Re “Student Debt at Colleges and Universities Across the Nation” (interactive graphic, May 12):

Congrats to the NYTimes Graphics Design Team on their continuous effort and success in delivering captivating and enlightening visualization to the mass reader base. As part of my graduate course work at University of Maryland College Park, I have decided to present a short critique of one of their recent works - Student Debt at Colleges and Universities Across the Nation (nyti.ms/sdebt).

**Objective achieved for intended audience:** I am assuming that the visualization’s main objective is to illustrate the rising cost of college and the burden of debt, whereas the intended audience are students, parents and interested stakeholders who are comfortable with using a browser enabled device. I believe the design team has been successful in conveying their main message through the initial animation. The visualization does a commendable job of first providing an overview, then letting the user zoom & filter to a certain degree, and lastly view certain details on demand.

**Platform and browser compatibility:** The visualization performed satisfactorily with major browsers in Windows. Though I was unable to evaluate it on other platforms, the designers should ensure that it works well on mobile and tablet browsers. The colors used were not only aesthetically pleasing but also differentiable for the colorblind (Error! Reference source not found.).

**Better analysis with existing variables:** Further analysis would be possible by plotting the other variables on the two axes. For example, the fact that ‘higher graduation rate have a correlation with annual tuition in private schools’ is not clearly visible. The fixed color labels, on one hand, make the Public / Private filter redundant (Figure 2, #1) as public and private schools are always displayed in different colors. On the other hand, the labels would help in analysis if they could be colored based on the other variables as well. (e.g. Error! Reference source not found.)
**Axis customizability and uniformity:** The axes are not customizable other than the default zooming and panning capability. Providing limits for the maximum and minimum values would reduce user error possibility and provide flexibility. Furthermore, the default axes for the comparable variables (graduate cost and tuition) are disproportionate as seen in Figure 3. This is a major data journalism issue as it can lead the user to believe tuition is increasing at a significantly higher rate compared to graduation debt.

**Multilevel filtering and multiple object selection:** The filtering options for the visualization are limited as one can neither drill down based on multiple variables at the same time; nor arbitrarily select multiple items from the visualization to follow separately or to see details for comparison. Lack of dynamic query range sliders for the variables is another area of need here. The useful option for selecting and following a certain university could be further improved by including a shadow tracker like Gapminder or a tracing line (e.g. Error! Reference source not found.).

**Lack of scale:** Looking at the bubbles, it is difficult to determine the absolute significance of their size since there is no scale or reference for the sizes either in the chart or in the tooltip details (Figure 1, #5 & #3).

**Other issues and recommendations:**

- The visualization uses ‘schools’, ‘institutions’ and ‘colleges’ to refer to the same entities. A single term among these three should have been used to maintain a standard.

- The font sizes in some instances are too small for the visually impaired. Making the texts larger and using a small-size-friendly font like Verdana could be a solution.
• There’s seems to be an issue with the enrollment size – most probably the data is available for only one year. This is why the bubble sizes do not change in any view and hitting the play button in the ‘map’ view results in nothing.

• Two export buttons might have been significant additions: 1) Download data of the selected universities and 2) Share the current state of the visualization.

• It might be useful for the users to view both the map view and chart view side by side, especially when viewing only selected universities or universities from a certain geographical area. (e.g. Figure 6)

![Figure 6: Mapview and Chartview side by side](image)

• The autocomplete search (figure 1, #2) is useful but the top search bar seems separate from the visualization. Removing or dimming the horizontal bar (figure 1, #4) is a possible answer.

• The mouse wheel should be bound with zooming (an example can be seen here: nyti.ms/OiGC8k) so that the controls are intuitive.

• The y-axis label can be made horizontal (figure 1, #6) so that it is easier to read (as mostly recommended by Edward Tufte and Stephen Few).

The visualization’s performance is praiseworthy. The design is consistent and user-friendly. The tasks are short, reversible and did not generate significant errors. Despite the minor improvement areas, I believe this is a powerful visualization that performs as a capable aid for its accompanying articles. Thank you Jeremy, Archie, Andrew and Andrew for such a delightful visualization and keep up the good work!

Kazi Minhazur Rahman
College Park, Md., Sept. 13, 2012
minhaz@gmail.com

*The writer is a graduate student in the Master of Information Management Program at University of Maryland College Park.*