Distilling jargon: A case study examining the efficacy of government information visualizations

Lauren Kilgour, University of Pittsburgh
Eleanor Mattern, University of Pittsburgh

Abstract

In 2010, the federal government passed the Plain Writing Act, a piece of legislation that calls for clearly and concisely written government information. While this statute focuses on textual communication, its passage illustrates the government's broader concerns with improving the accessibility of all government information. The same principles should guide the creation of non-textual communications, including visualizations intended to illustrate and accompany government information. This poster applies a case study approach to consider how current visualization methods and techniques might be modified in the future to more equitably distill government jargon. The case study looks at the Patient Protection and Affordable Care Act (ACA) and how this act is currently being visualized for lay audiences. We compare and contrast the text and visual versions of the ACA to examine what information is lost when concepts are transferred into visual format, as well to consider the efficacy of the visualization.

1   Introduction

We routinely encounter dense, jargon-filled information resources, which are very difficult for the majority of the general public to independently interpret. These resources often take the form of terms and conditions, insurance policies, and legal statutes that govern our actions. Despite such difficulties, there is currently no formalized, cohesive, or equitably effective way to translate expert information for lay audiences.

Recently, however, the US federal government signaled a commitment to improving the legibility of published information through passing the Plain Writing Act in 2010. The act's purpose is to "improve the effectiveness and accountability of Federal agencies to the public by promoting clear Government communication that the public can understand and use" (Sec. 2). The act itself does not consider how visual aids, which may distill concepts from text or be used in lieu of text, may be governed by "plain language" principles or what the "plain language" of visual aids might be.

This poster is premised on the principle that it is imperative to consider how visual aids for government information can be designed to be of the greatest use for all. Consequently, this poster presents a case study analysis of a visualization used by the federal government to explain key elements of the Patient Protection and Affordable Care Act (passed 2010, upheld 2012) to the general public. We share preliminary findings from comparative content and

framework analyses and conclude by considering how this research can be expanded to increase user participation in the design process and diversify how information is communicated.

2   Research Questions

[1] How effectively is government information currently distilled by visualizations?
[2] What challenges might viewers experience when trying to understand government information visualizations?

3   Literature Review

The *multimedia learning theory* belief that "[p]eople can learn more deeply from words and pictures than from words alone" (Mayer, p.1, 2005b) has begun to permeate practice and study in fields other than education. In law and medicine, visualizations have been used to communicate health literacy concepts and juridical language and processes (Edwards et al., 2002; Lipkus, 2007; Garcia-Retamero & Galesic, 2010; Haapio, 2013;). Yet, because visualizations are not universally successful (Mayer, 2005a) and there are currently no cohesive, agreed-upon guidelines for creation, scholarship is increasingly studying the design and development of visualization methods toward establishing best practices for visualizations (Nelson et al, 2009; Curtotti & McGreath 2012).

There are, however, ongoing efforts among researchers to develop techniques for producing comprehensible visualizations and evaluative frameworks for measuring visualization quality (e.g. Shneiderman, 1996, Tufte, 2001, Amar & Stasko, 2004). This paper is informed by Shneiderman's heavily-cited work on visualization quality. As a response to the information overload and anxiety that people often feel when seeking or trying to understand information resources, Shneiderman (1996) developed a "mantra" for designing effective information visualizations. The mantra operates on the core principle that, when looking at visualizations, people want to gain an overview of the visual's topic and information, identify items of interest, and learn further details about the items of most interest to them. Shneiderman argues that the ability to act out these three steps form the central characteristics of effective visualizations and should be the first concerns of the designer.

Overview first, zoom and filter, then details-on-demand
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Figure 1. Shneiderman's "Mantra" as it appears in his paper (p. 337)

Methods

Using comparative content analysis as a methodological approach, this poster contrasts the content and properties of the complete Affordable Care Act document with a visualization that the government has provided to help the general public interpret and understand the statute's "key" features. We then frame our analysis of the visualization through applying Shneiderman's heavily cited "mantra" evaluative framework.

Overview: The Patient Protection and Affordable Care Act and its Visualization

The Patient Protection and Affordable Care Act (more commonly referred to as the Affordable Care Act or ACA) was signed by President Obama on March 23, 2010. It is meant to provide those seeking American health care with flexible and affordable options that enable them to make informed decisions about their health. As a document, the ACA is divided into ten sections, is 2,409 pages, and covers a sweeping set of topics related to health care provision. As a visualization, it is illustrated on one webpage.

Figure 2. "The Affordable Care Act, Section by Section" (U.S. Department of Health & Human Services "Read the Law" webpage)
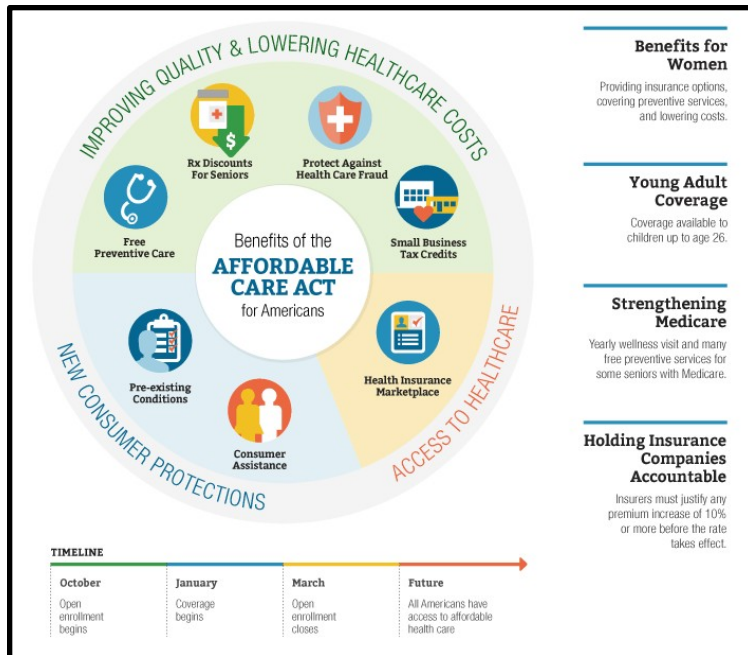
Figure 3. Visualization of the ACA (US Department of Health & Human Services "Key Features" webpage)

Preliminary Findings of Comparative Content Analysis

- While the visualization includes few words, it employs language that is in the document itself.

- There are no visuals in the act itself. In the visualization, chapters are represented small thematic icons (a stethoscope, a money sign, a "Red Cross" emblem).

- The visualization does not note any of the direct costs of the ACA.

- The visualization does not explain how any of the concepts outlined in the act itself function or are implemented.

- The visualization does not explain how changes brought about by the ACA will be effected.

Preliminary Findings of Framework Analysis of the ACA Visualization

Employing Shneiderman's "mantra" of "overview first, zoom and filter, and details-on-demand," this analysis discovered:

- The visualization covers topics present in the statute, succeeding in providing an "overview" of what the document is explaining. The visualization does not use language that is a departure from the language in the ACA itself. The viewers would understand this visualized overview only if the original descriptors in the statute are intelligible.

- The visualization also covers key changes brought about by the ACA, again overviewing notable elements. By illustrating thematic areas of focus present in the ACA, the visualization provides its viewers the opportunity to "zoom in and filter" the components that are of most interest to them.

- The visualization is static. Users are unable to click on the visualization to reveal more information about areas of interest to them, (those that the users "zoomed" in on and "filtered" out). The visualization thus fails facilitate "details-on-demand," and is consequently absent a quality that Shneiderman views as important.

These analyses reveal key ways that the visualization might be improved, as well as identifying key questions about the nature of visualizations more generally. First, very little of the language from the ACA has been simplified for the visualization. Additionally, beyond illustrating the thematic areas, the visualization fails to provide much insight about substance. This adherence to the ACA's word choice and the lack of an extended explanation of its contents are critical deviations from Shneiderman's principles of effective visualizations. If viewers do not find the language accessible, it is difficult for them to interpret the visualization's overview. Furthermore, because viewers are not able to select any element of the visual to learn more about areas they find interesting, it is difficult for them to carry out the final two elements of Shneiderman's "mantra" - "zoom and filter," and details-on-demand. With its diction, lack of digital interactivity, and singularity as a visual artifact, it is unlikely that the visualization would do much to augment the public's understanding of the ACA.

Conclusion
This poster compares the content of the original ACA and the visualization and analyzes the visualization through Shneiderman's framework. The goal has been to begin an exploration of how such government visualizations might be made more effective and equitably comprehensible in the future. There is an opportunity for information scientists to contribute to the development "plain language" visualization guidelines that will complement the Plain Language Act's aims. Our future research is animated by the following questions, which have broad significance for fields such as education, law, health, finance, and policy.

[1] What tools are available for visualizing government information?

[2] How can principles from the Plain Language Act inform a set of best practices for visualizing government information?

[3] How involved are end-users in the design of government visualizations for the general public? How can they be empowered to make and share visualizations that work for them?

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