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COMMUNICATION SKILLS

Four Books to Start My Data Visualization Journey

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As an actuary, I have been using tables and charts to communicate data and analysis in my daily work. So when data visualization became a trendy topic, I started to wonder how it was different from what I had been doing for so many years.

To answer this simple question, I picked out four books on the subject.

THE VISUAL DISPLAY OF QUANTITATIVE INFORMATION

Edward Tufte's book has been viewed by many as a classic on the topic, and it is very deserving. The book first introduces a brief history of how data graphics (tables and charts) have been used in publications and reports. Along the way, data graphic design principles started taking form.

The majority of the book focuses on the design of graphics and elaborates the do's and don'ts of data visualization. Tufte opened my eyes about the effectiveness of different graphic presentations in delivering certain types of data. Thinking back on the

years of using data charts, I never put enough thought into what chart type would best deliver the message. Rather, I was making charts following how they had always been made. Tufte's book brought so much awareness of design elements into my usage of data charts and tables.

Some may find the examples a bit outdated. This might be true, but it really didn't affect the effectiveness of Tufte's message. What I especially like is the short conclusion at the end of each chapter. If you're short of time, those takeaways can carry you a long way.

DATA POINTS: VISUALIZATION THAT MEANS SOMETHING

Nathan Yau's book could be seen as the modern version of Tufte's book. The examples look much more modern and relatable (I can recreate them in Excel!). Similar to Tufte, Yau gives a very organized and systematic overview of the usage of data graphics. While Tufte tells readers a lot about "what not to do," Yau emphasizes what to do and how to do it.

Yau also takes a step further to point out that data visualization should not serve a decorative purpose. Instead, it could be the essential means to explore and present data. Yau spends a fair number of words on design psychology and artistic value of data graphics. Visual cues can help guide an audience's attention and enhance content, yet I didn't know about them until reading about them. Although these elements seem distant from actuaries' daily duties, the broader perspective helped open my eyes to more possibilities. Should I always use a line chart to illustrate portfolio yields?



For those who have started to work with big data and data analytics, Yau's book would help in developing graphic tools to explore data and find patterns. From time series to multivariate correlations, Yau shows readers step-by-step how visualization can help or distract from one's work.

All in all I found Yau's book easy to read, engaging, and full of interesting charts. I love how organized it is and how intuitive the examples are. This is the go-to book for me when it comes to data visualization.

VISUALIZE THIS: THE FLOWING DATA GUIDE TO DESIGN, VISUALIZATION, AND STATISTICS

For those actuaries who love the technical aspect of data visualization and want to get their hands dirty right away, this title by Nathan Yau is the perfect companion book. It is an instruction manual to set things in motion. From choosing tools to learning how to visualize different patterns and purposes, Yau shows readers many ways and options. Almost all of the coding is in R, so a newcomer can learn visual exploration and R at the same time. Like many technical books these days, the examples and codes in the book are available at Yau's website www.floodingdata.com.

STORYTELLING WITH DATA: A DATA VISUALIZATION GUIDE FOR BUSINESS PROFESSIONALS

Last but not least of the four books, Cole Nussbaumer Knaflic approaches the topic from a slightly different angle. This book is not very technical, and all examples are produced in Excel. The book emphasizes delivery of messages instead of their production. I see this as a textbook for MBA students, yet I learned so much more than I expected.

The author makes it clear at the very beginning that this book focuses on explanatory rather than exploratory analysis. How can one effectively share results of quantitative analysis, especially to nontechnical personnel? That is the very challenge every actuary often faces.

The nontechnical aspect allows the author to explore various tools and formats:

- A good presentation could combine graphics with explanatory commentaries on the same page.
- A series of the same charts can be shown repeatedly with different highlights to tell a story.
- Shades and patterns can sometimes be more distinctive than colors.
- Scale of a chart can sometimes be removed to make room for clearer messaging.

Some of these ideas can be thought-provoking, especially for actuaries who value precision above all. In practice, I found these tips really made my presentations clearer and more effective. It

did take me more time to compile a report as I took time to think and design, but the result justified the extra time and effort. I would recommend this book to actuaries who produce reports and presentations to management teams and nontechnical audiences alike.

What did I learn from these four books? First of all, even with "data" in its name, data visualization is less a technical topic—rather, it's a new way of communication. To be proficient, one should spend more time considering the key ingredients of an effective communication rather than the technical elements.

- **Understand your audience.** The same lapse experience analysis should look very different when presenting to a peer group of actuaries versus senior management. What would you want the audience to learn from this communication? Would you like them to participate in a discussion or accept your proposal? Would you want them to focus on the process or results? It is important to answer these questions first before diving into making reports.
- **Tailor visualization style to the objective of the communication.** A line chart can give an easy view of time series, while bar charts provide great visual comparisons. Think like a designer rather than a technician.
- **Determine the narrative and key points.** You want to draw the audience's eyes to follow your storyline instead of wandering to distractions that cause unnecessary questions.
- **Keep it simple and direct.** We sometimes like to give the audience a lot of data when we try to explain a complex issue (such as combo charts or multidimensional pivot tables). But results could be opposite to what we hoped. Fancy charts and color variation can sometimes cause more distraction. Try to remove clutter and simplify.
- **Visualization serves better in certain circumstances but not always.** A good old data table can sometimes be your best option.

Data visualization is not just for big data. Learning the theory and method of data visualization improved my practice of applying data graphics in my daily work. I've seen so many actuaries (myself included) reproduce the same reports with the same charts and tables year after year. And these reports were sent to all kinds of audiences. Maybe it is time for us to think outside the box, and start to create more effective data visual communication. ■



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