

Exploring Physicalization with CU Graduate 2015 Survey Data

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ABSTRACT

The purpose of this project is to explore the use of physicalization by representing data from the CU Boulder Exit Survey sent to all the 2015 graduates. The methods for this project includes extensive research into related works, prototyping via tableau and sketching in order to find the best way to Physicalize this type of data. The end result of this project was two physicalizations. The first visualization shows where 2015 graduates graduated from high school. The second visualization shows where 2015 graduates “primary activity” is after they graduate. The point is to show population movements through CU Boulder. I created the physicalization using one piece of rice for every person, placing them on a USA map to represent the related state.

Keywords: Physicalization

1 INTRODUCTION

The motivation for this project was to get out of my comfort zone and build a physical representation of data. I have only built - WYSIWIG visualizations or used D3 code to create something. Because I was new to Physicalization, much of my time for this project was spent researching and reading what other people had created.

In order to gain access to my data I called the Office of Data Analytics at CU. I requested the Graduate Exit Survey because I was curious to see what states people were coming to CU Boulder from, and where they ended up after graduation.

1.1 Related Works

A considerable amount of time for this project was spent doing research into related works. I was not sure where to take the project so I wanted to see what experts in the field were making. The first cited work is from Hans Rosling, who does storytelling of immigration and population growth with physicalizations. He is pretty well known and he has done a Ted talk in the past. A key takeaway for me as I was looking at his visualizations was that he simplified them. He had few dimensions and simple objects and portrayals that were easy to understand.

The second Physicalization that had an impact on my project was “2004- Of All the People in All the World: Stats with Rice.” This physicalization maps each grain of rice to a person and displays different data of populations and different historic events. They made this massive display by weighing small amounts of rice and placing them in the corresponding pile. This Visualization had a big impact on my project because I was going to show different populations and I wanted to give a similar sort of individuality to the people who are my data points.

The third visualization I read about was called “2009- How much Sugar do you Consume?” This visualization shows sugar cubes next to drinks to represent the amount of sugar in drinks. An example is a can of coke, which has 39g of sugar. Thus there are 39 grams of sugar built in a triangle formation next to the can. This is a visualization that has a positive impact on society by showing people what is in their drinks.

The fourth citation is called “1970- MoMA Poll: Participatory Bar Chart.” This visualization is unique because you see the data as it is being created. There are two plexiglass boxes with slots to put answers to poll questions. As people place their answers to the poll, one can see this being build up as if it were a bar chart.

The fifth visualization is a dissection of pins on a map that some Harvard grads were developing in 1907. Before the digital age, it was quite difficult to show large quantities of datapoints on a small area on a map. They tried to solve this by building up the pins and making them taller in order to show heights. Having too many data points for a small area was a problem I also had. The east coast includes many small yet densely populated states.

The sixth cited work is called “Mount Fear East London 2003.” This visualization shows crime data in London in a 3d topography. This visualization is relevant to my project because it is spatial data.

The seventh cited work is called is “Gumballs and Pencils: 7 Data Visualization Projects Made with Unusual Objects.” This has several examples of cool visualizations that are creative and unique. The specific visualization here that I got the most out of was gumballs showing sleep data for University students.

The eight cited visualization is titled “How much does the tax code reduce inequality?” This is another storytelling visualization that is in the format of legos being moved on camera. There are different bars representing the different population groups and their annual income. Then he shows where all the money is after taxes, trying to prove the point that the taxes do not help distribute wealth enough.

These physicalizations all helped me brainstorm and think of how I was going to design my project.

2 PROCESS OF CREATING VISUALIZATION

The biggest challenges I faced when creating my visualization were the amount of data and how to display this type of data in a geospatial format. I wanted to use a United States map because the geospatial aspect is an important part of this data. It is also more engaging than just a list of items. I started by creating the visualization that shows the data for where graduating students (2015) went to high school. I laid down rice on the map of the United States, with one rice grain representing one person. For some of the smaller states that have more dense populations, I had to create an extra section for them and point to the state with an arrow. After taking photos of this visualization I transitioned it to the second one, which was where graduating students principal activity would be after graduation. Starting from the original physicalization gave me more insight into which states had drastic changes, and which ones had no change at all.

Some states that had very little to no change in outgoing vs incoming students include Washington, Georgia, New Hampshire, Rhode Island, Michigan and relatively California and Colorado.

Some states that had very few people graduate high school, but received many graduates include Utah, the District of Columbia, Indiana, Kentucky and Arizona. New York received many as well.

States that lost population from our 2015 graduates include Wisconsin, Michigan, Montana, Idaho, Pennsylvania, Connecticut and most significantly New Jersey and Illinois.

Nearly twice as many people are going out of the country as graduated outside of the country, and more than 100 participants still did not know where they were going to move.

3 CONCLUSION

I thought that the most important outcome of this project would be creating a visualization that

would inform my audience and give a new perspective on the data. I was surprised to find out that the process that taught me the most about my data was actually the process of creating my physicalization. During this process I became familiar with my data and gained perspective. I would recommend to any data scientist to manually touch the data points in order to become more familiar with them!

front/2015/04/09/how-much-does-the-tax-code-reduce-inequality/

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