The Effects of Educational Funding in Public Schools On Higher Education Admissions

Project Book

Yuen Ting Chow and Gabe LeBlanc

Abstract

Our group found a common interest in analyzing social trends in the United States, particularly those relating to identity, opportunity, and lived experiences. We initially considered performing text analysis on archival records, but later realized that doing so would involve cherry-picking data and performing vast amounts of computation. Consequently, we decided to focus on more publicly available (and comprehensive) datasets related to the topic of education for a few reasons: education is a universal experience in the United States, and as a result data available about funding and educational outcomes should reveal a lot about the backgrounds and experiences that mean the most to us, and about how policy failures have disproportionately impacted students across the country. We also hope to uncover similar trends and stories that we may have found in archives, especially as our analysis extends into cross-referencing of datasets and case studies of outlier states - even so far as making direct links to the student body at Harvard, where we experience these outcomes most directly.

One of the main goals we want to achieve through this data collection and analysis is to show the direct link between government funding in secondary public schools and higher education. Not only is this true, but we would like to explore the intersections between socioeconomic status and chances in college admissions, and how this correlates with the funding that demographics regions receive when they are largely underrepresented at a socioeconomic scale. Additionally, the datasets that we will acquire will be largely sources from government data, since we are dealing with information that is of public domain. These datasets include those of public education funding by state, socioeconomic and demographic data, Harvard admissions data by state (which hopefully we can acquire from the admissions office, or directly source through the Harvard Facebook). We have already been diving into some of the datasets that we will be using, which can be found below:

- https://www.census.gov/data/tables/2020/econ/school-finances/secondary-education-finance.html
    - Summary table has good data on funding and expenditures by state, per student spending, state populations, elementary/secondary school enrollment etc
- https://data.census.gov/cedsci/table?q=S1501&g=0100000US%240400000&tid=ACSST1Y2021.S1501&moe=false&tp=false
    - Educational attainment by state
- https://www.collegefactual.com/colleges/harvard-university/student-life/diversity/chart-geographic-diversity.html
    - Harvard University enrollment by state

Team Agreement & Detailed Project Plan:

Details Project Plan:

- Basic Info:
  - Project Title: The Effects of Educational Funding on Public Schools on Higher Education Admissions
  - Group Members: Yuen Ting Chow & Gabe LeBlanc
  - E-mail Addresses:
    - Yuen Ting Chow: ychow@college.harvard.edu
    - Gabe LeBlanc: gleblanc@college.harvard.edu
  - Team Name: Think BYG
- Background and Motivation:
  - Our group found a common interest in analyzing social trends in the United States, particularly those relating to identity, opportunity, and lived experiences. We initially considered performing text analysis on archival records, but later realized that doing so would involve cherry-picking data and performing vast amounts of computation. Consequently, we decided to focus on more publicly available (and comprehensive) datasets related to the topic of education for a few reasons: education is a universal experience in the United States, and as a result data available about funding and educational outcomes should reveal a lot about the backgrounds and experiences that mean the most to us, and about how policy failures have disproportionately impacted students across the country. Not only is this true, but as students at a higher education institution such as Harvard, we want to understand the implications of funding and socioeconomic disparities in the regions we come from to the overall admissions statistics at our own university. This would allow us to uncover a larger issue in higher education admissions that is largely pushed under the rug.
- Related Work:
  - It has largely been known (through past research on the topic) that admission into higher education, specifically those of "elite" recognition, largely favors the high-income and legacy population. However, it seems that research on the exact statistics of who gets into these institutions and where they come from has been either largely ignored or kept hidden from the public eye. Moreover, it seems that an exact analysis of how public school funding affects higher education admissions still begs to be questioned, especially when there is an ever-growing push of FGLI students attending college. With members of our group coming from disadvantaged communities filled with a lack of public funding, it is important for us to do data analysis on these issues in order to better understand the true effects of funding on higher education admissions, especially when such analyses can have a grand effect on our home regions.
- Data:

    - We will be using data from the US census on elementary/secondary school funding and educational attainment.
    - We will use Harvard enrollment data by state available at https://www.collegefactual.com/colleges/harvard-university/student-life/diversity/chart-geographic-diversity.html.
- Data Cleanup:
    - We do not anticipate substantial data cleanup from these datasets. We will use Python / R for initial filtering / sorting and getting our data in the csv format for the visualization.

Think BYG Team Agreement

- We will communicate via text message, and have weekly in-person meetings on Saturdays at 5:30pm in Cabot House / Pforzheimer House dining halls. Additional meetings may be arranged as necessary.
- Our team will strive to submit work by the Sunday evening before Monday deadlines.
- Although code will be written by individuals, all team members should be involved with the technical aspects of the project. All code should be documented well.
- Final design decisions will be discussed among all members; fair compromises should be made when necessary.
- Work hours should be split as evenly as possible (actual task output may differ based on an individual's ability / previous experience). This ensures not only fairness but also learning opportunities for everyone. We will keep each other accountable so that one person does not work too much / too little.
- We will use a Git workflow to aid our progress as a team and help us split up the work of coding. We'll follow instructions listed here to register our Webstorm accounts with Github, and commit the most recent versions of our code after we finish independent work.
- *If working simultaneously,* to avoid merging conflicts, we will use the Webstorm "Code with Me" feature (which works in person too) so that we are all modifying the same version of the file.
- Work will not necessarily be done together in person, but good communication via text is expected in a timely manner. Work may be done remotely as long as collaboration and communication are done well.

Signatures: *Yuen Ting Chow, Gabe LeBlanc*
Date: 10/19/2022

Map: Project Direction & Data Analysis

Potential Audiences

1. Government Officials
2. Colleges
3. General Public / Students

Target Audience: Government Officials

Description of Target Audience

Our target audience concerns individuals in local governments, particularly those in charge of distributing funds to the school system, like Board of Education or Board of Finance members. We feel that since our data tracks school system funding as it links to higher education enrollment and outcomes, public school funding is the root cause we want to address, and this audience is most capable of changing that funding structure. We are aware that the public may also have an interest in this data, especially as they can advocate for change within their local government, so we'll want to make our data relevant to both audiences.

Government officials should know statistics about their local school systems, including the distribution of funds, enrollment data, and information about whether students pursue post-secondary education. Thus, our data should be very familiar to these officials. Ideally, the interests of these officials should be about the well-being and success of their local students, so they should care about how their allocation of money impacts the long-term outcomes of those students. Governmental officials likely have some visual literacy in terms of simple charts (like bar and line graphs) since that is how financial data is usually presented, but we'll want to be mindful of ensuring they can understand more novel and complex visuals as well. Our level of detail should be enough that officials can recognize specific trends in student outcomes as they link directly to their home state, but simplified enough so that our visuals require little cognitive overload and allow for a broad understanding of public school funding.

Interesting Audience Questions

1. How well does my specific state perform in terms of higher education outcomes?
2. Can public school funding data be directly related to the geographic makeup of Harvard College, and if not, what other factors may play a role?
3. Which is more important to consider: total amount of funding per district, or the amount of funding per student in a district?
4. Can elementary-school data be generalized to middle and high schools? In other words, can the same conclusions about the impact of public school funding be derived from elementary school funding alone?
5. How does public school funding data correlate to the racial and socioeconomic makeup of each state?
6. Is there an association between school funding and geographical location?
7. Is there a correlation between the amount of school funding for a state and the educational attainment distribution for individuals of that state?
8. Does it matter whether funding is coming from federal, state, or local sources?

9. How does the way in which funding is used differ by state, and does this correlate to higher education outcomes for certain states?
10. How has public school funding and spending changed over time?

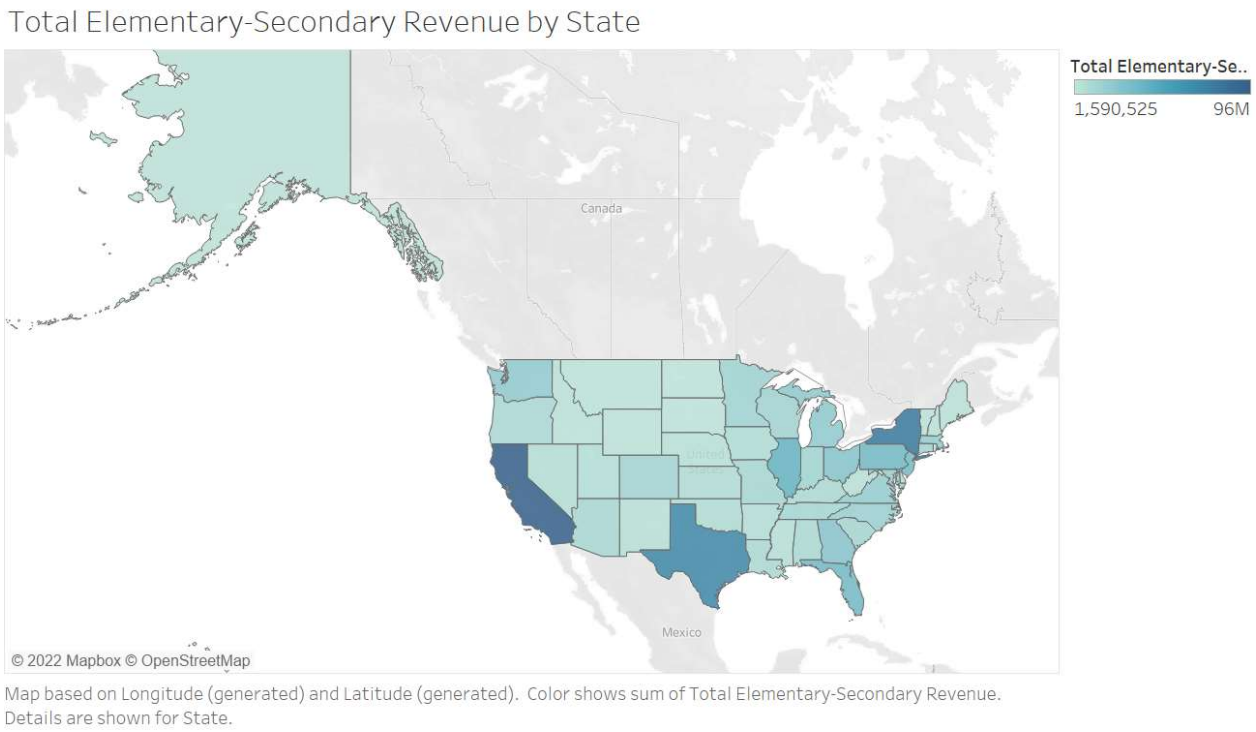
Description of Available Data

We are planning to combine data from three different datasets. The first dataset (from the US Census) is on school finances, which includes attributes such as state (categorical), amount of funding from federal, state, and local sources (quantitative), per pupil spendings (quantitative), state population (quantitative), school enrollment (quantitative).

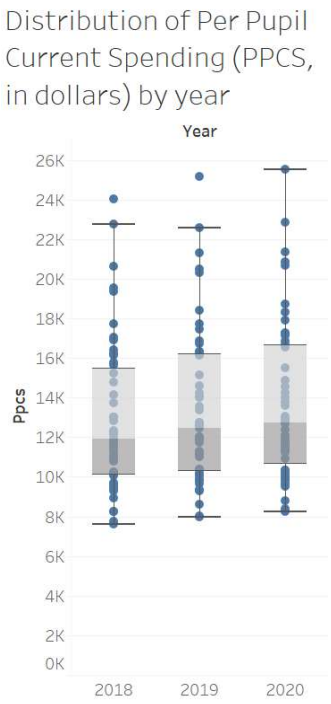
The second dataset (from the US Census) is on educational attainment and includes the percentage of individuals (quantitative) in each state (categorical) whose highest educational level is in one of four categories: “Less than high school graduate”, “ High school graduate (includes equivalency)”, “Some college or associate's degree”, or “Bachelor's degree or higher”. The data also includes information on how the percentage of people in each educational category differs by race.

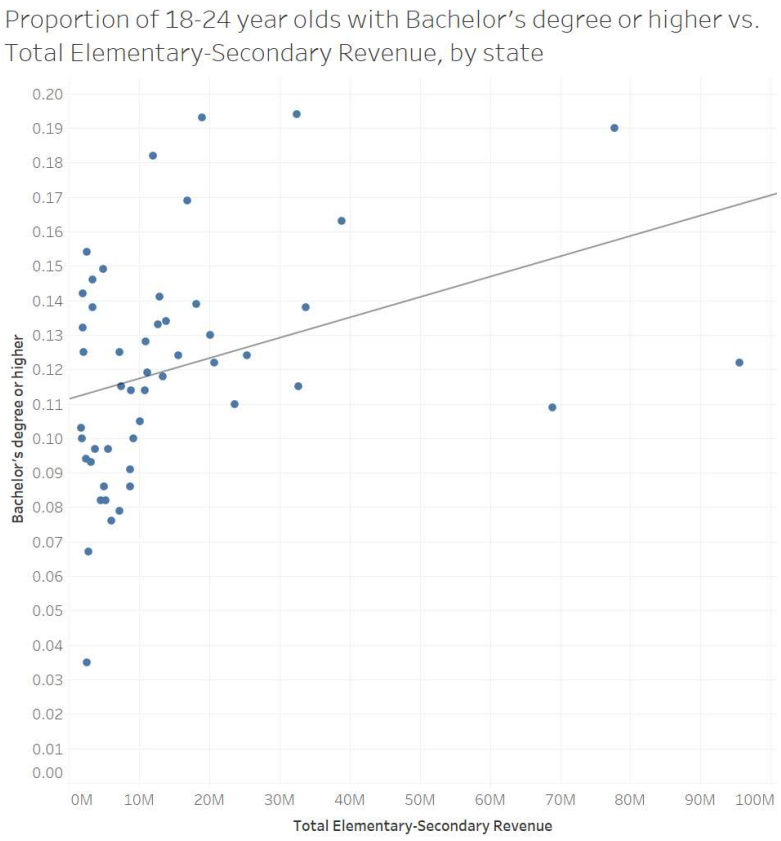
The final dataset is Harvard state data, which includes the number of students (quantitative) at Harvard College from each state (categorical) for a certain class year. We are not sure which year this dataset is from, so we are also planning to contact the admissions office to see if we can obtain more recent state data.

Three Tableau Visualizations: Yuen Ting



Map based on Longitude (generated) and Latitude (generated). Color shows sum of Total Elementary-Secondary Revenue. Details are shown for State.

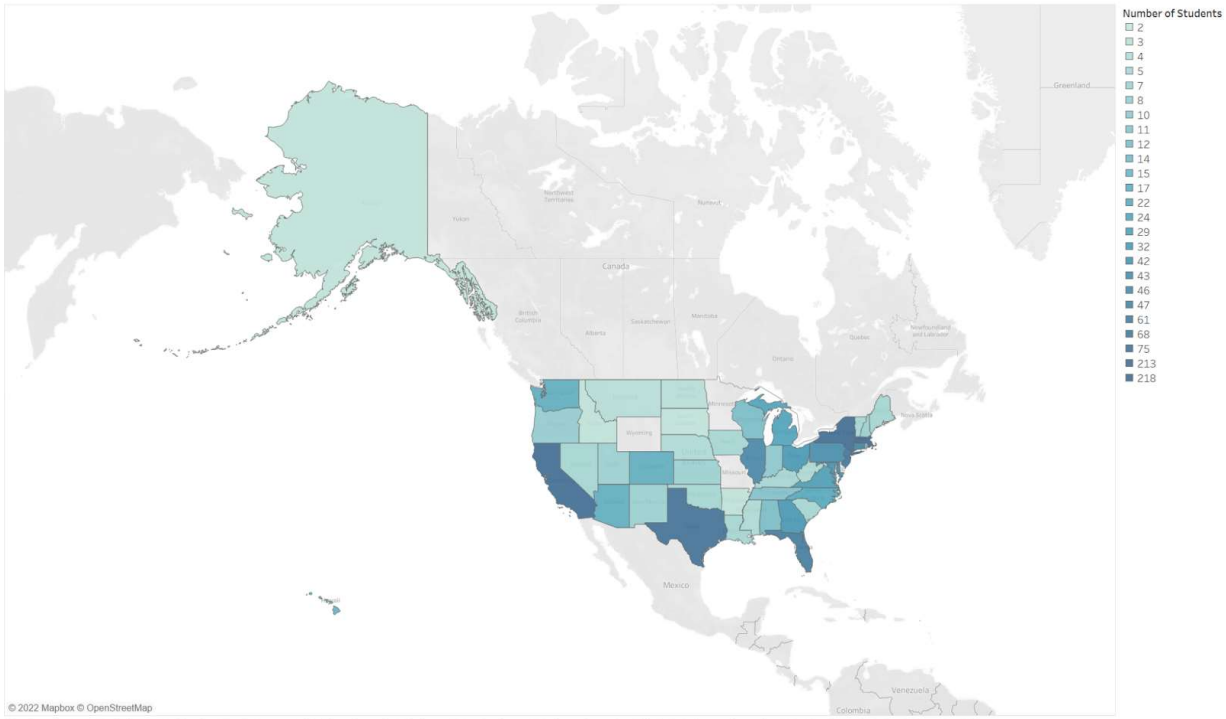




My first visualization answers the question "Is there an association between elementary-secondary school funding and geographical location?" The states with the most funding are distributed across the nation (California, Texas, New York); this probably has something to do with the fact that more populous states tend to receive more funding. This question will be good to include for the final project, but it may be good to instead look at funding per unit population, to obtain a less biased metric. The second visualization answers the question, "How has Per Pupil Current Spending changed over time?". From the plot, we see a general increase in spending from 2018 to 2020. The original question proposed above also concerns how funding has changed over time, so a similar plot could potentially be generated for that. We can also look at a wider time range to obtain a slightly more long-term trend. The final visualization answers the question " Is there a correlation between the amount of school funding for a state and the proportion of individuals 18-24 with bachelor's degrees?". We see no distinct trend here, but again, this may be because the funding currently does not take into account the population size. Additionally, it may be interesting to look at older age groups or the proportion of individuals who have graduated high school etc to have a more complete picture.

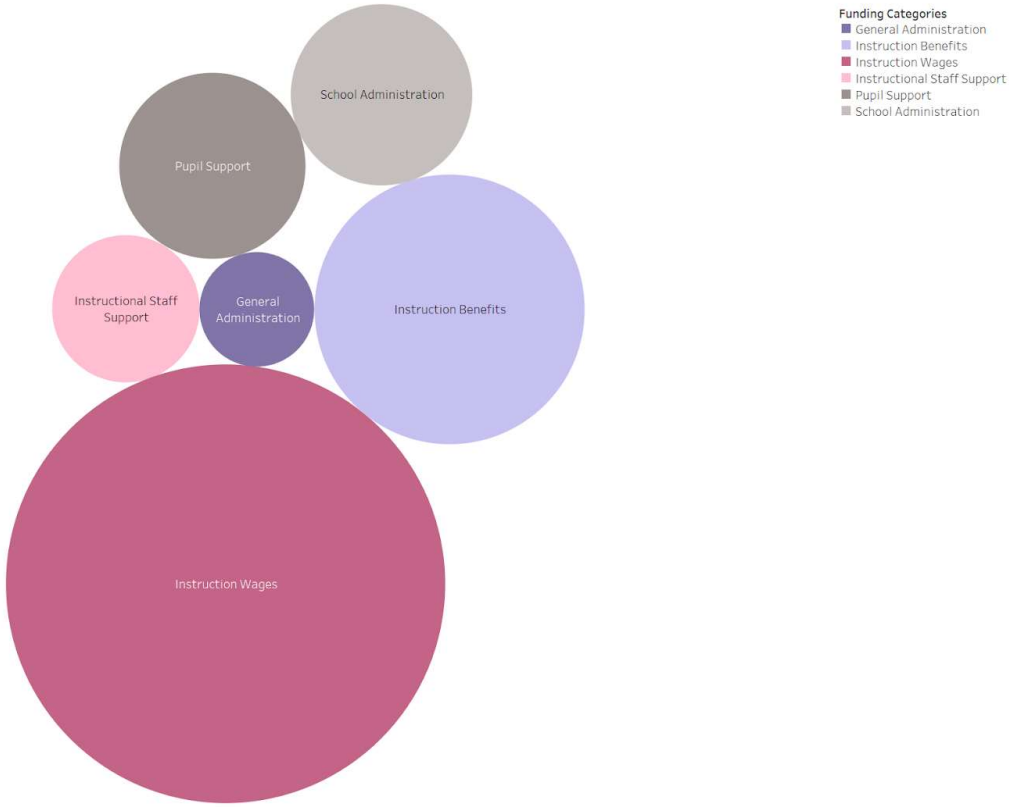
Three Tableau Visualizations: Gabe

Harvard Enrollment Low Across Midwest



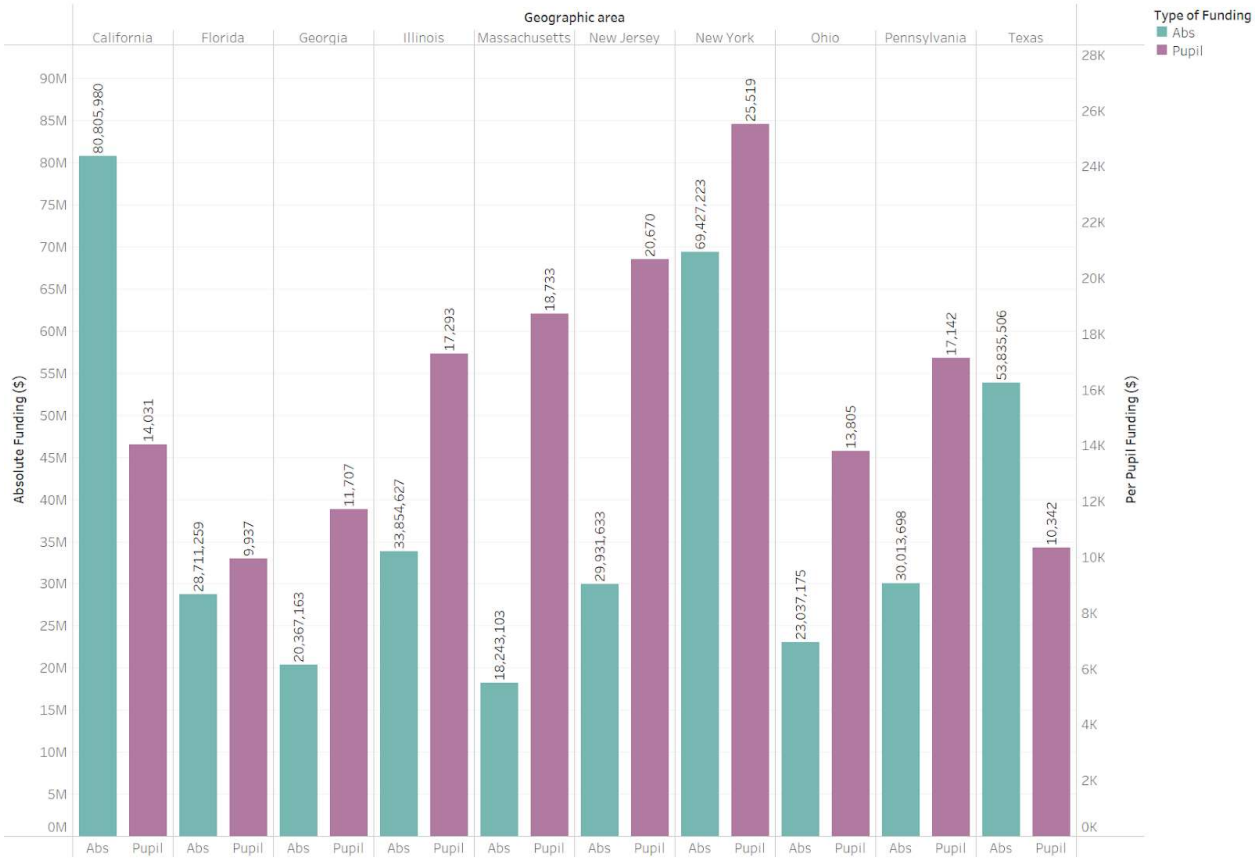
Map based on Longitude (generated) and Latitude (generated). Color shows details about State,Number-of-Students,Percent - Split 2. Details are shown for State,Number-of-Students,Percent - Split 1.

Per-Pupil Funding Prioritizes Instruction Wages in Alabama



F1. Color shows details about F1. Size shows sum of F2. The marks are labeled by F1.

Absolute and Per-Pupil Spending Weakly Correlated Among Top 10 Absolutely Funded States



Abs and Pupil for each Geographic area. Color shows details about Abs and Pupil. For pane Sum of Absolute Funding ($): The marks are labeled by Abs. For pane Sum of Per Pupil Funding ($): The marks are labeled by Pupil. The view is filtered on Geographic area Set, which keeps 10 members.

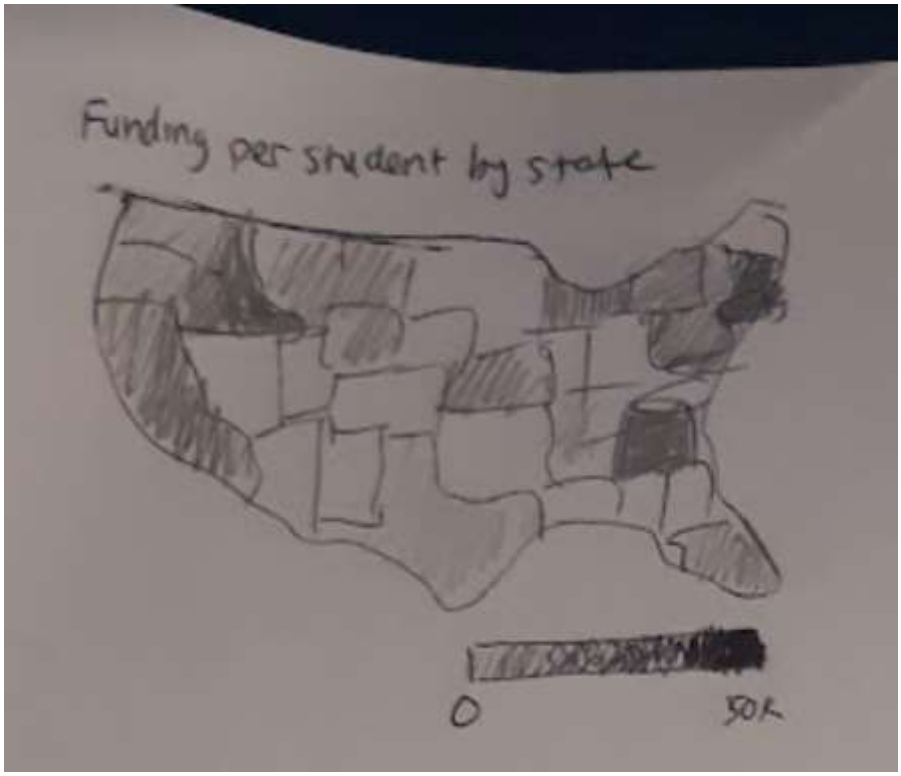
My three visualizations answer the questions, in order, “Which states have the highest enrollment at Harvard?”, “How is funding distributed within a school system?”, and “Which is better to consider: absolute spending or per-pupil spending?”. The first visual highlights areas where enrollment is low, and where we wish to investigate links to lower public education funding - this differs slightly from our original question about state distribution, though, because it appears there might be larger regional trends rather than just state-by-state trends about enrollment, so this visual helps focus our analysis. The second visual answers a new question about how effective funding is distributed within a state’s school districts, which is better than just considering outright funding because raw amount spent does not mean that money is spent in the right areas to support student success. Visuals like those could help with case studies that contrast high-outcome states with low-outcome states, and with analyzing the reasons those outcomes may occur. The third visual helps address an important question we raised as a team about whether to consider absolute or per-pupil funding, and thus informs our further data analysis by noting that the two don’t correlate very well, and it may be best to compare on a per-student basis to control for population size.

Data, Sketches, Design, and Storyboard

Our cleaned datasets have been included in the data folder located here: https://drive.google.com/drive/folders/1rzB766HY4RkMiODndz523bZSrZeA_0es?usp=sharing. They are all in .csv form for easy processing in D3, and most can be linked by geographic state or region.

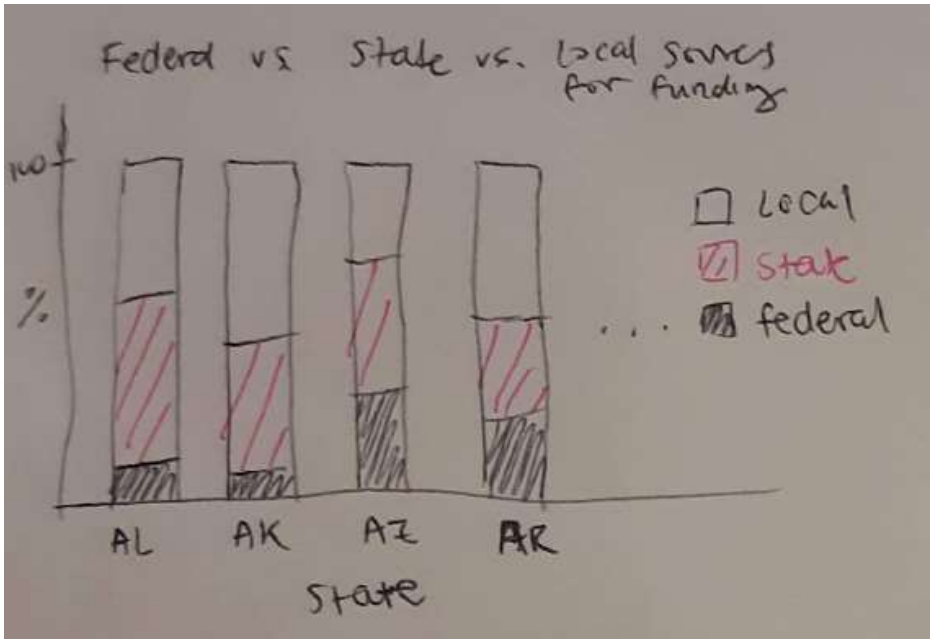
Sketches - Yuen Ting

Sketch 1:



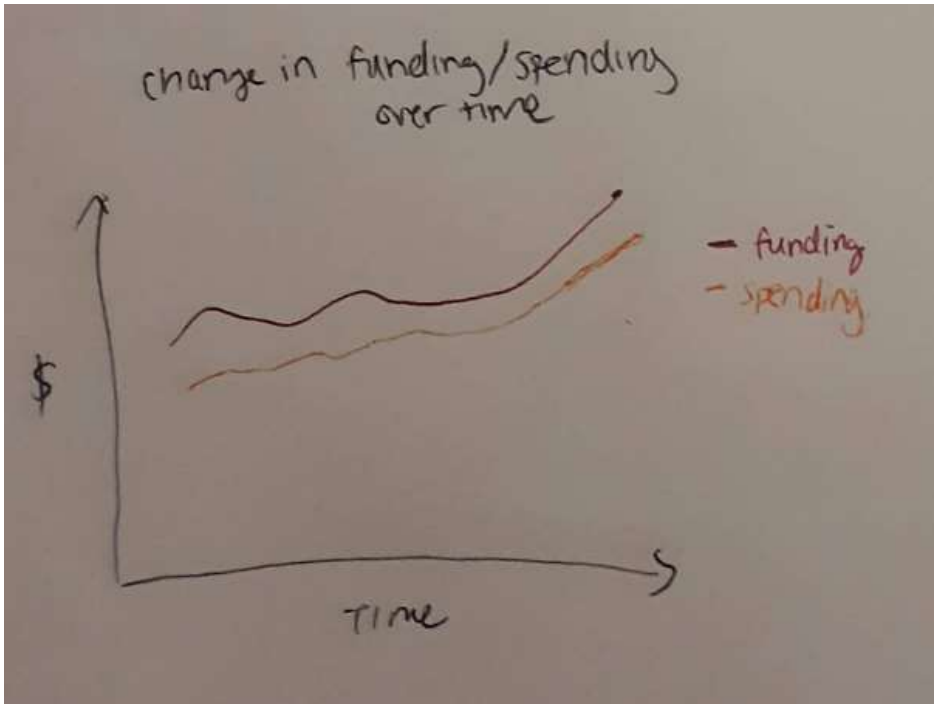
Questions answered: Is there an association between school funding and geographical location?

Sketch 2:



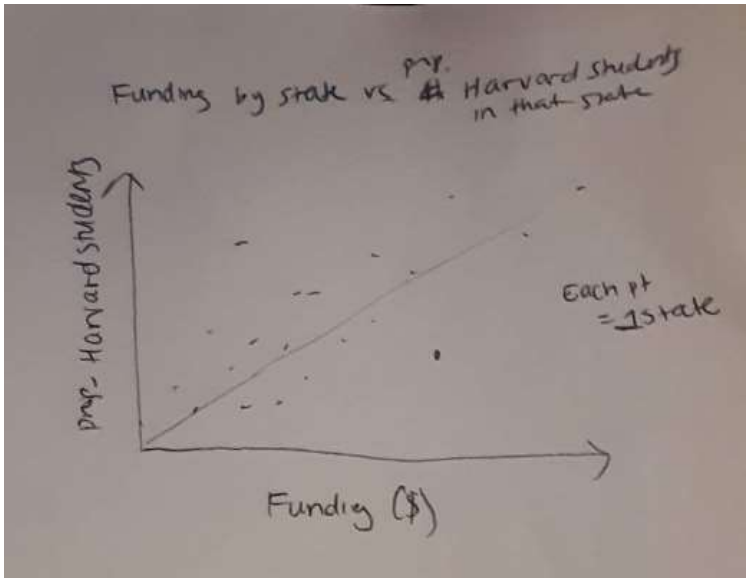
Questions answered: Does it matter whether funding is coming from federal, state, or local sources?

Sketch 3:



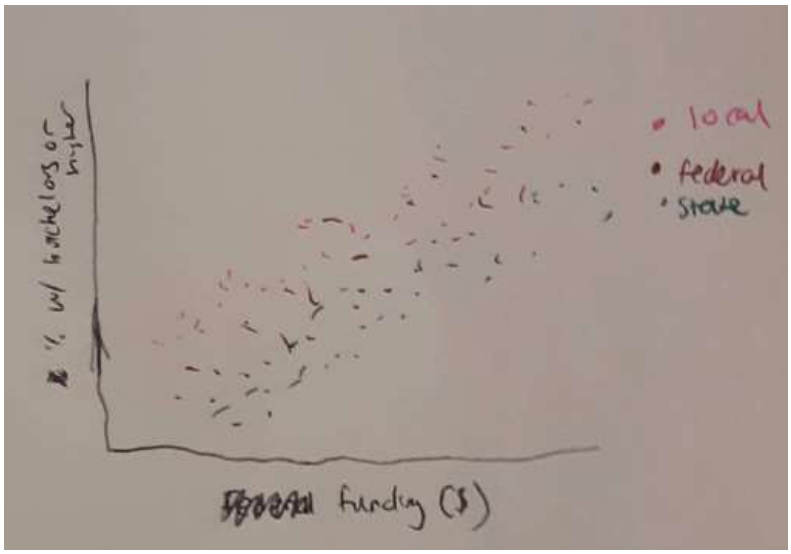
Questions answered: How has public school funding and spending changed over time?

Sketch 4:



Questions answered: Can public school funding data be directly related to the geographic makeup of Harvard College?

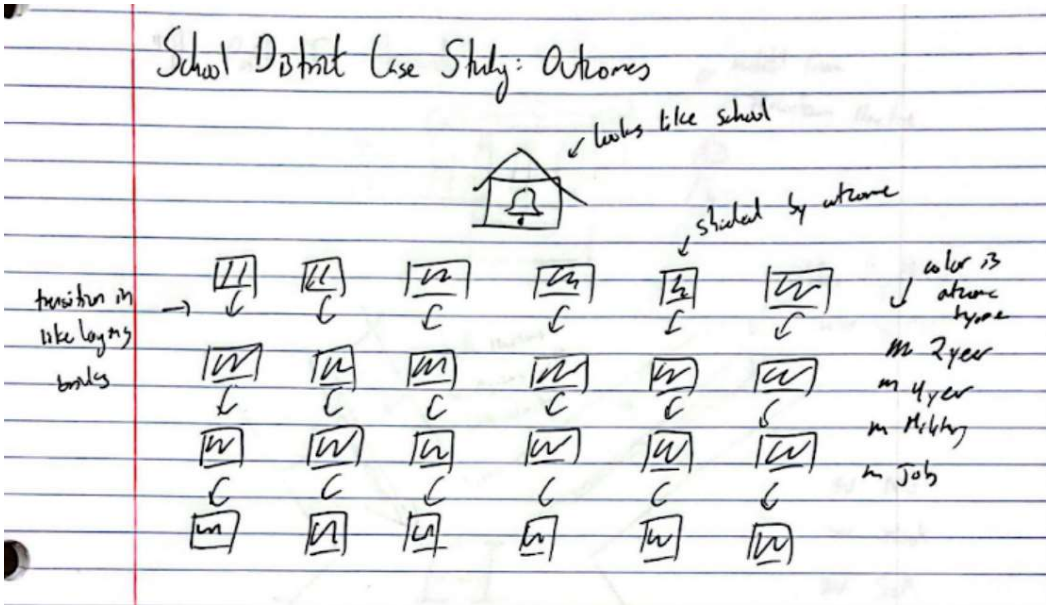
Sketch 5:



Questions answered: Is there a correlation between the amount of school funding for a state and the educational attainment distribution for individuals of that state?

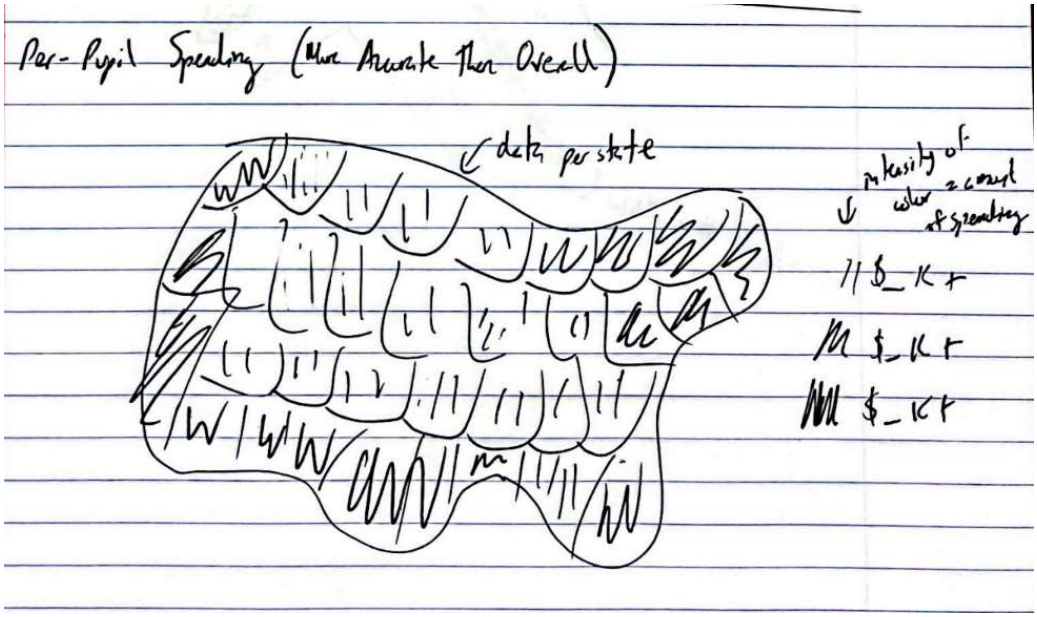
Sketches - Gabe

Sketch 6:



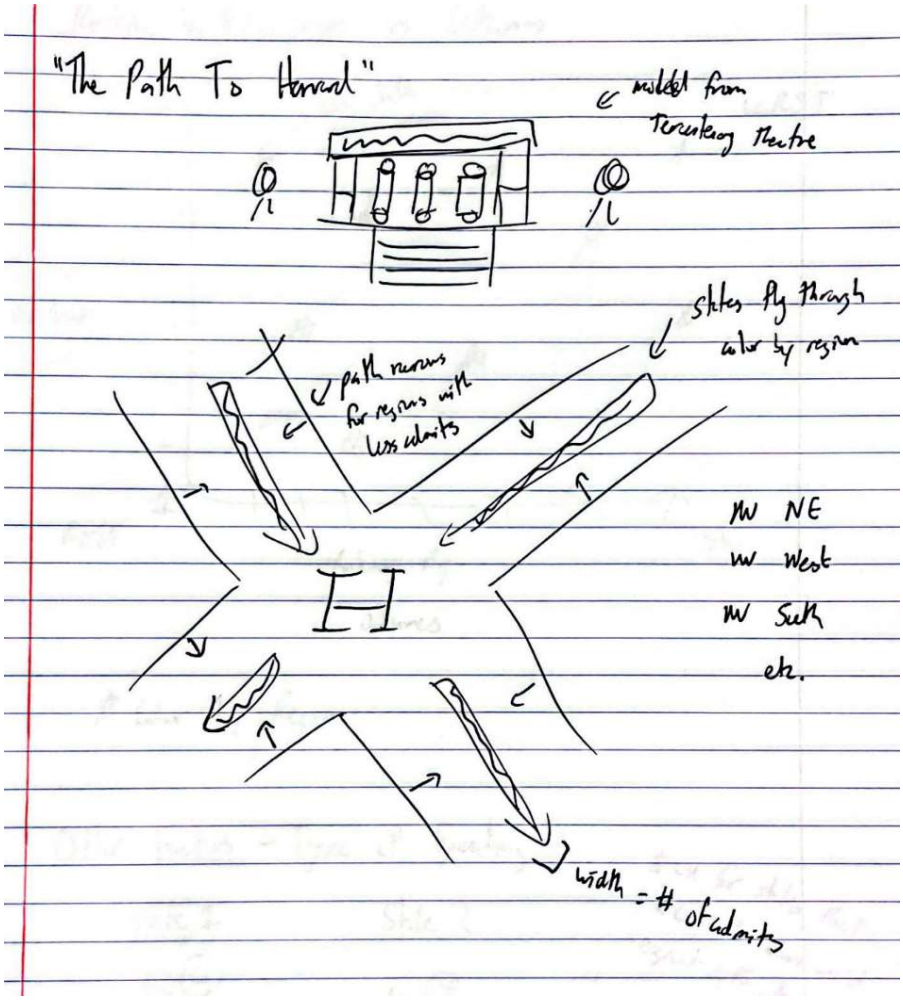
Questions answered: How well does my specific state perform in terms of higher education outcomes? (1) Note: replace the legend categories with 'less than high school', 'high school', 'bachelors', etc.

Sketch 7:



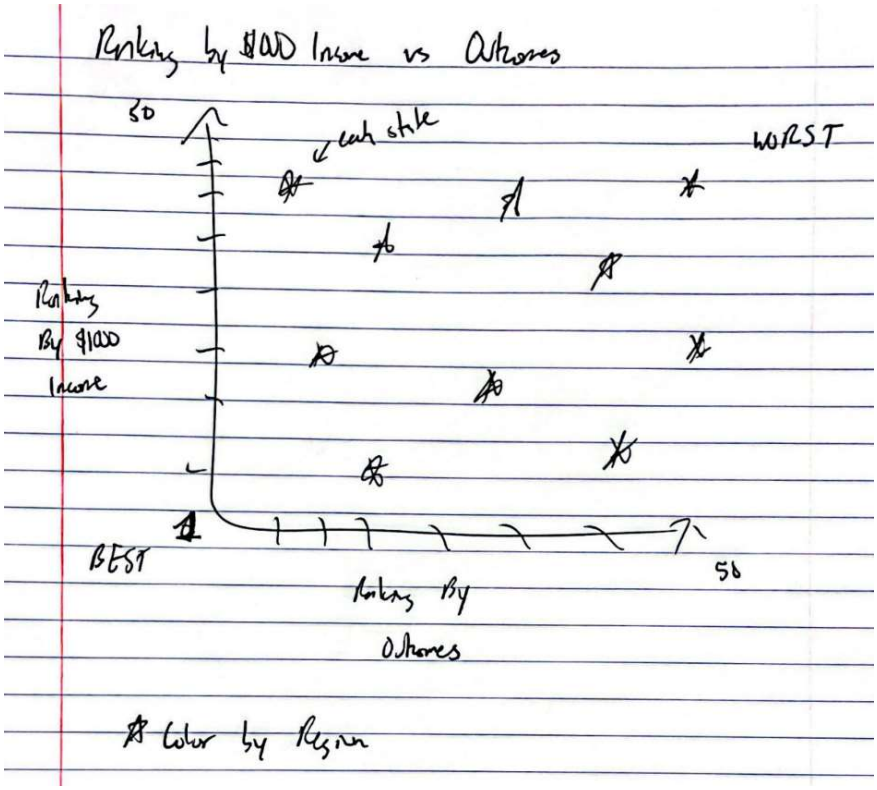
Questions answered: Which is more important to consider: total amount of funding per district, or the amount of funding per student in a district? (3) and Is there an association between school funding and geographical location? (6)

Sketch 8:



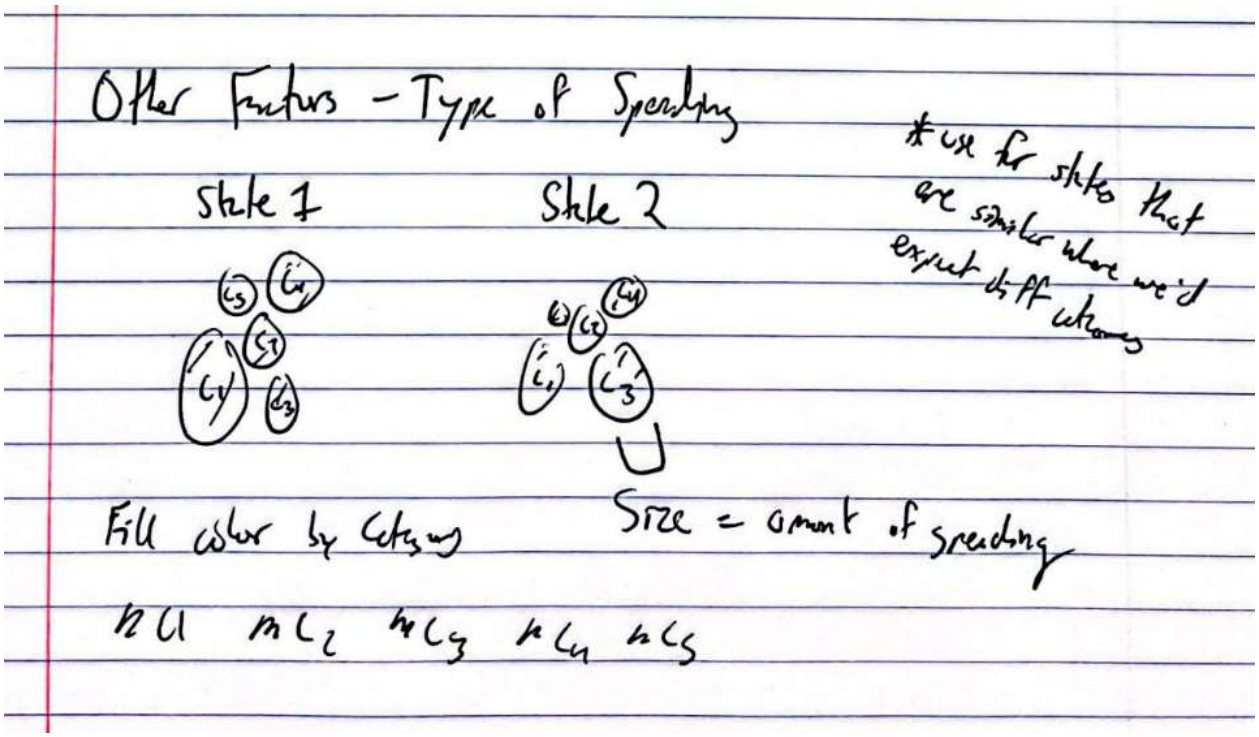
Questions answered: Can public school funding data be directly related to the geographic makeup of Harvard College? (2)

Sketch 9:



Questions answered: How does public school outcome data correlate to the racial and socioeconomic makeup of each state? (Modified 5) → can also do with spending data instead of outcomes

Sketch 10:

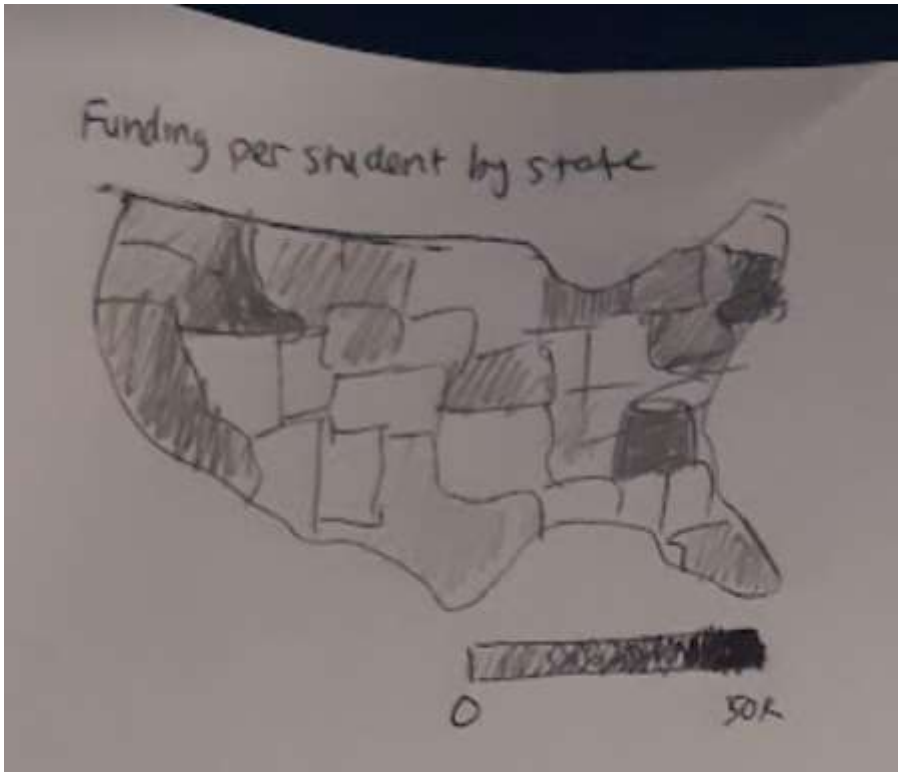


Questions answered: Outside of absolute funding, how does the way funding is distributed impact relative outcomes? and Why might some low-spending states still rank high on outcomes?

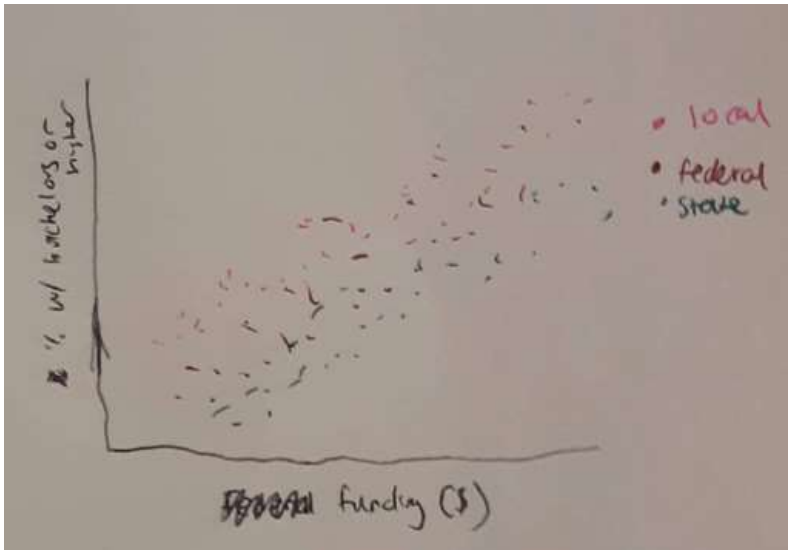
Decide

Sketch ID	Question ID	Author	Votes
1	6	Yuen Ting	**2**
2	8	Yuen Ting	**0**
3	10	Yuen Ting	**0**
4	2	Yuen Ting	**0**
5	7	Yuen Ting	**2**
6	1	Gabe	**2**
7	3, 6	Gabe	**0**
8	2	Gabe	**0**
9	5	Gabe	**2**
10	11 (New)	Gabe	**0**

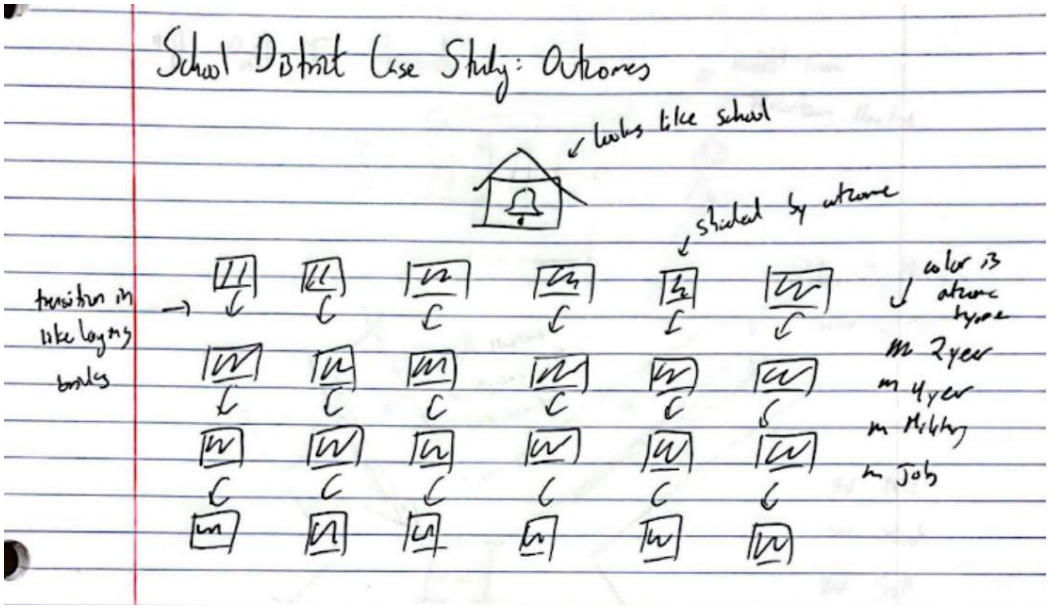
Selected Sketches



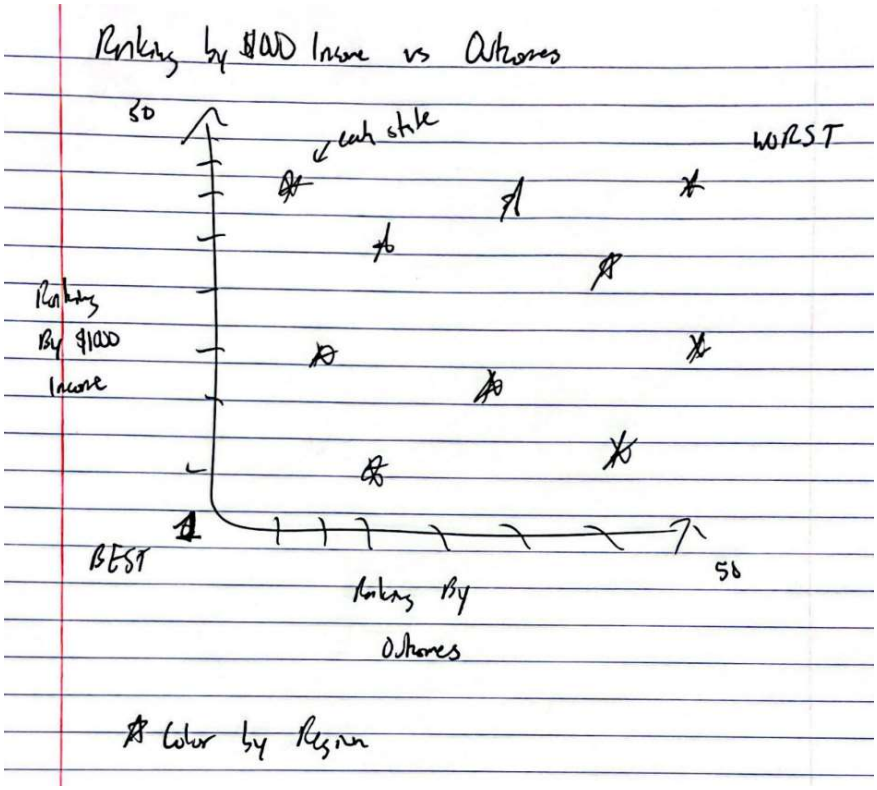
Questions answered: Is there an association between school funding and geographical location?



Questions answered: Is there a correlation between the amount of school funding for a state and the educational attainment distribution for individuals of that state?



Questions answered: How well does my specific state perform in terms of higher education outcomes? (1) Note: replace the legend categories with 'less than high school', 'high school', 'bachelors', etc.



Questions answered: How does public school outcome data correlate to the racial and/or socioeconomic makeup of each state? (Modified 5) → can also do with spending data instead of outcomes

Rationale For Sketch Choices

We've designed our project around relating public school funding to higher education outcomes, so we wanted our first visual to concern the distribution of funding such that we could build upon that data and connect it to higher education later in our story. Tracking per-pupil funding by state seems to be the best way to do that, especially if it helps indicate regional trends in funding that we can link to in later visuals. Our second visual then helps answer our core question by relating funding with higher education outcomes via a scatter plot, which we hope will indicate a positive correlation between the two. Our third visual then connects both visualizations together by allowing a user to select a particular state (which we can categorize by funding level per student) and visualize the distribution of outcomes within their state, which we hope will give a more detailed overview of the relationship between geography, funding, and outcomes. Now that we've indicated these trends, we hope to link this funding to characteristics about certain states that may influence these funding patterns, like their racial or socioeconomic makeup, which our fourth visual tracks via a scatter plot.

Yuen Ting's Data Insights

1. There appears to be a positive correlation between per student funding and educational outcomes (proportion age 18-24 with Bachelor's degree or higher).
2. States in the northeast generally tend to have more funding (and higher educational attainment) than states in other regions of the US.

Gabe's Data Insights

1. There appear to be regional differences in per-pupil funding (not just on a state-by-state basis), so comparing by regions may be a useful data analysis strategy.
2. At a glance, there appear to be some correlations between states in more well-funded regions correlating with higher percentages of bachelor degree or greater attainment.
3. Looking at our data about racial outcomes, there are definitely major differences among different racial groups in terms of what percent of people obtain a bachelor's degree. At the same time, the relationship between these outcomes in higher-funded states and lower-funded states appears to be less correlated.

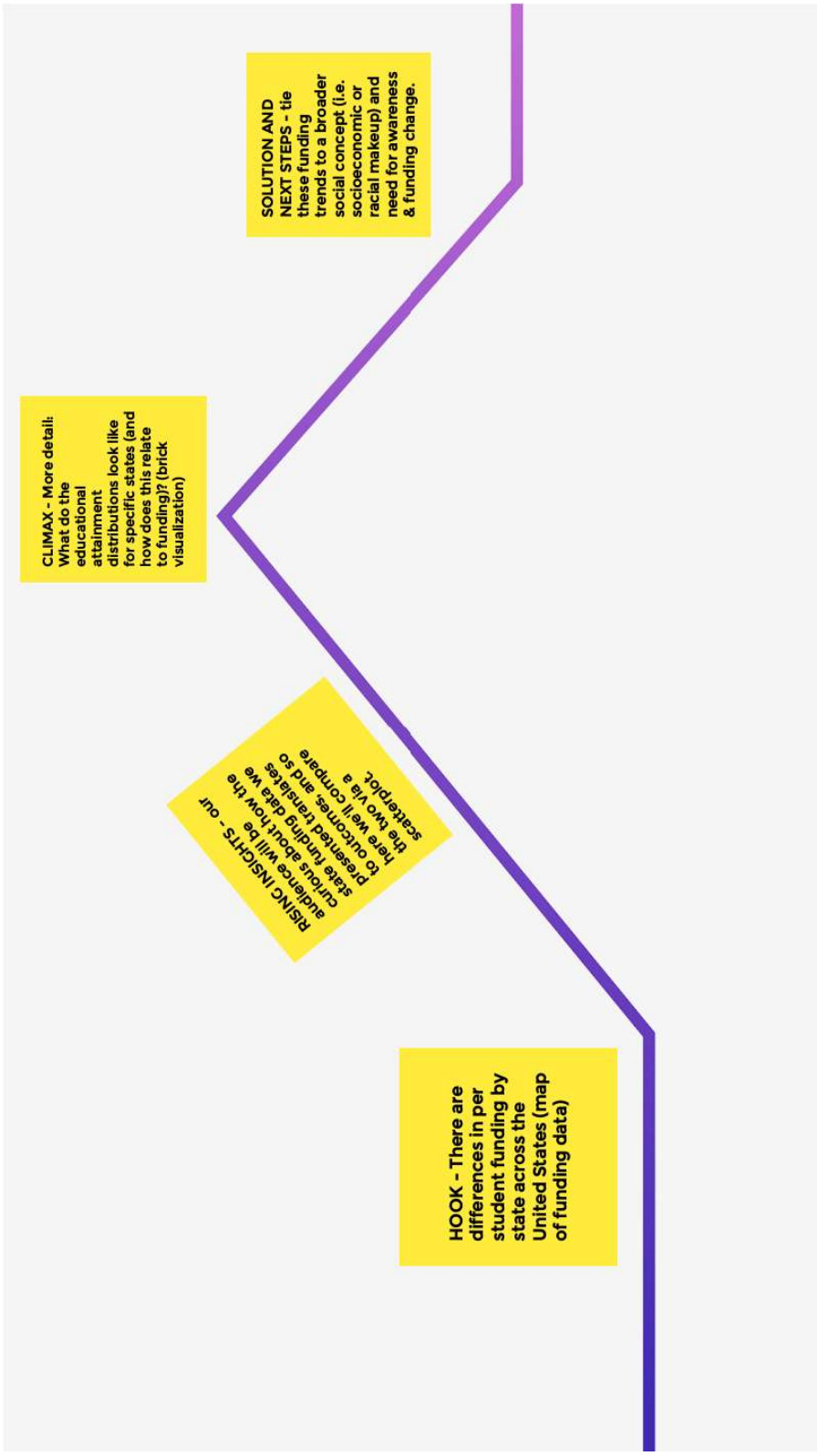
Main Insight:

The differences in public school funding between states and its positive correlation with eventual educational attainment outcomes should be investigated further in order to determine how the government should best allocate its funds.

Reasons for Choosing Main Insight

- This insight leads to many more questions to be analyzed, including about confounding variables, and the socioeconomic and racial makeup of states that may contribute to funding trends.
- Funding is very changeable at the local and federal level, and is likely one of the areas everyday viewers would have the most capability to affect (i.e. by advocating to their government)

Storyboard

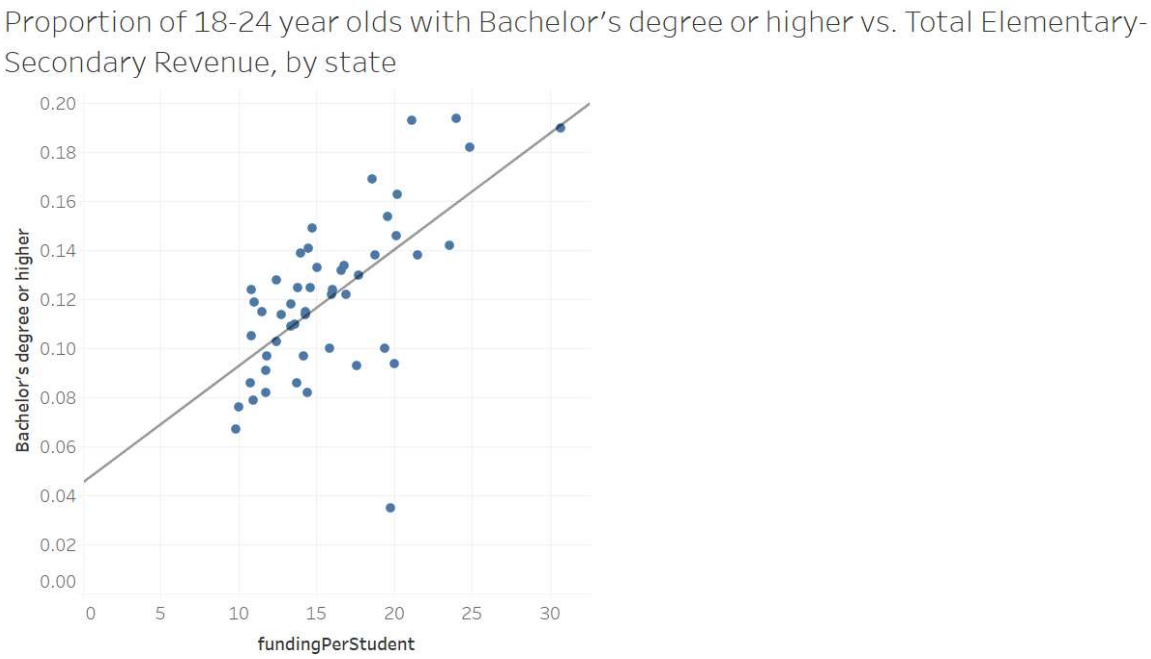

HOOK - There are differences in per student funding by state across the United States (map of funding data)
RISING INSIGHTS - our audience will be curious about how the state funding data we presented translates to outcomes and so here we'll compare the two via a scatterplot.
CLIMAX - More detail: What do the educational attainment distributions look like for specific states (and how does this relate to funding)? (brick visualization)
SOLUTION AND NEXT STEPS - tie these funding trends to a broader social concept (i.e. socioeconomic or racial makeup) and need for awareness & funding change.

Prototype

Yuen Ting:
I cleaned the data and added new columns for per student funding and educational attainment. I then implemented two related map graphics – one for overall funding and one for per student funding – that allowed for filtering between the federal, state, and local levels. For the per student funding map, I also added an associated bar chart that allows us to see the 10 states with the top funding. These plots still need some fine tuning with regards to the legend and axis labels.

Gabe:
I created the template and story structure for the prototype and implemented the novel visualization, which is the visualization constructed of bricks representing various outcomes within a school system. The visualization still needs an interactive component, which I'll implement this week using Yuen Ting's map of per-student funding as a basis for selecting which state to display.

Next steps:
We plan on adding a scatterplot showing the relationship between funding and educational attainment.
Draft example from Tableau:



Additionally, we will implement a sankey-like plot to show the relationship between funding and income.

Draft for Sankey Plot:

Ranking Of Incomes **Ranking of Outcomes**

Each line represents a state.

Prototype Week 2 Update:

- Color scheme modified on the Geo graphs to account for outliers (no longer starts at 0).
- Implemented scatterplot and associated visual sequence to relate funding with educational outcomes.
- Modified the bricks visualization (a novel visualization) to include a linked map so data can be filtered by state.
- Implemented Sankey chart (a novel visualization) and associated display to link outcomes with an additional factor: socioeconomic status.
- Incorporated a more in-depth storyline throughout the website to link all visualizations together, along with accentuated key takeaways.
- Various debugging.

CS 171 – Think-Aloud Study

Tester Name: Olivia Jacks
Tester Email: ljacks@college.harvard.edu

General Observations from the think-aloud study:

- Found buttons and tooltips on first few graphs to be intuitive, noticed CA and Northeast strong
- Interpreted “elementary / secondary” as being two separate things - can just say elementary
- They missed the third “next” on the scatterplot graph, though liked the chart that displays there when clicked
- Confused about what was happening in the moving scatterplots, labeling wasn’t clear
- Thought the bricks diagram was intuitive, interpreted relative amounts well
- On Sankey took a while to realize that each bar was a state

What does the tester like about your data story?

- Sankey showed clear stability within Top 20 and Bottom 20
- Thought user could see and explore trends for themselves well
- Story was cohesive

What improvements does the tester point out?

- Labeling Sankey as “top 20% of states” not just “top 20%” to avoid confusing with percent of population
- Better labels on scatterplot when moving, potentially toggle functions
- Adding a label under “next” button i.e. “⅓, ⅔, 3/3” so user doesn’t miss a section
- User had to replay the moving scatter a few times, could increase wait times

Was the intended key message clear to the tester? Why or why not?

- Yes, thought very logical and built out well from initial funding
- Story flowed well and each visual linked with each other

Did the tester get your next steps or call to action? Why or why not?

- Yes made a lot of sense, followed well from presented data
- Though cognitive processing took a bit long on some visualizations all the trends did eventually come through and support importance of local & SES

CS 171 – Think-Aloud Study

Tester Name: Minjue Wu
Tester Email: minjuewu@college.harvard.edu

General Observations from the think-aloud study:

- Easy to follow
- Forgot last “next” in second viz

What does the tester like about your data story?

- Clear message, not cluttered, intuitive
- Consistent color, green reminds of money

What improvements does the tester point out?

- Color background to separate the sections
- Maybe have grayscale for those that are not hovered over
- Not have red for the hover over (red-green blindness)
- Back button for the animation
- Faster brick animation, also make it smaller
- Make it possible to see two different brick animations together so that we can compare
- Add names
- Sankey: make it clear that it is by state, make the lines different colors so it is clear where the lines are coming from, maybe make it thicker/different color when hovering over it

Was the intended key message clear to the tester? Why or why not?

- yes

Did the tester get your next steps or call to action? Why or why not?

- yes

CS 171 – Think-Aloud Study

Tester Name: Tadhg Looram
Tester Email: tadhglooram@g.harvard.edu

General Observations from the think-aloud study:

- Noticed high funding discrepancy in geo graphs, buttons intuitive, and noticed a lot more variance in the per-student graphs (so our logic of choosing per-student funding is supported)
- Like the checkboxes in the second vis, knew to click through to last “next”
- Surprised by CA being an outlier - high funding, high income, not great outcomes (so other factors at play)

What does the tester like about your data story?

- Noted they definitely agreed with local funding being most important based on scatters
- Intrigued by state and local funding being much larger than federal funding
- Saw the correlation with the Sankey very well, liked the choice of chart
- Text was not overwhelming

What improvements does the tester point out?

- Add a label to bricks vis that indicates the percentage of each outcome type
- Change the background color to be a more neutral color (i.e. a beige, dim white)

Was the intended key message clear to the tester? Why or why not?

- Yes, mentioned as they read over our key takeaways that they agreed and each one made sense
- Logic flowed well from each vis
- Noted that outliers mean our logic is not perfect, other things influence as well

Did the tester get your next steps or call to action? Why or why not?

- Yes agreed that focus on local funding made sense with advocating in local government
- Overall said vis was cohesive and gave all the info necessary to agree with call to action

Think Aloud Study Reflection Questions

Based on the results of your 'think aloud' study, what would you improve in your data story?

It seems that though our logic and message were clear, our visuals took a while for viewers to understand and need some additional functionality to reduce cognitive load. To improve this, we'll add additional opportunities for viewers to compare and analyze the trends we present, such that our data story is easier to grasp - these include 'forward' and 'backward' buttons on our scatterplot so users can better compare trends among funding types, and adding another bricks visualization side by side so that viewers can more easily compare distributions of outcomes between states based on funding. We'll also modify some of the aesthetics of our website, such as adding more labels to make our data clearer and adjusting line styles to better emphasize certain trends.

Are there any additional insights and visualizations you would use? Would you amplify or change your message? Did your narrative work? Did the tester get your takeaways?

One additional visualization that we initially thought could be helpful was looking at Harvard College admissions data by state. We were able to obtain some data from the admissions office detailing the number of current undergraduate students from each state. We have not had time to implement this visualization (probably a map), but if we did have time, it still may not be the best idea, as looking at Harvard may be too specific of a case study and may not reflect funding trends (for example, Harvard tends to attract more east coast students than west coast students, due to proximity to home). Our narrative worked and our testers were able to get our takeaways, but to make them more clear, we have decided to bold key phrases and include them on "slides" between visualizations as well.

List of Planned Improvements

Yuen Ting

- ☑ ~~Change Sankey label to reflect that each line is a state~~
- ☑ ~~Not have red for the hover over (red-green blindness)~~

Gabe

- ☑ ~~Add better labels for scatterplot~~
- ☑ ~~Add a label under "next" button i.e. "⅓, ⅔, 3/3" so user doesn't miss a section~~
- ☑ ~~Back button for the scatterplot animation~~
- ☑ ~~People had to keep replaying scatterplot, make waiting times longer~~
    - Note, removed wait times entirely to make navigation easier with buttons
- ☑ ~~Faster brick animation, also make it smaller~~
    - Note, didn't make smaller due to large amount of visual elements present on screen
- ☑ ~~Make it possible to see two different brick animations together so that we can compare~~
- ☑ ~~Add a label to bricks vis that indicates the percentage of each outcome type~~

Both

- [x] ~~Change to full page scroll~~
- [x] ~~Add our names (more prominently)~~
- [x] ~~Change the background color to be a more neutral color (i.e. a beige, dim white)~~
- [x] ~~Use a similar color scheme throughout~~
- [ ] Incorporate # of students at Harvard
    - Note, didn't implement because may be too specific / irrelevant to main message

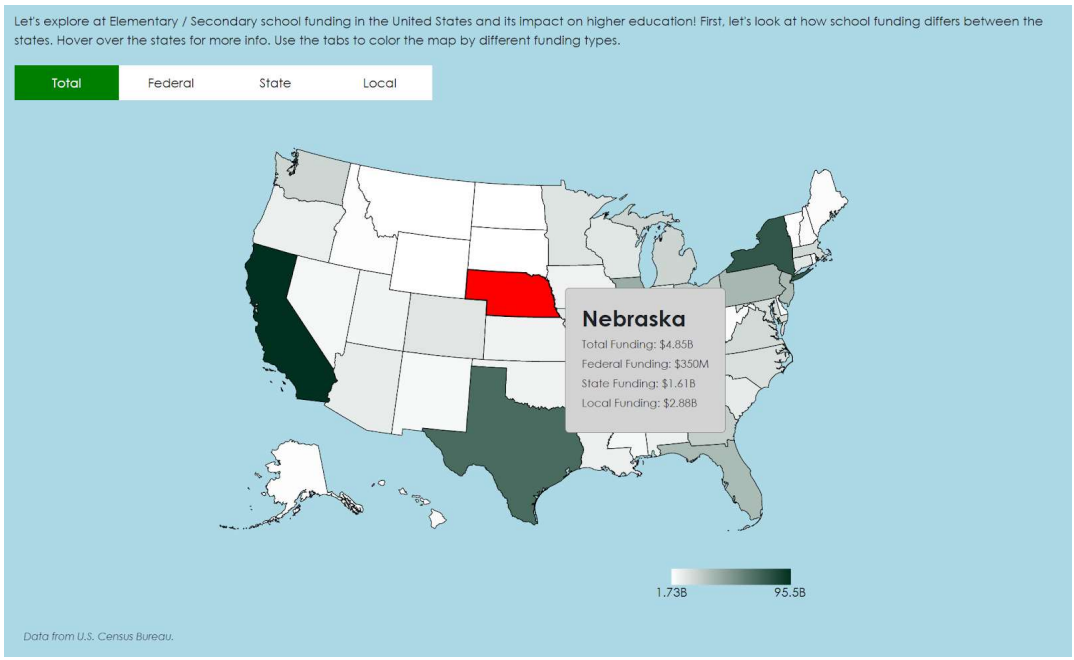
Final Submission

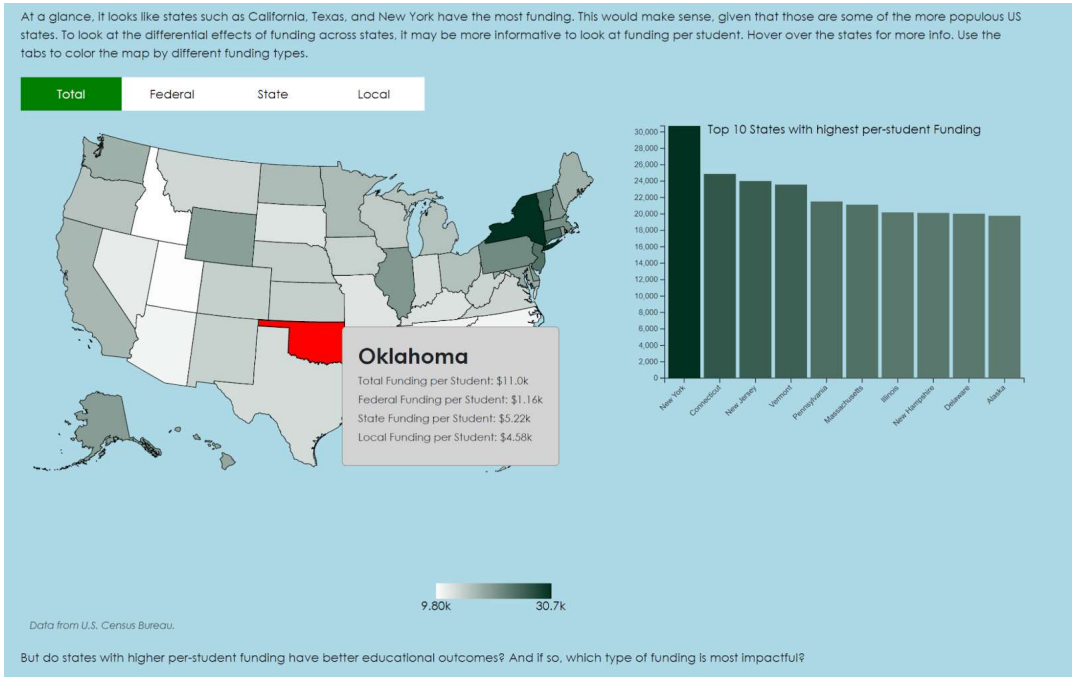
Link to project website: gblanc25.github.io/public-school-funding

Link to project video (also included in submission): https://youtu.be/Njn7AN9JN3k

Screenshots: Before and After Testing

*Funding Map Visualizations - **BEFORE***

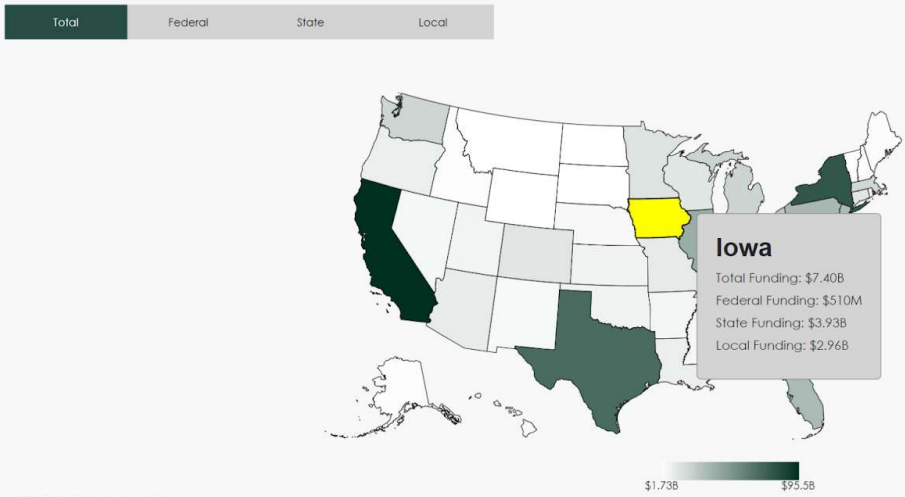




*Funding Map Visualizations - **AFTER***

Let's explore elementary school funding in the United States and its impact on higher education! First, let's look at how school funding differs among states.

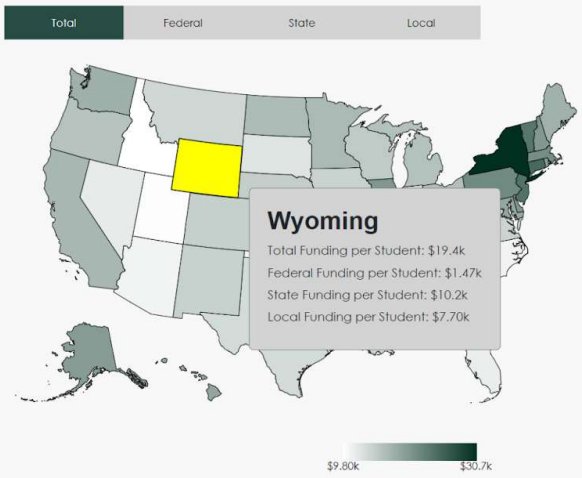
Hover over the states for more info. Use the tabs to color the map by different funding types.

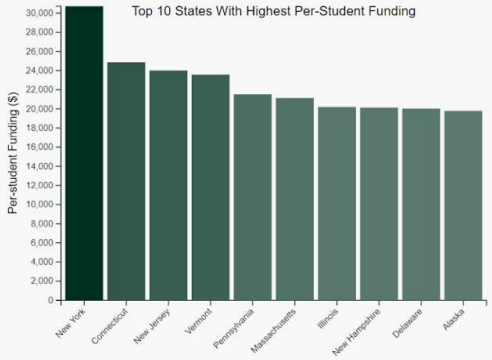


Data from U.S. Census Bureau.

At a glance, it looks like states such as **California**, **Texas**, and **New York** have the most funding. This would make sense, given that those are some of the **more populous US states**.

Hover over the states for more info. Use the tabs to color the map by different funding types.





Data from U.S. Census Bureau.

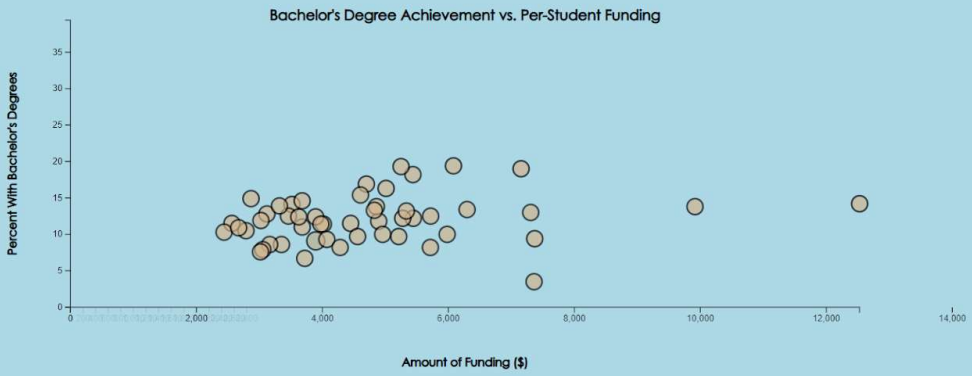
Overall, it looks like states in the **Northeast** have the most per-student funding.

*Outcome Scatter Plot Visualizations - **BEFORE***

First, take a look at the graph below of total funding (in white) vs Bachelor's Degree achievement. We see a clear upward trend, so funding appears to correlate with eventual outcomes. Let's investigate what type of funding contributes most to that trend!

Compare the trends of federal funding per student (teal), state funding per student (tan), and local funding per student (purple). Only the local funding displays a positive correlation, suggesting that pursuing a Bachelor's degree is influenced most by funding at the local level.

Next | Replay



Data from U.S. Census Bureau.

These trends show that **increasing funding at the local level** may be an important way to improve educational outcomes in your local district, especially as schools can invest in the teaching staff and support resources best fit for their students' success. But of course, each district is different, and will need unique solutions to close educational gaps. So how do districts in your state 'stack' up?

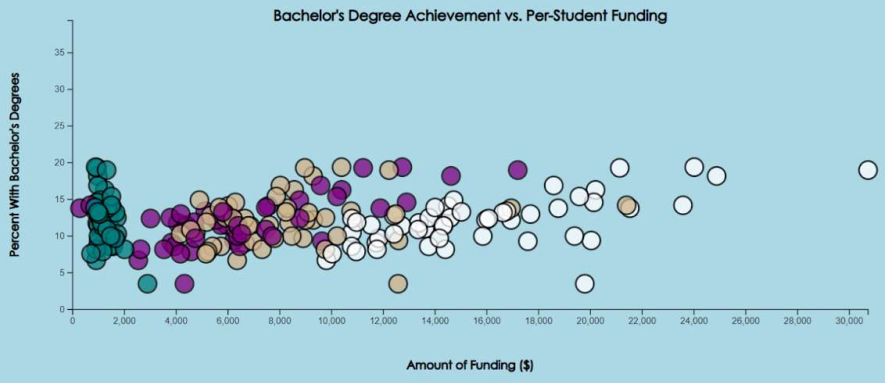
First, take a look at the graph below of total funding (in white) vs Bachelor's Degree achievement. We see a clear upward trend, so funding appears to correlate with eventual outcomes. Let's investigate what type of funding contributes most to that trend!

Compare the trends of federal funding per student (teal), state funding per student (tan), and local funding per student (purple). Only the local funding displays a positive correlation, suggesting that pursuing a Bachelor's degree is influenced most by funding at the local level.

Here's the full chart. Use the checkboxes to explore trends in funding data on your own.

Restart

☑ Federal Funding Per Student ☑ State Funding Per Student ☑ Local Funding Per Student ✔ Total Funding Per Student



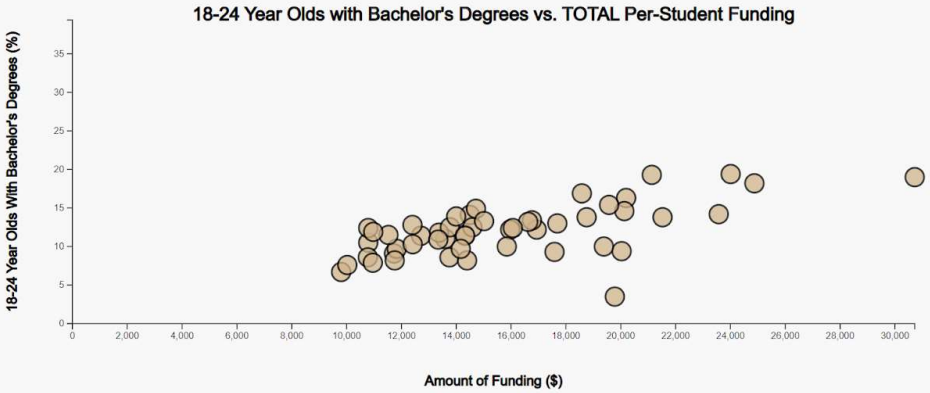
Data from U.S. Census Bureau.

These trends show that **increasing funding at the local level** may be an important way to improve educational outcomes in your local district, especially as schools can invest in the teaching staff and support resources best fit for their students' success. But of course, each district is different, and will need unique solutions to close educational gaps. So how do districts in your state 'stack' up?

*Outcome Scatter Plot Visualizations - **AFTER***

First, take a look at the graph below of total funding vs Bachelor's Degree achievement. We see a clear upward trend, so per-student funding appears to correlate with eventual outcomes. Let's investigate what type of funding contributes most to that trend!

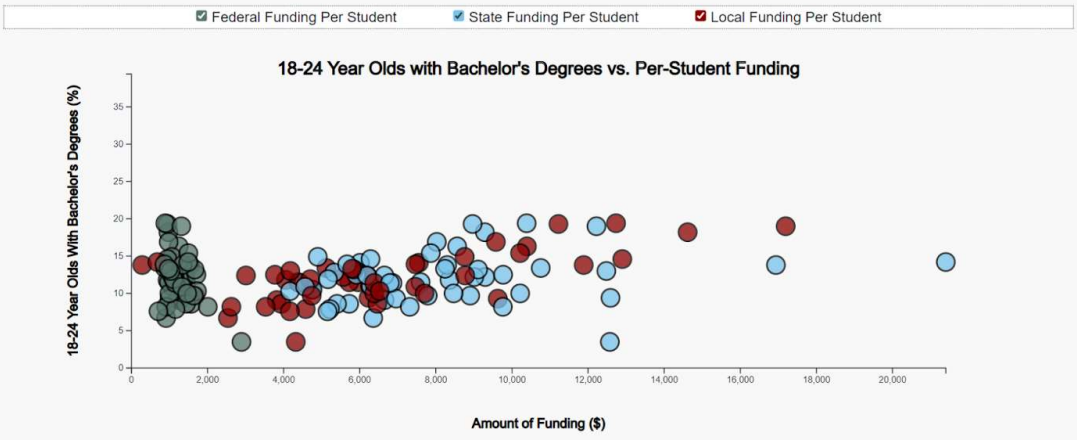
Next



Data from U.S. Census Bureau based on state of residence (typically the student's home state).

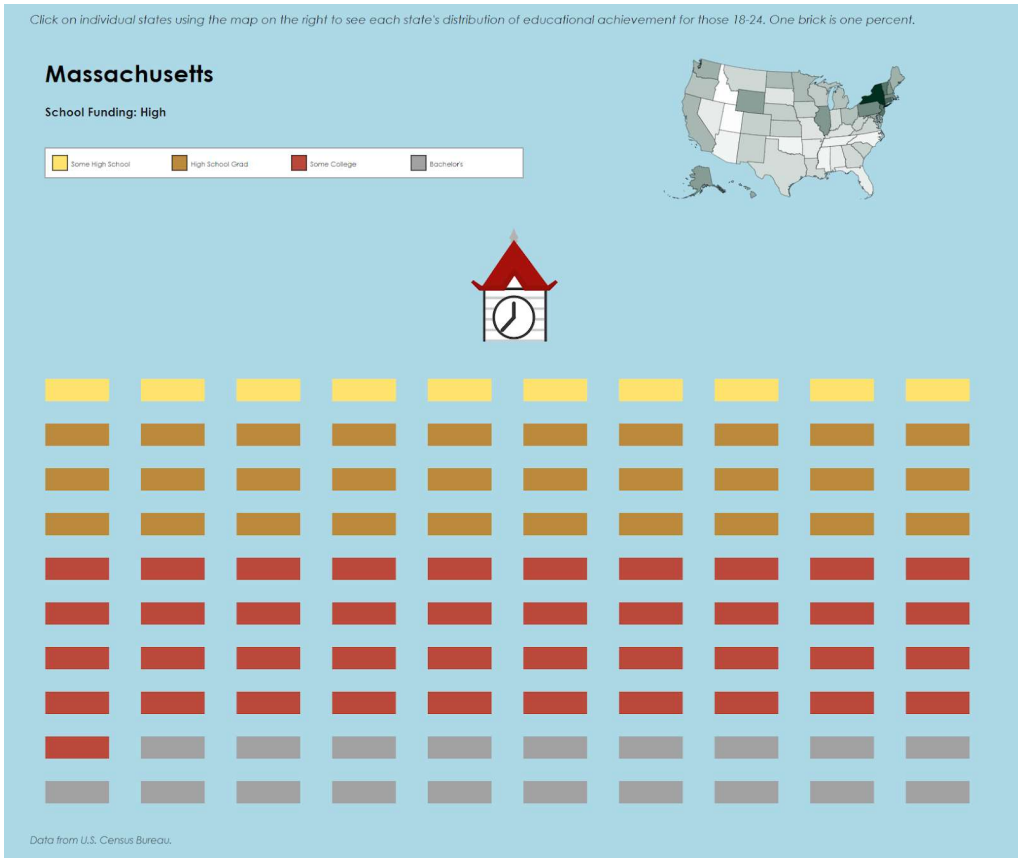
Compare the trends of federal, state, and local funding per student. Only the local funding displays a clear positive correlation, suggesting that pursuing a Bachelor's degree is influenced most by funding at the local level.

Restart

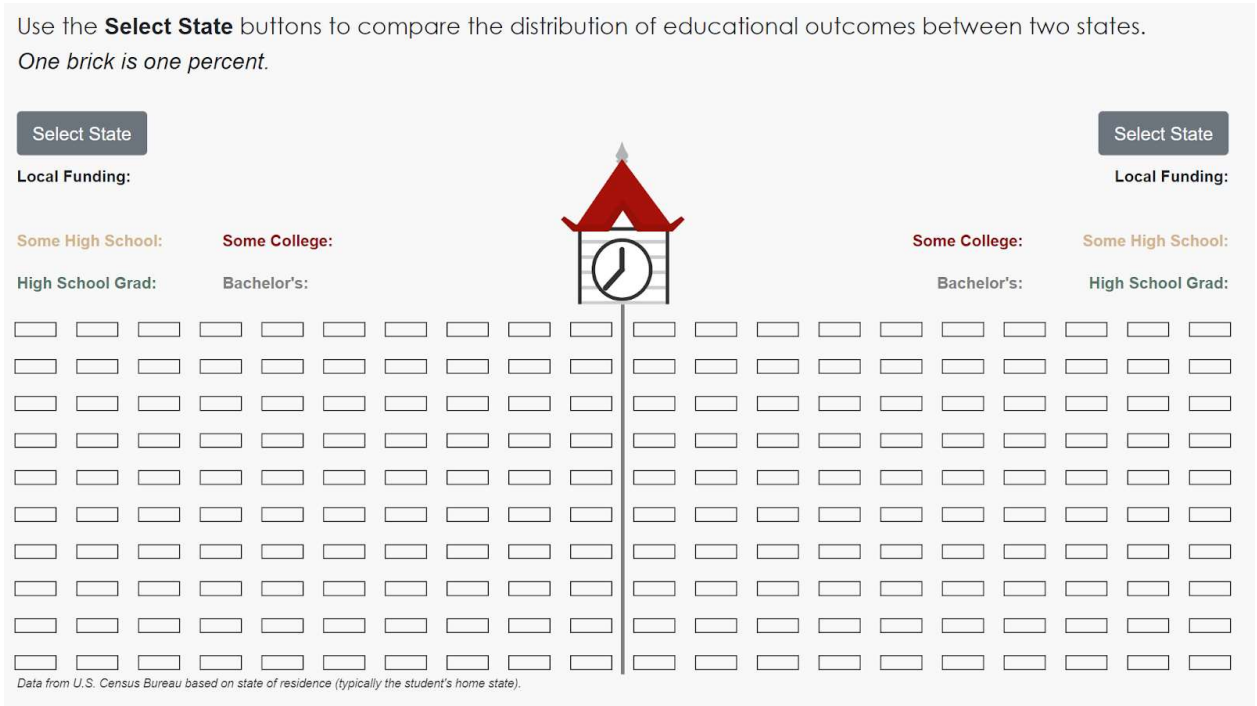


Data from U.S. Census Bureau based on state of residence (typically the student's home state).

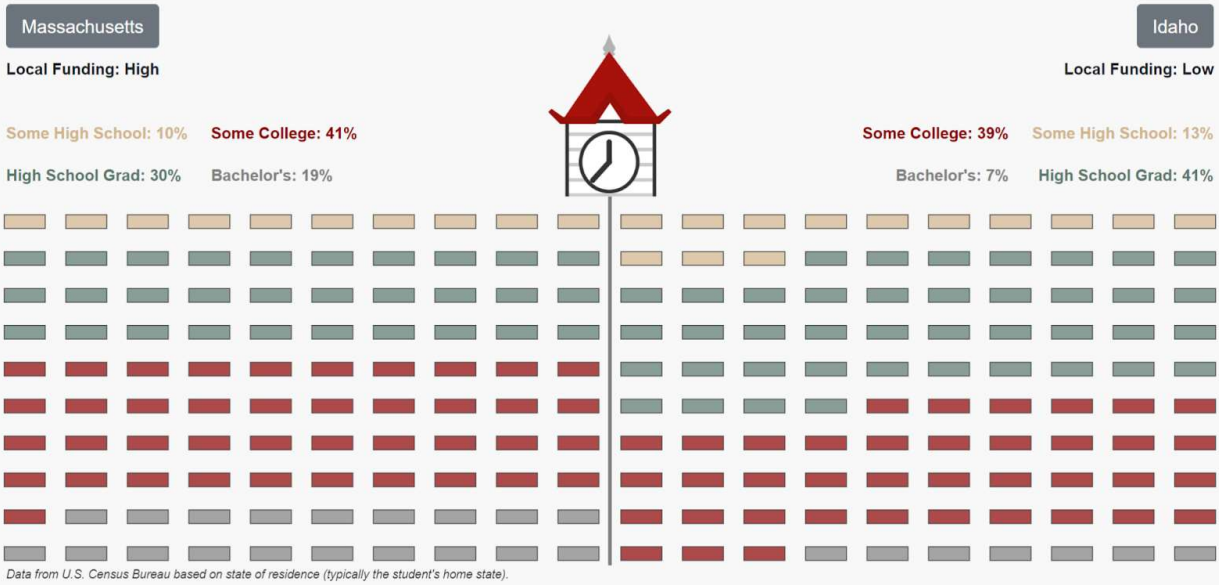
*Bricks Visualization - **BEFORE***



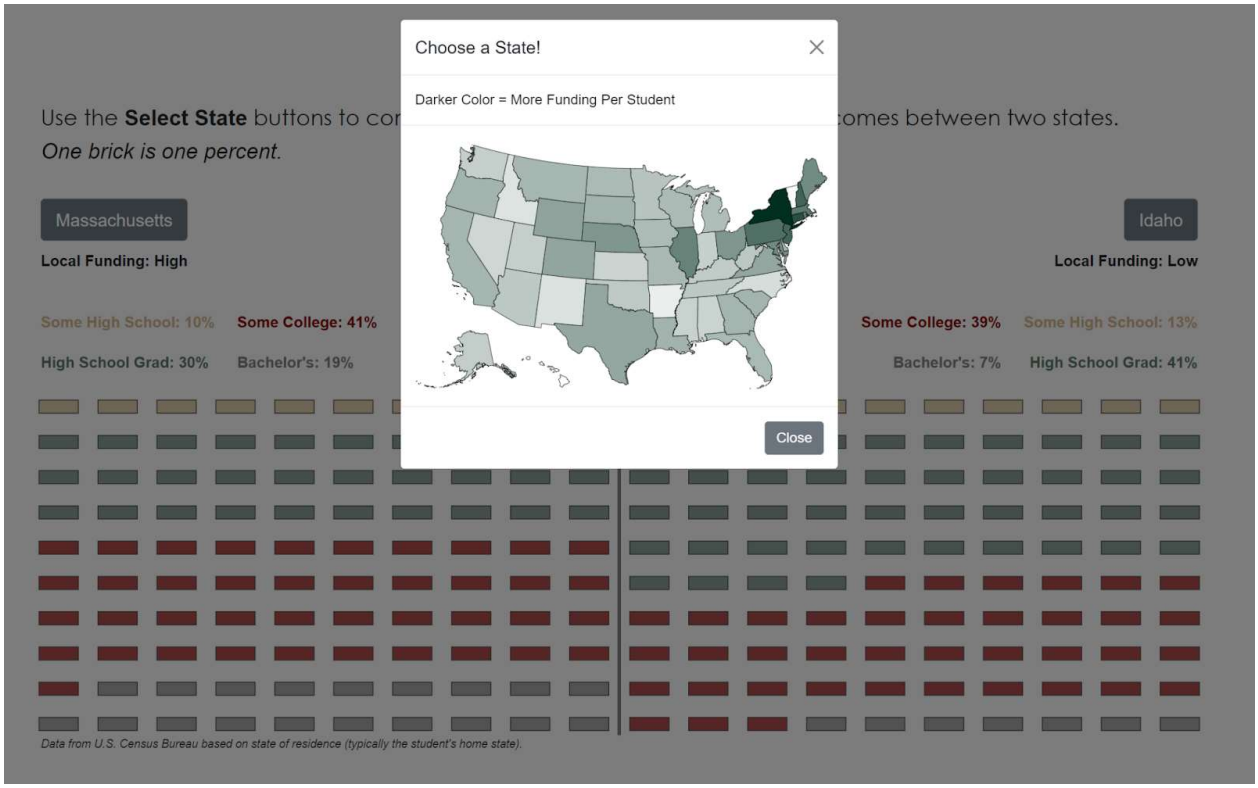
*Bricks Visualization - **AFTER***



Use the **Select State** buttons to compare the distribution of educational outcomes between two states.
One brick is one percent.



Data from U.S. Census Bureau based on state of residence (typically the student's home state).

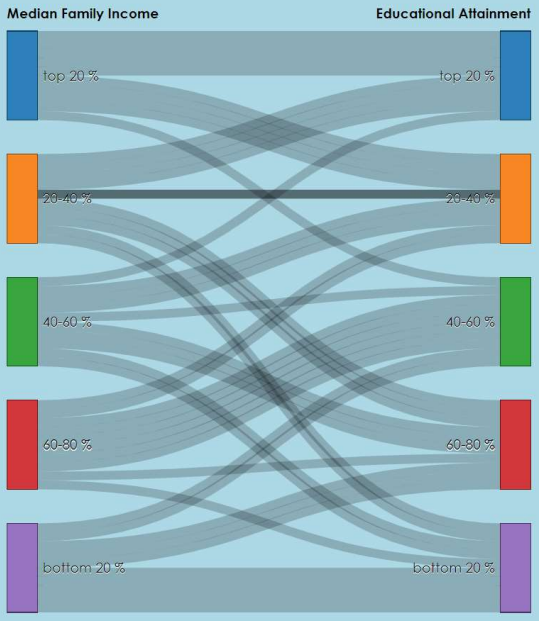


*Sankey Visualization - **BEFORE***

Compare two states like Massachusetts and Minnesota, two states with high funding disparities, and there are huge gaps in college degree attainment. But then compare New York and Colorado (which have large gaps in funding), and the distribution looks quite similar. So, **funding can't be the only factor at play.**

Below, we explore another contributing factor: the socioeconomic makeup of each state, which likely bolsters or inhibits the pursuit of higher education.

Hover over the curved lines on the chart below to see details about each state.

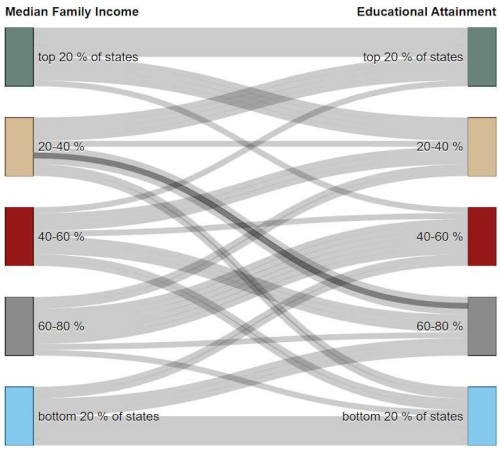


Minnesota

Population 18-24 with Bachelor's degree or higher	13.4%
Median Household Income	$77,720

*Sankey Visualization - **AFTER***

Below, we explore another contributing factor: the **socioeconomic makeup** of each state, which impacts funding and likely influences whether someone pursues higher education.



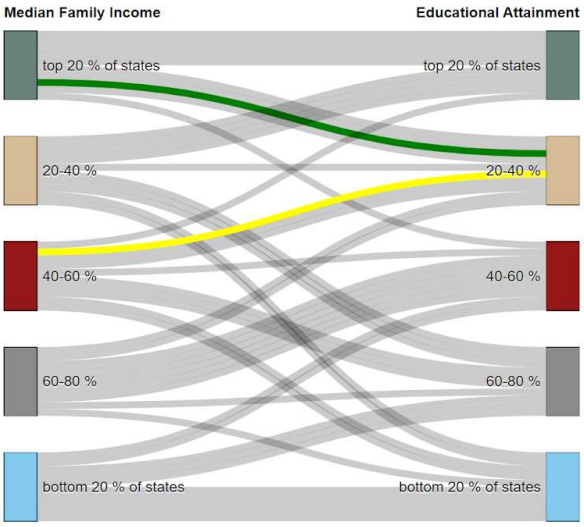
Delaware

Population 18-24 with Bachelor's degree or higher	9.4%
Median Household Income	$71,091

Data from U.S. Census Bureau based on state of residence (typically the student's home state).

Although there is some movement between the income and educational attainment brackets, it **stays relatively similar**. For example, half the states with median income in the top 20% of states also had rates of educational attainment in the top 20% of states. Similarly, half the states with median income in the bottom 20% of states also had rates of educational attainment in the bottom 20% of states. So aside from the amount of public school funding, **socioeconomic status** may affect whether individuals pursue post-secondary education.

Note, too, that **Colorado** (low funding) is much higher up on the left side of the chart than **Pennsylvania**, and those two states had identical educational outcomes.



Data from U.S. Census Bureau based on state of residence (typically the student's home state).

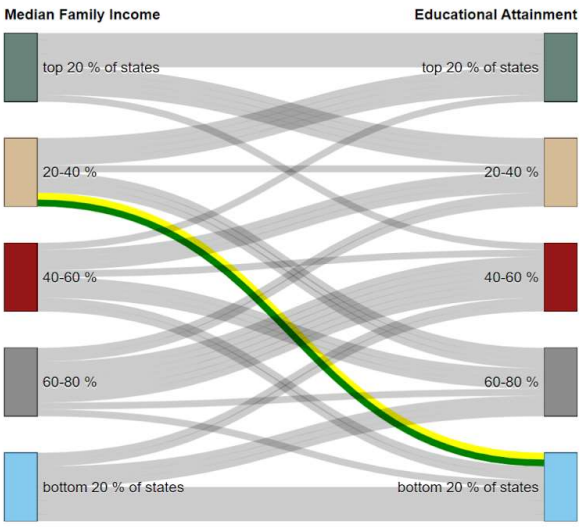
Colorado

Population 18-24 with Bachelor's degree or higher	14.1%
Median Household Income	$82,254

Pennsylvania

Population 18-24 with Bachelor's degree or higher	13.8%
Median Household Income	$68,957

Additionally, we can see that **Alaska** and **Utah** both have relatively high median family incomes, yet are both in the bottom quintile with respect to educational outcomes. This suggests that factors like local cultural practices and beliefs that influence the decision to pursue higher education.



Data from U.S. Census Bureau based on state of residence (typically the student's home state).

Alaska

Population 18-24 with Bachelor's degree or higher	3.5%
Median Household Income	$77,845

Utah

Population 18-24 with Bachelor's degree or higher	7.6%
Median Household Income	$79,449