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| Checkpoint III | Checkpoint III: Visualization Sketch | |
| Group: | G14 |
| Date: | 2021/10/1854 |
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# Overview

Overview of the visualization, including the different idioms, showing credibly how they are to work together.

Chart

Description automatically generated

On the image above we can see what our goal for the visualization is. This visualization features five different idioms, each with its own purpose but all of them interconnected and interactable.

The slider above the choropleth map allows the user to change which year the data is being taken from, this affects both the map and the dot plot below it.

Right next to the slider the user can pick the main attribute for the visualization and up to two secondary attributes (by clicking the ‘plus’ button). These will affect what is seen on the choropleth map (main attribute only) and on the scatter plot and line chart (all attributes).

The map is also interactable, each state is clickable and that changes what is represented on the three idioms on the right side of the visualization.

Finally, the dot plot also features buttons to toggle between two attributes, the one chosen is shown no matter what the main attribute is, allowing the user to visualize the values for enrolment or academic success at all times.

# Visual Encoding

Description of the visual encoding you have selected for each data type, describing for the different idioms, which attributes are represented by which marks/channels.

We decided to use five different idioms for this visualization: a choropleth map, a line chart, a scatter plot, a dot plot, and a variant of a Gantt Chart.

The choropleth map is a map of the United States of America divided by states. After the user picks a year and an attribute, the color saturation of each state changes according to the attribute value. The user is also able to interact with the map to pick a state for the other charts to focus on.

The line chart represents the evolution through time of an attribute for a state, both picked by the user. The x-axis represents the year and the y-axis the value of the attribute. The year chosen by the user is highlighted with a dot on the line. Below this chart there is a representation of the timeline of governing parties for that state (which draws some similarities to a Gantt Chart), this is a horizontal bar that is split in several parts color-coded according to the party (blue for Democrats, red for Republicans).

The scatter plot shows the correlation between two different attributes: the main one, chosen for the other plots, and another one that the user can pick from a drop-down menu. The main attribute is represented on the y-axis and the other one on the x-axis. Each dot corresponds to a different year for that same state. There is one case in which the plot represents three different attributes, so the dots have different hues.

The dot plot shows us a similar perspective as the choropleth map: a visualization by year instead of by state. Each state defines the dots’ position on the x-axis and for the dots’ y-axis position the user can pick one of two attributes: student enrolment or academic success. For each state there are several dots, most representing different races and one representing the global value, all color-coded to differentiate. By default, the global value is highlighted and the others have some transparency, but the user may click on one of them to highlight a specific race.

# Answering the Questions

## Description of:

## How the idioms provide the means to answer to each of the questions.

## For at least one of the questions, a storyboard showing how several idioms must be used in tandem to provide its answer.

To answer our first question, we select the attribute “Total Investment” from the drop down menu and then press the “plus” sign to add the other two attributes (academic success and enrolment) to compare, the line chart and the scatter plot are particularly helpful for this one, in the first one we can compare the lines’ slopes and in the scatter plot we can tell if there is a correlation between the values by looking at the dots’ positions: if they seem to form a line they are probably correlated.

The same goes for the next two questions, for the second one we pick “academic success” as our main attribute and both state revenue and state investment as secondary attributes to be able to compare, and for the third question we choose either enrolment or academic success and “Type of Investment” as secondary attribute and compare each of them with the main one also by looking at the line chart and the scatter plot.

To see whether there’s a connection between the party that governs the state and its investment we can look at the line chart for each state and the bars below it.

The last question, regarding race, can be answered by the dot plot. If there seems to be a higher concentration of a specific dot colour on higher spots throughout most states, there probably is a correlation. We can also use the slider on the top to see how that changes through the years.