Are pie charts always evil?
Information Design for Excel

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Agenda

- Information design concepts
- Edward Tufte: graphic excellence & chartjunk
- Excel 2013: chart options, pivot tables, Power View data visualization tool
- Pie charts
- Demos of charting data
  - Excel 2013 “Quick Analysis” and recommended charts
  - Pivot tables and slicers
  - PowerPivot: data import and hierarchy creation
  - Integrating images (infographic concept)
  - Power View: cards, tiles, multiples and multivariate data
Information Design: What is it?

- Wikipedia: the practice of presenting information in a way that fosters efficient and effective understanding of it, specifically for graphic design for displaying information effectively.

- IIID (International Institute for Information Design): the selecting, rendering, and transmission of information for the purpose of knowledge transfer as well as the optimization of the information with respect to these requirements.

- John Emerson (backspace.com): uses pictures, symbols, colors, and words to communicate ideas, illustrate information or express relationships visually.... adds seeing to reading to make complex data easier to understand.
**SANS RISQUE À LA PLAGE**

**PRÉVENTION** Chaque année, on dénombre quelque 12 000 accidents dans l’eau, dont cinquante ont une issue fatale. Dangers sous-estimés, imprudence et témérité en sont les causes principales. Respecter les quelques règles qui suivent vous permettra de garder la tête hors de l’eau.

**BIENS NAGEURS** Ne jamais nager seul sur de longues distances. Même le corps, le mieux entraîné peut avoir une défaillance. Un accident survenu dans l’eau peut entraîner des changements musculaires. Plus l’eau est froide, plus court y sont les séquelles.

**ORIGINES ET ALCOOL** Quelque part, il est déconseillé de boire de l’alcool ou de se baigner de prématurément. L’alcool peut causer des accidents majeurs, riches, dysis, coulants, panique,

**APPAREILS DE SECOURS** En cas d’accident, ne jamais laisser les enfants sans surveillance ni gardes. Les enfants ne sont pas corps des dangers. Un accident est un fait, il est trop tard. Lorsqu’il est un accident, ne jamais l’eau; pour les minimes de prévention et de surveillance.

**SURVEILLANCE** Le jouet est emporté. Le jouet est un accessoire, un jouet qui peut causer des accidents. L’adulte doit être à portée de main, et le corps n’est pas un jouet qui peut causer des accidents.

**PLONGEURS** Si un enfant ne sait pas nager, il est important de le faire en sécurité, sans risques, sans dangers. Les conditions ne sont pas nécessaires, pas d’excès.

**EMBARCATIONS PNEUMATIQUES** Les embarcations pneumatiques sont un des défis de l’embuscade. Les enfants doivent être surveillés de près. Ne jamais laisser les enfants sortir de la surveillance du surveillant. L’embuscade est un risque.

**PULPITE AVEC MASQUE ET TUBE** Ne jamais utiliser des équipements non appropriés (masques, tubas) dans les bassins ou les piscines. Les équipements appropriés (masques, tubas) doivent être en portée de main.

![Diagramme de prévention des accidents](image_url)
Information Design: What is it?

- Purposeful transformation of *data* into high-quality *information*
- Closely related to the fields of data visualization and user experience (UX) design
- Requires designers to draw from an interdisciplinary background of:
  - graphic design
  - linguistics
  - cognitive psychology
  - information & communication technology
Tufte – Graphical Excellence

• Consists of complex ideas communicated with clarity, precision, and efficiency. “Graphical elegance is often found in *simplicity of design* and *complexity of data*.”

• Gives the viewer the greatest number of ideas in the shortest time with the least ink in the smallest space (data-ink ratio)

• Is nearly always multivariate

• Requires telling the truth about the data
Bar charts—single variable data
Power View: multivariate data
Information Design – People

• Edward Tufte “The Visual Display of Quantitative Information”
• David McCandless, informationisbeautiful.net
• Jer Thorp, Data Artist for NY Times, TED Talk @blprnt
• Jen Stirrup, Microsoft MVP @jenstirrup
• Naomi Robbins “Creating More Effective Graphs”
• Alberto Cairo, theFunctionalArt.com
• Stephen Few, dashboard design
• Nathan Yau, flowingdata.com
Tufte – Graphical Excellence

• Small, non-comparative data sets usually belong in tables. Tables are the best way to show exact numerical values.

• Time series is not a good explanatory variable. Chronology does not equal causality.

• Presentations should communicate complex ideas
  • With clarity, precision and efficiency
  • Without "chartjunk“, graphical decoration, unintentional "optical art" and other forms of bad graphical design

• Graphics can never rescue a thin data set
Chartjunk and non-data ink
Tufte – Six Fundamental Principles of Analytical Design

1. Show quantitative comparisons
2. Show causality/explanation by placing the data in an appropriate context (not time series)
3. Use multivariate analysis
4. Integrate evidence: words, numbers, images, diagrams
5. Document your source to provide credibility
6. Have content. Analytical presentations stand or fall based on their content.
Tufte – Small multiples

• Same graphical structure repeated
• Inherently multivariate and inevitably comparative
• Constancy of design helps user focus on changes in data
• Do work adjacent in space not serial in time (spread over multiple pages)
Tufte – Small multiples

Change in Home Prices (year over year)

From New York Times Economix blog

- Phoenix: -36.2%
- Las Vegas: -31.7%
- San Francisco: -31.0%
- Miami: -29.0%
- Boston: -6.0%
- Denver: -5.2%
- Charlotte: -4.4%
- Dallas: -3.0%
Tufte – Sparklines

- Small, high-resolution graphics usually embedded in a full context of words, numbers, images.
- Shows recent changes in relation to many past changes (context) and reduces recency bias.
Excel 2013

• What are options for presenting information?
• “Quick Analysis” on selected rows
  • Formatting, like data bars and conditional coloring
  • Charts such as column, bar and pie
  • Sparklines, win/loss markers
  • Pivot tables, good for aggregations
• Now has “recommended charts”; tries to recognize whether your data will be best displayed as a bar chart, pie chart, combination chart with a secondary axis, scatter chart or PivotChart
Excel 2013

- Demo #1
- Quick Analysis and recommended charts
Pie charts

• Tufte, “Given their low data-density and failure to order numbers along a visual dimension, pie charts should never be used.”

• Jen Underwood, “Most often, pie charts are misused to communicate part-to-whole scenarios where line or bar charts would be much more effective.”

• Pie charts are intended to display proportions of a whole within a single, small data set. Although humans are good at comparing linear distances along a scale—like bar graphs—pie charts don’t bring those skills to bear. We tend to underestimate acute angles, overestimate obtuse angles, and take horizontally bisected angles as much larger than their vertical counterparts.
Pie charts

Question 1

Question 2

Question 3
Clocks: Analog vs. Digital

• An analog visual image is easier to process rapidly than is a number; one is mentally processed as an image and the other as text.

• The basic rule is that a digital display works best when a value with high precision is required, while analog works best when rate-of-change or relationship to a limit is required.

• Work with control-panel operations: people who had to read digital gauges had a harder time keeping a clear image of the overall situation. They knew the individual values, but had a much lower sense of how the overall system was performing.

• A good design must minimize mental transformation or calculations, such as calculating how close a reading is to the high or low value.

Taken from Professional Writing course “Technical Editing and Production”, Michael J. Albers, East Carolina University
Spending by category
Spending over time
Left-to-right comprehension

• Graphics should tend toward the horizontal (greater in length than height)
• Horizon analogy
• Ease of labeling
• Emphasis on causal influence
Left-to-right comprehension
Excel 2013

• Demo #2
• PowerPivot data import and hierarchies
• Images
Infographic

Three parts of all infographics are the visual, the content, and the knowledge.

1. The **visual** consists of colors and graphics. “Theme” graphics represent the data and “reference” graphics point to additional data.
2. Statistics and facts usually serve as the **content** for infographics.
3. Infographics should provide **insight** into the data that they are presenting.
Infographic Examples

- AAA Travel Forecast
- Easel.ly template
- Healthcare literacy
- Weather forecast
Comparing data
Chart Suggestions—A Thought-Starter

Comparison

Relationship

What would you like to show?

Distribution

Composition

Comparison

Relationship

What would you like to show?

Distribution

Composition
Excel 2013

• Demo #3
• Power View
Additional Information

- **Tutorial: Optimize a Sample PowerPivot Model for Power View Reports**
- **Jen Underwood (MSBI): Best Practices in Data Visualization**
- **Power View: Explore, visualize, and present your data**
- [http://seedmagazine.com/content/article/getting_past_the_pie_chart](http://seedmagazine.com/content/article/getting_past_the_pie_chart)
- **Visualizing Information for Advocacy: An Introduction to Information Design**
- [http://flowingdata.com/](http://flowingdata.com/)
- [http://visualizing.org/](http://visualizing.org/)
- **Examples of chart tools (good? bad?)**
Thank you! Questions?

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