

Project: Interactive Data Visualization

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GROUP: BRADI

ENGKU FAIZ NAQUIUDDIN B ENGKU FAHMI MUKHLIS	1201201163
IMTIAZ AHMAD	1171102501

Project Title: **Exploring the Role of Federal, State, and Local Funding in Educational Financing**

1. Proposed Dataset:

It is crucial to comprehend the complex financial dynamics involved in sustaining education across the country while evaluating the role of federal, state, and local revenue and expenditure for educational institutions in the United States.

At a high level, funding for educational institutions in the United States comes from a variety of sources, including federal, state, and municipal taxes, as well as spending on instruction, support, and other expenses. Each level plays a unique part in the financial resources devoted to education.

The data contained of:

- Total revenue of Educational Financing for each state in USA thru year
- Total expenditure of Educational Financing for each state in USA thru year

2. Project Description:

Example of Storyboard:

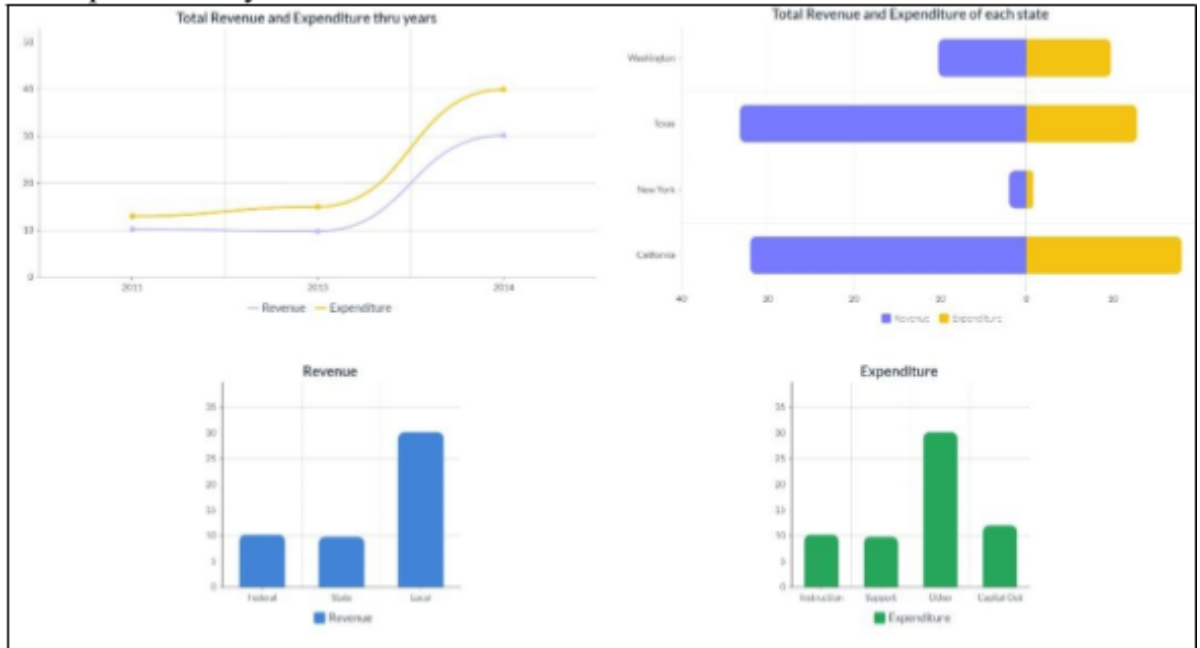


Figure 1: Example of Storyboard

Explanation:

- This is the example of our Storyboard that shows the Role of Federal, State, and Local Funding in Educational Financing. The graph above (left) will show the total revenue and expenditure thru years and The barchart above (right) will show the total revenue and expenditure of each state in the USA. Both of The bar charts below show the differences type of revenue and expenditure
- Overall, our storyboard uses numerous graphic components to provide facts, comparisons, and breakdowns in order to clearly communicate the role of federal, state, and local funds in educational financing. It gives a thorough overview and improves knowledge of the financial dynamics affecting the American education industry

3. Changes between Storyboard and the Final Implementation

Storyboard:

A variety of images were used in the storyboard's initial design to display the data. The first thing I noticed was a line graph showing the overall revenue and expenses for the entire year. A bidirectional bar chart was also used to show the overall income and expenses for each state. Additionally, there were distinct bar charts for various forms of income and outlays.

Elementary-Secondary education revenue & expenditure Storyboard:

In the final implementation, the design underwent considerable revisions to enhance data presentation and user engagement. One obvious modification was the insertion of a state map of the United States. Users would be able to study the data in a geographic context with this update. A key component of the visualisation was the map, which provided a visual depiction of the states. The final implementation contained a line chart that presented Total Revenue and Expenditure by State as well as an option to examine Total Revenue and Expenditure of USA instead of a single line chart showing total revenue and expenditure. Users may now analyse the financial trends of certain states thanks to the more detailed picture of the data that this upgrade gave them. A bar graph displaying the various revenue streams for each state was also included to show how they affect each state's revenue. Users are better able to understand how the revenue is divided across the states. In the final implementation, an interactive line chart that shows the Total Revenue funded in each state during presidential administrations was added to increase interaction. This interactive feature allows users to look into revenue trends over numerous presidential terms, which sheds light on the impacts of different administrations on state finances. A dot line chart was also utilized to display the many financial sources for the presidency. This image presented a visual comparison of revenue sources under various presidential administrations to aid readers in identifying any noteworthy movements or trends. Users can also view the trend of enrollment based on the selected president.

Pie Charts:

From 1993 to 2016, the pie chart contrasts four different types of expenditure. The graph is divided into four sectors, each of which represents a different category of spending. Each sector's size reflects the percentage of spending that was allotted to it within the specified time frame. This graph's objective is to give a visual depiction of how much money was spent in each of the four categories over the chosen years. It is simpler to see the relative proportions and variations in spending habits for each category when utilising a pie chart. To notice any notable changes in the distribution of expenditure over time, the reader can rapidly compare the sector sizes.

Stacked Bar Charts:

The percentages of states that rely more on federal financing in comparison to state and local funding are shown in the stacked bar graph. Each horizontal bar on the chart represents a state, while the entire chart is made up of bars. Each segment of the bars represents the share of financing for a specific state that comes from federal, state, and local sources.

This graph is intended to show the relative contributions from state and local sources as well as how much each state depends on federal money. The chart makes it simple to compare how much funding each state receives by stacking the segments on top of one another. It shows in plain sight which funding source—federal, state, or local contributes the largest proportion of a state's financial resources.

One may identify the states where federal funding dominates their financial structure by analysing the chart. In comparison to state and municipal financing, these states would get bigger portions from the federal government. States with greater state or local spending segments and smaller federal funding segments, on the other hand, suggest a higher level of independence or a stronger focus on local control.

The modifications made for the final implementation were made to enhance the user experience and offer a more thorough knowledge of the data. Users were given a richer and more interesting experience by the final design, which included a map, interactive components, and more precise visualisations.

4. The Final Implementation

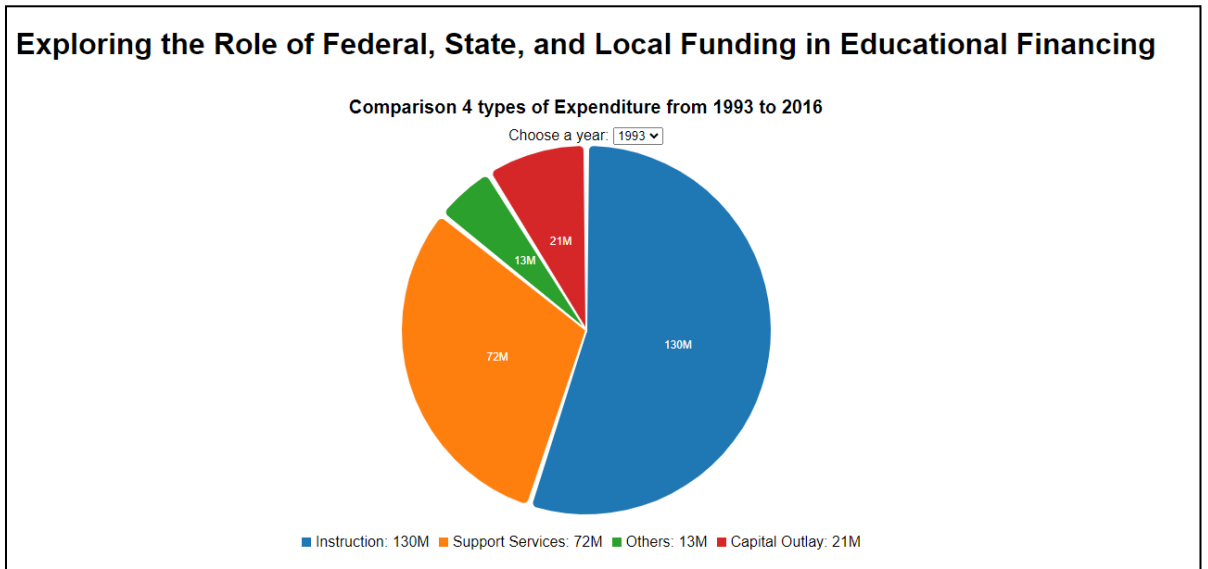


Figure 1: Pie Chart visualization of Comparison 4 types of Expenditure from 1993 to 2016

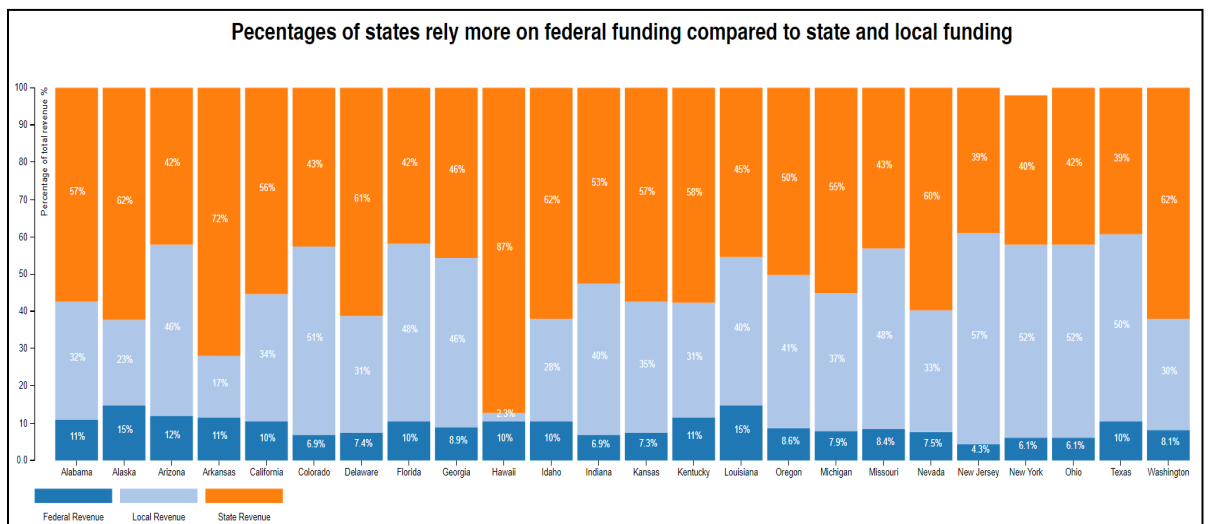


Figure 2: Stacked Bar Chart visualizing the percentages of states that rely more on federal funding compared to state and local funding

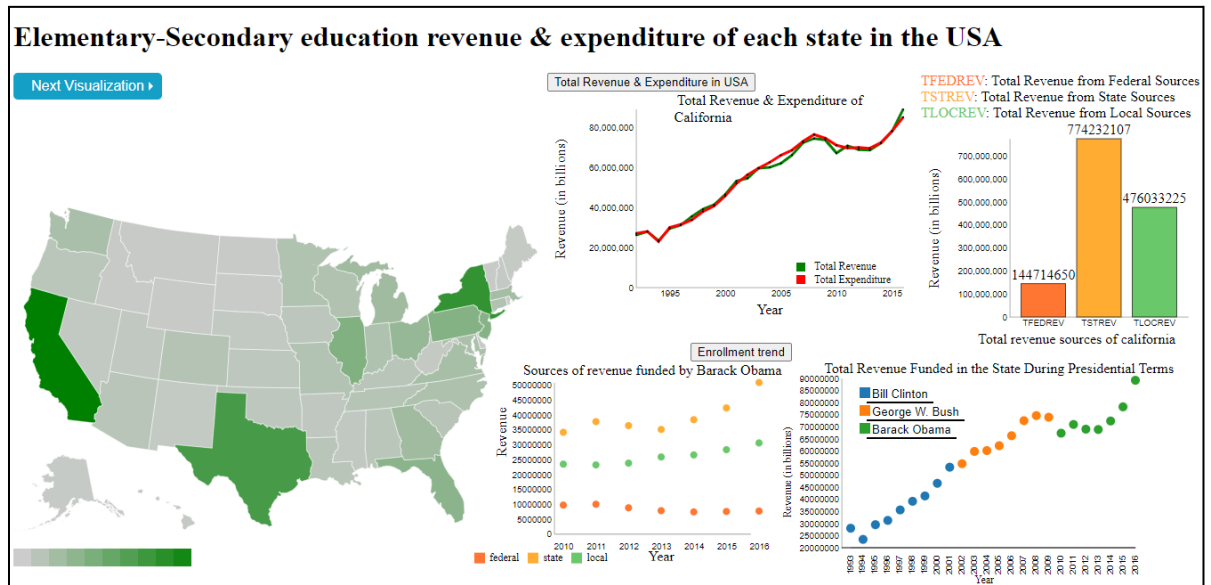


Figure 3: Storyboard visualizing the Elementary Secondary education revenue & expenditure of each state in the USA

5. Development Process

- Imtiaz Ahmad focused on the ‘Elementary-Secondary education revenue & expenditure of each state in the USA’ Storyboard visualization.
- Engku Faiz Naquiuddin focused on the ‘Stacked Bar Chart visualizing the percentages of states that rely more on federal funding compared to state and local funding’ and ‘Pie Chart visualization of Comparison 4 types of Expenditure from 1992 to 2016’
- Adding interaction between the map and the charts and within the charts and the map took the most time.
- Create the charts using Tableau for more clear description on visualization
- Adding functionality on the Pie Chart and Stacked Bar Chart.
- Fixing error and bugging for the Storyboard, Pie Chart and Stacked Bar Chart take the most time
- Combine the Storyboard and the other two charts.
- Finish the report

6. Conclusion

In conclusion, funding from the federal, state, and local levels is essential for supporting education. Federal support fosters innovation, promotes equity, and addresses pressing national issues. Customised strategies based on enrollment, local revenue, and regional needs are made possible by state support. Although it might lead to inequities, local funding supports resources. To solve the financing problems and make sure that all kids receive an equitable education, cooperative efforts are required. We can work towards a more inclusive educational system that provides kids with the resources and opportunities they need by acknowledging the significance of each level of government's involvement and addressing funding imbalances.