September 13, 2012

Mr. Jeremy White
The New York Times
Dear Mr. White:

I am writing here to show my appreciation for the “Student Debt at Colleges and Universities Across the Nation” interactive data visualization design on the New York Times online at http://www.nytimes.com/interactive/2012/05/13/business/student-debt-at-colleges-and-universities.html.

I was thrilled when I first saw the visualization which at the first glimpse explicitly conveys one of the interesting topics – private schools tend to impose higher intuitions. The choice to use scatter plot as the visualization model is appropriate because it is good as showing the relationships between two variables in a data set. The color-encoded circles representing two types of schools are clearly distinguishable and the circle’s size depicting the enrollment amount is intuitive.

The feature of the timeline slider is very useful in revealing the transition and trend of the tuitions and debt at graduation, as well as their relationships. I can easily perceive that the tuitions of private schools increase in a faster pace than those of public schools, from 2004 to 2010. The “Schools to show” filter is also conducive to helping the audience view the dataset from different dimensions of interest, so as to reveal more stories. It’s also a good interaction design to allow audience to input their own data and compare with school averages.

Admittedly, your visualization design offers us the ability to delve into the student tuition and debt data. However, as I tried every features of the visualization, I found some space for improvement:

1. The Timeline Slider:
   - The slider thumb changes abruptly. I know this is caused by the data granularity of year, but the smooth transition of slider thumb is still helpful in aiding the audience with the perception of the change.
   - The transition of the circles uses an easing function that’s none linear, which is fancy but causes a jerk at the start which prevents audiences from keeping track of the moving circle. I recommend use linear easing function for the transition.
• BUG: I managed to move the thumb to 2009 from 2010 with the interaction for circles updated for 2009 and the graphics remaining at 2010, as in Fig.1.

![Figure 1](image)

**Figure 1** The left panel shows the view for 2010. The right panel shows the malfunctioning timeline slider moved to 2009 while not updating the view.

2. The “School to Show” Filter:
   • The filtered-out circles are hidden rather than dimmed, which removes the context for the selected data. It’s better to just lower the opacity of the filtered-out circles.
   • It is confusing that the arrow point to right in the top level categories means “expand”, while it continues to apply for the sub-level categories which cannot be expanded.

3. Your Debt Interaction Feature:
   • BUG: Extreme input like $2 generates wrong tag.
   • After I input my debt, there is no way to remove the “Your debt” tab, which sometimes occlude other visualization elements.

4. The Map View is not serving for much purpose:
   • After the circle representing each educational institute is mapped into a geographical map of USA, the overlapping problem gets exacerbated. I recommend using transparent circles so that the color can agglomerate. Alternatively,
   • The power of timeline slider is extremely reduced because it only reveals the change in the size of each circle which is hard to perceive. To better show the change, I recommend using hues of color to encode the enrollment and instead use shape to encode school types.

5. Design Suggestions:
• The transition of the circle is transient so audiences must play the slider again and again to grasp the change. It’s better to draw the trail of the circle when pointed by the mouse, or draw a fading trail as the circle moves.
• The zooming bar design is not perfect. The zooming process is so fast that audiences lose track of where it goes. This can be solved by implementing mouse-oriented zooming using the scroll wheel. Also a sub view with a window showing where the current view is among the whole data helps to orient the audiences.

6. Implementation Problems:
• I’ve tested the visualization on different platforms, including a laptop, a tablet and a smart phone. It works smooth in the laptop but not in the tablet and the cell phone. Since, mobile devices have been increasingly growing as an alternative way of traditional stationary computer in helping users accessing online information, it’s obvious making our application fast and nice in those devices is a good consideration.

Nevertheless, this visualization application succeeds to convey the information that it was designed for. Hope this letter go to you and help show my appreciation and potential suggestions for future improvement of the visualization application design.

Sincerely

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