Infographics: Horrid Chartjunk or Quality Communication

Michael J. Albers
East Carolina University
albersm@ecu.edu

Abstract – Infographics continually appear across a wide span of websites. Design teams have embraced the trend toward infographics, but often misuse them by focusing on visual presentation rather than presenting information appropriate for the audience and content. The results are artful infographics that lack a clear audience or message. In addition, many of the infographic design guidelines seem to be based on posters. An analysis of a collection of infographics found they can be divided into four categories: bullet list equivalent, snapshot with graphic needs, flat information with graphic needs, and information flow/process. Only last three are appropriate for infographics. Several areas needing further research are identified: (1) how people comprehend the infographic and how they connect that understanding into the bigger picture, (2) better guidelines on when/how to create infographics, and (3) how to craft the content into an integrated presentation with text and graphics supporting each other.

Index Terms –Complex information, Comprehension, Infographics, User experience

INTRODUCTION

The web, especially Facebook and Pinterest, is awash in infographics. Even more telling, technical communication discussion lists have a continual set of threads about designing infographics. At both the popular and professional level, we clearly embrace the idea of using visuals, but I wonder if the trend to infographics has gone in the wrong direction and resulted in flagrant misuse of visuals and a failure to communicate. The loose definition of infographic used here is: an infographic takes a large amount of information in text or numerical form and condenses it into a combination of images and text with a goal of making the information presentable and digestible to an audience

After reading various websites on how easy they are to create, it seems everything should be presented with infographics rather than more focused graphs, charts, and text. There are many web pages with titles like "Seven Tips for Impressive Infographics;" unfortunately, most of their content sounds like a retread of old PowerPoint or 1989 newsletter design advice. They push adding glitz rather than defining intended audience and what content to communicate. They focus on numbers paired with clipart, because "visuals add interest." The result is a low information density design filled with an overabundance of clipart, fonts, and chartjunk that may be artistically pleasing, but fails to communicate its message.

On the other hand, some infographics are useful and do communicate. The important question is what separates the two? We create content to communicate information about a situation. The information that is supposed to be communicated by a typical infographic qualifies as complex information, but typical infographic design reshapes it into simple information [1]. That transformation seriously limits the comprehension a person can gain of the overall situation relevant to the infographic.

There is a rich literature on visual rhetoric and use of specific visual techniques to communicate information. Rather than working at that level, as a preliminary study, this works takes a more holistic approach to classifying infographics. Later work must connect how well the visual rhetoric literature does or does not map onto high quality infographics.

METHOD

As a preliminary method of analyzing infographics, the author performed an open-ended card sort on a collection of infographics.

Collecting a random sample of infographics proved difficult. This sample was collected in two different ways. First, all infographics in every Facebook or LinkedIn post from a friend that pointed to one was saved. Hopefully, these would be above average since other people were taking the time to share them. Second, a Google search for "infographic images" and then clicking on the "images" link. The first 25 unique infographics in the list were saved (some appeared twice in the first 25).

The results of the card sort are listed in table 1.

TABLE 1. CLASSIFICATION OF INFOGRAPHICS

Infographic type	Count	Percent
Bullet list equivalent	17	42%
Snapshot with graphic needs	4	10%
Flat information with graphic needs	10	25%
Information flow/process	9	22%

It is in the last two categories that infographics excel. Designers are faced with a complex mix of information that often does not lend itself to a strictly textual presentation.

I. Bullet list infographics

Bullet list infographics contain information that could be presented as a bullet list. They are a collection of facts that typically lack a clear audience and have no implicit visual component.

The large number of bullet list infographics (42% of the total) reveals a high misuse of infographics. A significant problem is an assumption that a visual presentation is inherently better than a textual presentation. The end result is essentially pure textual information which is dolled-up with an overuse of fonts and clipart. The issue of how to best communicate the information gets pushed aside for a visual presentation.

II. Snapshot with graphic needs

Snapshot infographics contain information that lacks a sequence for reading, is static, and typically does not need to be compared.

A problem with snapshot information infographics is that they often are not primarily visual. They are primarily a textual presentation with a single large visual added; a visual which often overpowers the text. Typically, they contain a large central graphic that grabs the reader's eye, but contains little to actually communicate the message. Although the infographic may contain good information, who the audience is and how the information is structured for that audience is not clear.

III. Flat information with graphic needs

Flat information infographics contain content that lacks a reading sequence, but supports comparing different data points. For example, an infographic about a city may display a breakdown of education levels or employment types. The text combines well with the charts to support comparing relative levels of information.

IV. Information flow/process

Information flow/process infographics contain information that shows some sort of flow or process in which the individual data points fit into an overall context. They have a reading sequence and their overall design must work to lead the reader along that path.

Showing flow or process is an inherently visual undertaking. However, the quality of the resulting infographic and its ability to communicate still depends on the integration of the text and graphics to present a coherent message.

DESIGNING FOR THE AUDIENCE

The ability of an audience to pull the most important points from the design should be considered a main criterion on judging design effectiveness. Regardless of how many individual data points are on an infographic, there is a small subset that forms the most important information. The difference in design quality could be defined by a person's ability to extract these points and connect them to the overall situation.

A significant portion of the infographics had a mismatch between the design, the audience, and how an audience would use it. Design-audience and design-use are two different issues and effective infographics must work for both.

I. Design and audience use

The design advice of how-to-create-infographic articles and the ways the audience views infographics are disconnected. Most how-to articles provide good information for poster-size graphics; the same advice I give my students in their poster assignment. However, most people view an infographic online and not as a poster. Clearly, there are design-use issues with this mismatch.

Viewing a poster-sized object on a screen results in information that is too small to read. Enlarging the image so it is readable puts most of the content off the screen and requires both horizontal and vertical scrolling, which is problematical and makes it more difficult to comprehend. Table 2 shows that slightly less than half of the infographics were readable on the screen with no scrolling (viewed as a full-screen image) or with only vertical scrolling.

TABLE 2. ONLINE DESIGN

Infographic type	Count	Percent
Vertical scrolling	7	16%
Readable on single screen	12	27%

Infographics with a vertical design, often discouraged in how-to articles, may be the best design for presenting information. The caveat is that the vertical design must fit widthwise onto the screen, requiring only vertical scrolling. In addition, the area seen should contain a complete set of information for the expected screen sizes. A very long area or ones that contain many lines/arrows

connecting elements to points above/below the visible area impair comprehension.

Although the vertical infographic can show process/flow information well, it may not be as effective with static information. Designs with the single large image need a poster-sized presentation to be effective. Designers need to consider the audience and perhaps rethink the basic design if the result will remain an online object.

In addition, people privilege what they currently see [2]. The content that is out of view, either with vertical or horizontal/vertical scrolling receives less weight in understanding and decisions.

II. Testing infographics

Testing the quality and effectiveness of complex communication inherent in good infographics remains an open question, even seven years after Redish [3] called for the development of new methods. Her call for a new approach recognizes most users operate within complex systems that present multi-dimensional challenges—layers of changing depth that, unfortunately, traditional usability methods often cannot adequately measure.

Usability testing of a complex system is fundamentally different from simple usability testing. Likewise, the testing of how people comprehend complex information is different from how they comprehend simple information. Accordingly, we must rethink how we test and how we employ new methods [3, 4, 5].

Traditional usability tests focus on fact finding (equivalent of button pushing on an interface), rather than on comprehension. Determining infographic value requires testing for comprehension and how well people can use the information.

Redish [3] argues that documentation move up a level and address goals and task repertoires and she recognizes that an emphasis on "higher than discrete task" is crucial for anyone doing everyday work. Tests of the user experience and comprehension of infographics is not a matter of determining if people can find/quote single facts, but do they understand how it fits into the bigger picture. It is not visuals that makes infographics effective, but the *appropriate* integration of both visuals and text. The user goals and information needs must be placed within the proper social and technical contexts. The testing needs to ensure the information is comprehensible within the multidimensional challenges presented by the complex information contained in the infographic [6]. Past research has consistently found people can perform simple tasks well, but have difficulty extending those tasks to realistic situations [7]. Defining how to design and test infographics to support complex situations needs to be a research priority.

FUTURE RESEARCH

A significant missing factor in infographic research is the comprehension level for the information. Designer's ability to judge how well people will comprehend their material varies, but it's the comprehension level which matters for complex information. Once the design requirements move past "look pretty," how well people comprehend the information and their ability to pull the most important points from the design become paramount. Moving forward:

- Most importantly, we need research into both how people comprehend an infographic and how they connect that understanding into the bigger picture. People come to an infographic for a purpose and with a goal. Addressing these goals in complex situations remains an open research question. With the growing use of infographics to communicate complex information, we must specifically look at how people read and understand them. Unless we understand that mental transformation, we cannot effectively communicate the information they contain.

- We need better guidelines on when and why to create infographics. Many of the reviewed infographics failed to clearly answer the basic question of "so what:" why should a reader exert the effort to comprehend it. More than the use of visuals, we need to consider the basic issue of audience, appropriateness of different presentations for different audiences—while acknowledging multiple audiences—and how to use a mix of visuals and text to communicate information.

- We need better guidelines on how to craft the content into an integrated visual, with text and graphics supporting each other. Too many infographics overly privilege the use of visuals. We also lack clear guidance on how to balance text and graphics.

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ABOUT THE AUTHORS

Michael J. Albers is a professor at East Carolina University, where he teaches in the professional writing program. His research interests include designing information focused on answering real-world questions, presentation of complex information, and human-information interaction.