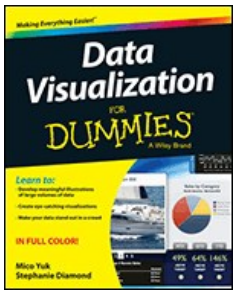


Data Visualization for Dummies

by Mico Yuk and Stephanie Diamond

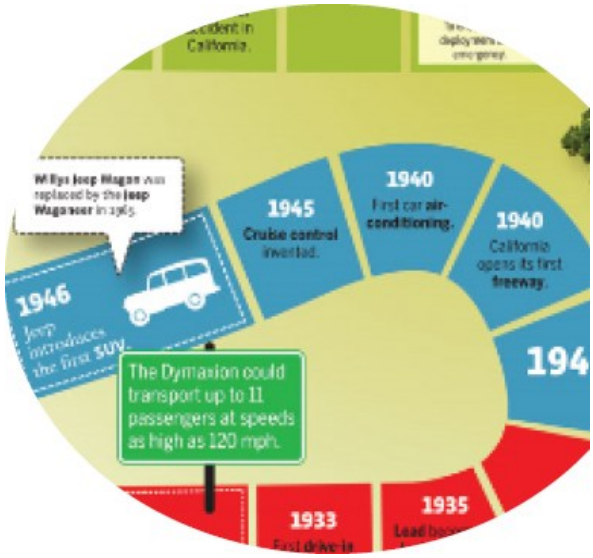
Chapter 2: Exploring Common Types of Data Visualizations

In This Chapter

- Understanding interactive graphics
- Selecting content for visualizations
- Looking at how different fields use visualizations
- Using cool infographics

We've all seen impressive visualizations that make us feel humble. You may ask, "Could I do something like that?" Chances are that if you're creating a data visualization for the first time, the answer may be "not yet." Creating data visualizations, like anything else, requires you to acquire some basic information and build your knowledge over time.

This chapter presents different types of visualizations so that you can familiarize yourself with the many options you have for creating data visualizations of your own.



Understanding the Difference between Data Visualization and Infographics

To simplify the process of understanding visualizations, we focus on the two most popular types: data visualizations and infographics. Because the use of graphical data visualizations is growing quickly, there is a bit of disagreement about how to define a data visualization versus an infographic. You may believe that the definition is clear, but when you get into more complex visualizations, you can start to wonder.

In their book *Designing Data Visualizations* (O'Reilly Media), Noah Iliinsky and Julie Steele use the following three criteria to determine whether to call a graphic a data visualization or an infographic:

- **Method of generation:** This criterion refers to what goes into creating the graphic itself. If a lot of original illustrations are created to explain the data, for example, it's likely to be an infographic. You often see info-graphics with beautiful, elaborate images created to explain the information. Figure 2-1 shows an example created by Coleen Corcoran and Joe Prichard. You can see the original image at http://thumbnails.visually.netdna-cdn.com/carland-a- century-of-motoring-in-america_50290aaca56d5.jpg.

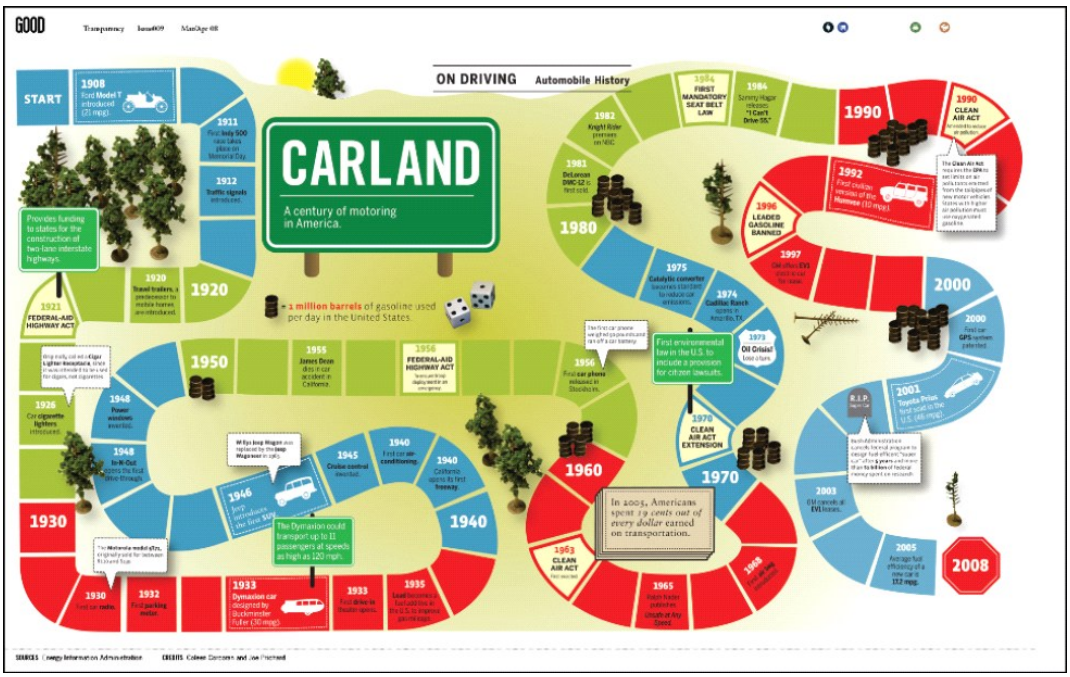


Figure 2-1: Carland displays history in an easy-to-follow way.

- **Quantity of data represented:** Typically, data visualizations have more and different kinds of data from infographics. Also, the data in data visualizations changes frequently to indicate changes in status. In addition, an infographic is less likely to include interactive numbers.
- **Degree of aesthetic treatment applied:** This criterion refers to the artfulness of the graphic. If a lot of design work has gone into displaying information, the graphic is likely to be an infographic.

We have another criterion to help you determine the difference between a data visualization and an infographic: whether the graphic is interactive or static.

An interactive graphic tells a different story each time new data is inserted. An interactive visualization helps you determine what the data is telling you. A static visualization depicts a data story that you want to explain to others. Figure 2-2 shows how coffee choices reflect one's personality. You can see the original image at http://img7.joyreactor.com/pics/post/comics-thedoghousediaries- coffee-672107.png.

Figure 2-2: A static visualization (infographic) isn't updated with new data.

You can use the information in Table 2-1 to determine whether you're working with an infographic or a data visualization. This table becomes useful when you want to decide what type of visualization to create for specific information and/or low-quality graphics.

Table 2-1: Data Visualizations versus Infographics

	Data Visualization	*Infographic*
Method of generation	More numbers used	Original images created
Quantity of data	More data	Less data, more conclusions
Degree of aesthetic treatment	Less artful, more focused on information itself	More artful
Interactive versus static	Interactive (data changes)	Static (data remains fixed)

Read on to find out what types of content you can put in an infographic or data visualization.

Picking the Right Content Type

When you're creating a data visualization to tell the story of your data, you can use many content types other than text and numbers. The key is to select visuals that are not only attractive but that also match the data you have. This is not an insignificant task. Your data viz will benefit from careful consideration of a variety of different content types.

Following are several to consider:

- **Graph:** An x and y axis is used to depict data as a visualization.
- **Diagram:** A visual that shows how something works.
- **Timeline:** A chronology is depicted on a graph to show how something happens or changes.
- **Template:** A guide for something that a user needs to fill in or develop.
- **Checklist:** A list of tasks to be completed that can be crossed off when they have been accomplished.
- **Flow chart:** A sequential set of instructions that show how something works.
- **Metaphor:** Comparisons of two dissimilar things for the purpose of making a vivid description.
- **Mind map:** Maps that enable you to show the big picture and the details of a topic on one sheet of paper. The main topic is in the center and the subtopics radiate out from it. Figure 2-3 shows an example of a mind map about the best-selling book *Brain Rules* by John Medina (Pear Press). It was created using the MindMeister software (https://www.mindmeister.com/100879355/brain-rules-12- principles-for-surviving-and-thriving-at-work-home-and- school)

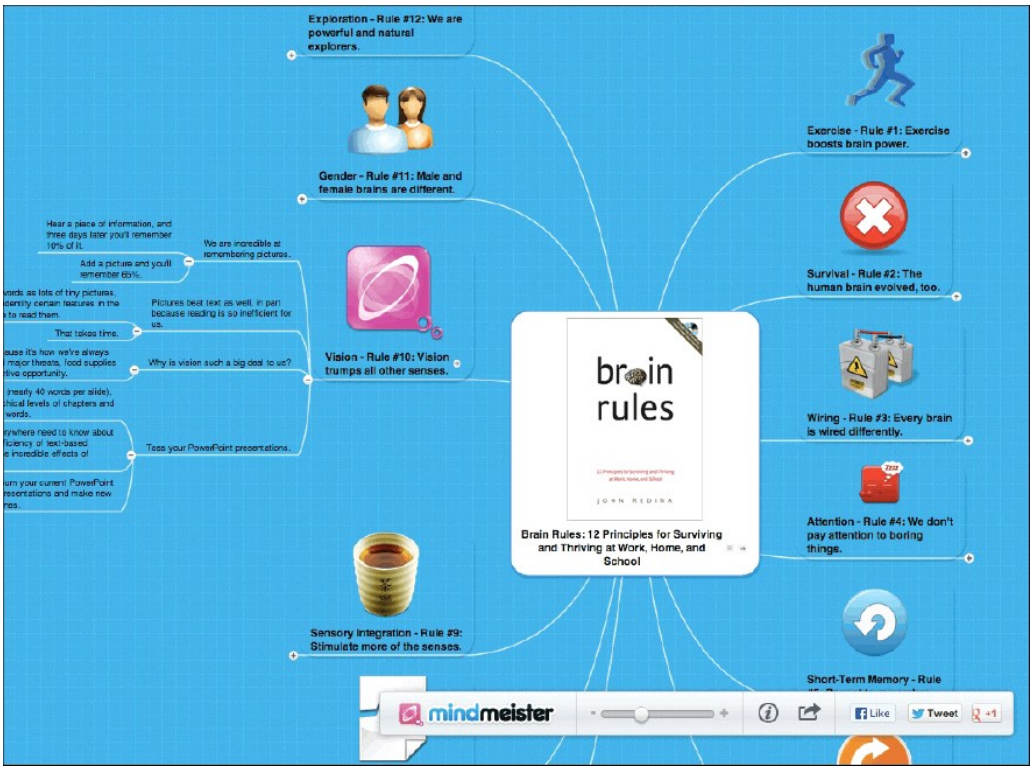


Figure 2-3: A mind map is one content type you might use for a data viz.

Tip When you see a visualization that contains interesting content types, you should clip the image and save it to a file for future reference. That way, you'll always have images that really inspire you. You can also refer to Chapter 15, which provides a list of hand-picked resources to keep you informed and inspired.

Warning! One caveat: Make sure that your data fits the visualization that you choose. Don't try to shoehorn data in just for the sake of art.

Appreciating Interactive Data Visualizations

Sophisticated software allows people to do analysis today that they only dared dream about five years ago. Couple this with mounting data stores, and you have an interesting choice. You can put your head in the sand and hope that the data stops multiplying, or you can work at making it a valuable asset.

Some companies choose to ignore the growing stacks of data and continue to rely on standard methods like spreadsheets that offer little customer insight. Others take a leap and bring in software that helps them analyze both their structured and their unstructured data (such as social media data). They can then create data visualizations that help them make more educated, fact-based business decisions and predictions.

The jury is still out as to whether most corporations will take full advantage of their data for competitive purposes. Companies that do realize that being able to analyze many forms of data at the same time in the form of interactive visualizations have a competitive advantage. From understanding the sentiments of their customers to examining their buying habits, the possibilities to get ahead of one's competitors by viewing one's data are endless!

Companies that take advantage of their available data by putting it into interactive data visualizations can reap the following benefits:

- **Self-service:** Users can manipulate the data to find out specific things they need to know.
- **Immediacy:** Users can be alerted to situations that require immediate attention.
- **Improved collaboration:** When everyone on a team is looking at the same data, the team can solve problems more easily.
- **Simplicity:** Users are presented with only the key elements that enable them to get both the big picture and the details in one visualization.
- **Insight:** Users can glean important revelations about the company's performance from a good interactive visualization.
- **Depiction of patterns:** Patterns make it easier for users to analyze the data and identify trends. It is unlikely that users would be able to recognize patterns when presented with millions of lines of data in a spreadsheet; visualizations make it easier to identify patterns at a glance.

Groups that use data visualization receive many of these benefits. Next, we look at how different fields use data visualizations to their advantage.

Observing Visualizations in Different Fields

Many fields of study now use data visualization to provide insight to their audiences about all types of data — political, financial, scientific, and historical. Like anything that gains popularity, you can find both good and bad examples of data visualizations (see Chapter 13).

Politics and government

In the field of politics and government, data analysis has taken center stage. Government agencies are combining social media data with demographic information to inform decisions and convey information. Figure 2-4 shows a couple of visualizations that describe how recovery funds are distributed. You can see the original image at www.recovery.gov/Pages/default.aspx.

Figure 2-4: Government Recovery data by zip code.

Finance/social economics

Many financial institutions use visualizations to inform their clients about their own portfolios as well as current economic issues, such as interest rates and tax implications. Social data is also a common topic for visualizations — things like Tweets, shares, and check-ins, as shown in Figure 2-5. The original image is at http://blog.backupify.com/2012/04/05/what-is-social- data-worth/.

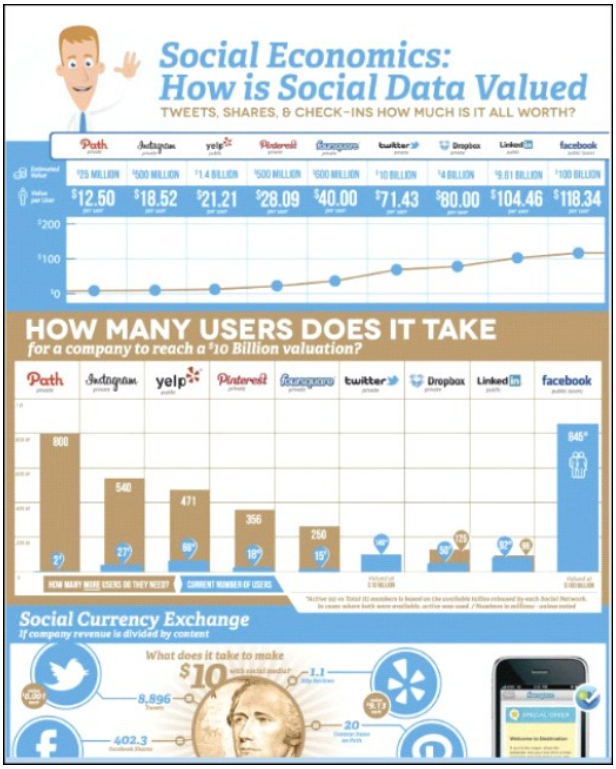


Figure 2-5: The value of social data according to Backupify.com.

Science

Science has always relied on some kind of visual to depict information. Advances in technology allow much more data to be analyzed at one time so that patterns can be more easily identified. Figure 2-6 shows a visualization that plots the occurrence of hurricanes since 1851. You can clearly see that some areas are more heavily affected than others. You can see the original image at www.theguardian.com/news/datablog/2012/oct/29/every- hurricane-visualised-since-1851.

History

Historical data is a great use of visualizations because it incorporates a large amount of data in a relatively small space. For example, you can follow the evolution of an idea or the growth of a company. You can also choose the segments to fit the data instead of forcing the data into some artificial designation.

Figure 2-6: The visualization of hurricane data shows that hurricanes occur more frequently in some places than in others.

For example, Figure 2-7 is an infographic showing how modes of communication have changed over the years. Notice that the segments of time are not uniform. However, if you are showing the growth of something, like the car industry, you could designate uniform periods to show which periods had the most explosive growth over the century. Check out the original image at http://visual.ly/communication-through-ages.

Figure 2-7: Historical look at communication.

Using Dashboards

As we discuss in several chapters of the book, Mico's company BIBrainz.com uses her Business Intelligence Dashboard Formula (BIDF) to help users around the world build their dashboards and understand their data.

Dashboards allow staff to see their Key Performance Indicators (KPIs) and important alerts on one screen. They have become increasingly popular because of the growing amount of data companies need to harness. Dashboards enable companies to put measures from different departments in one graphic.

Following are some benefits of dashboards:

- They remove the need to update manual calculations.
- They focus on the measures that are most important to the audience.

- They alert stakeholders to action(s) that must be taken.
- They increase productivity by showing the most important data on one screen so that users don't have to go searching for it.

How do you know whether you're on the right track when creating your first dashboard? Here are three questions to ask yourself:

- **Will any stakeholders champion the use of the dashboard going forward?** Unless some people believe in the data and want the dashboard to be used, the dashboard could languish unnoticed after the first flurry of interest.
- **Will someone update and maintain the numbers in the dashboard?** You need to make sure that whoever looks at the data is seeing current data that takes changes in company direction into account. Having a dashboard that reflects bad or outdated data is as unhelpful as having no data.
- **Remember** **Is the dashboard truly easy to understand?** This issue probably is the most important one that we cover in this book. If the visualization in the dashboard is confusing, no one will use it, no matter how pretty it is.

Discovering Infographics

Infographics have gained great favor of late. If done well, they can illuminate a problem and tell an interesting story. Infographics have generated great interest on the Internet because of their ability to entertain as well as enlighten.

Infographics use design rules to artfully display text, numbers, metaphors, and other data types. You should use a few key guidelines when you're planning your own infographic or evaluating one:

- **Make the infographic easy to understand**. First and foremost, an info-graphic should be simple. If the information isn't clear or leads to confusion, you've failed.
- **Make it accurate**. Infographics reflect actual data. The artwork must accurately reflect the data and carefully report the trends or patterns of the data. Double-check your work.
- **Provide your sources**. Data sources typically are listed at the bottom of an infographic. If you want yours to have credibility, list all the places where the data was gathered.
- **Choose complementary colors**. An infographic should be eye-catching. If you have trouble determining what colors to use, many online tools can help. For more information using color in your visualizations, read Chapter 10.
- **Make it worthwhile**. Although it's true that infographics can be frivolous or silly, most business users are looking for solid information. Take the time to create something that others will want to share.

Examining different types of infographics

Several types of infographics are currently popular. The following list can help you choose the right type for the information you're trying to illustrate:

- **Case study:** If you've conducted a specific inquiry about a particular topic and want to share the results, try a case study. In the context of an infographic, a case study shows the goals, objectives, and outcome of a particular campaign or action plan.
- **Chronology:** The content of a chronology follows a logical, dated order, as shown in Figure 2-8. Use this type of infographic if you want to recount something like the history of a product or the growth of an industry. You can view the chronology shown in the figure at http://educationcloset.com/wp-content/uploads/2012/05/ creativity-infographic.jpg.
- **Comparison:** When you're trying to show the difference between one item and another, try a comparison. Figure 2-9 shows a comparison of iOS 6 and iOS 7 icons; in the comparison you can see that some changes make sense, whereas others seem to change simply for the sake of change. See the original image at http://mashable.com/2013/06/12/ios-7-apps-comparison.

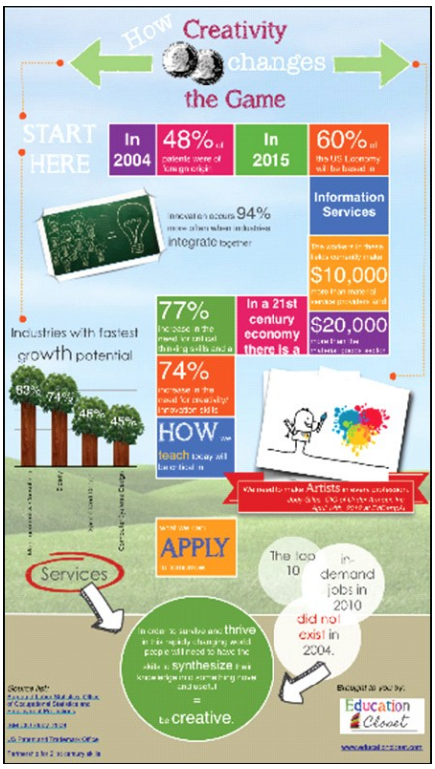


Figure 2-8: This chronology illustrates the effect of creativity in industry.

- **Compilation:** If you want to inform your audience about a key topic and make it memorable, use a compilation of information as an infographic. A compilation refers to a collection of information that is gathered from a variety of sources into one cohesive whole.
- **Expert advice:** Dispensing expert advice in an infographic is a great way to establish yourself as an expert. It also "helps the medicine go down" if you're recommending something difficult.

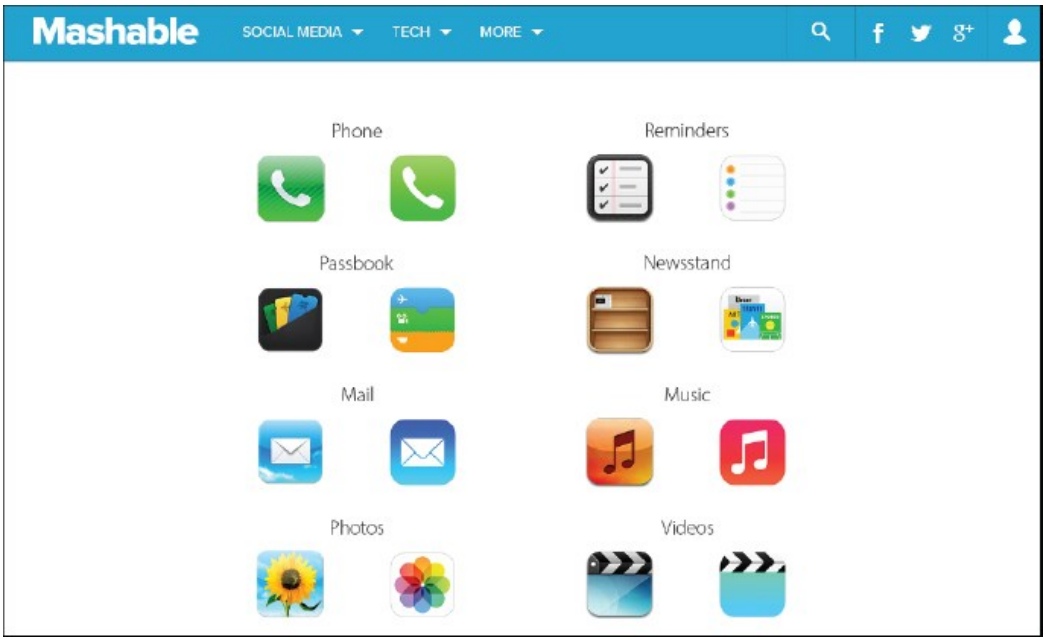


Figure 2-9: A comparison of icons used in iOS 6 and iOS 7.

- **How-to information:** Presenting information in a sequential manner is a great way to educate your audience. Infographics often use visuals to get the message across, as shown in Figure 2-10. The original image is available at www.stack.com/2012/06/20/how-to-properly-use-sunscreen.

Figure 2-10: The how-to infographic describes the proper use of sunscreen.

Remember Sometimes, infographics are just for fun. Don't hesitate to use humor when you display data on a lighthearted subject. It's okay to entertain your users as you provide information. Just be sure to represent the data accurately.

Taking advantage of online infographic tools

If you want to try your hand at infographics, a lot of great online tools are available. Many of them supply graphic and design templates that simplify things for do-it-yourselfers.

Here are some tools that you may want to consider:

- **Piktochart** (http://piktochart.com): Create your own infographics by using templates. Free and fee versions are available.
- **Venngage** (https://venngage.com): This tool is a great way to create infographics. It doesn't work with Internet Explorer but does work with Mozilla Firefox and Google Chrome. Free and fee versions are available.
- **Creatly** (http://creately.com): This tool is useful for creating good-looking diagrams. Free and fee versions are available.
- **easel.ly** (http://easel.ly): This tool, which has easy drag-and-drop features, is in beta testing as of this writing.
- **Wordle** (www.wordle.net/create): This tool lets you create a free word cloud for any URL. The size of the word displayed indicates what topics are covered most. Figure 2-11 shows a Wordle cloud created for Stephanie's blog, Marketing Message Mindset.com.

Figure 2-11: A Wordle cloud created for Stephanie's blog.

What about you?

Just for fun, you may want to check out a tool called What About Me? that creates a personalized infographic. You can find it at www.intel.com/content/www/us/en/what-about-me/what-about- me.html. The figure shows the landing page.

The tool visualizes your digital life by using your Facebook, Twitter, and YouTube accounts. The visuals are well done and created almost instantly. The result will probably tell you things about your digital life that even you didn't know.