Data Visualization Practices in Education

Recommendations for Philanthropic Efforts

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Executive Summary

Good visualizations empower; bad visualizations mislead

It might be hard to concretely define what constitutes good data visualization, but bad visualizations are usually apparent. They contain bad scales, ambiguous color legends, and unnecessary clipart – components that mislead and overwhelm rather than inform and empower. This report identified three main aspects of good data visualization based on human visual cognition theory: finding the appropriate symbolic representation for the data, maximizing information through layers and channels, and reducing "chartjunk" whenever possible. Additionally, in order to make visualizations inclusive, creators should use additional differentiating factors beyond color and text to ensure that individuals with color vision deficiency and low language proficiency can still access vital information.

Visualization designers need to understand the user

A crucial aspect of data visualization design is understanding user behaviors and preferences. For education data in particular, because stakeholders of data usually vary significantly in priorities, behaviors, and cognitive patterns, making the wrong assumptions about what the users hope to learn would lead to failed message delivery. As such, foundations and agencies should seek to provide easy-to-access resources to creators of educational data visualizations. This can be in the form of concrete user behavioral guidelines, streamlined user research toolkits, and access to user research professionals.

Analysts, educators, and researchers should collaborate on data projects

Data analysts, educators, and academic researchers employ and create different kinds of visualizations that are usually siloed within their practice – educators need data to help their classroom practice; data analysts strive to engage policymakers to make changes; researchers are focused on innovative data visualization prototypes. There is a need for collaboration across sectors to create projects that are rooted in the latest development in data visualization techniques, informed by best practices in educational

settings, and used by real educators in practice. This is best accomplished not by occasional workshops, but by shared projects that require continuous involvement.

Promote visualization literacy amongst the public to allow for more powerful visualizations

The only long-term solution to improving data visualization is through data visualization literacy education. Not only do we want to equip data visualization creators with more knowledge and skills to implement better visualizations, but we also have to promote a deeper understanding of data and data visualization in the general public. In this way, consumers of data visualization would not shy away from complicated visualization designs and would be more willing to explore and investigate data through visualization. Promoting visualization literacy can be achieved through targeted outreach and educational programs, and freely accessible and user-friendly data visualization tools that contain tips and recommendations. Over time, through expanded exposure, it is possible that everyone can understand complicated visualization designs as easily as a bar chart.

Ideas to improve data visualization in education

Immediately actionable interventions

- Evaluating ongoing projects using established data visualization guidelines
- Disseminating data visualization guidelines to future project leaders
- Hosting data visualization design competitions for educational data
- Hosting data literacy hackathons to collectively brainstorm ideas to improve data and data visualization literacy

Longterm initiatives

- Funding projects that require collaboration among educators, analysts, designers, and researchers
- Supporting technological advancements in human-centered visualization design tools
- Promoting data and data visualization literacy through targeted outreach and educational programs