

Communicating With Census Data: Storytelling

Select Topics in International Censuses¹

Released June 2017

INTRODUCTION

Storytelling communicates data or presents statistical results by stressing the importance of audience needs and maintaining focus on the author's primary message.

Effective data dissemination is one of the most critical tasks undertaken by national statistical offices (NSOs), especially concerning census results. The ultimate goal is to disseminate statistical data in ways that will be useful for varied users, will promote public interest in data, and will help data users to make informed decisions. With storytelling, NSOs can achieve each of these goals more effectively.

This technical note is part one of a two part series on *Communicating With Census Data*. This series illustrates the importance of conveying census results to a wide audience through the production of relatable and engaging data products.

This technical note discusses what storytelling is, why telling stories with data is important, and how to communicate with your audience through effective messages. It also discusses how to choose the most effective medium to tell your story (e.g., blog, infographic, brief, report) and the importance of incorporating an organization's statistical and corporate identity standards into their data products.

WHAT IS STORYTELLING WITH DATA?

Telling a story with data is a form of **explanatory data analysis** that can be used to present census results to external data users (Knaflic 2015, pp. 19–20). Explanatory

data products seek to highlight a specific feature of the data that may be of interest to specific users. Examples of such features include trends over time and relationships between variables. Explanatory products typically have a high level of refinement and undergo extensive internal review prior to release.

Explanatory analysis differs from **exploratory data analysis**, which is the process of becoming familiar with the data in order to generate the content of a data product. Unlike explanatory analyses, exploratory analyses are not typically released to the public.

WHY TELL STORIES WITH DATA?

Dissemination of census or survey data should be a fundamental part of the mission of any national statistical office. The United Nations' *Principles and Recommendations for Population and Housing Censuses* (Rev. 3) states that "[a] census is not complete until the information collected is made available to users in a form suited to their need" (United Nations 2015, p. 133). It further states that data from censuses "represent a valuable public good that should be widely promoted by national statistical/census offices in order to enhance its utilization by the various users" (United Nations 2015, p. 132). It is thus crucial that NSOs devote time, resources, and expertise to the dissemination of data.

NSOs face a challenge, however, in disseminating data in formats and modes that are relevant to different audiences. While some data users, such as policymakers and

¹ This technical note is one in a series of "Select Topics in International Censuses" exploring matters of interest to the international statistical community. The U.S. Census Bureau helps countries improve their national statistical systems by engaging in capacity building to enhance statistical competencies in sustainable ways.

researchers, may have the technical expertise to find and use tables of census results, many other potential users of census data do not. **Storytelling with data** is a way for NSOs to disseminate valuable census results to varied audiences while taking user interests and skills into account. Effectively telling a story with data can help users make decisions, address policy issues, or otherwise take action.

HOW TO TELL A STORY WITH DATA

Successful data storytelling requires an understanding of the context driving the need to communicate. Explanatory analyses require focusing attention on specific aspects of data for specific users. Consequently, authors must answer

these three key questions when drafting their communication plan (Knafllic 2015, pp. 20–28):

1. **Who** is the audience?
2. **What** knowledge do you want your audience to have, or what do you want them to do?
3. **How** can you use your data to convince your audience?

Figure 1 presents some examples of types of data users, the type of information they seek, and samples of effective means to convey knowledge to those groups.

Figure 1.
Who, What, and How: Storytelling for Different Audiences

The story you tell will depend on your audience. Below are examples of three different groups ("who") that are interested in learning about census or survey data. Each group includes examples of types of information the group may find interesting ("what") and effective means to convey knowledge to that group ("how").

Who? Who is the audience?

What? What knowledge do you want the audience to have?

How? How can you present your data to convince the audience?

General public (e.g., teachers, schoolchildren, librarians, news media, everyday people)



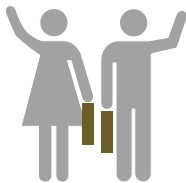
Community focus
Wide range of specialties and education
May know little about statistics

Basic characteristics of their communities and the nation
Notable trends and patterns
Demonstration of the usefulness of censuses, surveys, and official statistics

Focus on major trends and patterns
Avoid technical jargon
Relate content to their communities
Use simple visuals to tell a story
Create targeted products for communities

Storytelling mediums: blogs, infographics, standalone visuals (e.g., maps), physical products (e.g., data wheels)

Decision makers (e.g., senior executives, politicians, business leaders)



Administrative focus
Generalist
Influential
Educated
Results oriented

Indicators for planning and program monitoring
Indicators that may impact their constituencies or businesses
Indicators they can influence through policy or other action

Focus on major trends and patterns
Prepare executive summaries for lengthy technical reports
Avoid technical jargon
Relate content to their business needs
Use visuals for important indicators

Storytelling mediums: reports and briefs, infographics, standalone visuals (e.g., maps)

Power users (e.g., academics, researchers, analysts, civil servants)



Analytical focus
Specialist
Technocratic
Highly educated
Detail oriented

Patterns and trends across multiple indicators and sectors
Cross-tabulations, detailed geography, microdata
Methodological documentation to improve their analytical capabilities

Include descriptive statistics and use technical jargon if necessary
Use visuals to highlight patterns that may need further investigation
Provide detailed methodology
Provide access to structured data

Storytelling mediums: reports and briefs, standalone visuals (e.g., maps)

Source: U.S. Census Bureau.

Psychology of storytelling

Effective data presentation follows the **data-information-knowledge-wisdom (DIKW) hierarchy** (Chen 2009; Cairo 2011, pp. 15–17). First, data must be identified. Then, data are transformed into information by providing context, typically by answering the questions: “Who? What? When? and Where?” The final process is the transfer of information to a reader as knowledge and wisdom by answering questions such as “How?” Authors should remember this process when preparing statistical products for an audience, since creating and effectively transmitting information is the goal of telling a story with data.

Human memory is an important consideration for effectively transmitting data into knowledge. Memory can be broken into three classes: **iconic, short-term (working), and long-term** (Few 2012, pp. 65–67; Knafllic 2015, pp. 101–116). Iconic memory is instinctual and subconscious and houses awareness of **preattentive attributes** such as color and symbols that naturally draw a person’s attention (Few 2012). When presenting and telling stories with data, authors should appeal to iconic memory since it has the lowest mental burden for the audience.

Who is the audience?

Effectively telling a story with data depends on knowing to whom you are communicating. The United Nations recommends that NSOs identify diverse categories of data users as part of the consultation process for designing a census dissemination plan. Specifically, “[a] wide range of statistical products can be made available to the public, the private sector, government agencies, local authorities and the academic and research communities” (United Nations 2015, p. 135).

Different means of dissemination should be used according to each product’s characteristics and tailored to user needs. NSOs should draw on their data users to understand the kinds of issues they deem important. **Familiarity with data users and their needs** can give rise to ideas for specific data stories for these groups.

NSOs can also target data storytelling efforts at census stakeholders and other key decision makers in the census process. Stories tailored to meet the needs and grab the attention of key stakeholders can also reflect and further the agency’s priorities. Knowledge of the priorities of sponsors can result in stories that confirm or even increase the value of the data in the eyes of these important decision-makers.

What do you want the audience to know?

After identifying the audience, data storytellers should determine the **message** to transmit to that audience. Generally, the mission of NSOs is to **inform**, not advocate.

Therefore, authors need to determine what they want the audience to **know**. Without a clear message to transmit, authors should reconsider whether the proposed communication is necessary (Knafllic 2015, pp. 22–23).

Ideally, authors should have priorities in mind for each audience when planning data communication and align their message to inform the audience’s priorities. This approach is useful when communicating with decision-makers, as it prompts them to apply the presented data to an issue that concerns them. In the absence of accurate and appropriate information, it is not possible to make good evidence-based decisions and policies or design effective programs that address problems.

How can you use your data to convince your audience?

Following identification of the audience and the key message to communicate, authors should assess **which data are available to help make the intended point**. Census results typically contain a wealth of data on a wide variety of topics at multiple geographic levels, making it possible to develop many different stories. Choosing the appropriate data—the variables and geographic levels that will support your story—depends on the audience and the message. Data that could convince one audience may not convince another.

Recent census data are the most comprehensive and authoritative data available, so selecting the appropriate variables and geographies from the census data set can be the main emphasis of authors’ work. Authors may be able to tell a more compelling story by combining data from other sources with recent census data. Combining data from previous and current censuses allows exploration of changes over time, while combining data from a labor or reproductive health survey with census results can allow for a story about topics not included in the census or in these surveys.

During exploratory data analysis in preparation for a data story, it can be helpful to consider **contrasts and variation** that can serve as the basis of a compelling story. Such variation could be temporal (trends over time), geographic (contrasts between different areas of a country or between rural vs. urban), or socioeconomic (contrasts between groups with different social, economic, or demographic characteristics). Exploratory analyses of a variety of contrasts can lead to new storytelling opportunities. **Subject matter experts** (SMEs) should play an important role in designing stories, as they have deep knowledge about trends and variation. NSOs should involve SMEs in the planning of data storytelling products and their dissemination.

STORYTELLING TECHNIQUES

After answering the three key questions about their communication with data, authors can begin to shape the story. This section reviews some general techniques for storytelling and offers some recommendations for a successful story.

Focusing on the audience and message

When telling a story with data, it is often tempting to provide large amounts of unnecessary detail. However, effective communication requires **a focus on the audience and the main message to convey**.

Authors should consider the audience's perspective when generating content. Technical details should match the intended audience's skill level and data products should use plain language by avoiding technical jargon. The final product should not cover everything done in the exploratory data analyses, but it should include the critical assumptions and definitions used in the final analysis.

Successful stories make data relevant by putting the audience at the center of the story. Knafllic (2015, pp. 167–168) suggests that authors can employ techniques from cinema or other fiction genres such as the classic **three-act structure**, with a beginning (plot), middle (plot twists), and end (call to action). The story can also use narrative elements such as **conflict/tension** and **repetition** to keep the audience's attention.

Several concrete techniques can help creators of data stories stay focused on their audience and message. Knafllic (2015) recommends that planning for a data story should include articulation of a **3-minute story**, which would be a brief version of the longer story told in three minutes. She recommends further boiling down the story to a **big idea**, which is a one-sentence statement of the story's message. Exercises like this will help authors to reinforce the concepts of intended audience and message.

Staying on message requires precise control of the story's elements. In general, storytellers should order the elements of their narrative in a manner that leads the audience to the main message. This can be achieved with the help of **storyboarding**, which involves creating a visual outline of the content. One way of doing this is by using sticky notes or index cards for individual story elements, as these can be easily rearranged as the storyteller develops the structure of the story.

Choose the right medium to tell your story

The medium for a story influences audience interpretation of the message. A **trade-off between amount of control and amount of detail** exists for many forms of communication (Knafllic 2015). For example, with written forms of communication authors can present in detail but have little

control over readers focus as they move through the material. Live forms of communication afford presenters many opportunities to focus the audience's attention but do not allow for presentation of detail. Storytellers should keep this trade-off in mind when choosing a medium for a story.

While many formats are possible for data stories, authors can leverage the advantages of particular formats for data stories targeted at specific audiences. In contrast to standard census data products, the goals of which may be to disseminate as much data as possible, **data stories should be easily digestible**. The following formats allow for concise and convincing data stories:

- **Short report or brief:** Formal written products combining narrative text, standalone visuals, and data tables.
- **Blog:** Short article posted on a Web site, usually less formal than reports or briefs.
- **Physical product:** Promotional materials that may include bookmarks, data wheels, and postcards.
- **Standalone visual:** Chart, map, or table displaying univariate or multivariate data. See part 2 of this series, *Data Visualization*, for further information.
- **Infographic:** Combination of standalone visuals and narrative text. Further information about the use of infographics is provided later in this document.

Unlike standard volumes of tables or long reports, these formats work best with focused communications. They can also allow data visualizations to play a large role in the presentation of convincing evidence for the story. Furthermore, these formats allow for a degree of interactivity, allowing authors to guide audiences to the main message more effectively. This interactivity is possible even with physical products such as data wheels. Authors should also consider the intended **audience's preferences** when choosing a medium: some audiences may prefer digital presentations accessible from mobile devices, while other audiences may prefer paper-based communications.

Corporate standards

While data stories should leverage formats that allow for focused communication of a message to a particular audience, they should also follow NSO regulations regarding data products.

Corporate identity standards strengthen the NSO's brand and should convey a message of trust, authority, and professionalism. See Figure 2 for an example of the corporate identity standards used by the U.S. Census Bureau. These standards include elements such as font, color palettes, and overall look and feel of products from the NSO. Elements comprise some of the preattentive attributes mentioned previously. To create these standards, an NSO

may need to consult with a graphics designer or marketing specialist.

Design standards should apply to all data products, including storytelling products. Single graphics or visuals should not diverge from these standards. Furthermore, the appearance of one visual should be similar to another visual in the same product and across multiple products. The product as a whole should have the same look and feel as all other NSO products, regardless of the topic.

Another important consideration is **responsive design**, or designing products for compatibility across multiple platforms. In terms of storytelling products, authors should consider how their product will appear both on paper and in digital formats. Furthermore, if posting to a Web site, authors should consider how the product appears on multiple device types, such as desktops, laptops, smartphones, and tablets. Products for a wide audience should also meet accessibility standards for persons with disabilities and may need to be designed for use across multiple national languages.

NSOs should also establish and adhere to **statistical standards** when presenting data, such as the representation of the scale and the number of decimal places shown. All products should undergo a rigorous internal review process prior to release.

VISUAL STORYTELLING: INFOGRAPHICS

This section provides a brief overview of good practices for designing infographics, a popular form of storytelling with data. Infographics weave together narrative text and individual visuals such as charts, maps, and tables.

Figure 2.

Corporate Identity Standards

The elements shown in this figure are used in U.S. Census Bureau publications. They would appear above and below the visual itself. These elements are nearly identical across all Census Bureau publications, reflecting the agency's corporate identity standards and providing important context.

Table 1-1.

Population Aged 65 and Over by Age: 1900 to 2050

(Numbers in thousands. For information on confidentiality protection, nonsampling error, and definitions, see www.census.gov/prod/cen2010/doc/sf1.pdf)

<Visual would appear here>

Sources: U.S. Census Bureau, 2001, *Census 2000 Summary File 1*, Table P12, Washington, DC, available at <<http://factfinder2.census.gov/>>, accessed on February 20, 2012; U.S. Census Bureau, 2011, *2010 Census Summary File 1*, Table PCT12, Washington, DC, available at <<http://factfinder2.census.gov/>>, accessed on February 20, 2012.

Source: U.S. Census Bureau.

Advantages

Convey more information: A properly executed infographic condenses information into a relatively small space.

Tell a story: An infographic tells a story that would not be possible with a single visual or block of text.

Combine multiple visuals: Multiple types of charts, maps, and tables can be used within the infographic.

Condense longer narrative: Many users will not read an entire brief or report. An infographic can convey the important highlights.

Disadvantages

Time-consuming to read: Multiple visuals and text means the audience will require more time to read. If the purpose is to make a quick impression, an infographic may be inappropriate.

Difficult to design: An effective infographic requires extensive planning to combine text and multiple types of visuals. Balancing the appropriate amount of information to convey without overloading the reader is challenging.

Good practices

Note: These good practices are shown in Figure 3.

The infographic in Figure 3 effectively **tells a story** about Internet use in the United States. From the top: text context (the Internet is important); use over time (we are using the Internet more); use by demographic groups (certain groups use the Internet more than others); and use geographically (not all parts of the country use the Internet equally).

Graphical elements—such as colors, line weights, and font sizes—are used effectively throughout this example. Only the data points are emphasized, not the contextual elements.

Multiple visual types are used: a map, line chart, and bar chart. Each visual is appropriate for the information it conveys.

The text and visuals are **well-balanced**. The text provides context, but the dominant items in the infographic are the charts and map. Elements are arranged meaningfully by type and make effective use of white space.

Practices to avoid

Lack of substance: Infographics require extensive planning to be effective. Make certain the infographic conveys only useful information.

Excessive graphics: Infographics can be “overdesigned,” by including elements or graphics that distract rather than inform the audience.

Overuse of text: Use text, but not too much. Emphasize the visuals such as charts, maps, and tables using text in a supporting role.

CONCLUSION

This technical note has highlighted the importance of communicating census data through effective storytelling. It is essential that authors understand the needs of their audience as well as their capacity to understand statistical complexity before developing census data products. Using the storytelling approach, NSOs can improve audience understanding of their data, highlight important national characteristics, and disseminate their products more effectively.

REFERENCES

Cairo, A., *The Functional Art: An introduction to information graphics and visualization*, New Riders Publishing, Thousand Oaks, CA, 2013.

Chen, M. et al., "Data, Information, and Knowledge in Visualization," *IEEE Computer Graphics and Applications*, Jan/Feb 2009, pp. 12–19.

Few, S., *Show Me the Numbers: Designing Tables and Graphs to Enlighten*, 2nd ed., Analytics Press, USA, 2012.

Knaflic, C. N., *Storytelling with Data: a Data Visualization Guide for Business Professionals*, Wiley, Hoboken, New Jersey, 2015.

United Nations, "Principles and Recommendations for Population and Housing Censuses, 2020 round (Revision 3)," presented at The United Nations Statistical Commission 46th Session, New York City, 2015 (unpublished) available at <http://unstats.un.org/unsd/publication/seriesM/Series_M67Rev3en.pdf>, accessed on February 2, 2017.

U.S. Census Bureau, "Measuring America: A Digital Nation," 2016, available at <www.census.gov/library/visualizations/2016/comm/digital_nation.html>, accessed on February 22, 2017.

Figure 3.
Visual Storytelling: Infographics
Infographics can combine a brief narrative with visuals to summarize the author's primary message.

