Learning the art of analytical storytelling

By Jen Underwood, Founder & Principal Consultant at Impact Analytix, LLC

Storytelling is an ageless influential art. Stories are memorable, connect with humans on an emotional level and inspire action. Effectively crafting and pitching captivating data-driven stories to organization leaders, potential customers, partners, investors and peers is a vital skill to master.

To tell illuminating analytical stories with data, you begin with an idea. Then, consider the audience and presentation objectives. Why should they care about your findings? What motivates them? Most importantly, what actions do you recommend be taken next?

After thoughtful consideration of your audience and goals, explore available data to look for relevant insights. Although you may be on a mission to influence your audience, take care not to introduce bias into your analysis. Bias is anything that would not treat findings objectively or would skew your conclusions. Bias can include but is not limited to data source selection, sampling methods and confirmation bias. If you are unfamiliar with bias concepts, that would be a good topic to review.

Types of stories hidden in data

Analytical stories visually showcase measurement, proportions, comparisons, trends

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and associations, and provide context to the reader via narratives. To identify stories in data, you will collect, filter, cleanse and creatively combine variables to compare differences, look for changes over time and examine relationships.

Data storytelling often is an iterative exercise of analyzing data from different angles, experimenting, exploring implications and testing alternate theories. This step is where you will invest most of your time in crafting a stellar story.

Measurement values such as maximums, minimums, ranks and differences over time often provide fundamental context to set the stage for your audience. Popular narratives are rising, falling and forecast trends. Typically, histograms, bar charts, line charts, bullet graphs and sparklines are effective measurement visualizations.

For example, when making an offer to buy a home you may to review current trends in pricing per square foot (SF). By reviewing recent differences in list price versus sold price, you can get a feel for the demand. In the chart below, a lowest acceptable offer is identified along with actual list and sold prices. To better highlight increases in demand, the difference in actual list and sold price is added. Showing differences can help emphasize positive or negative movements that are more difficult to decipher by looking at the actual values.

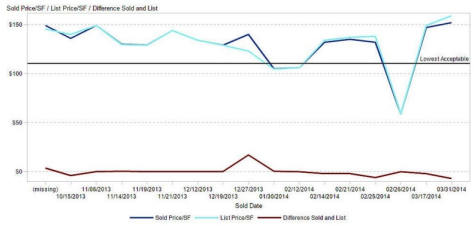

Figure 1: A line chart highlights changes over time.

Another common need is to provide bigger picture understanding. As you contemplate how to best illustrate key points in relation to the broader context, you will often use visual comparisons and part-to-whole proportions as shown in the sample below. Stacked column and area charts, waterfall charts, tree maps, trellis charts, radar charts and pie charts are usually used. **Note it is a best practice to avoid using pie charts.** If you can't resist them, limit your pie charts to showing one to three categories at most.

In our real estate example, you might be wondering why your target price differs from your realtor's suggested price. By reviewing the aggregate average comparable home prices, the realtor appears to have selected more expensive homes.

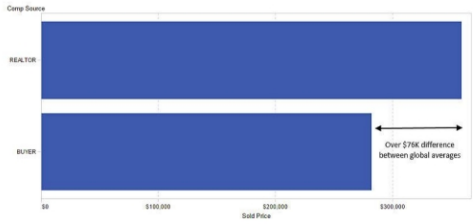

Figure 2: A simple bar chart comparing average aggregate differences.

Exploring relationships between variables in your data can reveal surprising associations that can be helpful to further analyze for decision making. Patterns, seasonality and symbiotic relationships are often hidden valuable gems within your data. For visualizing relationships between variables, scatter charts, bubble charts and more advanced chart types such as network or Sankey diagrams are used.

Diving deeper into our real estate sample, you might explore the size of home and pool type to the sold price as shown below. Here we can see larger homes are priced higher. In the data set, we are unable to tell if pool type might be related price and would need to further analyze that hypothesis.

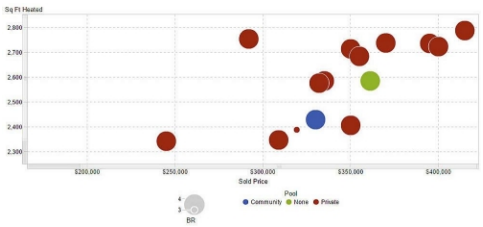

Figure 3: A bubble chart is a good way to illustrate differences between variables.

Note that if you do find a correlation or relationship in your data, keep in mind that it does not imply causation. Relationships can occur for many unrelated reasons.

Formulating your data story

Now it's time to organize and sequence your findings simply and clearly. You will shift from analytical thinking to a design focus. Designers embrace themes and appreciate object placement, size, color and white space – all with the intent to draw attention and elicit desired actions.

John Tukey, renowned American mathematician and statistician, once said, "The greatest value of a picture is when it forces us to notice what we never expected to see." By using preattentive properties in design such as color, form, movement and position, you can help users find what they never expected to see.

Remember to align your communication style to your audience and human emotion. What one or two key points should be remembered? What action is recommended? How much detail will they need? What learned or cultural assumptions may affect your design choices and interpretation of results? As you design your visualizations, always use color blind-friendly palettes and icons. Another tip is to test if your visualizations retain context when printed without color.

If you start designing your data story with the end goal in mind, effective ordering and placement of supporting visuals becomes much easier to do. By using a storyboard approach, you can combine narratives with visuals that guide analysis to the desired conclusion. Developing storyboards also reveals analytical gaps and pre-empts unnecessary questions before you get in front of your audience.

Figure 4: A storyboard of key points.

Good design should tell a story with data that does not become overwhelming with way too much information, clutter or noise. Limit your focus to one or two key points. Eliminate unnecessary information. Although it is tempting to share many insights all at once, your audience may not retain them.

Highlight the most important actionable insight and recommended action by carefully using **appropriate visualizations**, size and placement according to basic Gestalt Principles of visual perception. Be cognizant of audience reading direction. Starting

with the highest level of detail in the upper corner of the screen and show more detail as you move down in the direction your audience is used to reading.

Remember to provide adequate context and keep related items near each other. Also avoid displaying singular numbers without bigger picture, related context. In developing a compelling data story, context is key!

My favorite storytelling resources

In this article you have been briefly introduced to the analytical data storytelling process. Sharing actionable insights that may be hidden in your data by combining visualizations and narratives is powerful. Telling a great story that influences action is invaluable. To further enhance your data storytelling skills, I have listed several of my favorite resources below for additional reading.

- *Storytelling with Data: A Data Visualization Guide for Business Professionals* by Cole Nussbaumer Knaflic
- *Information Dashboard Design: The Effective Visual Communication of Data* by Stephen Few
- *Show Me the Numbers: Designing Tables and Graphs to Enlighten* by Stephen Few
- *Now You See It: Simple Visualization Techniques for Quantitative Analysis* by Stephen Few
- *Envisioning Information* by Edward Tufte
- *Advanced Presentations by Design: Creating Communication That Drives Action* by Andrew Abela

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Jen Underwood is the founder and principal consultant at Impact Analytix, LLC. She has more than 20 years of “hands-on” development of data warehouses, reporting, visualization and advanced analytics solutions. In addition to keeping a constant pulse on industry trends, she enjoys digging into oceans of data. In the past, Jen has held worldwide business intelligence product management roles and served as a technical lead for system implementation firms. Today she provides industry thought leadership, strategy, design, implementation, product and market research. She is also an active supporter of several analytics communities. Jen has a Bachelor of Business Administration – Marketing, Cum Laude from the University of Wisconsin, Milwaukee and a post-graduate certificate in Computer Science – Data Mining from the University of California, San Diego. Follow her on Twitter @idigdata.

Read more

Jen Underwood used SAS Visual Analytics to create her storytelling visualizations for this article. Learn more about SAS Visual Analytics in this white paper: ***A New Breed of Self-Service BI That Both Business and IT Users Will Love.***

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