

Institute of Educational Statistics
National Center for Education Statistics

INNOVATIVE GRAPHICS for NCES ONLINE REPORTS

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EXECUTIVE SUMMARY

Well-designed statistical graphics can grab the attention of the viewer and invite curiosity while providing statistically accurate, relevant, and suitably detailed information. NCES seeks to expand how they communicate their data analysis from basic, static maps and graphs to “Living Graphics” that will encourage viewer engagement and navigation for its online reports, with special emphasis on accessibility for the full spectrum of its audiences. NCES charged the National Institute of Statistical Sciences (NISS) with convening a panel of technical expert to address three aspects to this transition: Technology, Information, and Form/Design. Specifically, the panel was asked to identify key decisions and a program for transition. The panel framed the context for their deliberations in terms of the following questions:

- What technology decisions are needed for implementation of a system with a 5- to 10-year lifespan?
- What kinds of statistical graphics will make increased, relevant, and interesting information accessible to viewers?
- What are the design opportunities for interactive graphics and maps to engage viewers?

The panel met virtually for four conferences between January 6 and January 22, 2021, with additional *ad hoc* video conferences during preparation of this report.

The panel proposed a path forward in three phases from static to dynamic custom graphics.

Phase 1 consists of immediate goals for NCES and its contractors. Initiate work on improving static graphics to communicate data more effectively by utilizing data visualization best practices, including a greater variety of static graph types, and incorporating consistent styles and branding. At the same time, NCES can immediately explore creating static “infographics” that combine charts, text, images, and more into single images. First steps are to build a data visualization resource library and provide training to NCES staff.

Phase 2 for NCES and its contractors. Advance graphics to include basic interactive graphics such as drag and drop tools to the NCES websites. Introducing interactive capabilities would encourage users to interact with the data in ways that help them gain insights more easily. Once these capabilities are in place, NCES staff and contractors need only modest training to include interactive graphics in their reports and webpages.

Phase 3 for NCES. Invest in creating more complex graphics--like those that are commonly published by major media outlets. These typically require custom coding and programming languages, requiring additional staff or working with contractors.

Major Strategic Recommendations include:

1. Identifying the target audience at the start of each project is a top priority. Data visualizations have limited impact without understanding what the target audience wants and what they will use. The desired level of NCES directed data story versus user-directed exploration and local versus national focus may vary greatly by target audience. Information about the audiences and whether efforts to engage them are successful should be collected.
2. A more strategic approach is needed for the communication efforts between NCES and their contractors. In particular, RFPs should ask for:
 - a) A portfolio of the contractors' past creation of standard types of charts as well as more novel, engaging charts.
 - b) Specification of a data communication team such as data visualization specialists, graphic designers, and media experts.
 - c) A full dissemination and social media plan for the final product.
3. Two products are needed for NCES staff and contractors:
 - a) A branded style guide, particularly for charts, graphs, and tables.
 - b) Templates for standard packages that can be reused by agency staff and contractors.
4. Choice of static or interactive format for each visualization depends on the particular use of the graphic and the audience. While interactive graphics often get high-profile attention, they also can interact badly with some platforms and can be expensive to create.
5. Each visualization should be coupled with easy access to a data file, spreadsheet or other easily accessible format that contains both the visualized measurements¹ and their associated uncertainties displayed.
6. By the final phase of implementation of the project, most visualizations produced by contractors should be designed so that NCES can assure long-term maintenance of the code and the capability to add new features without returning to the contractor for minor revisions. For more complex and customized projects that require the use of expensive tools or tools with steep learning curves, NCES may need to consider staffing changes that may not be cost-effective.

Additional specific recommendations are included in the report.

¹ NCES needs a data file containing information required to reconstitute the graphic, for purposes of maintenance of the online report and graphic. Data files for public access are limited to data points that could be extracted from the graphic, such as coordinates for points or equations for lines displayed.