

R for Education Research

Schedule

Class: June 3 - July 22, Thursdays 1-3pm ET

Capstone Project: July 23 - August 5

Office Hours

Tuesdays 10am - 12pm, and by appointment

sara.hodges@bellwethereducation.org

Introduction and goals for the course

Bonnie O'Keefe

About Bellwether

Bellwether is a national nonprofit focused on dramatically changing education and life outcomes for underserved children. We do this by **helping organizations accelerate impact and improving public policy and practice** for the education field.

\‘BEL-,weth-ər\, noun;

A leader of a movement or activity;
also, a leading indicator of future trends.

Our goals for the School Finance Equity Trainings

- **Demystify school finance**, in partnership with advocacy groups, and clarify the importance of funding equity;
- **Build capacity** among advocates working at the state and local level to delve into school finance data, grapple with state funding formulas, and model the changes they would like to see made on behalf of underserved students — especially Black, Latinx, and/or low-income children ;
- **Support equity-driven state funding solutions** based on students' needs.

Our expectations for you as the inaugural cohort

- **Set aside time** to focus on class time, avoid multitasking, and complete between-class work.
- **Ask for help** when you need it — technical, conceptual, or otherwise — from your instructors, classmates, and/or me.
- **Respect confidentiality** of class materials and anything you might share with each other in discussions.
- **Give us feedback** on what could make this course better and more useful for you, or for future cohorts.

R for Education Research: Class 1

Sara Hodges

Introductions



Sara Hodges

Geographer, data scientist, data visualization developer
Former EdBuild Director of Data and Visualizations

sara.hodges@bellwethereducation.org



Alex Spurrier

Senior Analyst
Bellwether, Policy and Evaluation

alex.spurrier@bellwethereducation.org

Technical goals for the course

Learn R for data analysis and visualization.

Use it to enhance education finance research and advocacy.

Writing analysis R scripts that are easy to understand and share

- Clear analysis
- Well-documented
- Reproducible

Producing simple, effective data visualizations that make your analysis easy to understand and use for advocacy

Course Resources and Structure

Course website

<https://bwedfinance.github.io/courses/r-for-ed/summer-2021.html>

- Technical resources for course

- Class lessons and data (posted the day of class)

- Recordings of the lecture (posted by the day after class)

Class structure

- Discuss homework - 15 minutes

- Interactive lecture - 1 hour

- 10-minute break

- In-class exercise - 30 minutes

- Introduce homework - 5 minutes

Course environment

1. **Zoom:** Class, Office Hours
 - Questions: raise your zoom hand or send chat
 - When you complete a coding exercise: zoom thumbs up
2. **R:** Programming Language
3. **R Studio Desktop:** Environment for writing scripts using R
 - Projects to organize scripts and files
4. **R Notebook:** Interactive document with text and executable code
 - Lectures and some homework assignments
5. **Git and GitHub:** Version control system that's useful for coordinating group work
 - Version control, issue tracking
 - Check out and submit homework
6. **R Shiny:** R package to build and host data-driven web apps

Course 1 Outline

Class 1: Intro to R and RStudio

Class 2: Data exploration with the tidyverse

Class 3: Data wrangling

Class 4: Analysis and modeling

Class 5: Visualization

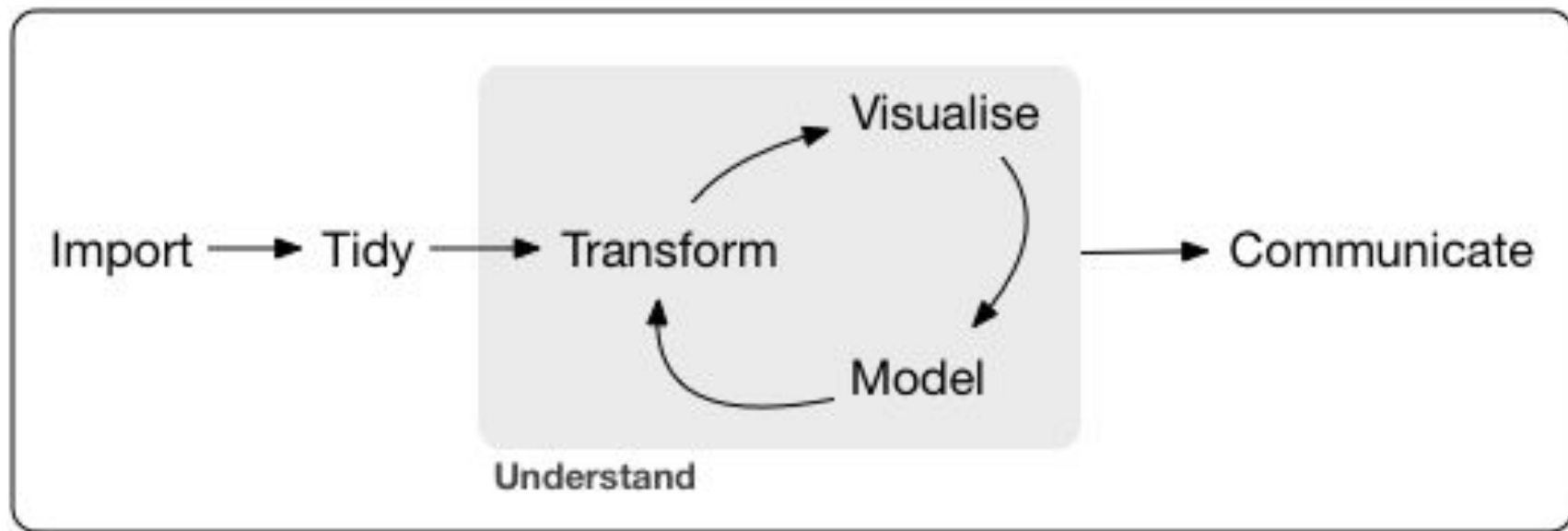
Class 6: Analysis and modeling 2, writing equations and functions

Class 7: Visualization 2, interactive plots and maps

Class 8: Intro to R Shiny

Capstone Project

Course 1 Outline



From [R for Data Science](#)
Hadley Wickham & Garrett Grolemund



Intro to R and R Studio

Terms/Definitions

R: a programming language and software environment for statistical computing and graphics

RStudio: an application that helps you write in R in a user-friendly way

R script: a collection of commands, equations, and functions that you write to do something (like answer a data question!). Scripts make your analysis reproducible and shareable.

Base R: the functions that come standard with your R installation

R package: a collection of functions and datasets, created by the community. Verified and published for other R users to access.

R, RStudio, and CRAN

R is free, and open source

- anyone can create a package, though it has to be approved

CRAN is the software repository for R, and the gatekeepers for new packages

- supported by the R Foundation
- team of volunteers that maintain R and manage new packages

RStudio is the company that created RStudio application

- pays people to create new, comprehensive packages that people use a lot and trust

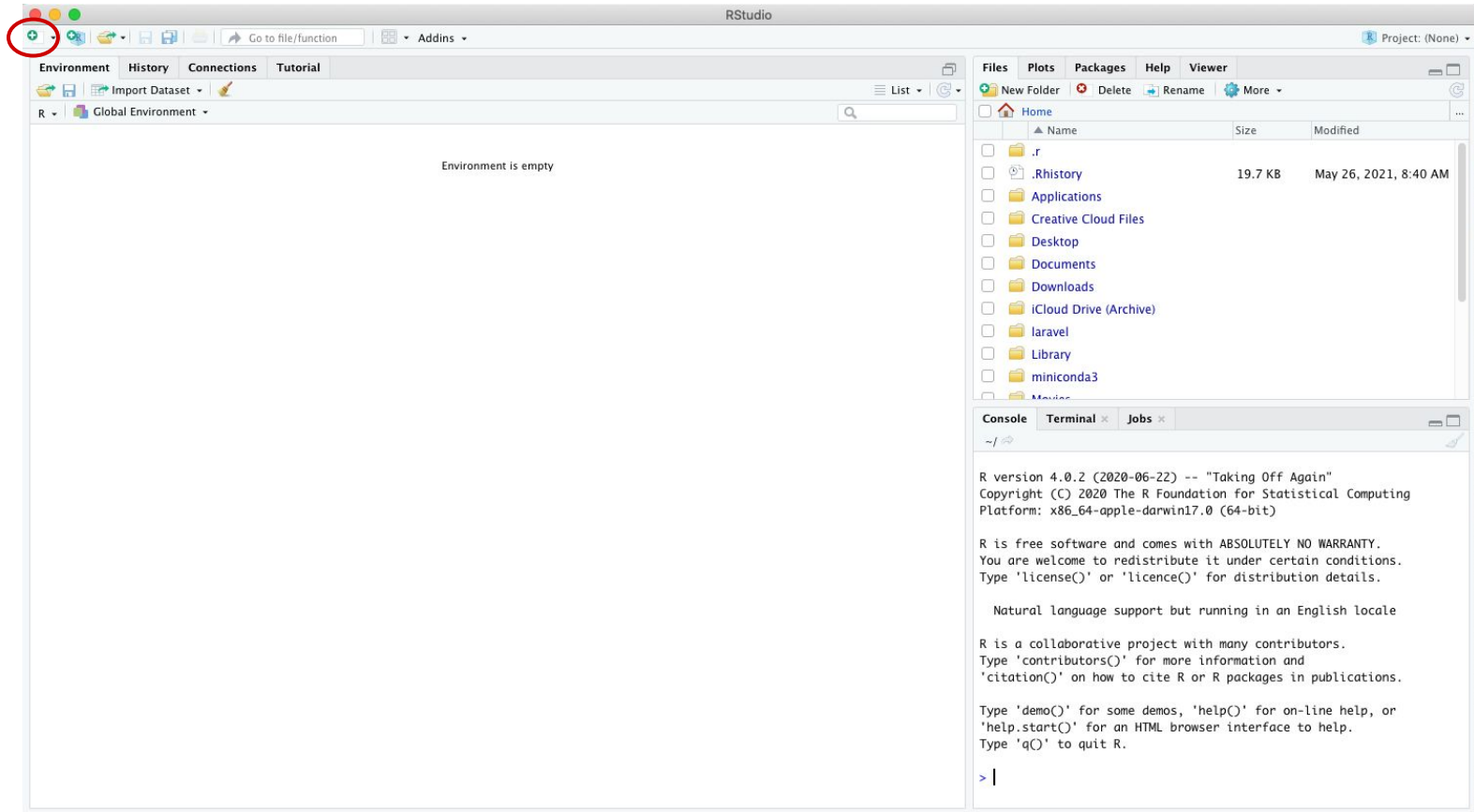
A few things

- R scripts sometimes run slightly differently on different machines
 - Some reasons: different operating systems, R versions, package versions, ...
- You can google R, try it! (“r import csv”)
- Other people have probably had the same problem as you or asked the same question
 - [Stack Overflow](#)
 - Google your error message
- Style matters! Make it readable for *future you*, and for your colleagues
 - Indent for readability
 - Include comments explaining what you are doing/thinking
 - Include sources in your script
- Learn R shortcuts ([cheatsheet](#))



Using R

RStudio



RStudio is your window into your analysis

1. SOURCE

Click "Run" to send your code to the console

This is where you write your code!

Your code will not be evaluated until you "Run" them to the console.

2. CONSOLE

This is where your code from the Source is evaluated by R.

You can also use the console to perform quick calculations that you don't need to save

3. Environment / History

Here you can see what objects are in your working space (Environment) or view your command history (History)

4. Files / Plots / Packages / Help

Here you can see file directories, view plots, see your packages, and access R Help