



# **From Here to There!**

## **Researcher Dashboard User Guide**

[fh2research.com](http://fh2research.com)

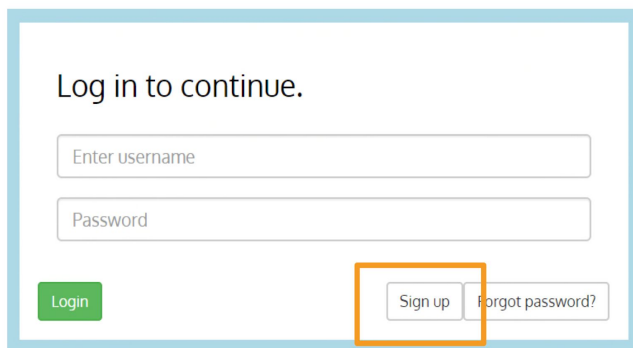
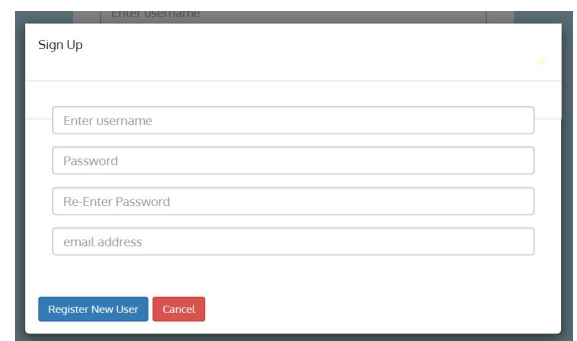
## Overview

From Here to There! (FH2T) Researcher Dashboard (<http://fh2tresearch.com>) provides information about students learning on FH2T by aggregating and extracting value from the data we collected. The dashboard displays student in-app behaviors with easy-to-understand data visualizations, such as tables, graphs, and diagrams. We hope that the researcher dashboard helps you better understand what students are doing on FH2T and how you can support student learning.

## Login

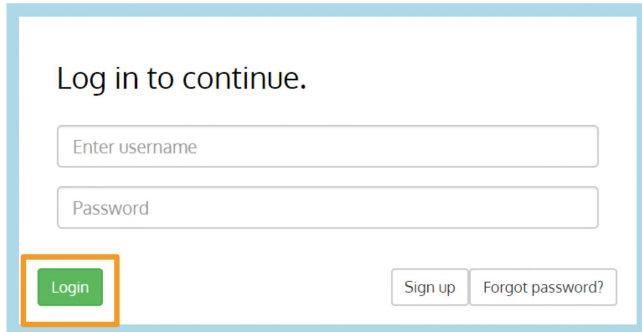
1. **Sign a data-sharing agreement (DSA).** Please contact [erottmar@wpi.edu](mailto:erottmar@wpi.edu) for a copy. Prior to accessing the Researcher Dashboard, every user *must* sign a DSA. After receipt of the data-sharing agreement by WPI, you can create a login for the Researcher Dashboard.
2. **If you are a NEW USER**, select the **Sign Up** button to request access login credentials. Enter in required information and click **Register New User**. After registering, you must wait for the Admin to confirm that you have signed the DSA.

**If you are a RETURNING USER**, skip to Step 4.

A screenshot of a login form titled "Log in to continue." It features two input fields: "Enter username" and "Password". Below these fields are three buttons: a green "Login" button, a "Sign up" button (highlighted with an orange box), and a "Forgot password?" link.A screenshot of a "Sign Up" form. It contains four input fields: "Enter username", "Password", "Re-Enter Password", and "email address". At the bottom, there are two buttons: a blue "Register New User" button and a red "Cancel" button.

3. **Check your email** for a confirmation that your New User Request has been approved.

4. **Log in with your username and password** after being approved by the Admin. Click **Login**.



Log in to continue.

Enter username

Password

Login

Sign up Forgot password?

5. **Select the experiment you want to view.** Then click **Continue**, which will appear after you select an experiment. This will bring you to the interface, or main page, of the FH2T Dashboard.



Select Experiment

FGA Fall 2019

IES WMA - Fall 2019

Continue Cancel

## Reset Password

1. **If you forget your password**, type in your username and then click the *Forgot Password?* button.



Log in to continue.

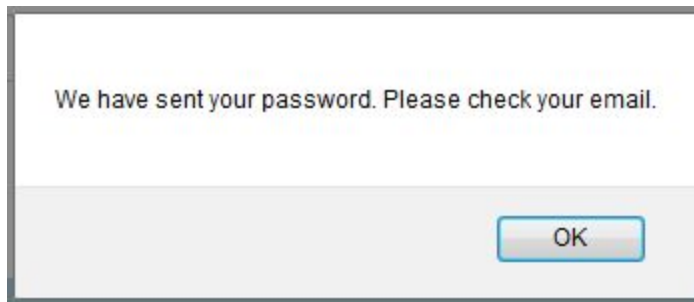
username

Password

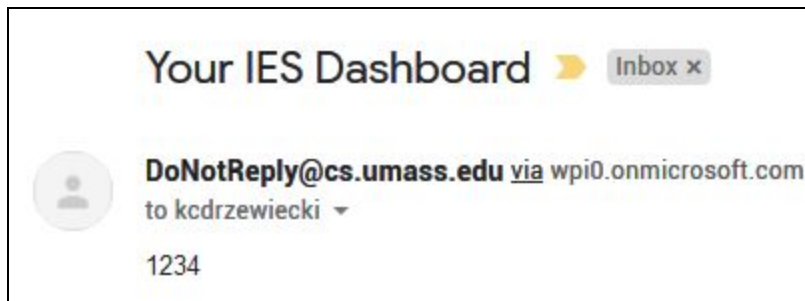
Login

Sign up Forgot password?

2. Afterward, you should see a pop-up notification saying that your password has been reset and to check your email.



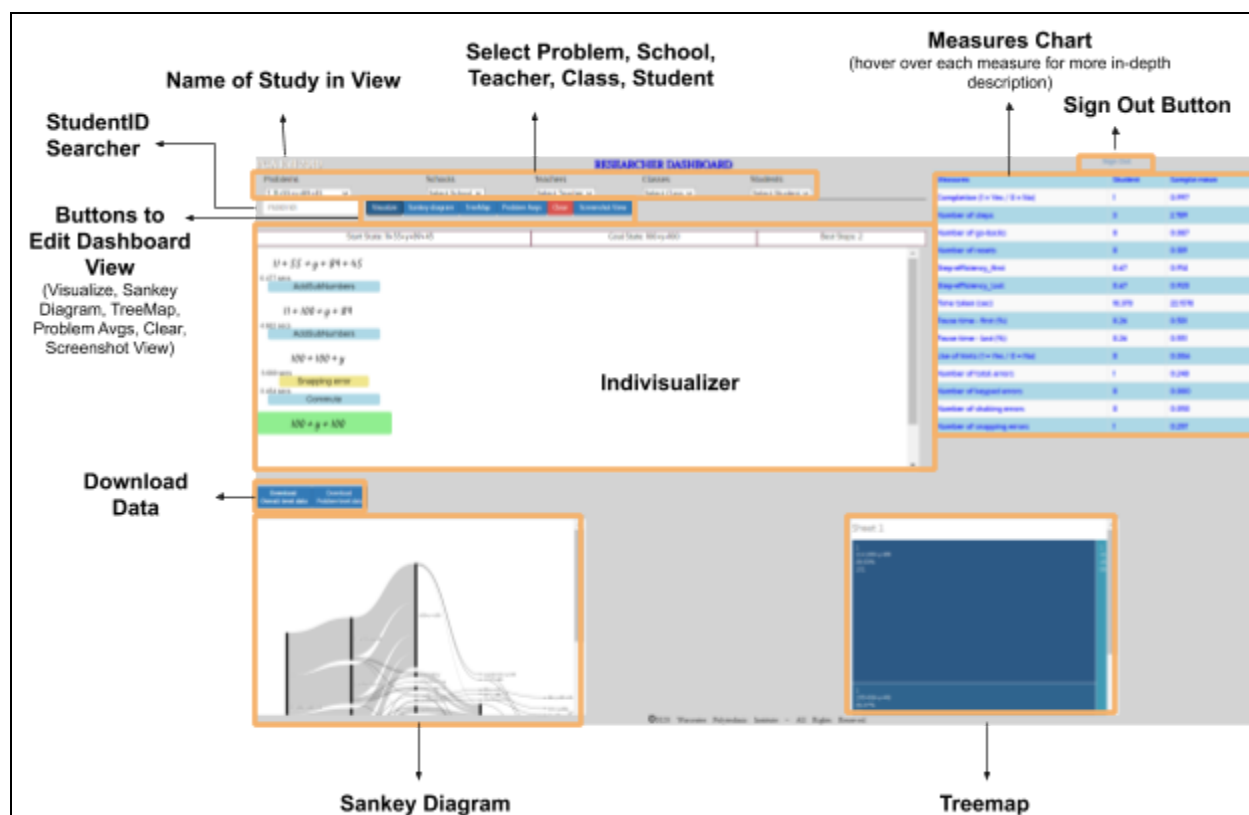
3. **Check your email** for your new password.



4. **Login to the Dashboard with your username and the new password.**

## Interface

The main page of the FH2T dashboard consists of four parts: **Individualizer**, **Measures Chart**, **Sankey Diagram**, and **Treemap**.



## Buttons to Edit Dashboard View

Select a problem to view data for before utilizing the following buttons:

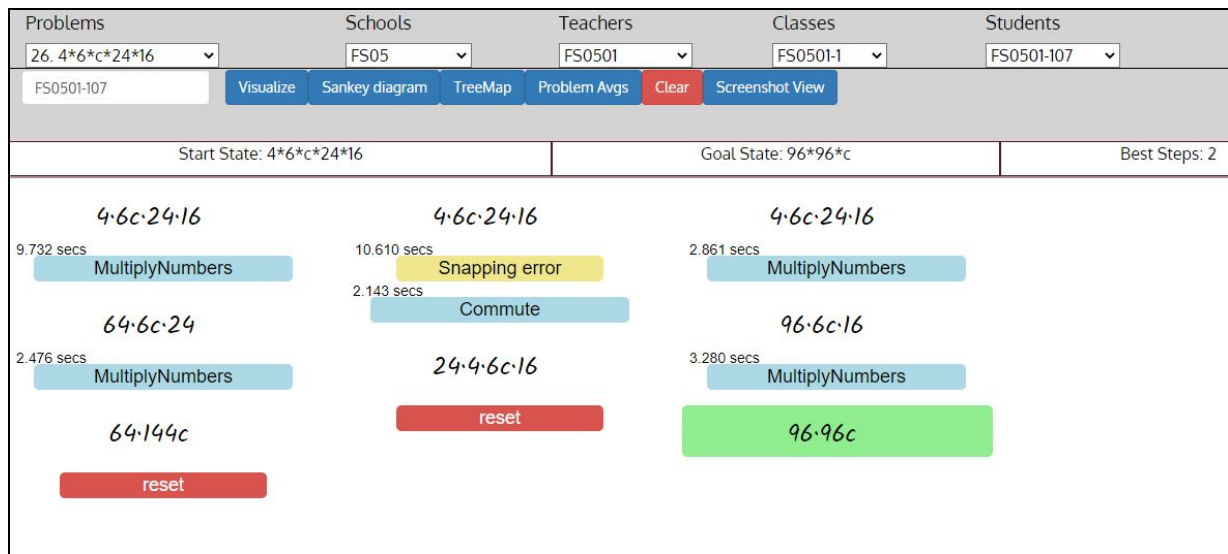
- **StudentID Searcher**: Allows you to search for how a specific student performed a problem. Type in the ID of the student you are looking for and hit Enter.
- **Visualize**: Brings up the Individualizer and Measures Chart information for the selected problem.
- **Sankey diagram**: Brings up the Sankey Diagram for the selected problem.
- **Treemap**: Brings up the Treemap for the selected problem.
- **Problem Avgs**: Brings up Problem Averages chart. This will replace the Measures Chart. Click the *Visualize* button to bring the Measures Chart back into view.
- **Clear**: Clears the dashboard of all information of the previously selected problem.
- **Screenshot view**: Opens a new tab with the Individualizer visualization and information for a more screenshot-friendly view.

\*Note that the students who only attempted the problem will show up in the "Select Student" drop-down list.

## Indivisualizer

### What is an Indivisualizer?

The Indivisualizer displays a student's expression transformation process between the start state and the goal state in FH2T.



### How to Read an Indivisualizer

- "Start State" indicates the starting expression of the selected problem (e.g., 4\*6\*c\*24\*16).
- "Goal State" represents the target goal expression of the selected problem (e.g., 96\*96\*c).
- "Best Steps" indicates that the minimum required number of steps to reach the goal state.
- Each column shows the student's (student FS0501-107 in the example above) try until he/she hits the reset button.
- The light blue box represents the student's actions leading to the transformation.
- The numbers above the light blue box indicate the time (in seconds) taken between transformations.
- The red box indicates that the student hit the reset button to restart the problem.
- The light yellow box represents the errors (keypad error, snapping error, sharking error) made by the student.

- Keypad error includes entering an expression on the keypad that is not equivalent to the expression the user is trying to substitute, and entering invalid operations to the equation.
- Shaking error occurs when the user attempts to perform an operation that does not follow the order of precedence. For example, in  $3+2*5$  if a user clicks the  $+$  before  $*$ , the expression shakes left and right. This can also occur in more complex cases, e.g.,  $39/(2+1)-10$ , the user needs to do  $2+1$  before dividing and subtracting. Click to divide or subtract first will result in shaking.
- Snapping error occurs when the user drags a number or a term, but the drag does not lead to a transformation, and the dragged term returns to its original location. For example,  $2*3+4$ , dragging 3 to the left of 4 will not lead to a valid transformation (commute) and 3 will snap back to its original place. This counts as a snapping error.
- The green box indicates that the student reached the goal state of the problem.

## Measures Chart

There are two different types of measures charts within the dashboard: problem averages and individual students. **Hover over each measure** for more in-depth descriptions of the measures.

### Problem Averages

Number of Students Completed	358
Measures	Sample mean
Completion (1 = Yes / 0 = No)	1.000
Number of steps	1.435
Number of go-backs	0.086
Number of resets	0.059
Step-efficiency_first	0.879
Step-efficiency_Last	0.902
Time taken (sec)	21.8349
Pause time - first (%)	0.726
Pause time - last (%)	0.738
Use of hints (1 = Yes / 0 = No)	0.009
Number of total errors	0.537
Number of keypad errors	0.000
Number of shaking errors	0.114
Number of snapping errors	0.463

### Individual Students

Measures	Student	Sample mean
Completion (1 = Yes / 0 = No)	1	1.000
Number of steps	1	1.435
Number of go-backs	0	0.086
Number of resets	0	0.059
Step-efficiency_first	1	0.879
Step-efficiency_Last	1	0.902
Time taken (sec)	17.211	21.8349
Pause time - first (%)	0.87	0.726
Pause time - last (%)	0.87	0.738
Use of hints (1 = Yes / 0 = No)	0	0.009
Number of total errors	0	0.537
Number of keypad errors	0	0.000
Number of shaking errors	0	0.114
Number of snapping errors	0	0.463

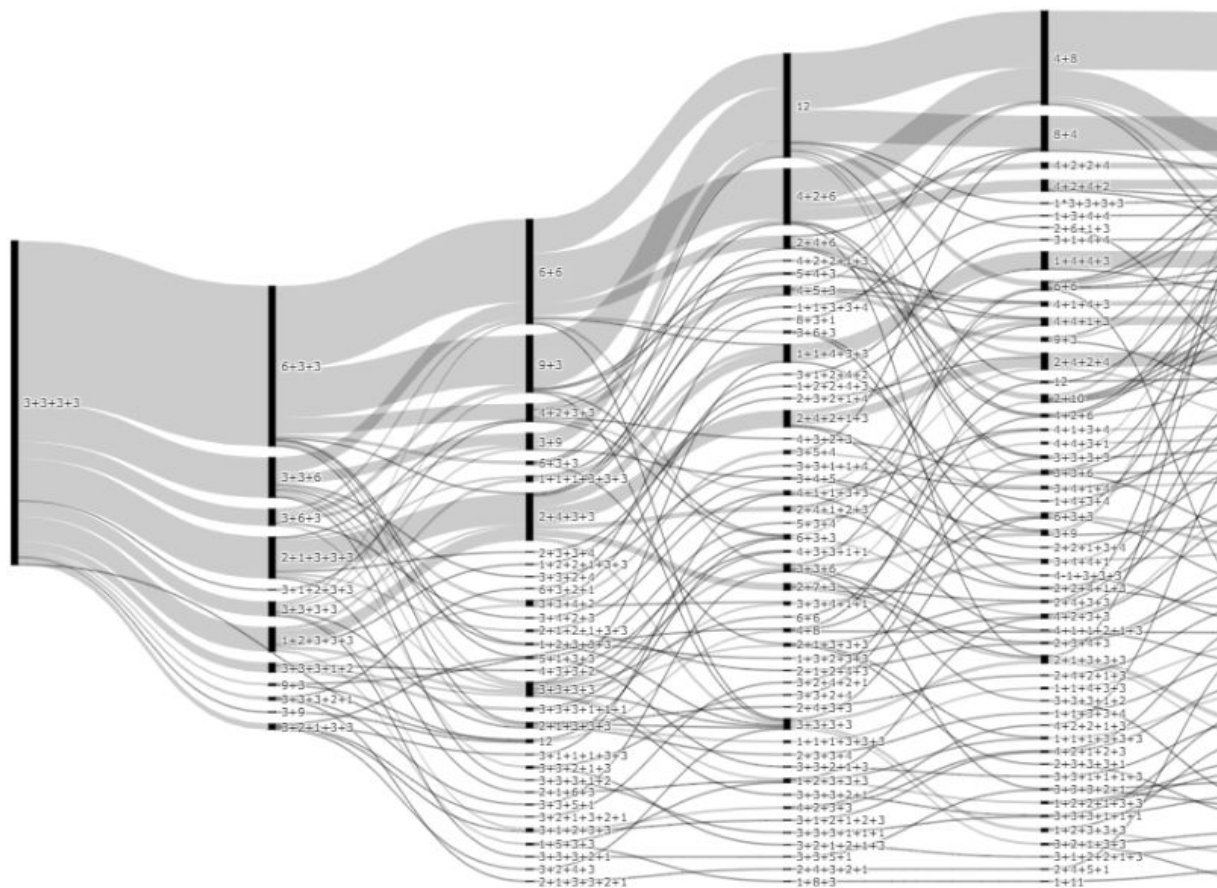


## Sankey diagrams

### What is a Sankey Diagram?

A Sankey diagram is a type of flow diagram which depicts a flow and its quantities (or frequencies) from one set of values to another using the width of lines.

In the FH2T researcher dashboard, a Sankey diagram displays how several students transformed the start state of the problem into the goal state. The thickness of each path represents the number of students who took the path.



### How to Read a Sankey Diagram

- In the diagram, the vertical bars (also called nodes; e.g.,  $3+3+3+3$ ) represent the students' steps (in other words, the mathematical transformation created by students).

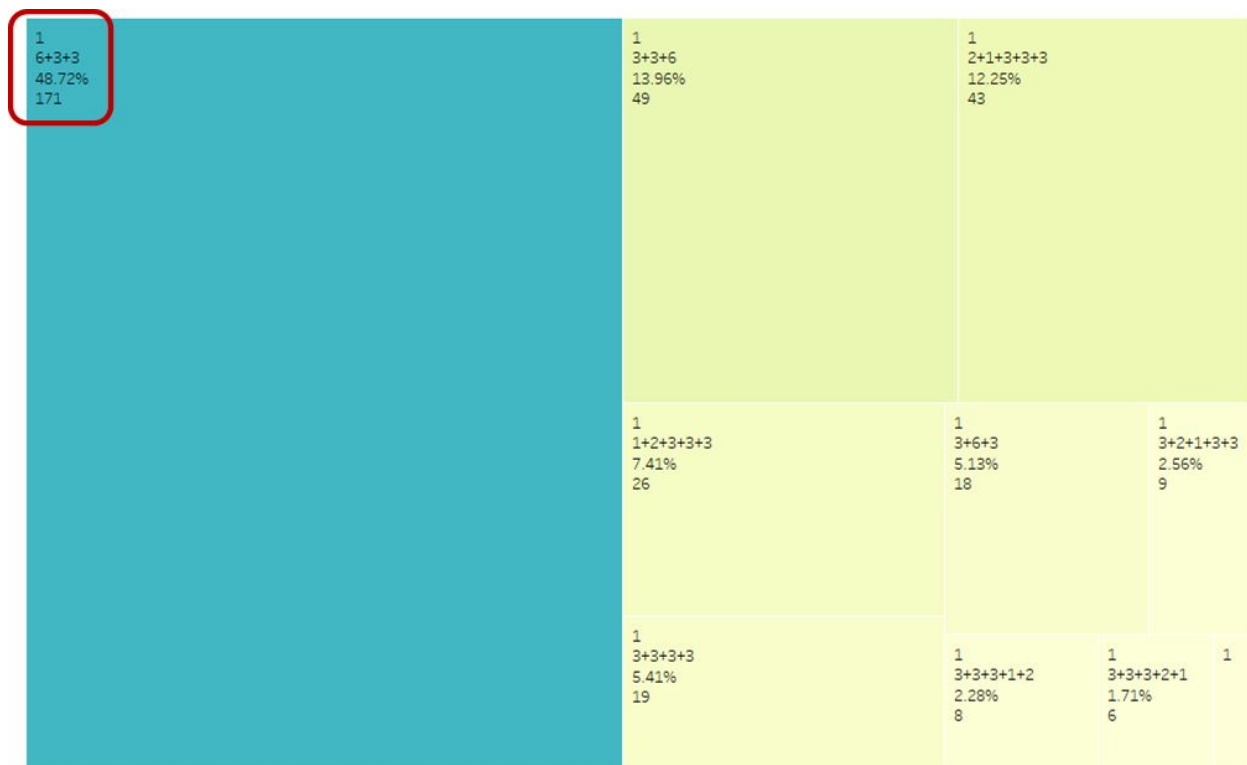


- The thickness of each path indicates the number of students who took the path. The greater the number of students for each step (mathematical transformation), the thicker its path.

## Treemaps

### What is a Treemap?

Treemap is a data visualization technique that displays frequencies (or quantities) for each category by area size and color. Here, both the size of the rectangles and their color were determined by the number of students (the greater the number of students for each category, the darker and larger its box).



### How to Read a Treemap

The treemap chart depicts the frequency of the students' first step of expression transformation for each problem, in other words, how the students first transformed the start state.

In the treemap, both the size of the boxes and the color represents the number of students who made that expression; the greater the number of students for each category, the darker and larger its box.

Each rectangle includes three rows of information:

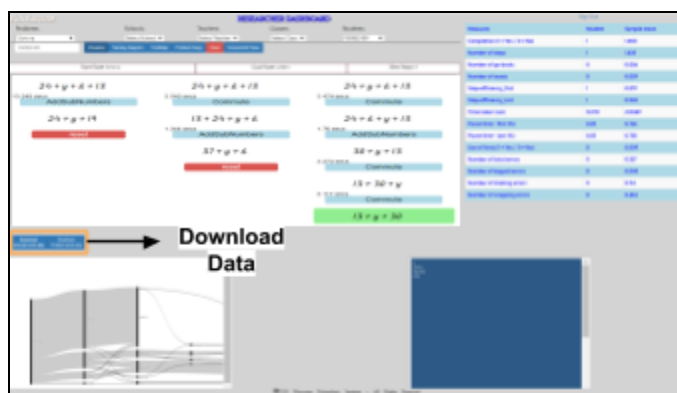
- The **first row** in each box (e.g.,  $6+3+3$ ) indicates the first mathematical expression made by the students.
- The **second row** (e.g., 48.72%) represents the percentage of students who made that expression (out of the total number of students who solved the problem)
- The **third row** (e.g., 172) indicates the number of students who made that expression.

## Downloading Data

The Dashboard allows users to download the study's data as a .csv file.

### 1. Determine which data set you want.

- If you want data for the **OVERALL STUDY**
  - Select *Download Overall-level Data*
- If you want data for a **SELECTED PROBLEM**
  - Select *Download Problem-level Data*



- After selecting a download option, **your .csv will immediately begin downloading.**

## Further Questions

If you have further questions or concerns, please contact **Erin Ottmar** at [erottmar@wpi.edu](mailto:erottmar@wpi.edu) or **Ji-Eun Lee** at [jlee13@wpi.edu](mailto:jlee13@wpi.edu).