Design Critique by Kyra Kieskamp

Introduction

Dow Jones & Company INC, and specifically Andrew van Dam and Renee Lighter present a full on visualization tracking both national unemployment and job gains and job losses over a time frame of respectively 2007-2015 and 1950-2015. The visualization can be accessed at the webpage of 'The Wall Street Journal'. As the data used in the graph origins from the Labor Department and the National Bureau of Economic Research via the Federal Reserve Bank of st. Louis. This indicates that the data shown in the visualization is from the st. Louis region. However, this is not mentioned specifically. The overal visualization consists of a mix of four different figures, graphs and tables, that have interactions between them. In this paper, these four visualizations will be analyzed on whether or not their tasks and goals are achieved, if graphical integrity is upheld and how effective and just the chosen design principles, and visual encodings are.

Visualizations and tasks

The problem domain of the visualization as a whole is showing the trends in job gains and losses and the unemployment rate, and additionally periods of recession. The first two visualizations, a graph (sectors graph) and a table (sectors table), show the percentage change in amount of jobs (either positive or negative) in a sector compared tot the total jobs in that sector the previous month. Of the total of 20 sectors shown, from construction to education to federal government, the graph represents both the amount of sectors with a posive or negative change and in colour the actual percentage. Due to this, a recession time is visual. In the table, more detailed information is given on the total sector size, total change in months, the amount of months with positive or negative change throughout the years. The second two visualizations, are focussed on the unemployment rate since 1950. Both a figure, visually showing the unemployment rate each month by colour coding (unemployment figure), and an actual graph showing the unemployment rate overal. These charts can be adjusted to showing the unemployment rates of several groups in gender, age, race/ethnicity, and education.

Cairo mentions in chapter 2 four possible tasks of a visualization, namely present, compare, organize and correlate data (2012). Each of the visualizations have their own focus and their own tasks. The first visualization, sectors graph, mainly helps the user to compare and correlate data. The first thing the user could pick up on is the overal trend of the economy, so the total amount of sectors in which growth occurred and the amount of sectors that decreased. Additionally, a comparison can be made between the absolute percentages between various sectors in one month using the colour codings. Using the sectors table both the takss present and organize can be achieved. Data regarding the sector size, monthly change in the total of jobs, total months with positive and negative changes are presented using numbers, bar charts, and colours. The user him/herself can organize the data as the interactive feature is implemented for clicking and sorting the list on either one of the topics presented. The third visualization, the unemployment figure, has comparison as main task. Due to the color code, the user can compare the years and see trends in when unemployment rate was relatively high, 11 % or more, or relatively low, 2% or less or somewhere in between. Additionally the recessions are shown as well. The last visualization, the unemployment graph, mainly presents data

regarding the unemployment rate in a graph. Yet, the user can draw correlations by adjusting the data for specific groups.

Tufte's principles

Edward Tufte's principles of graphical integrity and visualization design and graphic design are important to adhere to as mentioned in the lecture on Graphic Design by Hanspeter Pfister. The principles of graphical integrity are divided among three subjects, namely the (propper) labeling of scales, the so called lie factor, which is the effect shown in the graphic divided by the size of the effect in the data and showing data variation and not design variation. Overall, the visualizations do not all have proper labeling of their scales. Especially the two visualizations on the employment rate lack labeling. This is probably done as the user can still figure out that the x-axis contains years and the y-axis contains either months (in the figure) or the unemployment rate (in the graph). Additionally, the title of the sectors table does not change along with the data, it stays at November 2015, even when this data is not represented in the table. The lie factor in the overal visualization could be seen as reasonable. One of the points which creates a sense of inbalance is that the darkest colour red in the sectors graph on the negative side does not have the same absolute value as the colour blue on the positive side. Additionally, in the unemployment figure, the colour range seems to be chosen rather randomly. The colour green seems to show that the unemployment rate is good, but no valid reasoning seems available for the range where shades of green turn into shades of red. The data variation versus design variation is good. All the designs stick to their colour coding.

The visualization design prinicples of Tufte, data-ink ratio, avoid chart junk, increase data density, and layer information, are reasonably adherred to. The first visualization, the sectors figure shows relatively a lot data in its regards to the ink used, whereas the unemployment figure only expresses one type of data while the ink used is almost as much as in the first visualizaiton. Even though the unemployment figure is a good visualization of the overal trend of the unemployment rate, it is easier to understand at first glance than the unemployment graph, the data itsself is not an extra addition. So, this visualization might be considered redundant. Overal there is not much chart junk. Yet, the sectors figure tends to be overwelming as much data is shown. Especially the black dots indicating alike sectors in the various months, does not add clarity to the visualization. Additionally, the information about amount of months rising and falling is not encorporated in any kind of visual form. So, either this data might be seen as chart junk, or an extra visual needs to be added to this data to be able to correlate this and give a meaning to it regarding the context and the problem domain of these visualizations. The data density for both figures, sectors and unemployments, could be increased. At the moment they take up much space on the screen, while they are still readable when srunken down to 80% for example. Then the sectors table could be read while still having the sectors figure on the screen as well, increasing the given functionality and interaction between these two visualizations. The layering of information in visualization 1 is good. The recession is presented apart, and extra information of one sector is presented in the table when clicked. The information given with the colours and a popup occurs when clicking.

        a. Layer information.
            i. Reasonably good: vis 1
                1. Recession apart, overview of one sector presented when pressed

2. Colours (not best with the vague colours)
3. Popup, when clicking
4. Extra necessary info in the table
   ii. Table: some layers by colouring and the use of graphic bars in the table
   iii. Layering in vis 3 and 4, layers of each other. Perhaps not necessary. Little too much.

Points still to be assessed:

2. Graphic design principles:
   a. Contrast
      i. Vis 1: contrast mainly in colours
      ii. Vis 2: not much contrast
      iii. Vis 3: contrast due to colours
      iv. Vis 4: recession/no recession (gray/white)
   b. Repetition
      i. Repetition of colours in vis 1 and 2. Yet same colours used in vis 3, which do not mean the same in vis 1 and 2. This could be confusing to the user.
      ii. Repetition of marked resession in vis 3 and 4.
   c. Alignment
      i. Mainly centered.
      ii. Vis 3 and 4 aligned together, right on the graph, so it follows
      iii. Vis 1 and 2 are aligned centeredly. This is alright for this webpage.
   d. Proximity
      i. Vis 4: proximity of education and stuff.
      ii. Proximity of the two different stories told.

3. Visual encodings (Bertins characterisation – source/ S. Carpendale) / Heer paper (week 5)
   a. Intro sentence
   b. Visual encodings used/ appropriate
      i. Vis 1: circles for sectors, colours for growth/decrease etc. dots for alike ..
         1. Colours vis 1 is change
      ii. Vis 2: bars for amount, colour for growth increase/decrease
      iii. Vis 3: rectangles for months, colours for rate
      iv. Vis 4: colours, recession presented

References

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