COS30045: Data Visualization

VISUALIZATION ASSIGNMENT 1

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Word Count - 1950

Introduction

Data visualization means showing information using pictures instead of just words or numbers. It uses things like charts, graphs, and maps to help people understand data more easily. This is really helpful when you need to explain complicated information to people who aren't experts.

Our brains are good at quickly noticing colors, shapes, and patterns. That's why we enjoy looking at art, ads, and movies. Data visualization uses this idea to make information more interesting and easier to understand. When we look at a picture of data, we can quickly spot important trends and unusual points without having to read through lots of numbers.

Data visualization is important because it turns numbers into pictures. This makes it easier for everyone to:

1. See what the data means
2. Play around with the information
3. Really get what the data is saying

It doesn't matter if the data is simple or complicated. A good picture of the data helps everyone understand it, even if they're not experts.

These days, data visualization is used in many areas. Businesses use it to keep track of how well they're doing. Scientists use it to find patterns in their research. News reporters use it to explain big issues to regular people.

It's important to remember that while data visualization is powerful, it needs to be done carefully. A badly made picture can mislead people or hide important information. That's why it's crucial to create honest and clear visualizations that tell the true story of the data.

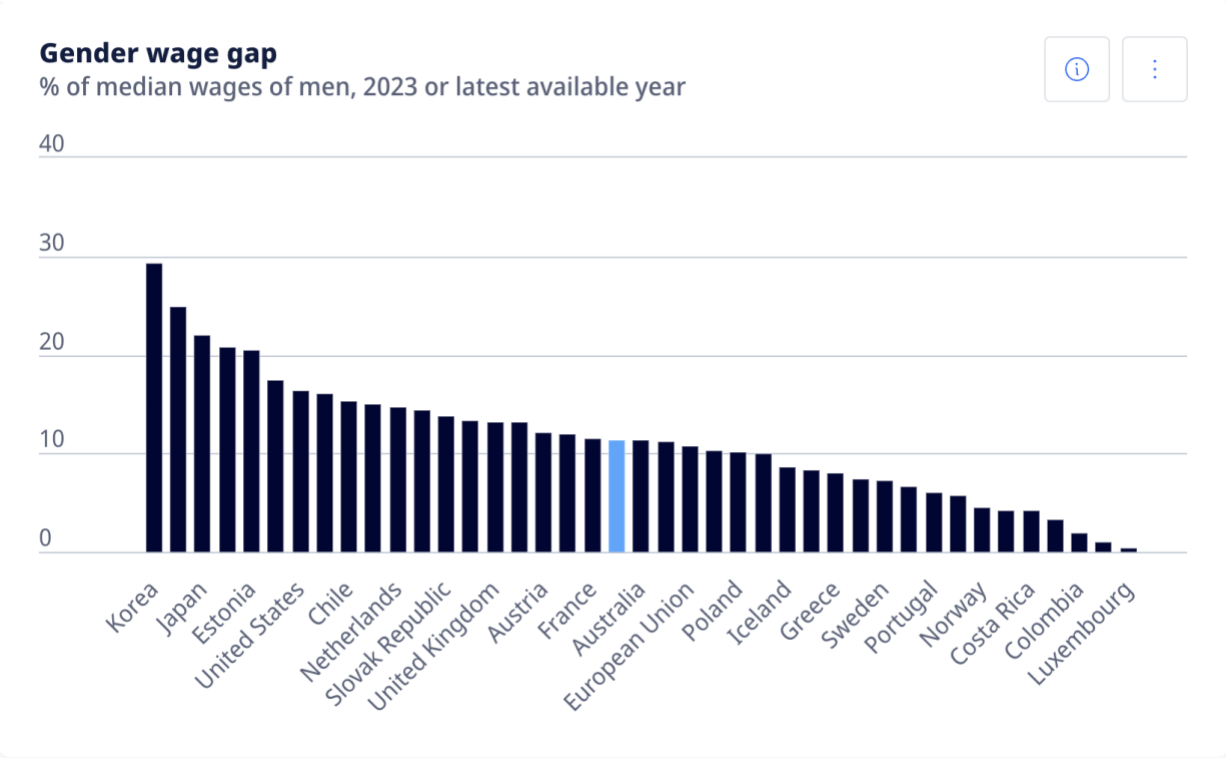
1st Critique

Firstly, I chose Gender Equality and Work from **The Organization for Economic Co-operation and Development** (OECD).

Over the past few years, women continue to be treated differently with men in the labor market. Some reasons are fewer job opportunity to women compared to men, lesser pay rate and benefits. These issues combine to create a big difference in how much money women and men earn throughout their careers. This gap in earnings doesn't just affect women while they're working but it has lasting effects. Because they've earned less, women often have less money saved for retirement. This puts them at a higher risk of living in poverty when they're older. These problems show how workplace differences can impact women's financial security for their entire lives.

In the graph below, it is showing that the gender wage gap was 11.4% on average across the OECD. This mean that, women are paid 11.4% lesser than men, meaning that, while a man earns a dollar or euro for full time, a woman only earns 88.6 cents in the same work place. But the visualization of the graph is not much distinct as expected because of some reasons below.
(OECD. (n.d.). *OECD home)*

- Color usage: The bar chart showing the gender wage gap uses a dark navy blue for most countries. While this creates a clean look, it doesn't effectively highlight differences or patterns among countries.
- Lack of contrast: The European Union average is shown in a lighter blue, which is a good attempt to highlight it. However, the contrast with the dark blue isn't strong enough to make it stand out significantly.
- Limited color palette: Using predominantly one color (dark blue) makes it difficult to quickly identify trends or group countries by their performance.
- Missing data for some countries

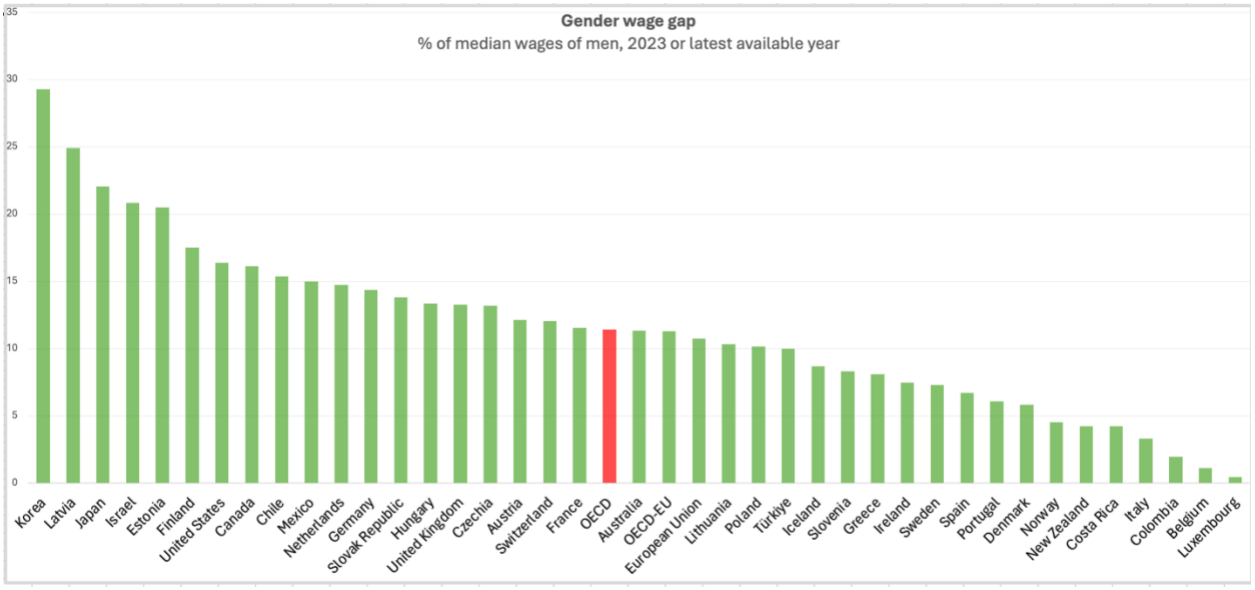


When we make graphs or charts to show data, the colors we choose are really important. Sometimes, people use dark colors to show differences between things. But this can actually make it harder to see what the graph is trying to tell us.

Because

1. Dark colors can blend together: When we use too many dark colors close to each other, they can start to look the same. This makes it hard to tell different parts of the graph apart.
2. Contrast matters: Our eyes need contrast (big differences) to easily see information. If everything is dark, there's not enough contrast.
3. Readability issues: Dark colors can make any text or numbers on the graph hard to read.
4. Emotional impact: Dark colors might make the information feel more negative or serious than it really is.

Instead, it's often better to use a mix of light and dark colors, or use different shades of the same color. We can also improve the graph like below and it helps make the differences clearer and easier to understand at a glance.



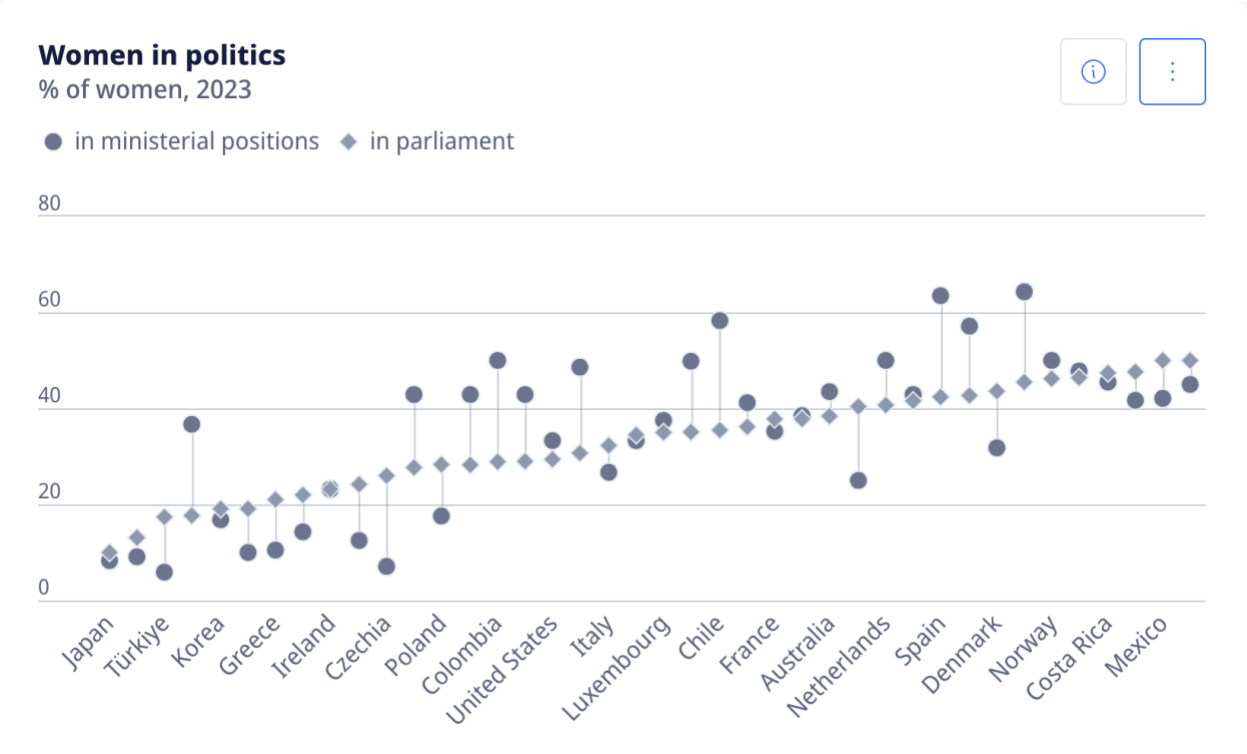
Some improvements compared to the old graph are

- Color Usage: Uses a green color scheme for most countries, with a contrasting red bar for what appears to be a significant data point (possibly the OECD or EU average).
- Contrast and Visibility: The green bars provide better visibility and differentiation between countries. The red bar stands out clearly, drawing attention to an important reference point.
- Y-axis Intervals: Putting more intervals in the Y-axis makes the columns of the result in longer columns and a more detailed view of the data.
- Readability: Country names are angled but more readable, and the chart includes more white space, reducing clutter.

The new proposed graph looks nicer and is easier to understand. It shows the differences between countries more clearly. The colors help a lot especially the red bar, which makes an important part stand out. Also, putting the countries in order from highest to lowest helps us quickly see which countries have big gaps and which have small gaps in how much men and women get paid.

2nd Critique

The following chart displayed about the **gender equality in government politics sector** among OEDC countries.



The chart looks simple, neat, and tidy, but it has several problems that make it hard to understand its meaning. These issues can stop people from getting useful insights from the data.

One main problem is the color choice. The light gray color for the "in parliament" data points doesn't stand out well against the white background. This can make it hard for some people to see the information clearly, especially those with vision issues. Using brighter colors would help make the data easier to read.

The Y-axis scale isn't tall enough, and the large gaps between intervals make it difficult to clearly see the difference between 60 and 20. As a result, the graph may lead to the mistaken conclusion that there isn't much difference between the data points.

Another issue is that the data points for ministerial positions and parliament representation often overlap. This overlap makes it difficult to tell them apart for certain countries. When data points mix together, it can confuse viewers, making them think that some countries are similar when they might not be. This confusion can reduce the chart's effectiveness.

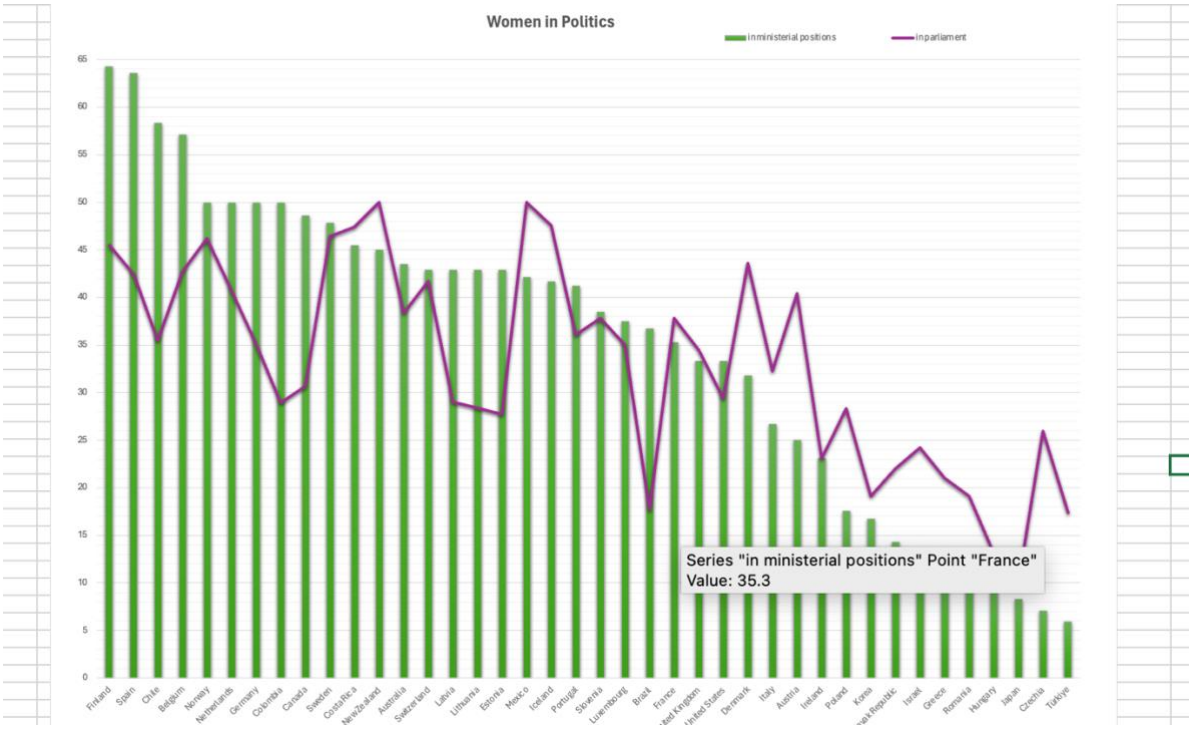
Additionally, the chart doesn't sort the data in any particular order. Without sorting the countries by their ministerial positions or parliament representation, it's hard to compare them or spot trends. When the data is presented randomly, viewers may struggle to understand the overall message.

To fix these problems, a few changes can be made. First, using different colors—like green for ministerial positions and purple for parliament representation—can help people easily tell the two data sets apart. Also, using different types of charts, such as bars for one and lines for the other, can make it clearer.

Second, sorting the countries by the number of ministerial positions in descending order will help people see trends and make comparisons more easily. This way, viewers can quickly find out which countries have the most representation.

Third, improving the color contrast between the background and the data colors will enhance visibility. Using darker colors for the data points against a light background will make the information stand out better.

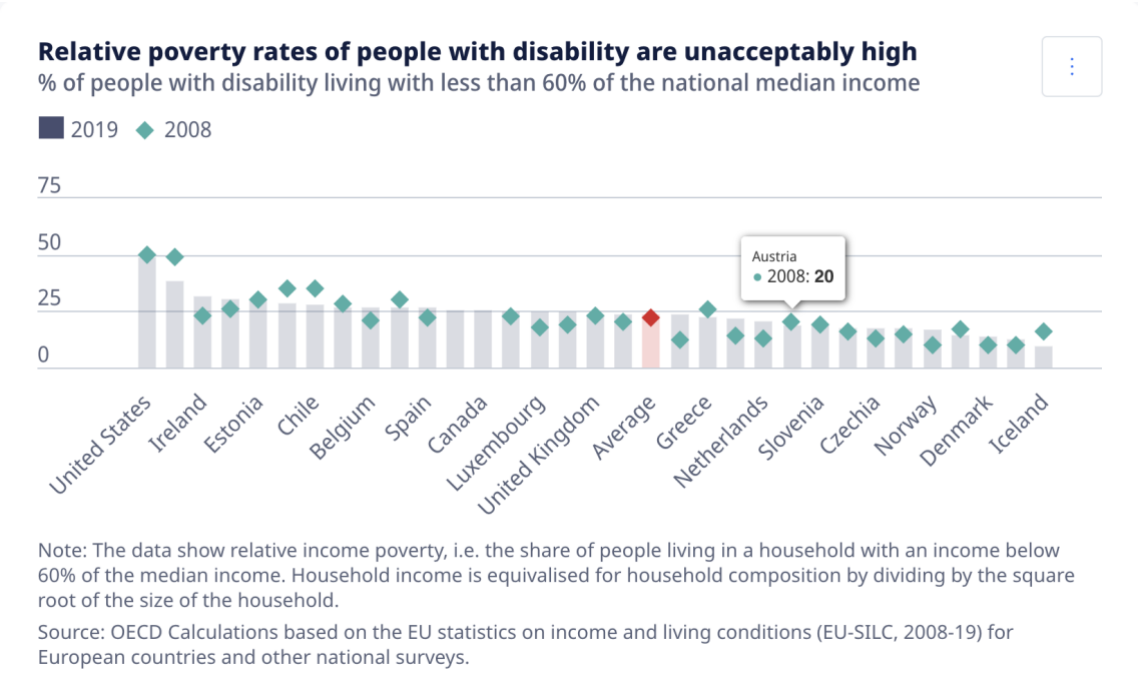
Finally, extending the y-axis to about 65% will bring it closer to the highest data point. This will make better use of the vertical space and allow for a clearer view of the differences between countries. By making these changes, the chart can become a much more effective tool for understanding political representation around the world.



This is the proposed chart design for Women in government sector among OEDC countries.

3rd Critique

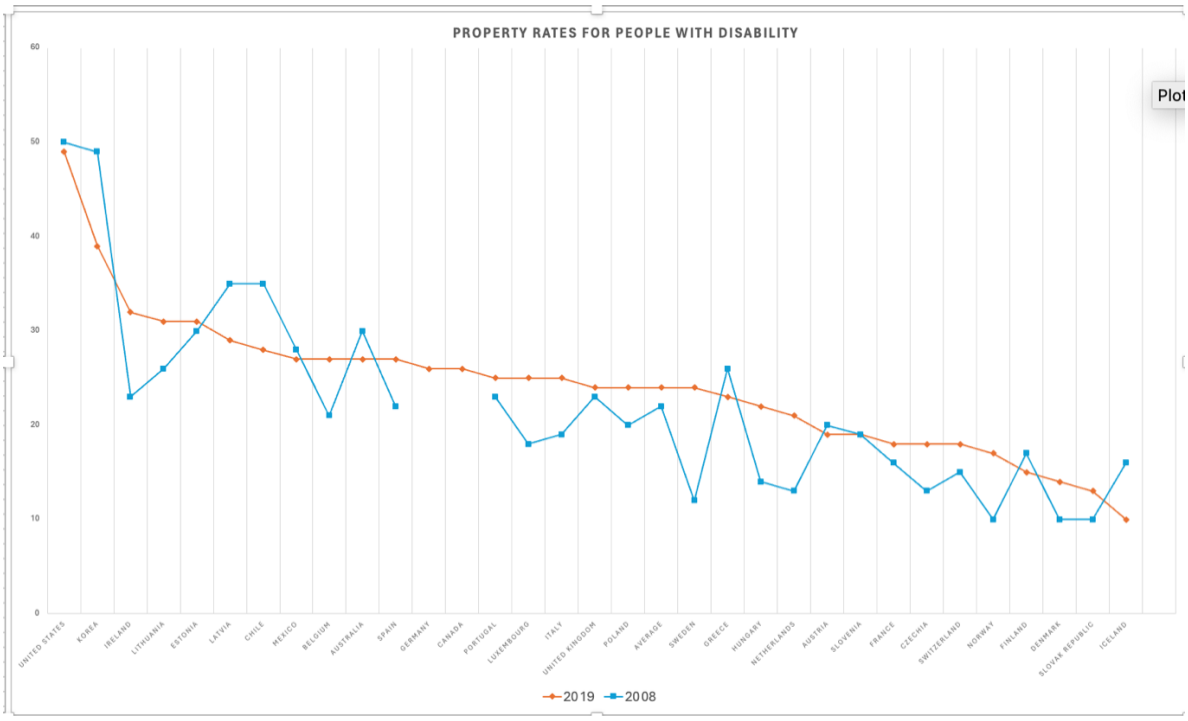
The chart below compares the relative poverty rates of people with disabilities between 2019 and 2008. Ideally, the rates should have decreased in 2019 compared to 2008, but surprisingly, they have either increased or remained the same in some countries after a decade.



Here are some issues with the chart:

- Many data points overlap, making it hard to see even small differences.
- The graph may be difficult for screen readers and other assistive technologies to interpret, which could prevent some users from accessing the information.
- The use of only blue and gray colors is not ideal for colorblind users and doesn't effectively highlight key differences in the data.
- The title of the graph shown is complex and difficult to know what the graph is about at a glance.
- The scale of Y-axis is not long enough to show the difference between each data.
- The current design fails to showcase interesting patterns or trends, such as which countries are doing well or poorly in terms of gender representation.
- Again, the graph may not be easily interpretable by screen readers, limiting access to important information.

This **line graph** illustrates the employment rates of people with disabilities over a decade, compared to those without disabilities. The trends indicate that employment rates for individuals with disabilities have not improved significantly, contributing to the persistent poverty gap.



According to the proposed chart,

- It has better trend visualization. Now, using line chart clearly shows trends and changes in property rates for people with disabilities across countries over an 11-year period.

- It enhances data density and accommodates more countries in the same space, providing a more comprehensive view.

- The Y-axis scale is now sufficiently tall, with intervals of 10, allowing us to easily observe the difference between 50 and 10.

- The title of the graph is now focused on specific context called “Poverty rate for people with disability”.

- Easily shows data insights which countries have improved (where the orange line [2019] is lower than the blue [2008]) and which have been improved in 2019 than in 2008.

- Sorting data into specific order will improve the visualization for viewers. In the proposed graph, the 2019 dataset was set in descending order so that it looks organized and clear unnecessary disturbs.

- Color usage is also important, and combination of blue and orange, which are more distinctly visible for most viewers.

- Rather than bar chart, usage of line chart provides a richer, more nuanced view of the situation, including changes over time and relative positions of countries in both years.

Conclusion

In summary, good data visualization is essential for making complex information easy to understand and engaging. In this assignment, we looked at different visualizations related to gender equality and poverty among people with disabilities using OECD Health Statistics. Each visualization offered valuable insights but also showed areas that could be improved.

We found that things like color choices, how much data is shown, and how data is organized can greatly affect how clearly information is communicated. For example, using contrasting colors and clear layouts helps people read and compare information quickly. Using different types of charts can also show trends and differences over time more effectively.

While the original graphs provided important data, our critiques pointed out the need for clear and accessible designs. By fixing these issues, we can create better tools that help people understand and engage with important social topics. Ultimately, thoughtful data visualization not only shares information but also encourages discussions and actions for equality and social justice.

References

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2. "Visualization Analysis and Design" by Tamara Munzner, 2014
3. https://medium.com/data-and-society/data-visualization-critique-275170c32c3b