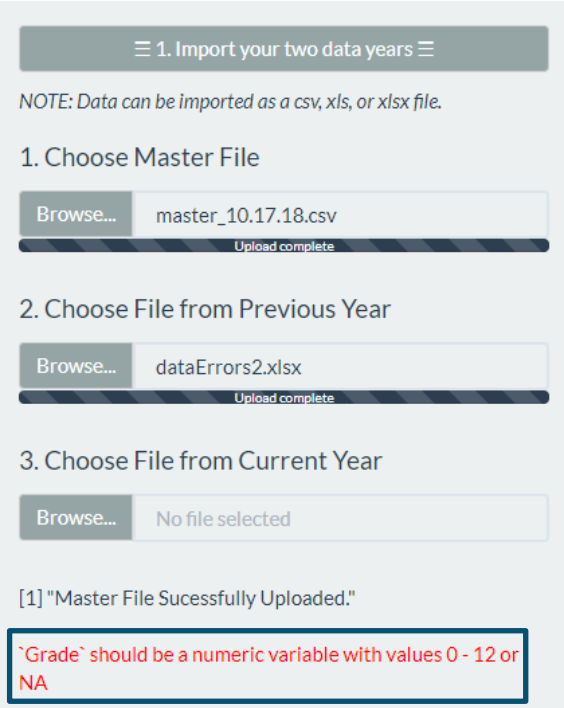
	A	B	C	D	E	F	G	H	I	J	K	L	M
1	StudentID	Gender	Ethnicity	SWD	SWD_Category	FRL	EL	Parental_Opt_Out	Exited	NEL	SIFE	ELP_Level_Initial	ELP_SS_Initial
2	1	0	3	1	1	0	1	0	1	0	0	NA	NA
3	2	1	3	0	NA	1	0	NA	0	1	0	NA	NA
4	3	0	3	1	2	0	0	NA	0	0	1	NA	NA
5	4	0	3	1	1	1	1	0	1	0	1	NA	NA
6	5	0	1	0	NA	1	0	NA	0	1	0	NA	NA

Variable Value Errors

The tool checks all values for each variable in the file to ensure that they match the format that the tool expects (e.g., numeric variables are formatted as numeric, character variables are formatted as characters). The following image shows a sample warning message that a user would receive after attempting to upload a data file containing variables with incorrect values.

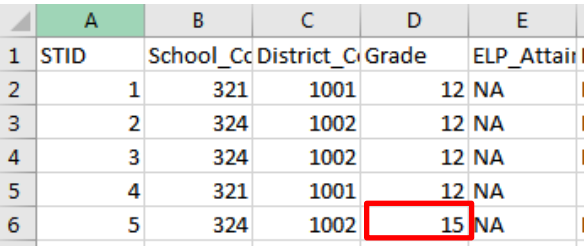
The message indicates that at least one value for the Grade and ELP_Listening variables is incorrect.

Figure 13. Incorrect variables message.



To correct the variable values, open the data file and make the necessary corrections. In the following sample warning message, the user receives an error because, as noted in the codebook in Appendix A starting on page A-1, the tool only accepts values 0–12 for the variable Grade. Grade levels greater than 12 should be either corrected, removed, or changed to NA.

Figure 14. Correcting variable values.



	A	B	C	D	E
1	STID	School_Cc	District_C	Grade	ELP_Attair
2	1	321	1001	12	NA
3	2	324	1002	12	NA
4	3	324	1002	12	NA
5	4	321	1001	12	NA
6	5	324	1002	15	NA

Section 4: Data Exploration

This section provides a guide for navigating the ELSTAR. Once you have uploaded your data to the tool (Section 3), you are able to generate a series of analyses based on these data. The tool features dropdowns that help filter the imported data set and allows users to generate figures that

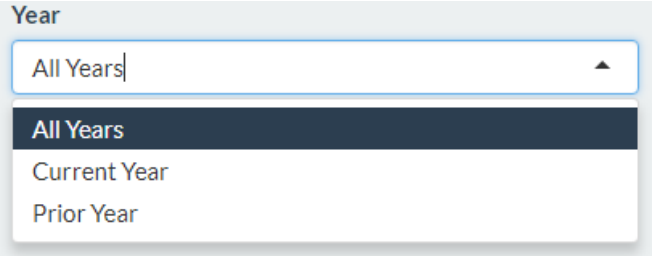
1. Examine the distribution of English learners across different English language proficiency levels, domains of the state ELP assessment, grades, and initial grades.
2. Compare the content area performance of current English learners (EL) to ELs who have attained English proficiency,[5] ELs who have been exited from Language Instruction Education Programs (LIEPs), ELs whose parents or caregivers have opted them out of LIEPs, and students never classified as English learners ("never EL").[6]

Selecting Parameters that Describe the Data Subset of Interest

The tool automatically imports the values from the uploaded data into dropdown menus to easily identify a desired subset of data to explore. The sidebar interface features (a) dropdowns and (b) dropdown checkboxes for ease of use in selecting values of interest.

1. **Dropdowns** allow for the selection of one value. By default, all values from the data set area selected.

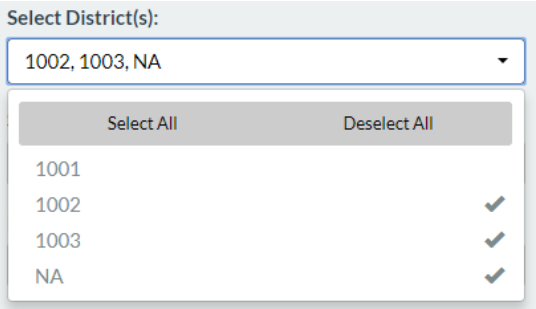
Figure 15. Dropdown menu for year selection.



2. **Dropdown checkboxes** allow for the selection of multiple values. By default, all values from the data set area selected.

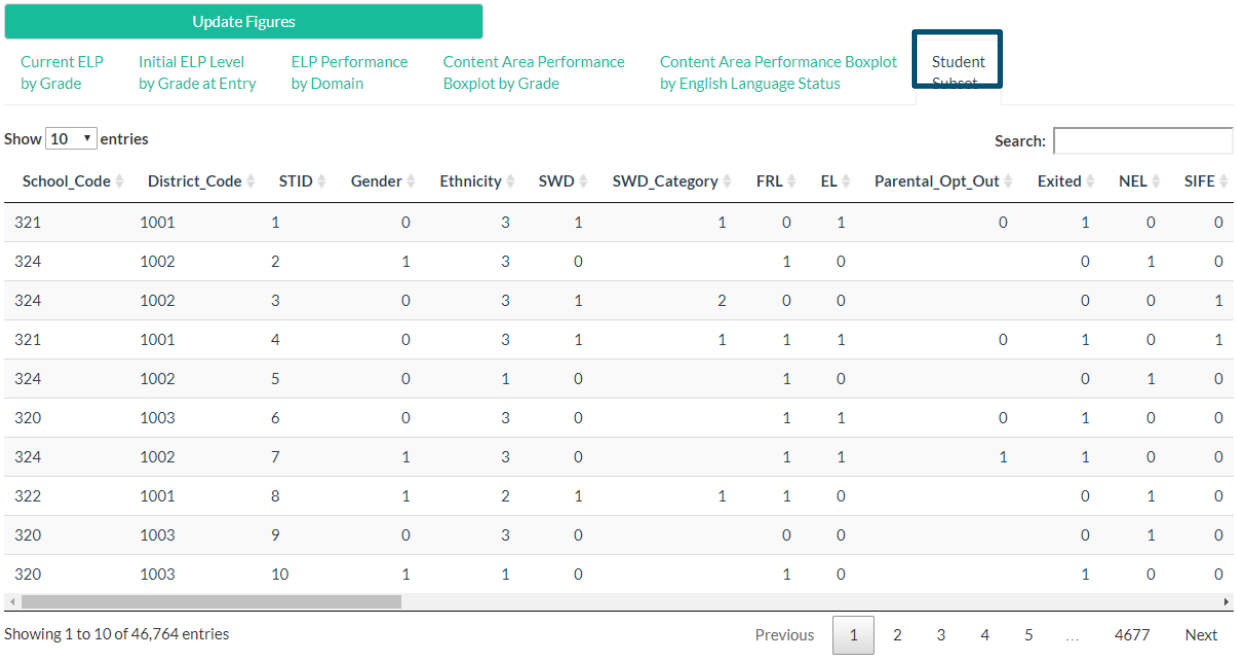
[5] In some states, ELs who have attained proficiency must meet additional criteria to be exited from LIEPs.
[6] Currently, students whose parents or caregivers have chosen to opt out of a LIEP program are counted in the group, but a separate code will be created to identify these students.

Figure 16. Dropdown for district selection.



Once an input is changed, a subset of the original data set automatically appears in the Student Subset tab.

Figure 17. Student Subset tab data.

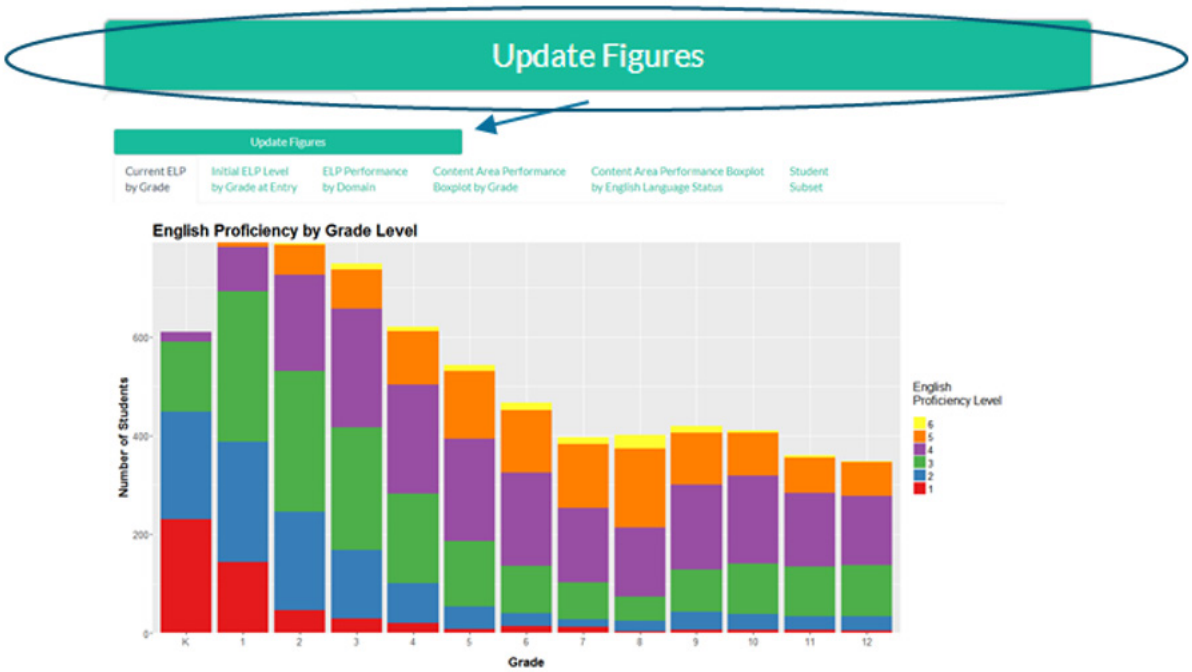


School_Code	District_Code	STID	Gender	Ethnicity	SWD	SWD_Category	FRL	EL	Parental_Opt_Out	Exited	NEL	SIFE
321	1001	1	0	3	1	1	0	1	0	1	0	0
324	1002	2	1	3	0		1	0		0	1	0
324	1002	3	0	3	1	2	0	0		0	0	1
321	1001	4	0	3	1	1	1	1	0	1	0	1
324	1002	5	0	1	0		1	0		0	1	0
320	1003	6	0	3	0		1	1	0	1	0	0
324	1002	7	1	3	0		1	1	1	1	0	0
322	1001	8	1	2	1	1	1	0		0	1	0
320	1003	9	0	3	0		0	0		0	1	0
320	1003	10	1	1	0		1	0		1	0	0

Generating Plots

Once the user has selected a subset of data to examine, the user can generate figures by clicking on “Update Figures”. Each dropdown selection (both default and changed by the user) will be reflected in your subset; therefore, the full data may not be reflected in a generated figure. It is important to note that figure generation may take a few moments to load depending on the size of the uploaded data files. A complete set of images for all available plots is provided in Appendix C.

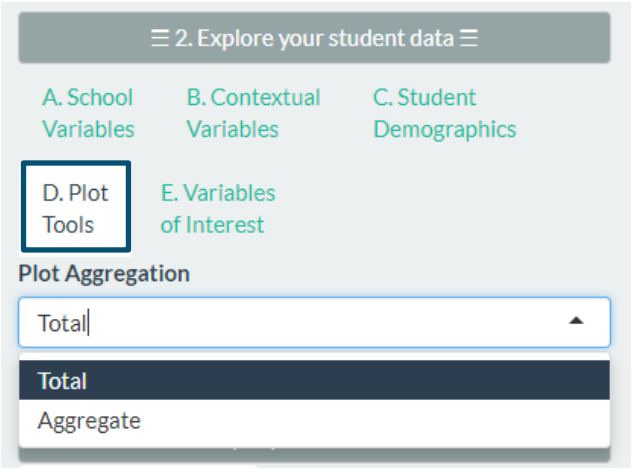
Figure 18. Generating plots.



Customizing Plots

By default, data in figures are presented in terms of total number of students. To display figures in terms of the percentage of students, users may change the "Plot Aggregation" dropdown to "Aggregate" as displayed in the following figure.

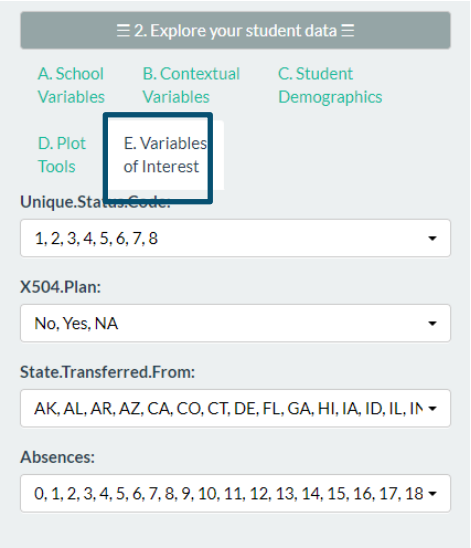
Figure 19. Customizing plots.



Subsetting Additional Variables

If you have an additional variable to integrate into ELSTAR, these will be shown in tab E, the Variables of Interest tab. Refer to Section 2: Data Preparation for Additional Variables for details regarding the inclusion of additional variables in ELSTAR. Additional variables of interest can be explored in the combined data set uploaded into ELSTAR. The values of these variables are populated into dropdown checkboxes in the Variables of Interest tab.

Figure 20. Variables of interest.



Note that because all unique values from each variable are included as options in the dropdown checkbox, special consideration is needed for variables with a large number of unique values (e.g., numeric variables to several decimal places). For example, numeric variables to several decimal places could show thousands of options to select, populating the dropdown with an overwhelming number of selections. Therefore, variables with a large number of unique values should be collapsed. Using our numeric variable example, rounding to the nearest integer would result in a more manageable set of selections for the dropdown. These variables can be used to drill down on your subset of data.

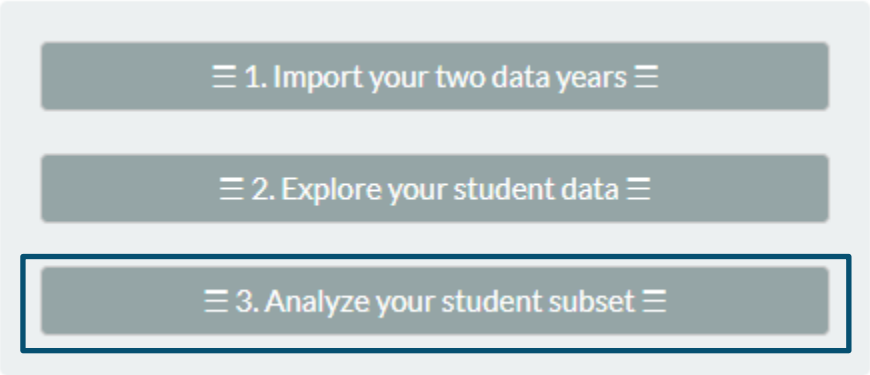
Analyzing a Subset of Student Data

Once a subset has been selected, student data can be further analyzed in section three of the ELSTAR tool, "Analyze your student subset." The ELSTAR tool features selections that generate figures to

1. examine the relationship between a composite scale score and the sum of individual domain scores,
2. explore the distribution of English learners' performance on content area assessment scale scores,
3. understand expected growth in ELP performance over time and explore how long it has taken students with different initial ELP levels to reach ELP proficiency, and

4. examine the probability of reaching English proficiency and exiting from LIEPs for different subpopulations of ELs.

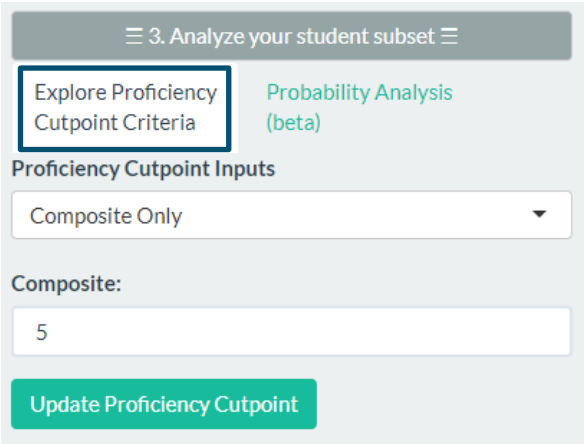
Figure 21. Analyze subset of student data feature.



Exploring Proficiency Cutpoints Criteria Based on ELP Assessment Scores

Users can input a particular composite score or set of domain scores to better understand the impact of a particular proficiency threshold. First set each domain level for Reading, Writing, Speaking, and Listening (by default, ELSTAR automatically populates this box with the maximum ELP score minus one). States who are wishing to use independent domain scores for setting proficiency cutpoint may also do so.

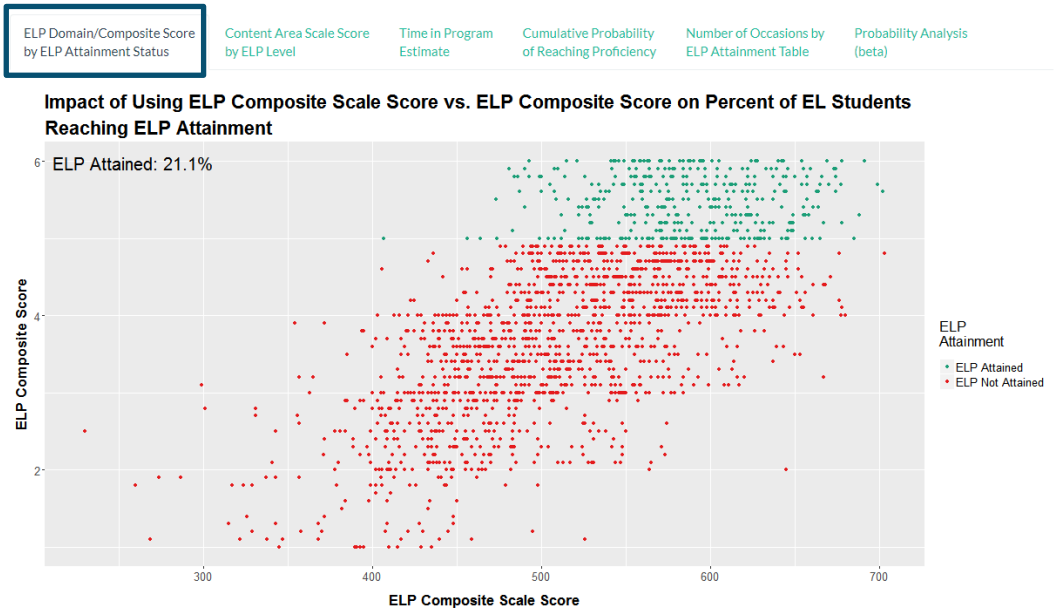
Figure 22. Independent domain scores for proficiency cutpoint.



The ELSTAR will regenerate the figures based on the proficiency cutpoint input by clicking "Update Proficiency Cutpoint" and is reflected in all tabs of the main panel. The composite proficiency cutpoint selected also influences the following four figures (on the following pages).

1. The "ELP Domain/Composite Score by ELP Attainment Status" tab examines the relationship between a composite scale score and the sum of individual domain scores.

Figure 23. ELP Domain/Composite Score by ELP Attainment Status tab.

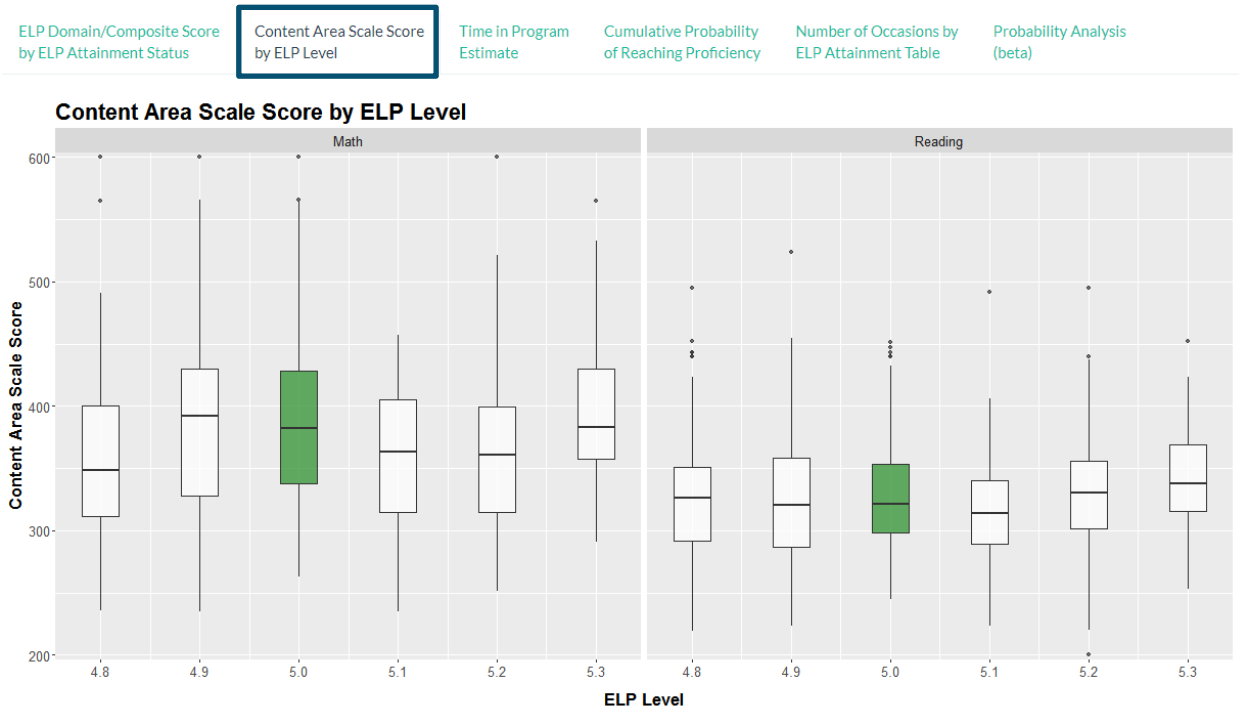


The purpose of this tab is to help the SEA examine the relationship between a composite scale score and the sum of individual domain scores. A close relationship is indicated by a tight band of points that increases from left to right. The chart allows the SEA to set a particular composite score for exiting students from EL status. This allows the SEA to determine whether a given proficiency cutpoint identifies the same set of students using a composite score as a particular domain sum score.

The ELP_Attained (green) students are the same students above the composite cut and the domain sum score cut. There will not be a 100% match; however, the SEA should want to set the cut score in such a way as to minimize the discrepancy between the two scores. That is, by raising (or lowering) the composite score, it reduces (or increases) the number of students who meet the domain sum score cut.

2. The "Content Area Scale Score by ELP Level" tab explores the distribution of English learners' performance on content area assessment scale scores.

Figure 24. Content Area Scale Score by ELP Level tab.



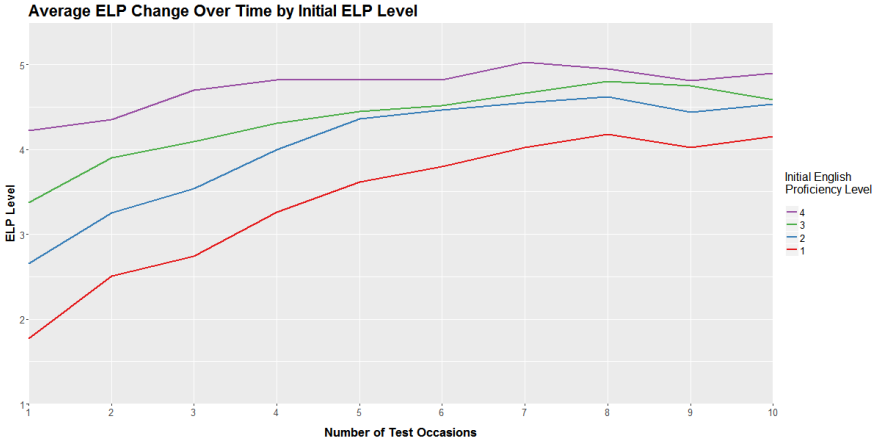
The purpose of this tab is to explore the distribution of ELs' performance on the content area assessment scale scores, by ELP level. This series of box plots shows the distribution of scale score performance for students by ELP performance level. The range of values displayed is determined by the value set in the proficiency cutpoint input box.

3. The "Time in Program Estimate" tab helps users better understand expected growth in ELP performance over time.

Figure 25. Time in Program Estimate tab.

ELP Domain/Composite Score by ELP Attainment Status | Content Area Scale Score by ELP Level | **Time in Program Estimate** | Cumulative Probability of Reaching Proficiency | Number of Occasions by ELP Attainment Table | Probability Analysis (beta)

Initial ELP Level	Test Occasion 1	Test Occasion 2	Test Occasion 3	Test Occasion 4	Test Occasion 5	Test Occasion 6	Test Occasion 7	Test Occasion 8	Test Occasion 9	Test Occasion 10	Years to Level 5 ELP
1.00	0.77	0.74	0.24	0.51	0.36	0.19	0.22	0.16	-0.15	0.13	NA
2.00	0.66	0.60	0.29	0.46	0.36	0.11	0.08	0.07	-0.18	0.09	NA
3.00	0.37	0.53	0.19	0.22	0.14	0.07	0.15	0.14	-0.05	-0.17	NA
4.00	0.22	0.13	0.34	0.12	0.00	0.00	0.21	-0.08	-0.14	0.08	7.00



The purpose of this tab is to provide the SEA with a snapshot of expected growth in ELP performance over time for the ELs in the state. The display examines different profiles of EL students' initial ELP levels and time in an EL program. This information can provide an empirical basis for setting growth expectations for ELs at different initial ELP levels.

The last column (Years to ELP) estimates how long it will take students at each initial English proficiency level on the state ELP assessment to reach proficiency. This estimate draws on what is known about the role of initial ELP and grade in time to proficiency: lower grades and proficiency levels will have higher percentages of students gaining one or more proficiency levels per year, whereas higher grades and proficiency levels take longer to reach the next proficiency level (Cook et al., 2008).

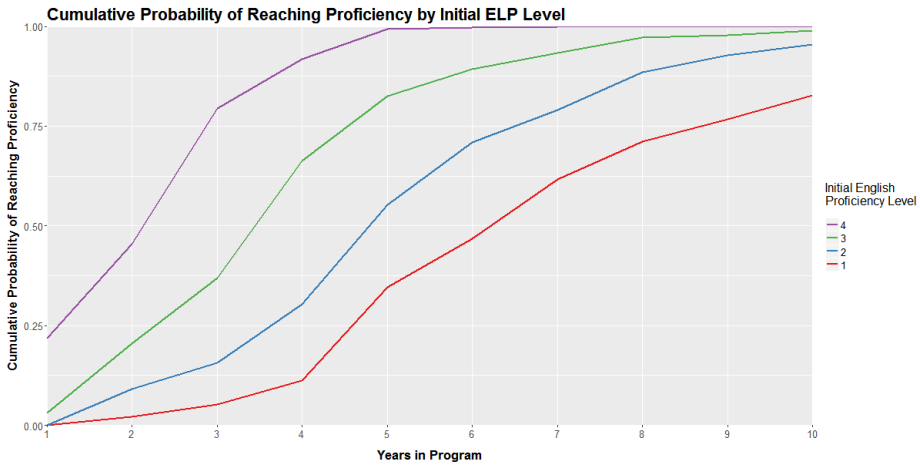
The chart also provides information on whether growth stagnates overall or for students with specific initial ELP levels, which may help target EL services. Considerations for the EL progress indicator for middle and high schools are that these groups may show more students in the flatter growth region, and the SEA model may want to account for this phenomenon in the business rules.

4. The "Cumulative Probability of Reaching Proficiency" explores how long it has taken students with different initial ELP levels to attain ELP.

Figure 26. Cumulative Probability of Reaching Proficiency tab.

ELP Domain/Composite Score by ELP Attainment Status | Content Area Scale Score by ELP Level | Time in Program Estimate | **Cumulative Probability of Reaching Proficiency** | Number of Occasions by ELP Attainment Table | Probability Analysis (beta)

Initial ELP Level	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1.00	0.00	0.02	0.05	0.11	0.35	0.47	0.62	0.71	0.77	0.83
2.00	0.00	0.09	0.16	0.30	0.55	0.71	0.79	0.88	0.93	0.96
3.00	0.03	0.21	0.37	0.66	0.83	0.89	0.93	0.97	0.98	0.99
4.00	0.22	0.45	0.80	0.92	0.99	1.00	1.00	1.00	1.00	1.00

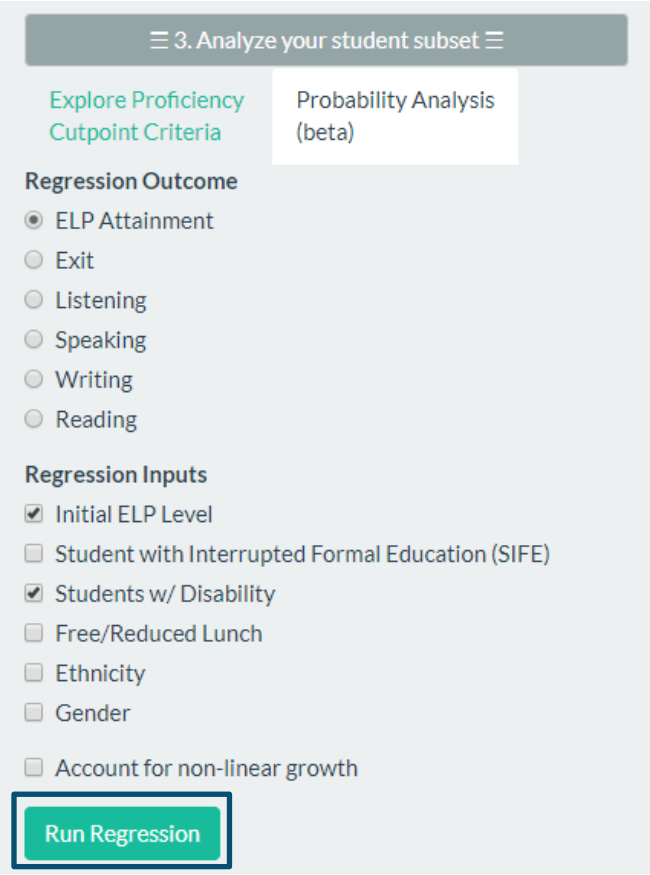


The purpose of this tab is to explore how long it has taken students with different initial ELP levels to reach proficiency. This information can help set the exit time frame. The SEA can use this chart, along with other information and stakeholder input, to set exit time frames. For example, the SEA may set the time to exit at the point where 50% of the students have attained ELP proficiency. The SEA may ask stakeholders what percentage to use to set the criteria (e.g., 40%, 50%). A higher percentage exit results in a longer time to exit.

Running Predictive Analyses

Users may be interested in understanding the probability that a student will reach English proficiency and exit EL status, based on the state's defined standardized, statewide exit procedure and taking into account student variables such as ELP test occasions and initial level of proficiency. To conduct this analysis, the user must first select an outcome (e.g., ELP attainment). The user can also select student variables to explore that might influence time to proficiency (e.g., initial level of proficiency, students with interrupted formal education). After all selections have been made, the user should select "Run Regression."

Figure 27. Run Regression function.



The output of the analysis is printed in the main panel. An example of this output is displayed on the following page.

Figure 28. Analysis output example.

ELP Domain/Composite Score by ELP Attainment Status | Content Area Scale Score by ELP Level | Time in Program Estimate | Cumulative Probability of Reaching Proficiency | Number of Occasions by ELP Attainment Table | **Probability Analysis (beta)**

```
Generalized linear mixed model fit by maximum likelihood (Laplace
  Approximation) [glmerMod]
 Family: binomial  ( logit )
Formula: ELP_Attained ~ ELP_Level_Initial + SWD + ELP_Test_Occasions +
    (1 | School_Code)
   Data: elpImport

     AIC      BIC   logLik deviance df.resid
  5718.1   5778.4  -2850.1   5700.1     5988

Scaled residuals:
    Min      1Q  Median      3Q     Max
-2.1455 -0.5253 -0.4184 -0.3137  3.3746

Random effects:
 Groups      Name        Variance  Std.Dev.
 School_Code (Intercept) 9.891e-14 3.145e-07
Number of obs: 5997, groups:  School_Code, 26

Fixed effects:
                   Estimate Std. Error z value Pr(>|z|)
(Intercept)        -1.86344    0.09143 -20.381  < 2e-16 ***
ELP_Level_Initial2  0.63294    0.09947   6.363 1.98e-10 ***
ELP_Level_Initial3  0.82070    0.10036   8.178 2.90e-16 ***
ELP_Level_Initial4  1.26447    0.11075  11.417  < 2e-16 ***
ELP_Level_Initial5  2.90904    0.14170  20.530  < 2e-16 ***
ELP_Level_Initial6  3.44714    0.51325   6.716 1.86e-11 ***
SWD1                0.02910    0.11577   0.251    0.802
ELP_Test_Occasions -0.05691    0.01178  -4.830 1.36e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
            (Intr) ELP_L_I2 ELP_L_I3 ELP_L_I4 ELP_L_I5 ELP_L_I6 SWD1
ELP_Lvl_In2 -0.655
ELP_Lvl_In3 -0.648  0.596
ELP_Lvl_In4 -0.577  0.542    0.543
ELP_Lvl_In5 -0.430  0.426    0.428    0.393
ELP_Lvl_In6 -0.115  0.118    0.119    0.110    0.088
SWD1        -0.203  0.075    0.113    0.124    0.117    0.039
ELP_Tst_Occ -0.502 -0.012   -0.031   -0.057   -0.094   -0.036   -0.024
```

The purpose of this tab is to explore the probability of ELP attainment or exit for different subpopulations of ELs. These results can help the SEA identify where fewer students are proficient on your ELP assessment. It can serve as a monitoring tool for the SEA to identify gaps in performance among ELs in the state.

The results are based on a linear probability model, and the estimates can be interpreted as probabilities. If the probability associated with the estimated (Pr(>|z|)) is greater than .05, then it is likely that the estimate is not significantly different from zero. This indicates that the specific input does not statistically impact the probability of a student attaining EL proficiency or exiting.

Appendix A. Codebook

Master Variable Descriptions

- ***STID*** - Student ID; needs to be a unique ID.
- ***Gender*** – Gender // Conditions: Numeric; Values 0, 1, 2, or NA
  - Male = 0;
  - Female = 1;
  - Nonbinary = 2;
  - NA
- ***Ethnicity*** - Ethnicity // Conditions: Numeric; Values 1 – 8, 99, or NA
  - White = 1;
  - Black = 2;
  - Hispanic = 3;
  - Asian = 4;
  - Amer. Indian/Alaska = 5;
  - Hawaii/Pac. Islander = 6;
  - Bi-racial = 7;
  - Other = 8;
  - Omitted = 99;
  - NA
- ***SWD*** – Student with a disability // Conditions: Numeric; Values 0, 1, or NA
  - Not classified as a SWD = 0;
  - Student with a disability = 1;
  - NA
- ***SWD_Category*** – Disability Category // Conditions: Numeric; Values 1, 2, 3, or NA
  - Specific Learning Disability = 1;
  - Speech and language impairment = 2;
  - Other = 3;
  - NA
- ***FRL*** - Free & Reduced Lunch // Conditions: Numeric; Values 0, 1, or NA
  - Does not qualify for FRL = 0;
  - Student qualifies for Free/Reduced Lunch = 1;
  - NA
- ***EL*** - English Learner // Conditions: Numeric; Values 0, 1, or NA
  - Not classified as an EL = 0;
  - English Learner = 1;
  - NA

- ***Parental_Opt_Out*** – Parents have waived ELD services. An informed, voluntary decision by the parent to not have the child placed in any separate, specialized ELD service or instructional program. A "waiver" indicates a desire by the parent to waive the child from participation in all or some of the ELD programs or services offered by the school // Conditions: Numeric; Values 0, 1, or NA
  - Parents have not waived ELD services = 0;
  - Parents have waived ELD services = 1;
  - NA
- ***Exited*** – ELs exited from LIEPs; a student who meets the full state criteria for exiting from LIEPs // Conditions: Numeric; Values 0, 1, or NA
  - Not exited from LIEPs= 0;
  - Exited from LIEPs= 1;
  - NA
- ***NEL*** - Never-EL // Conditions: Numeric; Values 0, 1, or NA
  - Current or former Language Learner = 0
  - Never classified as a Language Learner = 1;
  - NA
- ***SIFE*** - Student with Interrupted Formal Education // Conditions: Numeric; Values 0, 1, or NA
  - Not classified as a SIFE = 0;
  - Student with Interrupted Formal Education= 1;
  - NA
- ***ELP_Level_Initial*** - English Language Learners Level Initial (i.e., at school entry) // Conditions: Numeric; Range of Values (e.g., 0–5) or NA
- ***ELP_SS_Initial*** - English Language Learners Scale Score Initial (i.e., at school entry) // Conditions: Numeric; Values 0–3000 or NA

Figure 29. Master file codebook.

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	STID	Gender	Ethnicity	SWD	SWD_Category	FRL	EL	Parental_Opt_Out	Exited	NEL	SIFE	ELP_Level_Initial	ELP_SS_Initial
2		Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric
3		0, 1, 2, or NA	1 - 8, 99, or NA	0, 1, or NA	1, 2, 3, or NA	0, 1, or NA	0, 1, or NA	0, 1, or NA	0, 1, or NA	0, 1, or NA	0, 1, or NA	Range of 5 values or NA	Range of 5 values or NA
4		Male = 0; Female = 1; Nonbinary = 2;	White = 1; Black = 2; Hispanic = 3; Asian = 4; Amer. Indian/Alaska = 5; Hawaii/Pac. Islander = 6; Bi-racial = 7; Other = 8; Omitted = 99;	Not classified as a SWD = 0; Student with a disability = 1;	Specific Learning Disability = 1; Speech and language impairment = 2; Other = 3;	Does not qualify for FRL = 0; Student qualifies for Free/Reduced Lunch = 1;	Not classified as an ELL = 0; English Language Learner = 1;	Parents have not waived ELD services = 0; Parents have waived ELD services = 1;	Not exited from LIEPs = 0; Exited from LIEPs = 1;	Current or Former English Learner Student (EL) = 0; Never English Learner Student (NEL) = 1;	Not classified as a SIFE = 0; Student with Interrupted Formal Education= 1;		

Previous Year and Current Year Variable Descriptions

- ***STID*** - Student ID
- ***School_Code*** - School Identifier; needs to be a unique ID. For example, if a state typically appends school codes onto district codes to create a unique ID, use this combined value for the School ID variable.

- ***District_Code*** - District Identifier; does not need to be a unique ID (i.e., multiple school IDs can have the same District ID).
- ***Grade*** - Grade // Conditions: Numeric; Values 0–12 or NA
  - Kindergarten = 0;
  - Grade 1 = 1;
  - …
  - Grade 12 = 12;
  - NA
- ***ELP_Attained*** – a student defined as a 1 for ELP_Attained reached a qualifying threshold on an English Language Proficiency Assessment // Conditions: Numeric; Values 0, 1, or NA
  - Did not attain English proficiency = 0;
  - Attained English proficiency = 1;
  - NA
- ***ELP_Level*** - English Language Proficiency Level // Conditions: Numeric; Range of Values (e.g., 0–5) or NA
- ***ELP_SS*** - English Language Proficiency Scale Score // Conditions: Numeric; Values 0–3000 or NA
- ***ELP_Test_Occasions*** - English Language Proficiency Test Occasions // Conditions: Numeric Values 0–15 or NA
  - 0 test occasions = 0;
  - 1 test occasions = 1;
  - …
  - 15 test occasions = 15
- ***Math_SS*** - Math Assessment Scale Score // Conditions: Numeric; Values 0–3000 or NA
- ***Reading_SS*** - Reading Assessment Scale Score // Conditions: Numeric; Values 0–3000 or NA
- ***ELP_Listening*** - English Language Proficiency Assessment Listening Domain Level // Conditions: Numeric; Range of Values (e.g., 0–5) or NA
- ***ELP_Speaking*** - English Language Proficiency Assessment Speaking Domain Level // Conditions: Numeric; Range of Values (e.g., 0–5) or NA
- ***ELP_Writing*** - English Language Proficiency Assessment Writing Domain Level // Conditions: Numeric; Range of Values (e.g., 0–5) or NA
- ***ELP_Reading*** - English Language Proficiency Assessment Reading Domain Level // Conditions: Numeric; Range of Values (e.g., 0–5) or NA

Figure 30. Previous and Current Year file codebook.

	A	B	C	D	E	F	G	H	I	J	K	L	M	N
1	STID	School_Code	District_Code	Grade	ELP_Attained	ELP_Level	ELP_SS	ELP_Test_Occasions	Math_SS	Reading_SS	ELP_Listening	ELP_Speaking	ELP_Writing	ELP_Reading
2				Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric
3				0 - 12	0, 1, or NA	Range of 5 values or NA	0 - 3000 or NA	0 - 15, or NA	0 - 3000 or NA	0 - 3000 or NA	Range of 5 values or NA	Range of 5 values or NA	Range of 5 values or NA	Range of 5 values or NA
4				Kindergarten = 0; Grade 1 = 1; ... Grade 12 = 12;	Not exited = 0; Exited = 1;			0 test occasions = 0; 1 test occasions = 1; ... 15 test occasions = 15;						

Appendix B. ELSTAR Mac Installation

Running the ELSTAR on a Mac requires users to download R and RStudio and installing each R package used in the tool.

1. Installing R and RStudio on a Mac

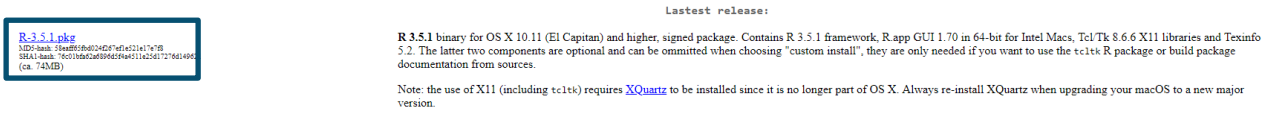
Mac users are required to download both R and RStudio. To do so, follow the instructions in this section or watch this video: https://www.youtube.com/watch?v=GLLZhc_5enQ.

1a. Installing R

To install R on your Mac computer, follow these steps:

1. Go to https://cran.r-project.org/bin/macosx/.
2. Download the appropriate link for your system; this should be 3.5.1 and above.

Figure 31. "R" download link.



3. You may be asked if you want to save or run a file *R-3.5.1.pkg*. Choose Save and save the file on the desktop or open it from your browser window. Click on the icon to run the executable (i.e., the *R-3.5.1.pkg* file).
4. You will be asked what language to install it in; choose English.
5. The R Setup Wizard will appear in a window. Continue to click "Next" at the bottom of the R Setup wizard window until a progress bar is generated and completes.
6. R should now be installed; click "Finish".
7. To start R, you can either follow Step 8 or 9.
8. Check if there is an R icon on the desktop of the computer that you are using. If so, double-click on the R icon to start R. If you cannot find an R icon, try Step 9 instead.
9. Use the Finder to search for "R" or "R 3.5.1"

Now that we have R installed, we need to download RStudio.

1b. Installing RStudio

1. Go to https://www.rstudio.com/products/rstudio/download/.
2. Scroll down to "Installers for Supported Platforms" and click the "RStudio 1.1.463 - Mac OS X 10.6+ (64-bit)" link (Note: this version number may have changed since writing.)
3. Similar to the R download, you may be asked if you want to save or run a file RStudio-1.1.463.dmg. Choose "Save" and save the file on the desktop or open it from your browser window. Click on the icon to run the executable.

4. The RStudio Setup Wizard will appear in a window. Continue to click “Next” at the bottom of the R Setup wizard window until a progress bar is generated and completes.
5. RStudio should now be installed; click “Finish”.
6. To start RStudio you can either follow Step 7 or 8.
7. Check if there is an RStudio icon on the desktop of the computer that you are using. If so, double-click on the RStudio icon to start “RStudio”. If you cannot find an RStudio icon, try Step 8 instead.
8. Click on the “Start” button at the bottom left of your computer screen and then choose “All programs”, and start “R” by selecting “RStudio” folder from the menu of programs and clicking on the “RStudio” icon.

With R and RStudio downloaded, we can move to initializing the ELSTAR tool.

2. Installing Packages

1. Open RStudio.
2. Copy and paste the following code script into the RStudio console; by default, the console should appear on the left portion):

Figure 32. Code for R installation.

```
dependencies <- c("shiny", "dplyr", "DT", "shinythemes", "shinyjs", "tools", "ggplot2
", "tidyr", "shinyWidgets", "ordinal","lme4","readxl","tidyr",
"shinycssoaders")
install.packages(dependencies)
lapply(dependencies, library, character.only = TRUE)
```

These three lines of code will install the dependent packages and load them using library. Note that when downloading these packages for the first time, it may take several minutes for the code to run.

The RStudio session should emit the following message that the packages have installed and loaded:

Figure 33. Package installation successful message.

```
package ‘shiny’ successfully unpacked and MD5 sums checked
package ‘dplyr’ successfully unpacked and MD5 sums checked
package ‘DT’ successfully unpacked and MD5 sums checked
package ‘shinythemes’ successfully unpacked and MD5 sums checked
package ‘shinyjs’ successfully unpacked and MD5 sums checked
package ‘ggplot2’ successfully unpacked and MD5 sums checked
package ‘tidyr’ successfully unpacked and MD5 sums checked
package ‘shinyWidgets’ successfully unpacked and MD5 sums checked
package ‘ordinal’ successfully unpacked and MD5 sums checked
package ‘lme4’ successfully unpacked and MD5 sums checked
package ‘readxl’ successfully unpacked and MD5 sums checked

The downloaded binary packages are in
        C:\Users\mlee\AppData\Local\Temp\RtmpCysHF7\downloaded_packages
> |
```

3. Running ELSTAR in RStudio

1. Open RStudio and type:

```
getwd()
```

Note the output of this function. It should show the location for the files, such as

```
"/Users/Michael"
```

or

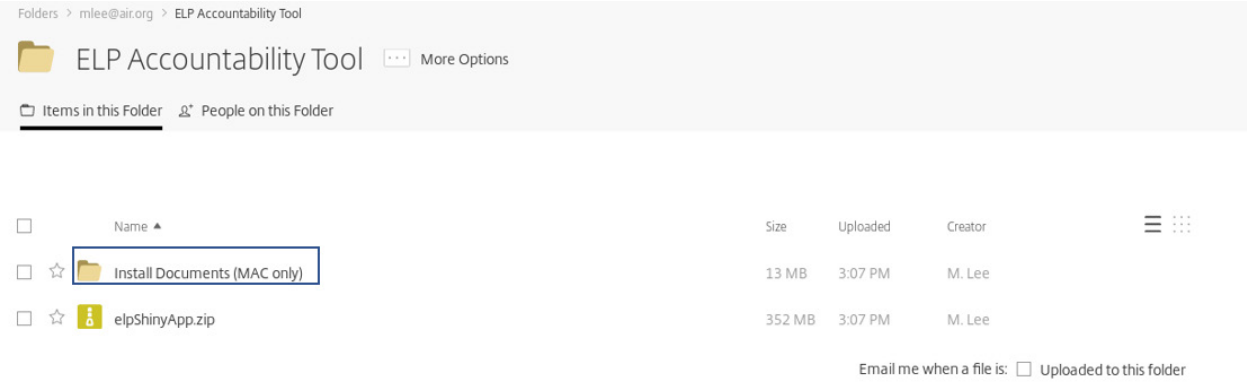
```
"/home/MacbookPro"
```

2. Next, download the ELSTAR tool from the AIR ShareFile data platform :
   a. Go to this webpage: https://air.sharefile.com/f/foh0e631-7517-4435-98e6-83295b47857e
   b. Enter the following user name and password when the login screen appears on the right side under Guest Sign In (see Figure 33)
   c. **Username:** elptool2018@gmail.com
   d. **Password (case-sensitive):** elstarDownload*2019*

Figure 34. Tool download log-in page.

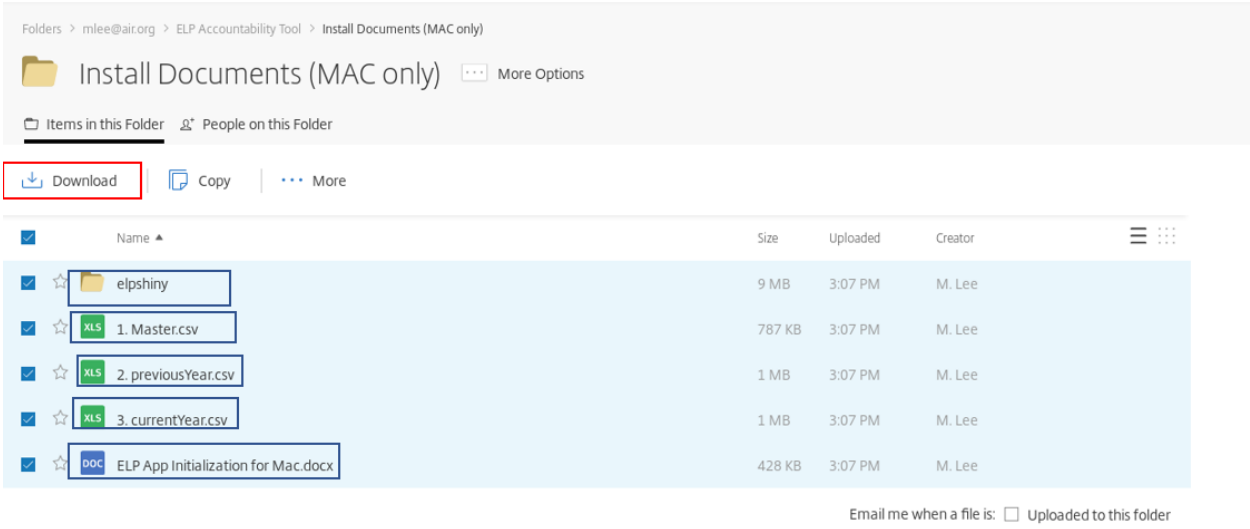
3. Select the Install Documents (Mac only) folder.

Figure 35. Install tool documents.



4. Download each of the following documents by selecting each item and clicking "Download", highlighted in Figure 36.

Figure 36. Download tool files to directory.



5. Move each of these files to the location of your working directory, as retrieved in Section 1 of this section.
6. Back in "RStudio", run the following code to navigate to the elpshiny folder we just placed in our working directory:

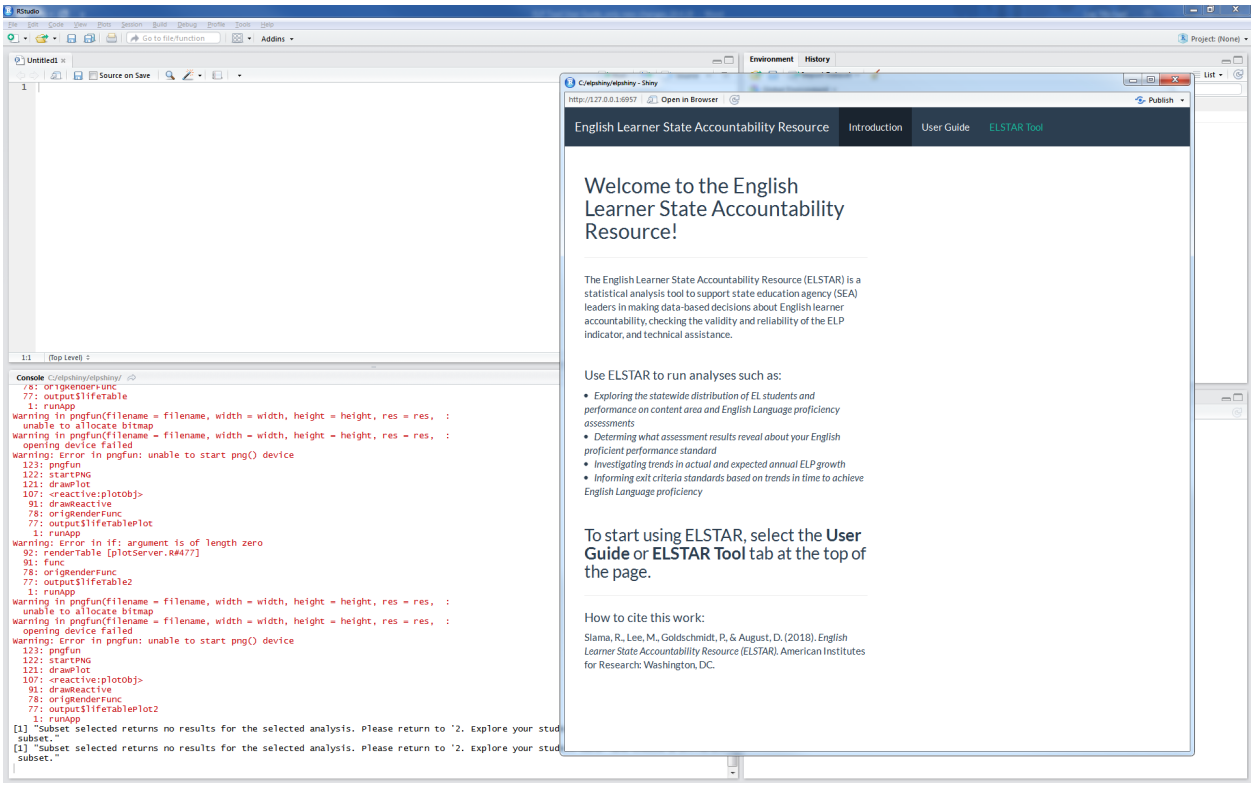
   ```
   setwd("~/elpshiny")
   ```

7. Finally, run the following code to load the tool:

   ```
   runApp()
   ```

8. The ELSTAR should now be hosted locally and can be opened in a browser window by clicking on the "Show in new window" symbol in the top left of the viewer pane:

Figure 37. Open the tool in a new window.



Appendix C. Screen Shots of ELSTAR

Landing Page Navagation Bar

Figure 38. Introduction.

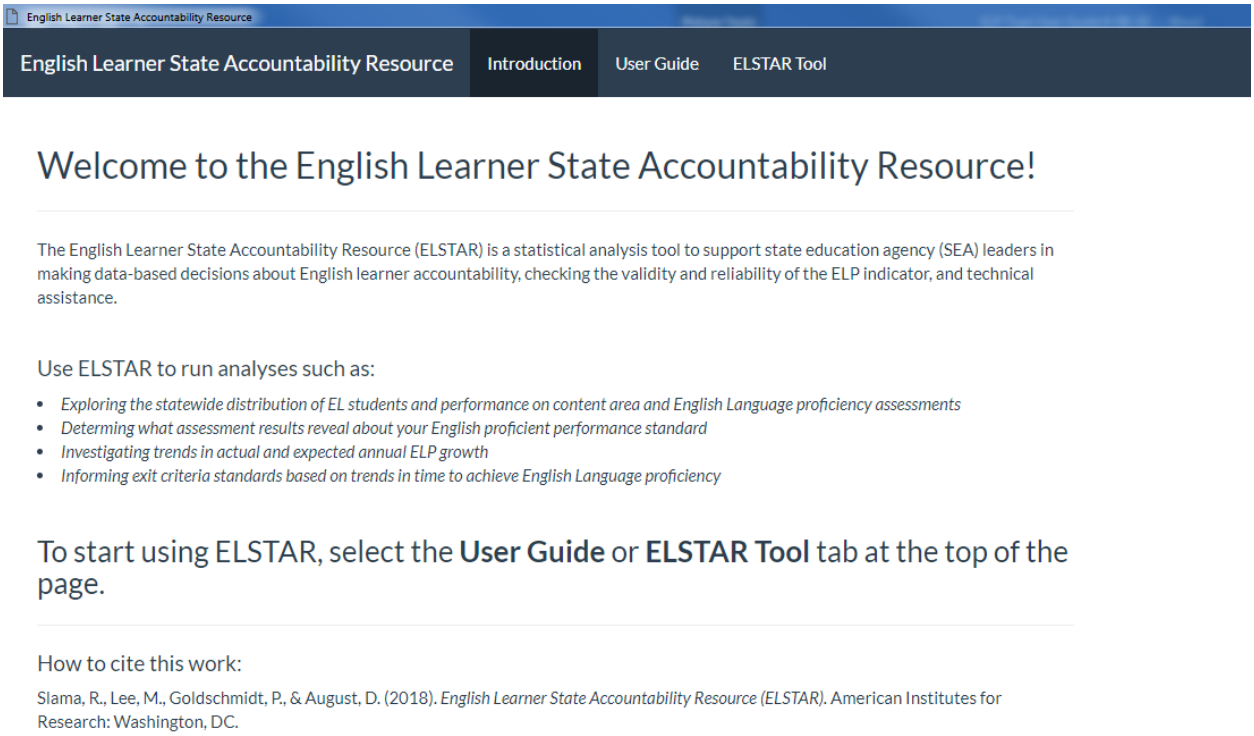


Figure 39. User Guide.

English Learner State Accountability Resource

English Learner State Accountability Resource | Introduction | User Guide | ELSTAR Tool

Data Preparation:

The English Learner State Accountability Resource (ELSTAR) is an interface that requires the preparation and upload of the user's data into a particular structure, saved as an excel or .csv file. This section provides the user with an overview of the steps required for data preparation.

Detailed variable descriptions that correspond to the variable names in the tables below are provided in Appendix A. There must be a common student identifier across all three files for the tool to function properly. The student identifiers and all other information provided in the tables below are mock data.

The user will need to prepare the following three data files (either .csv, .xls, or .xlsx) for import into the application:

1. **ELP master file** - The ELP master file contains the **most recent demographic information** and baseline test information on a specific set of variables (please see Appendix A Codebook).
2. **Previous Year file** - The "Previous Year" file contains basic school, district, and assessment data for all the students in the state, for the **previous school year** . Assessment data includes the statewide reading/language arts, mathematics, and English language proficiency assessments (only applicable for current English learners).
3. **Current Year file** - The "Current Year" file contains the same information contained in the "Previous Year" file but for the **current school year** . If the statewide assessment data has not yet been administered, Previous Year data should come from two year's prior and Current Year data should come from the prior year.

You can download the data file formats here:

- Master Data File Format
- Previous Year Data File Format
- Current Year Data File Format

Master Data File Codebook

Variable Descriptions:

- ***STID*** - Student ID
- ***Gender*** - Gender // Conditions: Numeric; Values 0, 1, 2, or NA
- ***Ethnicity*** - Ethnicity // Conditions: Numeric; Values 0 - 8, 99, or NA
- ***SWD*** - Student with a disability // Conditions: Numeric; Values 0, 1, or NA
- ***SWD_Category*** - Disability Category // Conditions: Numeric; Values 1, 2, 3, or NA
- ***FRL*** - Free & Reduced Lunch // Conditions: Numeric; Values 0, 1, or NA
- ***EL*** - English Learner // Conditions: Numeric; Values 0, 1, or NA
- ***Parental_Opt_Out*** - Parental Opt Out // Conditions: Numeric; Values 0, 1, or NA
- ***Exited*** - Exited // Conditions: Numeric; Values 0, 1, or NA
- ***NEL*** - English Only Student (never-EL) // Conditions: Numeric; Values 0, 1, or NA
- ***SIFE*** - Student with Interrupted Formal Education // Conditions: Numeric; Values 0, 1, or NA
- ***ELP_Level_Initial*** - English Language Proficiency Level Initial // Conditions: Numeric; Range of 5 Values or NA (ex: 0 though 5)
- ***ELP_SS_Initial*** - English Language Proficiency Scale Score Initial // Conditions: Numeric; Values 0 - 3000 or NA

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	STID	Gender	Ethnicity	SWD	SWD_Category	FRL	EL	Parental_Opt_Out	Exited	NEL	SIFE	ELP_Level_Initial	ELP_SS_Initial
2		Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric	Numeric
3		0, 1, 2, or NA	1 - 8, 99, or NA	0, 1, or NA	1, 2, 3, or NA	0, 1, or NA	0, 1, or NA	0, 1, or NA	0, 1, or NA	0, 1, or NA	0, 1, or NA	Range of 5 values or NA	Range of 5 values or NA
		Male = 0; Female = 1; Nonbinary = 2;	White = 1; Black = 2; Hispanic = 3; Asian = 4; Amer. Indian/Alaska = 5; Hawaii/Pac. Islander = 6;	Not classified as a SWD = 0; Student with a disability = 1;	Specific Learning Disability = 1; Speech and language impairment = 2; Other = 3;	Does not qualify for FRL = 0; Student qualifies for Free/Reduced Lunch = 1;	Not classified as an ELL = 0; English Language Learner = 1;	Parents have not waived ELD services = 0; Parents have waived ELD services = 1;	Not exited from LIEPs = 0; Exited from LIEPs = 1;	Current or Former English Learner Student (EL) = 0; Never English Learner Student (NEL) = 1;	Not classified as a SIFE = 0; Student with Interrupted Formal Education= 1;		

Figure 40. ELSTAR Tool.

English Learner State Accountability Resource

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The English Learner State Accountability Resource (ELSTAR) is a tool that offers an interactive interface to explore English Language Proficieny assessment data.
If you are having trouble formatting the variables names correctly, download the data file formats here:

- Master Data File Format
- Previous Year Data File Format
- Current Year Data File Format

After uploading your data, Step 2 features dropdowns and checkboxes to tune the parameters to select your subset of interest. Clicking 'Update Figures' then regenerates each figure using the selected subset.

Once you've selected a subset, you can analyze your student subset further in Step 3.

☰ 1. Import your two data years ☰

NOTE: Data can be imported as a csv, xls, or xlsx file.

1. Choose Master File

Browse... No file selected

2. Choose File from Previous Year

Browse... No file selected

3. Choose File from Current Year

Browse... No file selected

Sidebar Panel 1: Data Import

Figure 41. Panel 1, full view.

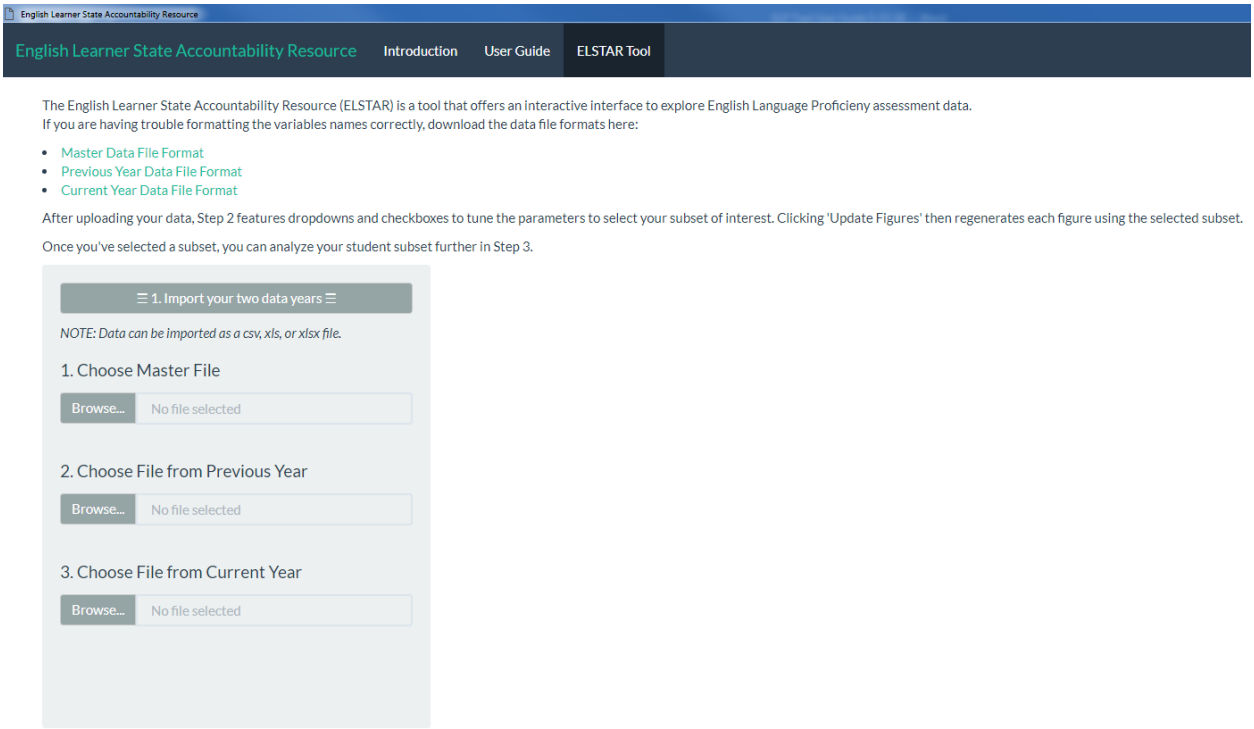


Figure 42. Error messages.

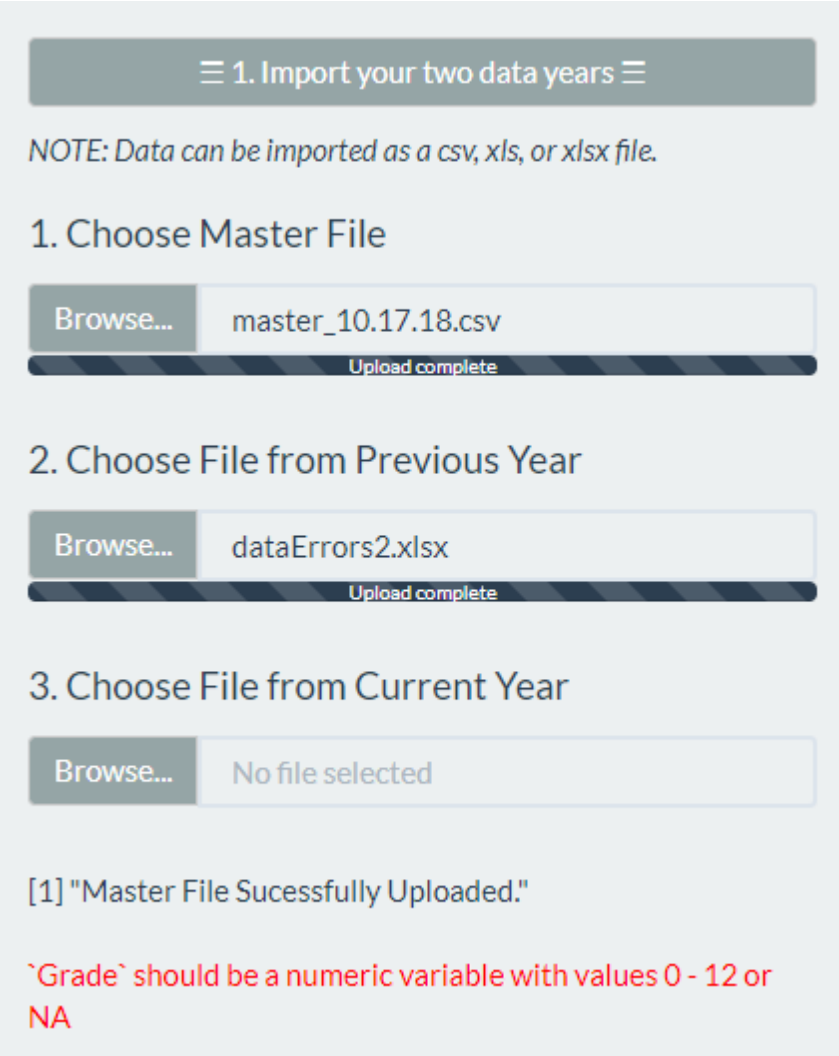
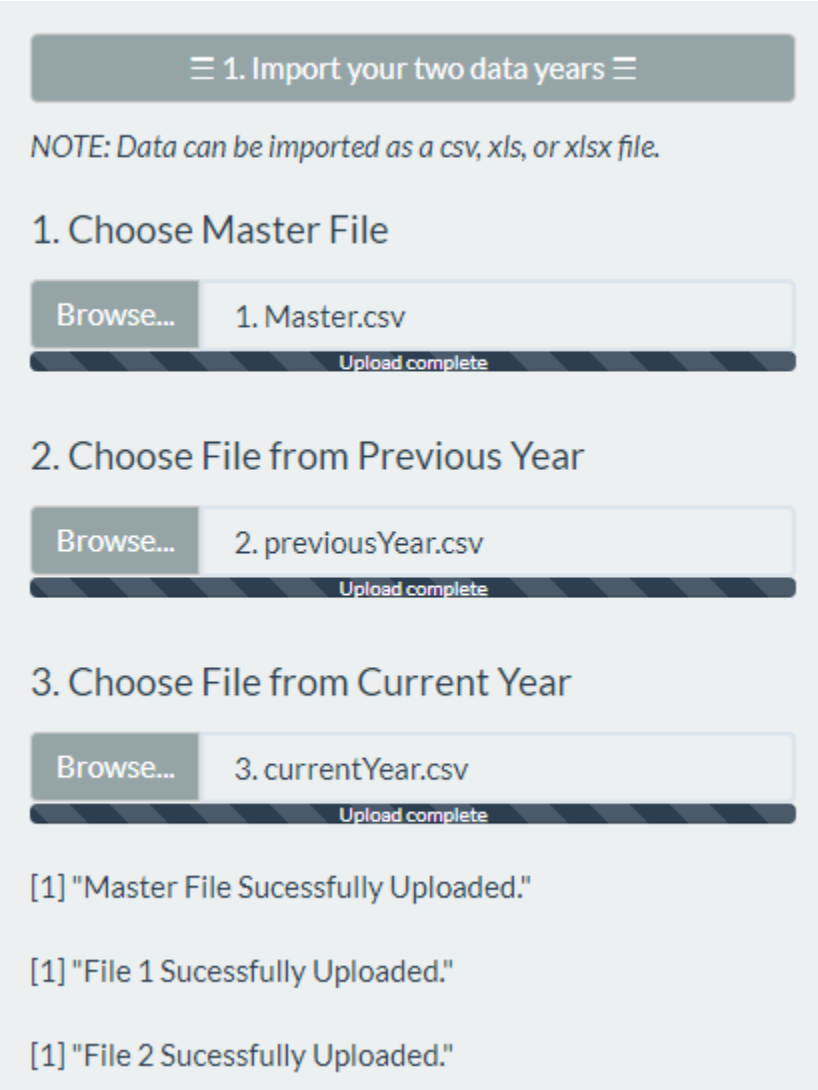


Figure 43. Successful import.



Sidebar Panel 2: Data Exploration

Figure 44. Panel 2, full view.

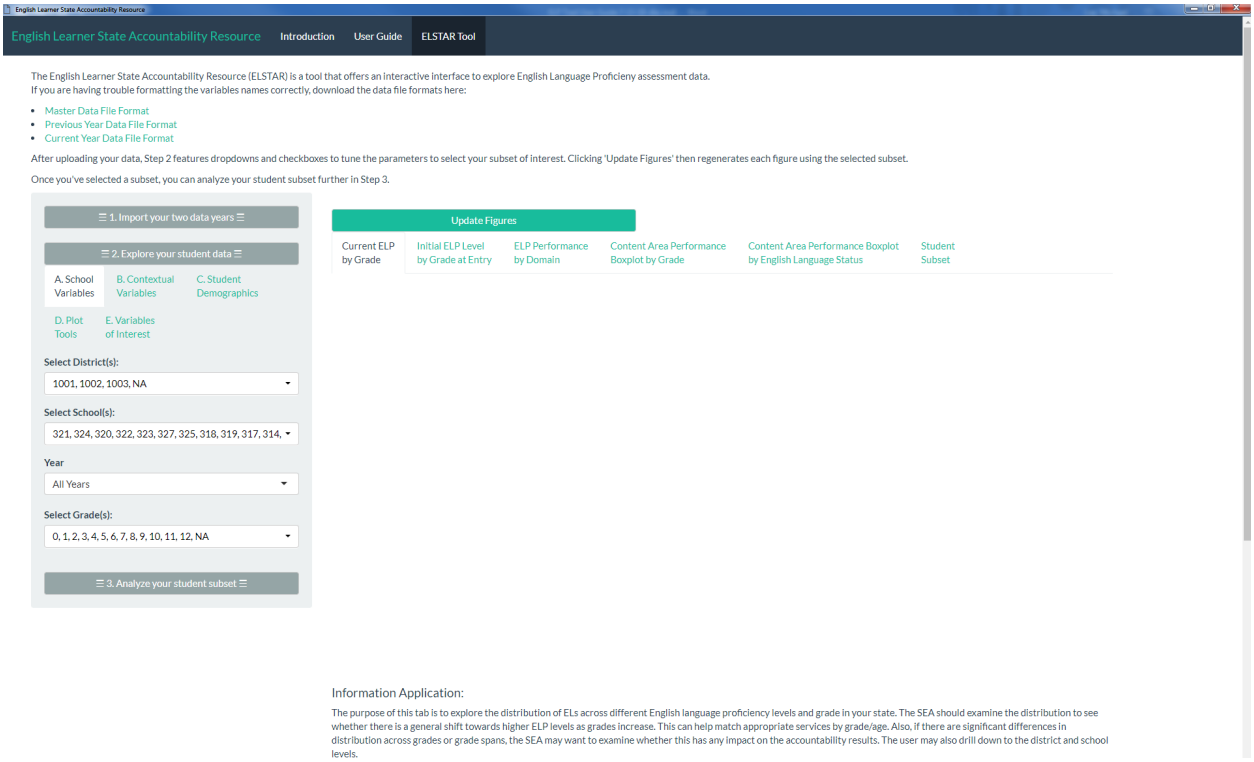


Figure 45. Panel 2, sidebar tab A: School Variables.

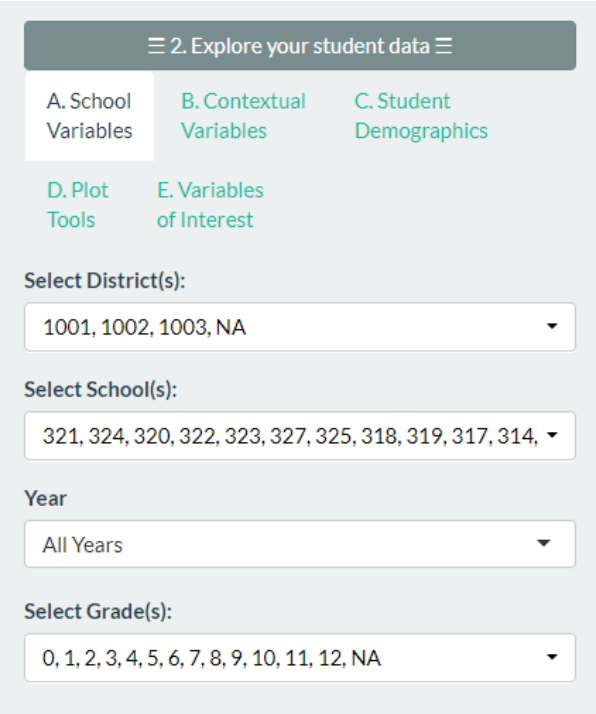


Figure 46. Panel 2, sidebar tab B: Contextual Variables.

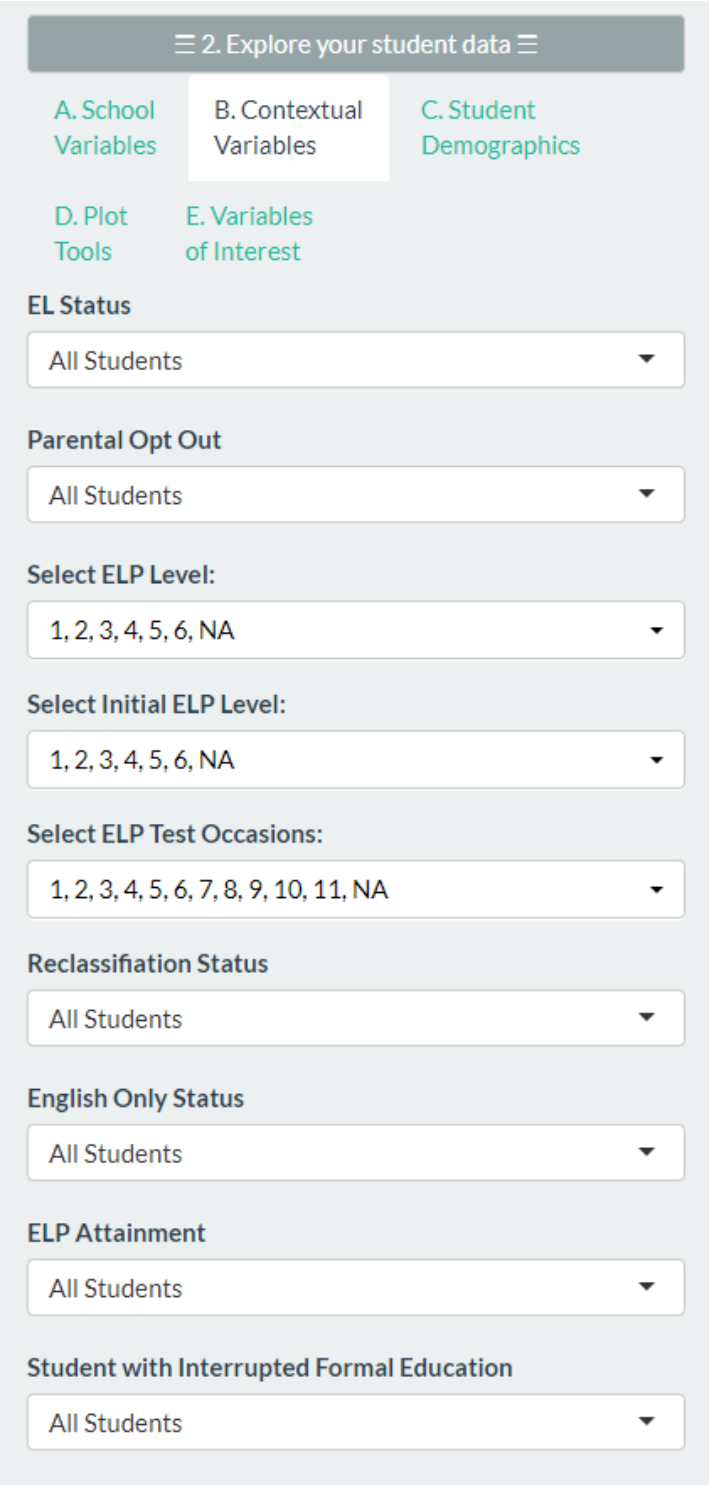


Figure 47. Panel 2, sidebar tab C: Student Demographics.

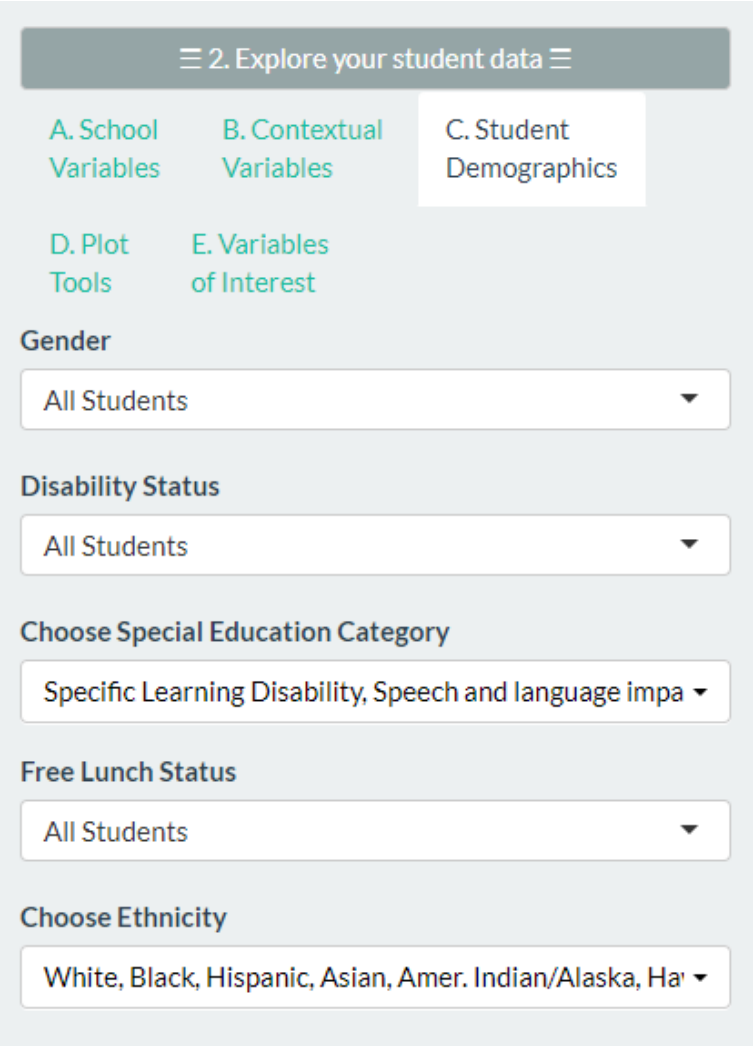


Figure 48. Panel 2, sidebar tab D: Plot Tools.

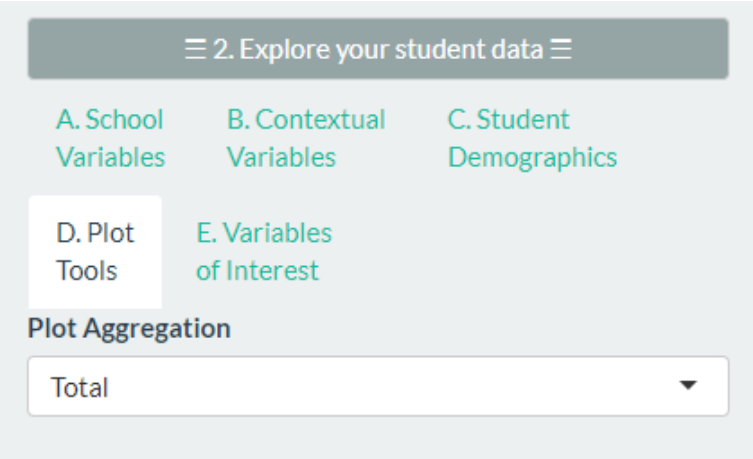


Figure 49. Panel 2, sidebar tab E: Variables of Interest.

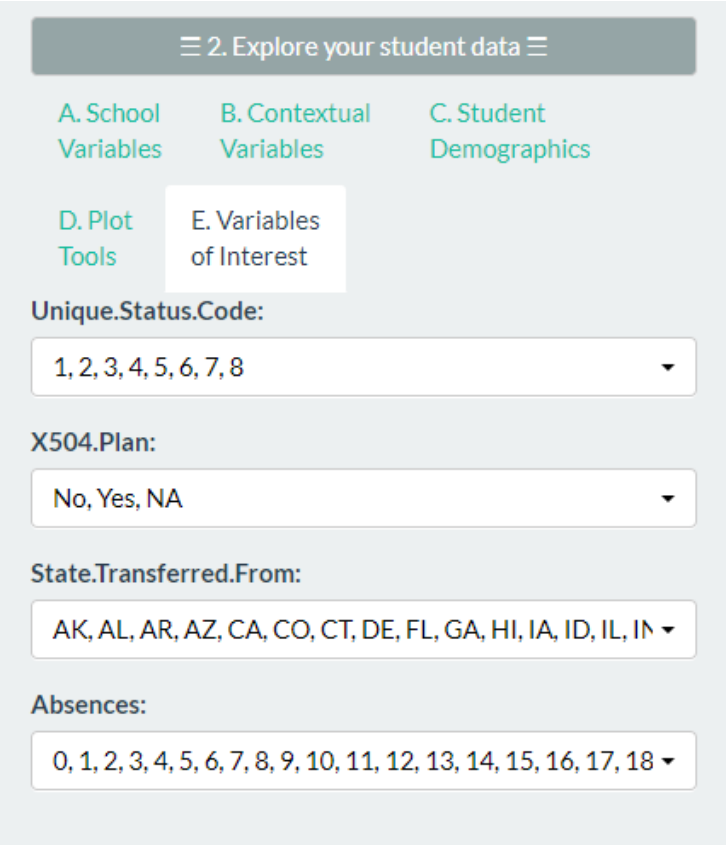


Figure 50. Panel 2, plot tab 1: Current ELP by Grade.

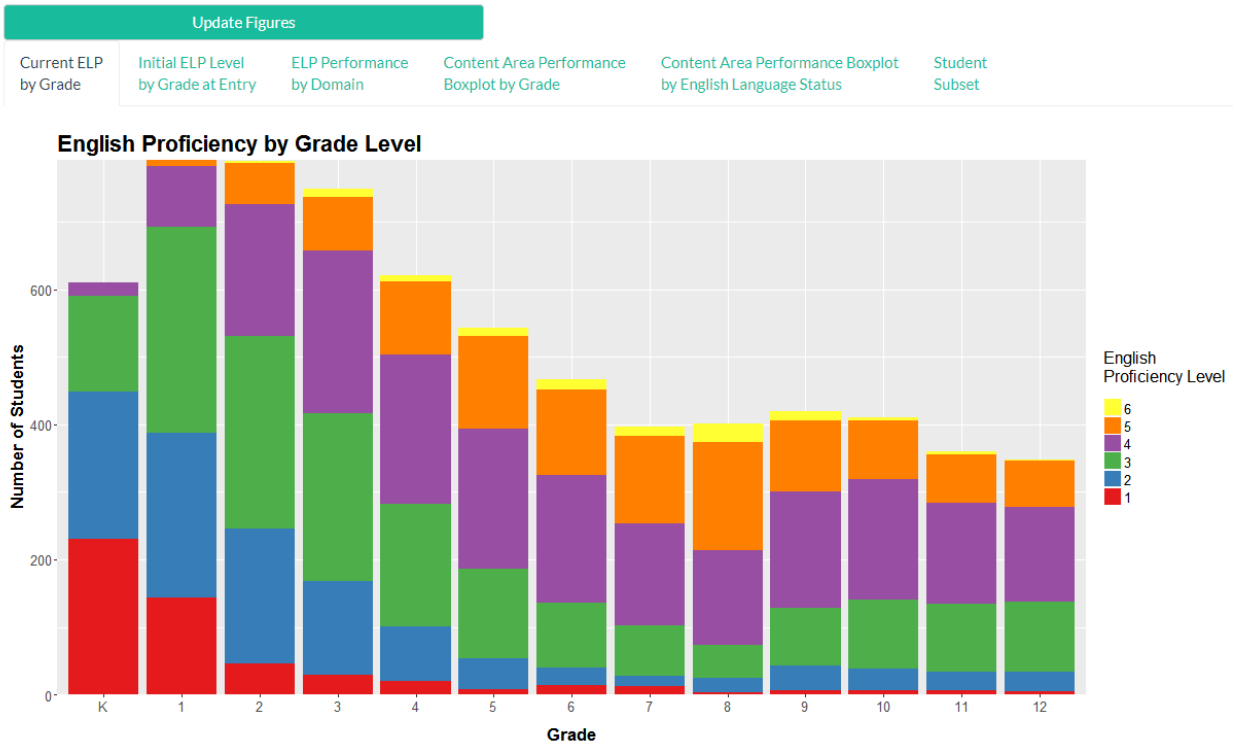


Figure 51. Panel 2, plot tab 2: Initial ELP Level by Grade at Entry.

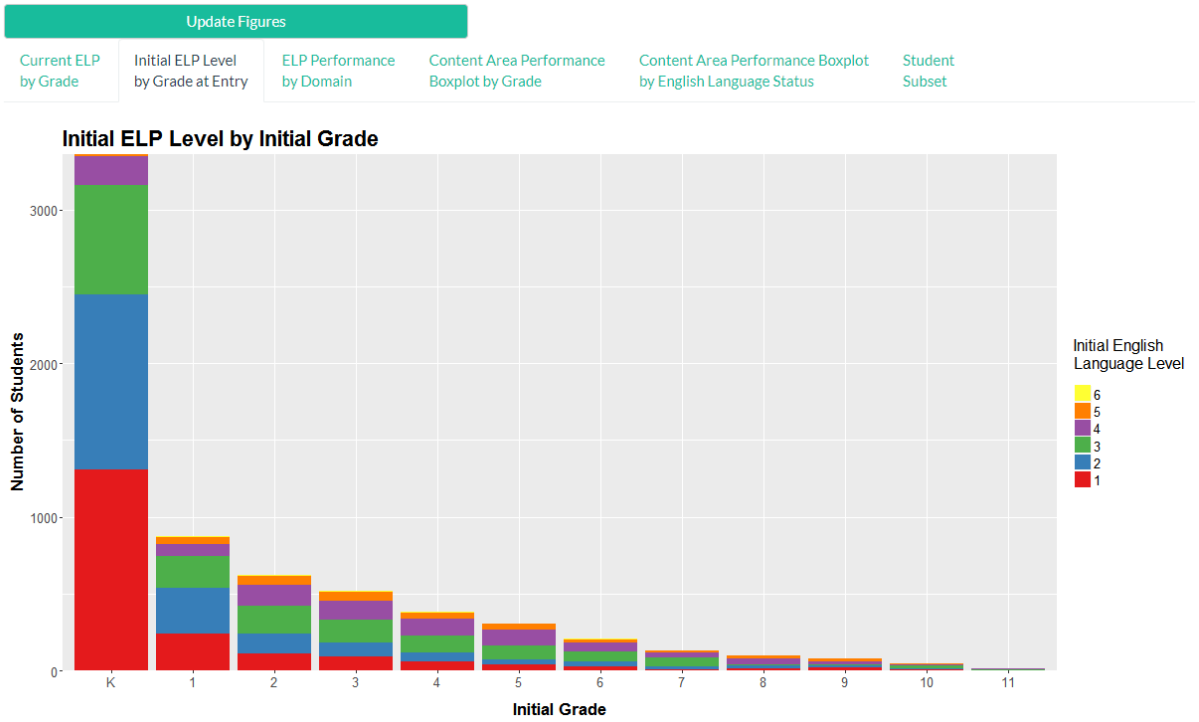


Figure 52. Panel 2, plot tab 3: ELP Performance by Domain.

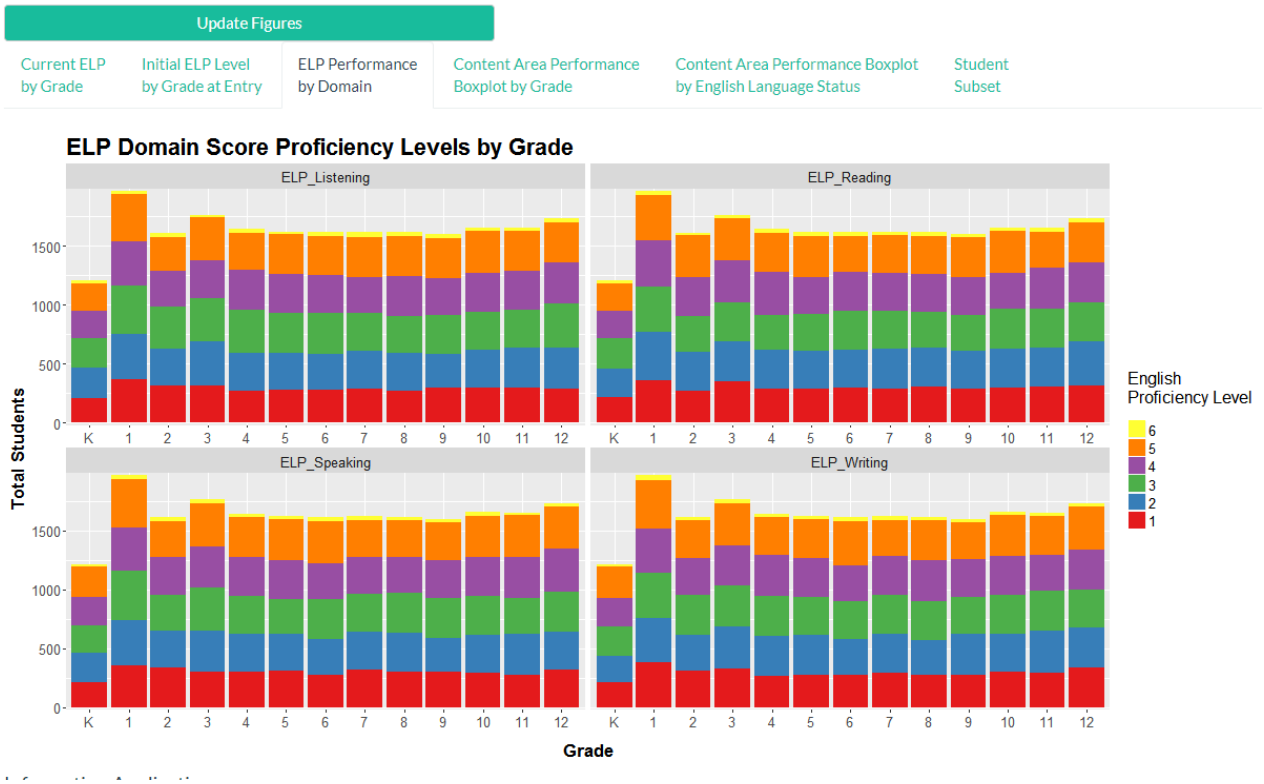


Figure 53. Panel 2, plot tab 4: Content Area Performance Boxplot by Grade.

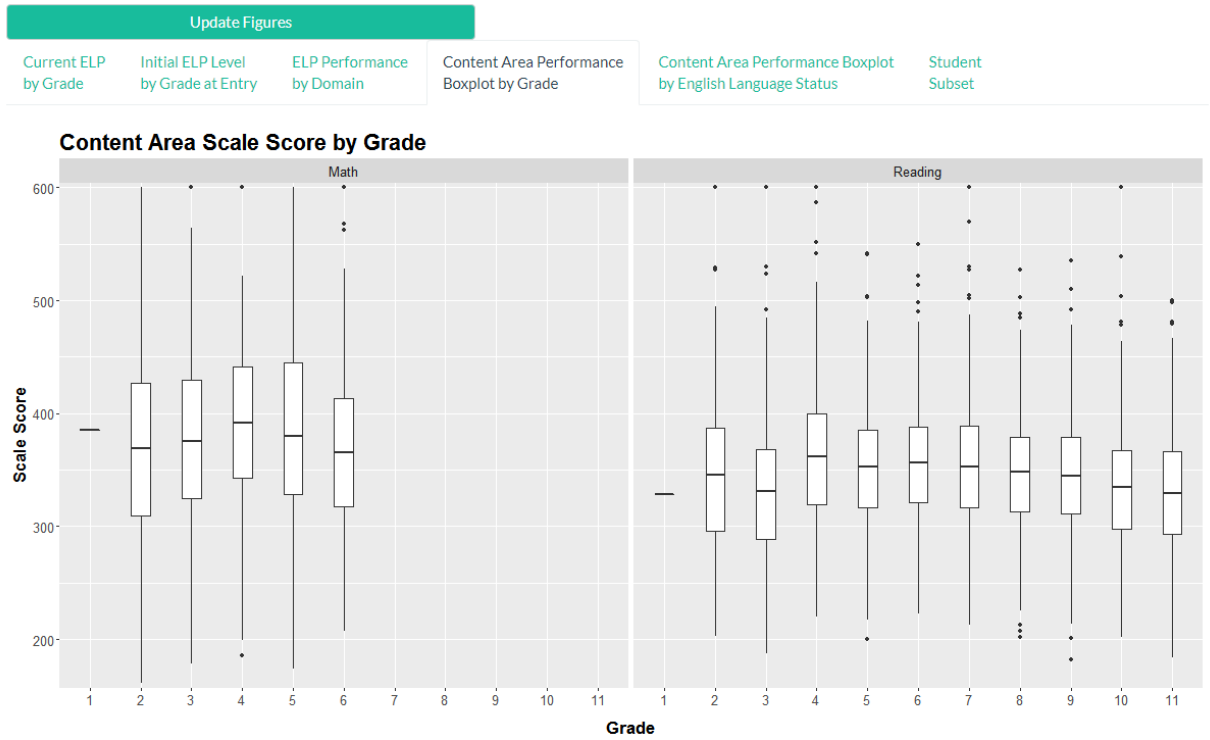


Figure 54. Panel 2, plot tab 5: Content Area Performance Boxplot by English Language Status.

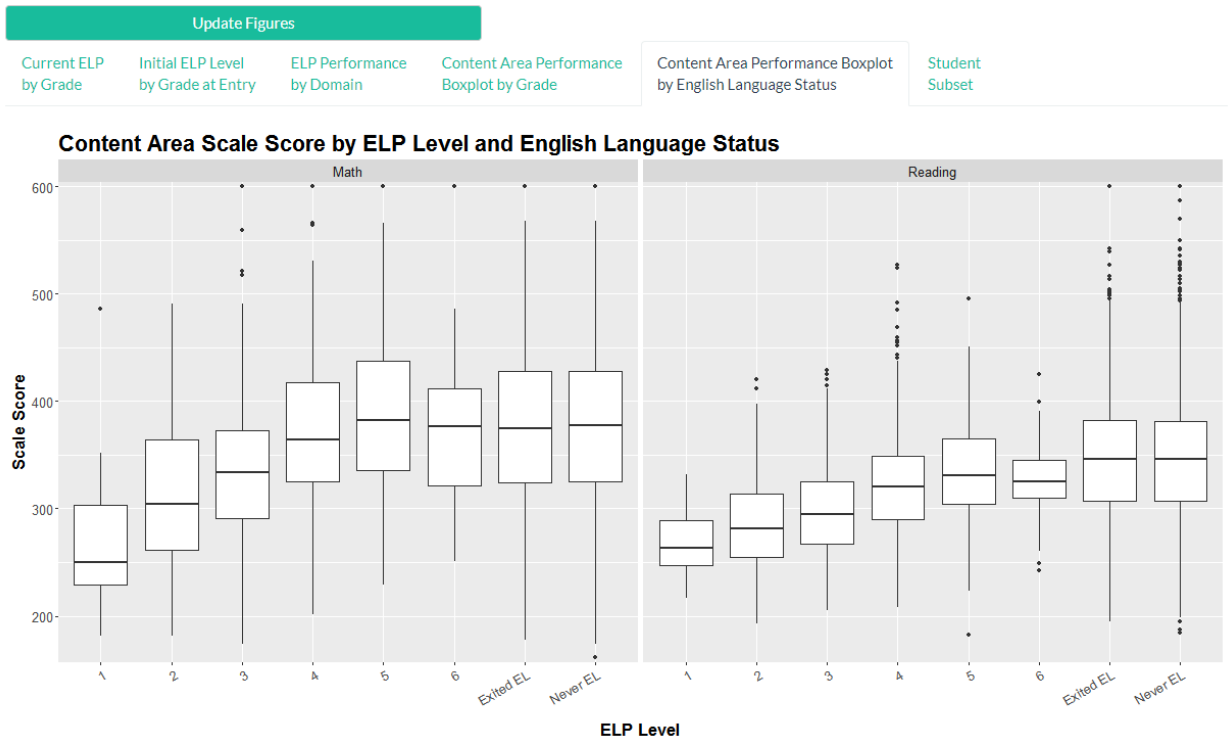
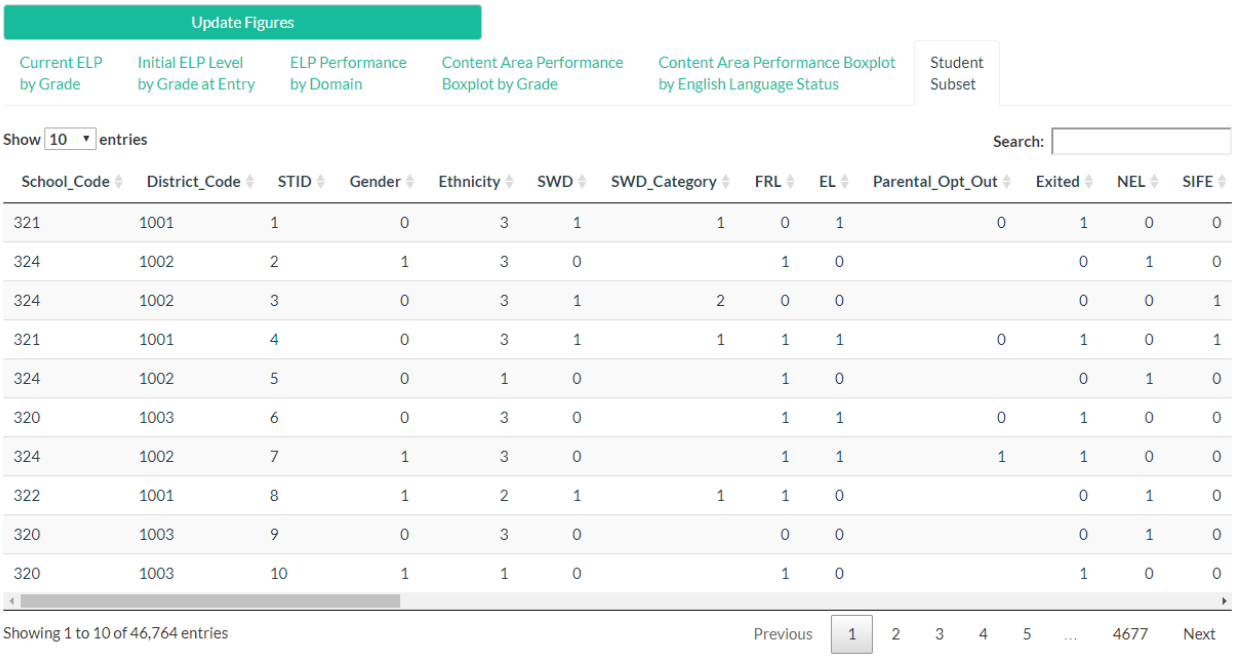


Figure 55. Panel 2, plot tab 6: Student Subset.



School_Code	District_Code	STID	Gender	Ethnicity	SWD	SWD_Category	FRL	EL	Parental_Opt_Out	Exited	NEL	SIFE
321	1001	1	0	3	1	1	0	1	0	1	0	0
324	1002	2	1	3	0		1	0		0	1	0
324	1002	3	0	3	1	2	0	0		0	0	1
321	1001	4	0	3	1	1	1	1	0	1	0	1
324	1002	5	0	1	0		1	0		0	1	0
320	1003	6	0	3	0		1	1	0	1	0	0
324	1002	7	1	3	0		1	1	1	1	0	0
322	1001	8	1	2	1	1	1	0		0	1	0
320	1003	9	0	3	0		0	0		0	1	0
320	1003	10	1	1	0		1	0		1	0	0

Sidebar Panel 3: Data Analysis

Figure 56. Panel 3, full view.

Figure 57. Panel 3, sidebar detail.

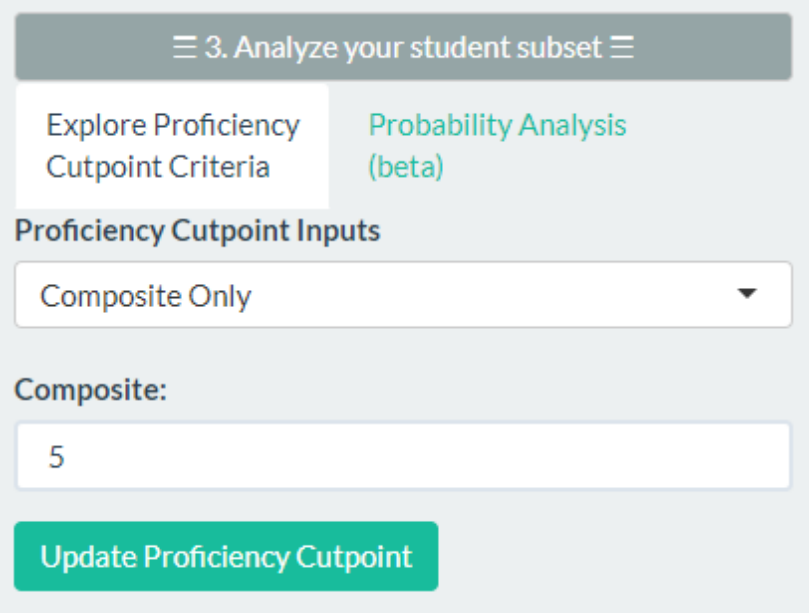


Figure 58. Panel 3, sidebar tab 1: Explore Proficiency Cutpoint Criteria.

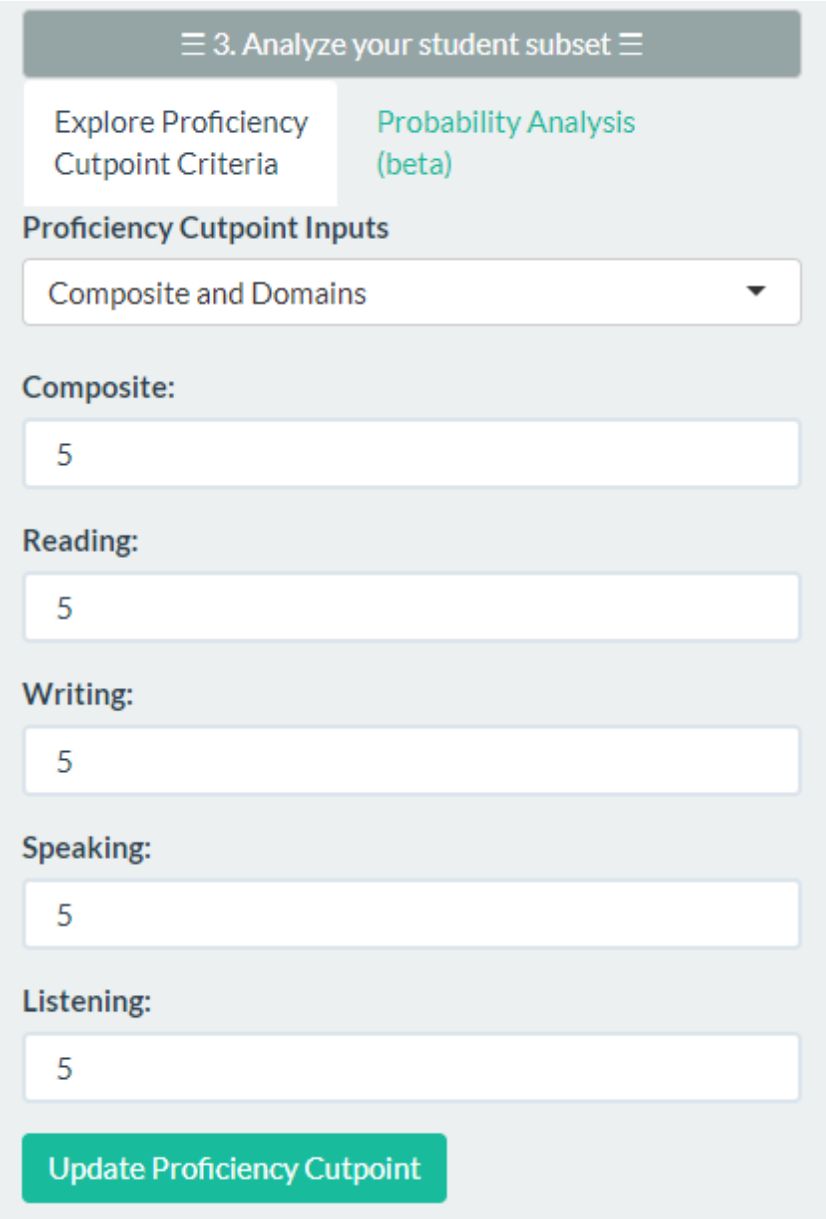


Figure 59. Panel 3, sidebar tab 2: Probability Analysis (beta).

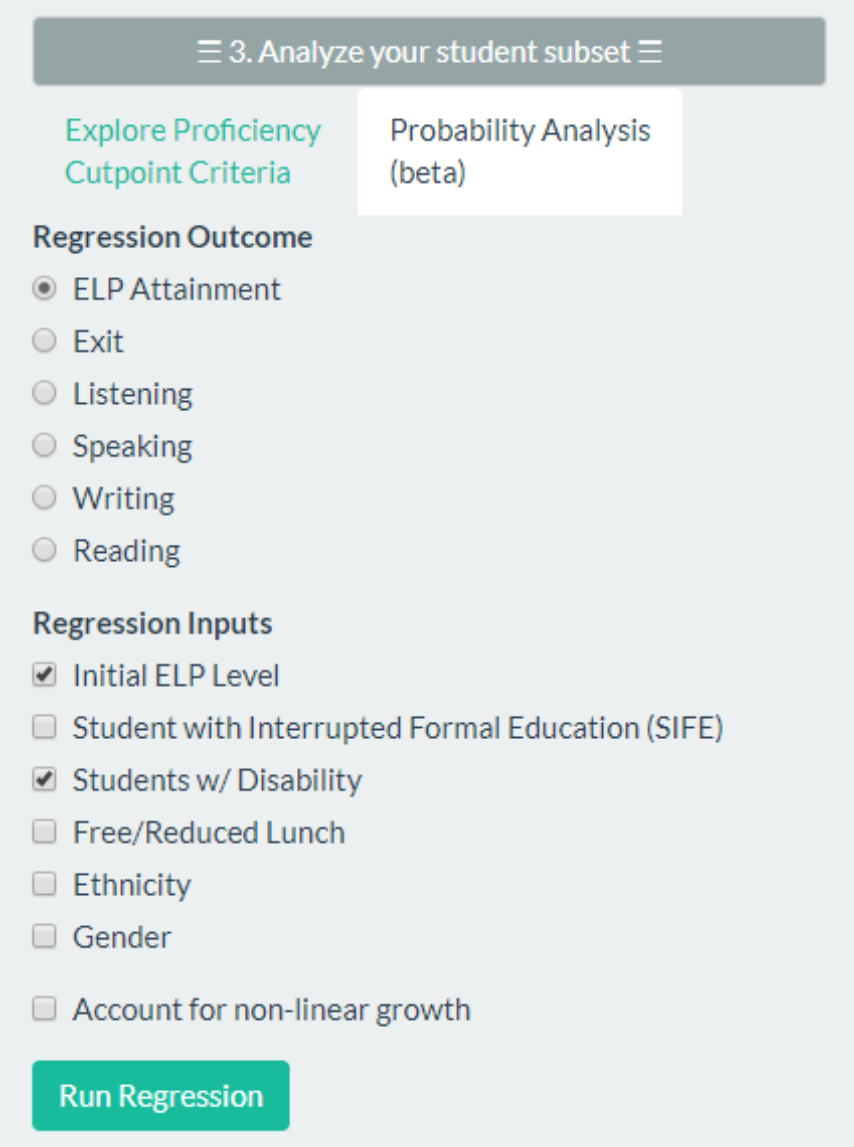


Figure 60. Panel 3, plot tab 1: ELP Domain/Composite Score by ELP Attainment Status.

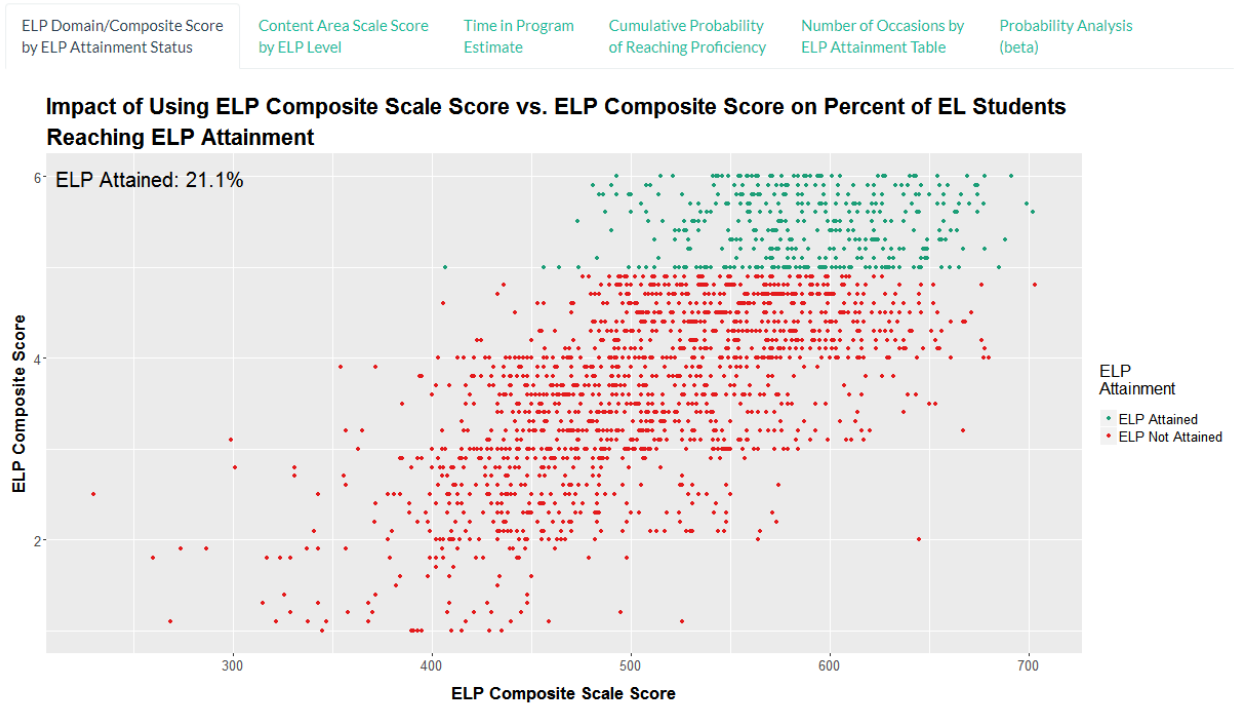


Figure 61. Panel 3, plot tab 2: Content Area Scale Score by ELP Level.

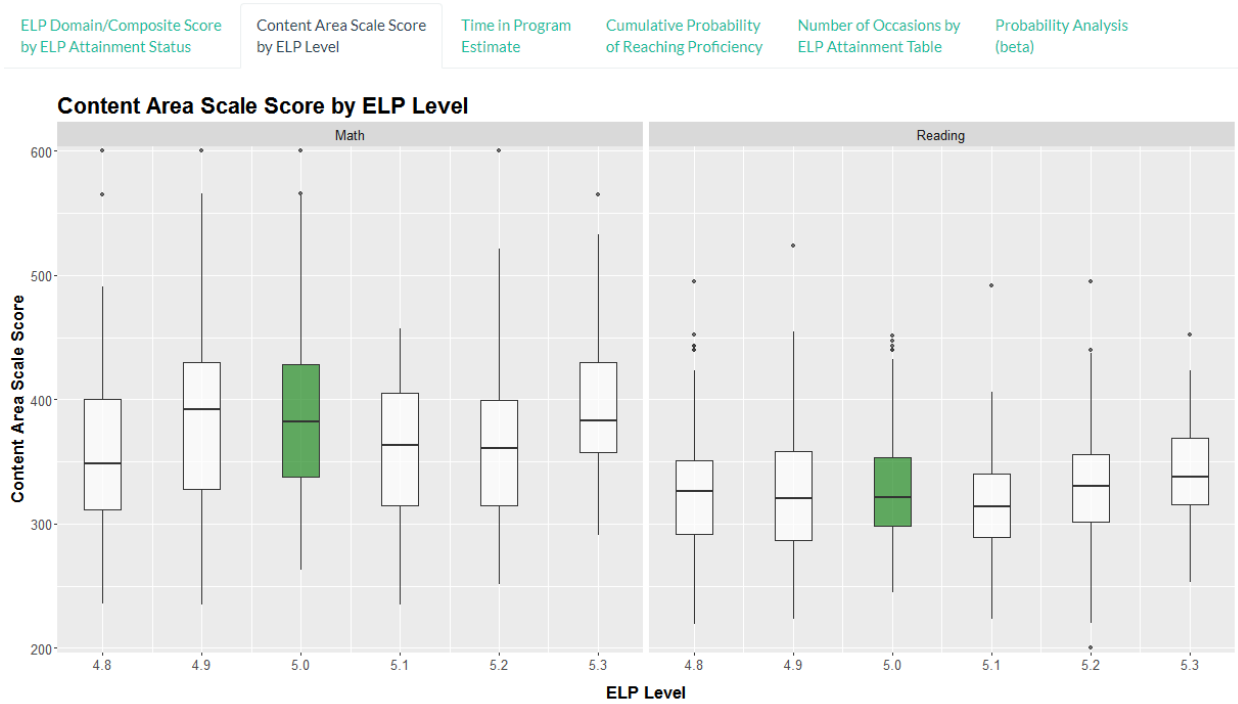


Figure 62. Panel 3, plot tab 3: Time in Program Estimate.

ELP Domain/Composite Score by ELP Attainment Status | Content Area Scale Score by ELP Level | Time in Program Estimate | Cumulative Probability of Reaching Proficiency | Number of Occasions by ELP Attainment Table | Probability Analysis (beta)

Initial ELP Level	Test Occasion 1	Test Occasion 2	Test Occasion 3	Test Occasion 4	Test Occasion 5	Test Occasion 6	Test Occasion 7	Test Occasion 8	Test Occasion 9	Test Occasion 10	Years to Level 5 ELP
1.00	0.77	0.74	0.24	0.51	0.36	0.19	0.22	0.16	-0.15	0.13	NA
2.00	0.66	0.60	0.29	0.46	0.36	0.11	0.08	0.07	-0.18	0.09	NA
3.00	0.37	0.53	0.19	0.22	0.14	0.07	0.15	0.14	-0.05	-0.17	NA
4.00	0.22	0.13	0.34	0.12	0.00	0.00	0.21	-0.08	-0.14	0.08	7.00

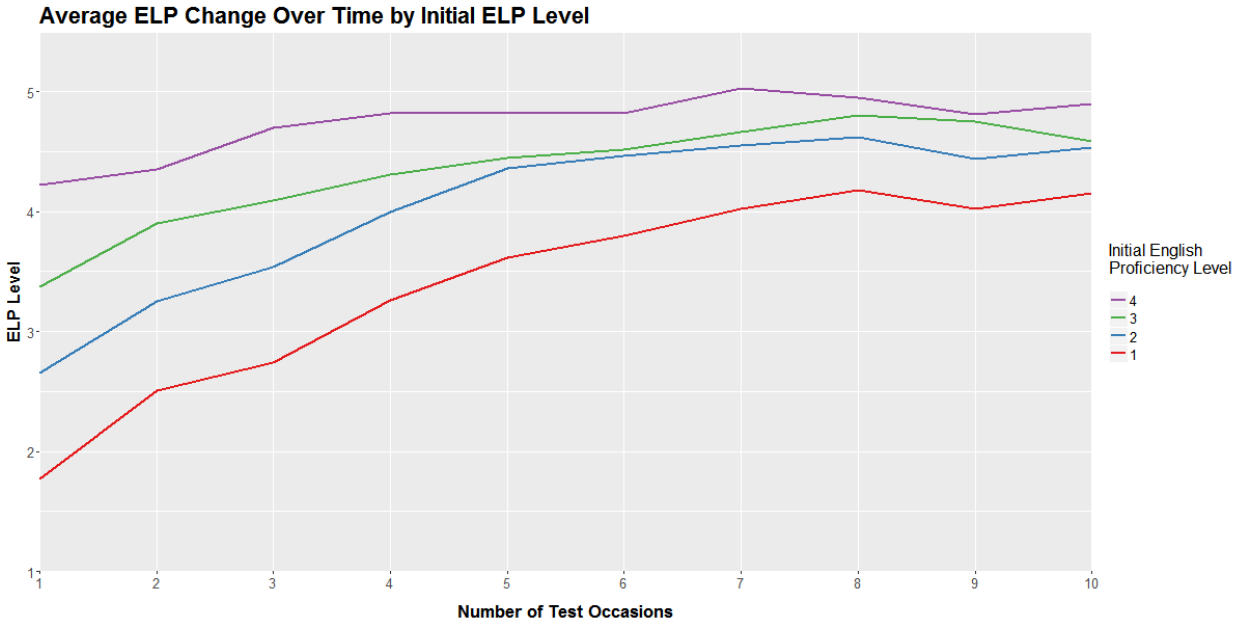


Figure 63. Panel 3, plot tab 4: Cumulative Probability of Reaching Proficiency.

ELP Domain/Composite Score by ELP Attainment Status | Content Area Scale Score by ELP Level | Time in Program Estimate | Cumulative Probability of Reaching Proficiency | Number of Occasions by ELP Attainment Table | Probability Analysis (beta)

Initial ELP Level	Year 1	Year 2	Year 3	Year 4	Year 5	Year 6	Year 7	Year 8	Year 9	Year 10
1.00	0.00	0.02	0.05	0.11	0.35	0.47	0.62	0.71	0.77	0.83
2.00	0.00	0.09	0.16	0.30	0.55	0.71	0.79	0.88	0.93	0.96
3.00	0.03	0.21	0.37	0.66	0.83	0.89	0.93	0.97	0.98	0.99
4.00	0.22	0.45	0.80	0.92	0.99	1.00	1.00	1.00	1.00	1.00

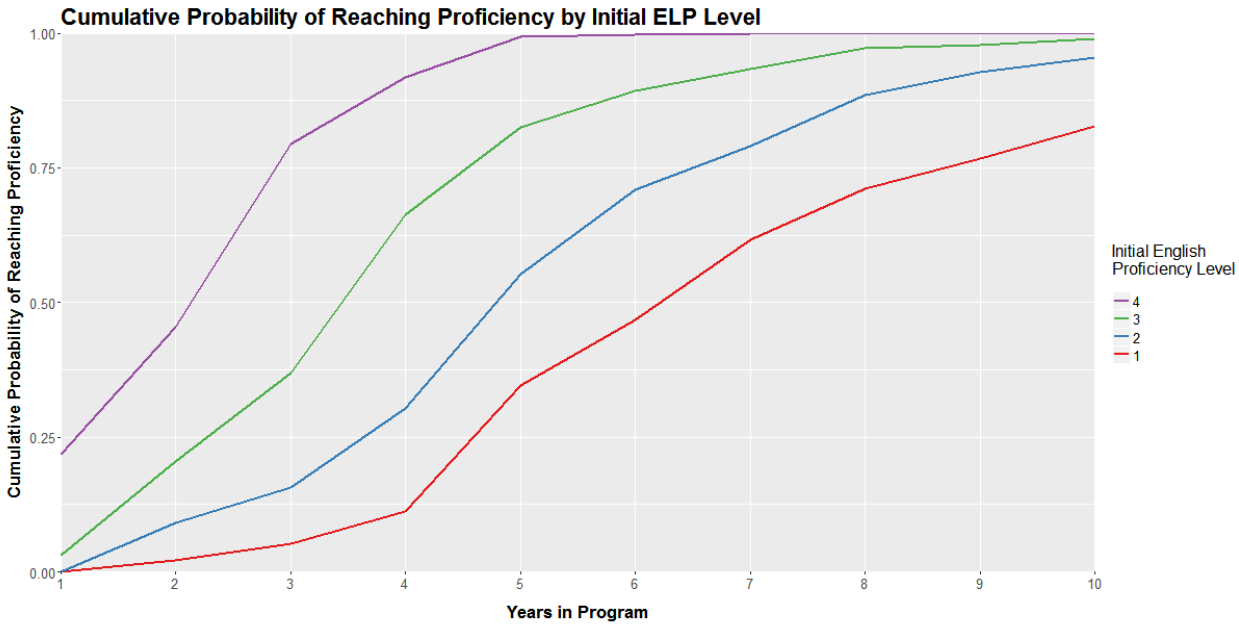


Figure 64. Panel 3, plot tab 5: Number of Occasions by ELP Attainment Table.

ELP Domain/Composite Score by ELP Attainment Status | Content Area Scale Score by ELP Level | Time in Program Estimate | Cumulative Probability of Reaching Proficiency | Number of Occasions by ELP Attainment Table | Probability Analysis (beta)

Initial ELP Level	Mean Test Occasions - ELP Not Attained (total)	Mean Test Occasions - ELP Attained (total)
1.00	4.3 (1555)	3.94 (192)
2.00	4.37 (1346)	4.14 (311)
3.00	4.56 (1140)	4.06 (315)
4.00	4.95 (546)	3.89 (232)
5.00	NA (110)	NA (257)
6.00	2.6 (5)	NA (19)

Figure 65. Panel 3, plot tab 6: Probability Analysis (beta).

ELP Domain/Composite Score by ELP Attainment Status | Content Area Scale Score by ELP Level | Time in Program Estimate | Cumulative Probability of Reaching Proficiency | Number of Occasions by ELP Attainment Table | Probability Analysis (beta)

```
Generalized linear mixed model fit by maximum likelihood (Laplace
  Approximation) [glmerMod]
 Family: binomial  ( logit )
Formula: ELP_Attained ~ ELP_Level_Initial + SWD + ELP_Test_Occasions +
    (1 | School_Code)
   Data: elpImport

     AIC      BIC   logLik deviance df.resid
  5718.1   5778.4  -2850.1   5700.1     5988

Scaled residuals:
    Min      1Q  Median      3Q     Max
-2.1455 -0.5253 -0.4184 -0.3137  3.3746

Random effects:
 Groups      Name        Variance  Std.Dev.
 School_Code (Intercept) 9.891e-14 3.145e-07
Number of obs: 5997, groups:  School_Code, 26

Fixed effects:
                   Estimate Std. Error z value Pr(>|z|)
(Intercept)        -1.86344    0.09143 -20.381  < 2e-16 ***
ELP_Level_Initial2  0.63294    0.09947   6.363 1.98e-10 ***
ELP_Level_Initial3  0.82070    0.10036   8.178 2.90e-16 ***
ELP_Level_Initial4  1.26447    0.11075  11.417  < 2e-16 ***
ELP_Level_Initial5  2.90904    0.14170  20.530  < 2e-16 ***
ELP_Level_Initial6  3.44714    0.51325   6.716 1.86e-11 ***
SWD1                0.02910    0.11577   0.251    0.802
ELP_Test_Occasions -0.05691    0.01178  -4.830 1.36e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Correlation of Fixed Effects:
            (Intr) ELP_L_I2 ELP_L_I3 ELP_L_I4 ELP_L_I5 ELP_L_I6 SWD1
ELP_Lvl_In2 -0.655
ELP_Lvl_In3 -0.648  0.596
ELP_Lvl_In4 -0.577  0.542    0.543
ELP_Lvl_In5 -0.430  0.426    0.428    0.393
ELP_Lvl_In6 -0.115  0.118    0.119    0.110    0.088
SWD1        -0.203  0.075    0.113    0.124    0.117    0.039
ELP_Tst_Occ -0.502 -0.012   -0.031   -0.057   -0.094   -0.036   -0.024
```