



Storytelling with Data

A Data Visualization Guide for Business Professionals

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Author Cole Nussbaumer Knaflic, who travels the world teaching companies how to produce better presentations, has streamlined the process of developing effective presentations. Each of her chapters provides a simple lesson that will transform how you offer data to your audiences. To explain why each step works, she refers to her extensive experience, to psychology, and to vision and brain science. Knaflic includes a chapter on model visuals and case studies to highlight how to use her lessons to produce stronger presentations. With appreciation for her specificity, *getAbstract* recommends her strategies to consultants, small business owners, marketing personnel, and anyone who needs to seize and hold an audience's sustained attention.

Take-Aways

- Before you start working on a presentation, learn who your audience is, decide what you need to communicate and ask how visualization can best express your message.
- To capture audience attention and explain data, tell a story. End with a call to action.
- Develop a “three-minute story” and a “Big Idea” for the overall presentation.
- Different visuals focus on and tell different types of stories.
- Use the “Gestalt Principles of Visual Perception” to help people absorb your visuals.
- These principles say that people “create order out of visual stimuli” based on “proximity, similarity, enclosure, closure, continuity and connection.”
- Improve your data presentations by eliminating unnecessary information.
- Highlight important elements at the beginning. Stating such “preattentive attributes” early on helps audience members remember those points later.
- After working with your data and your narrative, recheck your logic and ask a friend or colleague to preview your presentation.
- People resist new ideas. Help them understand why a new approach works by clearly stating its benefits.

Summary

Context Matters

When preparing to present information to an audience, make your content self-explanatory, and focus on a specific story, action item or issue. Don't fall into the trap of wanting to show your entire research process. Audiences would rather know your final analysis than see all the information it took to get you there. With any presentation, establish three basics:

1. **“Who”** – Make sure you know your audience members' level of knowledge and communication preferences. Understand their perception of you so your presentation builds off that established relationship.
2. **“What”** – Determine what you want the people in your audience to know or do as a result of your presentation. Don't leave them to decide for themselves: You are the expert presenting the data. Recognize the differences between live and written presentations. A live presentation lets you address questions and issues; a written presentation means the audience must determine how to interpret the information. If you must use one presentation for both purposes, find out the primary form of the presentation and target your approach accordingly. Suit your presentation tone to the audience and use data to celebrate, inform or engage as appropriate.
3. **“How”** – Consider what data you have and how to best organize your information to serve the story you want to tell.

“Being able to tell stories with data is a skill that's becoming ever more important in our world of increasing data and desire for data-driven decision making.”

Since invitations to speak can call upon a variety of ways to present and a range of content, ask your host or hostess for all the information you need to produce a presentation that will meet the needs of the event where you'll be presenting. Make storyboards that track your presentation to ensure that you have a clear structure. If necessary, you can modify it as your full package develops. Include enough information to present a “three-minute story” and state one simple sentence that summarizes your “Big Idea.”

The Right Visual

Different visuals tell different types of stories. The various visual styles you can choose among include: “simple text, table, heatmap, line graph, slopegraph, vertical bar chart, vertical stacked bar chart, waterfall chart, horizontal bar chart, horizontal stacked bar chart...square area graph” and “scatterplot.” People prefer the instant accessibility of graphs; they have to read tables, but they can just look at graphs and understand them. While putting information in a table works when you compare values or use different measurements, including a table in a live presentation distracts from the speaker.

“Being able to visualize data and tell stories...is key to turning it into information that can be used to drive better decision making.”

Avoid using pie charts, which create visual confusion since audience members will try to discern the different values of each segment. “Donut charts” presume that people can measure arc lengths and “ascribe quantitative lengths” to each arc. They can’t, so donuts don’t work.

Eliminate Visual Clutter

Improve your data presentation by eliminating unnecessary information, whether it’s in the form of unneeded verbiage or design elements like borders. Using 3D lettering adds no relevant value and distorts the way numbers look, making them hard to read and compare with each other. Reducing your audience members’ “cognitive load” allows them to focus on the main elements of your presentation. Cognitive load is the mental effort of absorbing information. The “perceived cognitive load” is how hard your observers think they have to work to understand your message.

“Take the time to learn your tool well so that it does not become a limiting factor.”

The “Gestalt Principles of Visual Perception” come from research in the early 1900s about how people simplify and make sense of the visual world around them. Still valid a century later, these six principles explain how people “interact with and create order out of visual stimuli”:

1. **“Proximity”** – Elements closer to one another appear to belong together. People see dots that cluster together as groups rather than as individual specks.
2. **“Similarity”** – Similar shapes, colors, sizes or orientation indicate grouped items.
3. **“Enclosure”** – Clustering elements in a box or a circle indicates a group.
4. **“Closure”** – Whenever possible, people prefer to see or mentally create complete, recognizable shapes. If part of a circle is missing, audiences will still identify it as a circle. This is useful in some contexts but unnecessary in others, such as adding borders around a graph. That qualifies as clutter, because borders don’t add valuable information.
5. **“Continuity”** – When shapes overlap, people still see each one as a whole element and not as an unrelated, broken piece. Lining up elements makes them seem grouped.
6. **“Connection”** – Even more than proximity, connection establishes relationship. When objects connect, viewers understand they have a stronger relationship than unconnected items. Connecting dots on a graph emphasizes the tie from one data point to the next.

Design Aesthetics

Often, an audience doesn’t consciously notice thoughtful design, but people do react against poor design. Alignment is a nice way to make text tidy, but centering text on a graph or in relation to a graph adds more visual information than necessary. Western audiences typically read in a Z-shaped pattern from the upper left-hand corner down to the lower right. But even though the eye scans information that way, putting information on a diagonal is visually confusing.

“Ensure what your audience needs to read on a given slide or section isn’t so dense or consuming that their attention is focusing on that instead of listening to you.”

Appreciate white space, which can act as a visual pause to let the eye rest or to create room to emphasize another element. Contrast can accentuate one major item. Be clear about what merits the audience’s attention. Use contrast to help them understand where to look, and provide information nearby to help them grasp what it means.

“There are often multiple potential paths for communicating effectively with data.”

To remove clutter, see what you can delete. Omit the borders around a graph or chart. Gridlines occur in many premade graphs, but they’re usually unnecessary; if gridlines are vital to clarity, then make them light gray so they aren’t distracting. Simplify the information on your x-axis and y-axis. Label graph lines directly rather than including a legend.

“People perceive more aesthetic designs as easier to use than less aesthetic designs – whether they actually are or not.”

Don’t force viewers to go back and forth between a legend and a graph, or they will get overwhelmed and stop paying attention. Use color to convey information across multiple graphs so people build on what you present rather than having to learn a new format for each graph.

Eliminating distractions is part of displaying only crucial information. People can understand your major point without unnecessary details. Eliminate the tidbits you appreciate but that don’t relate to the main story line. Leave only vital information in the foreground.

How to “Focus Attention” Within Graphs and Text

To focus your audience members’ attention, neutralize most of the data in a graph or a line of text. Limiting the cognitive burden on audiences allows them to pay better attention. Selectively use visual “preattentive” attributes to plant the seeds for later recognition of your words or images. Preattentive attributes help audience members notice your ideas before you mention them. They highlight critical elements of your presentation to help people recall them.

“Think about what it is we want our audience to be able to do with the data (function) and then create a visualization (form) that will allow for this with ease.”

These noticeable features form part of an observer’s “iconic memory,” information that lasts a tiny portion of a second before going on to short-term memory. In short-term memory, people process four bits of information at a time, which is why having multiple shapes, colors and sizes can overwhelm your viewers. Visual cues reinforce observers’ recollections once something goes into long-term memory. Different preattentive features can draw the eye to distinctive elements in your text or graphics, and can “create a visual hierarchy” in your presentation. To highlight graphics or other non-text visuals, select among these preattentive attributes:

- **“Orientation”** – When all but one line faces the same direction, the one alternative kind of line becomes the most significant.
- **“Shape”** – The shape that is different stands out, like a box amid a row of lines.
- **“Length”** – In relation to nearby lines, a longer or shorter line length draws viewer focus.
- **“Width”** – Thicker lines will also become visually dominant.
- **“Size”** – If one data point is bigger than the others, it appears more important.
- **“Curvature”** – A straight line will pop out among curved or wavy lines.
- **“Added mark”** – Adding an extra mark to anything draws attention to it.
- **“Enclosure”** – Surrounding an element makes people look at it.
- **“Hue”** – A significantly different color demands focus.
- **“Intensity”** – If you’re working with one shade, making one item darker will highlight it.
- **“Spatial position”** – Any element out of sync with the others becomes more meaningful.
- **“Motion”** – Using motion, like a moving arrow, in presentations can be an unnecessary distraction; however, it also can point to important information.

“If there is something really important we want our audience to know or see...we should make that the one thing that is very different from the rest.”

Create a “clear hierarchy” of information by avoiding complexity and using text as a verbal support for your visual representations. With text, try to “think like a designer,” who would use the term “affordances” for such treatments as boldfacing type or underlining it. Affordances are the elements of a product that show people how to use it; for example, “a knob affords turning.” Visual affordances guide people to the information they need. The affordances you can add to text go beyond just making it bold or underlining it. For example, you can put it in italics, make it a different color or use different cases, typefaces or sizes. Any word processing program enables such changes.

“While tables interact with our verbal system, graphs interact with our visual system, which is faster at processing information.”

Audiences respond better to more aesthetic designs. Use of color, alignment and spatial organization – as well as white space for visual pauses – tells your audience you respect them and your information enough to present it in the best possible manner. Remember when you select color treatments that color-blind people generally can’t distinguish reds and greens.

Gain Acceptance

If your team is presenting a new approach, expect resistance. State the benefits of the new approach in clear language. Show the difference between the old and new by comparing aligned elements. Offer team members multiple options so they can select the visualization they prefer.

“Tell a Story”

Capture your audience’s attention with a story. A story helps observers care about the desired outcome, call to action, need to change or any other goal that the data support. Every story has a beginning, middle and end. Cite your call to action at the opening so audience members can track the idea throughout your presentation and, then, at the end, clarify what you’re urging them to do.

“We can leverage visual affordances to indicate to our audience how to use and interact with our visualizations.”

The beginning establishes context and helps audience members determine why they should care. The middle develops the story by offering relevant background, examples to illustrate the problem, the bulk of the data, additional issues that result from doing nothing about the main problem, possible solutions, how this audience can enact change and why they should.

“Data becomes supporting evidence of the story you will build and tell.”

The ending must emphasize what the audience members ought to do with the information your presentation provides. Review the problem and its urgency. Restate how they can make improvements. Repetition is not a problem; the audience isn’t as familiar with the information as you are. Reiterating your message reinforces the material so people find it easier to retain.

“Think about the order in which you want your audience to experience your story.”

Make sure your story is clear. Check the “horizontal logic” to ensure that reading just the titles of your slides will tell the story. “Vertical logic” unites the information within a slide and ensures that its title relates to the presentation. “Reverse storyboarding” starts from the end and tracks each step back for clarity.

“Stories unite an idea with an emotion, arousing the audience’s attention and energy.”

Using these guidelines lets you advance step-by-step toward simpler, clearer visuals that meet your group’s goals and persuade your audience. But, before you present, show your work to friends or colleagues to see if they grasp the story you are trying to tell.

About the Author

Cole Nussbaumer Knaflic offers workshops and presentations internationally for data-driven organizations. She developed her unique data presentation talents through analytical roles in banking and private equity and recently as a Google People Analytics team manager.



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