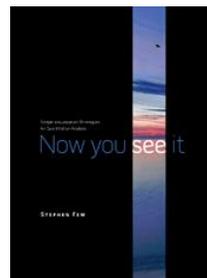
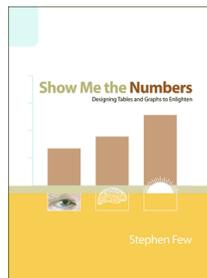


Few's Design Guidance



CS 7450 - Information Visualization
September 19, 2012
John Stasko

Today's Agenda



Stephen Few & Perceptual Edge

Stephen Few's Guidance



- Excellent advice for the design of tables and graphs
- Page references are from *Now You See It*
- Let's review some of his recommendations
 - We explored chapters 1-4 earlier
 - Today we examine chapters 5-12

Analytic Techniques & Practices



- Some examples he has highlighted
 - Optimal quantitative scales
 - Reference lines and regions
 - Trellises and crosstabs
 - Multiple concurrent views and brushing
 - Focus and context together
 - Details on demand
 - Over-plotting reduction

Add Reference Lines



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More Reference Lines



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Trellis Display



Typically varies on
one variable

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Crosstab



Varies across more
than one variable

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Crosstab



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Multiple Concurrent Views



Vintage
infovis

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Concurrent Views



- He calls such things *faceted analytical displays*
 - Sometimes that term is used in other ways in infovis
- As opposed to *dashboards*
 - They are for monitoring, not analysis

Overplotting



Too many data points

Overplotting Solutions



- Reducing size of data objects
- Removing all fill color from data objects
- Changing the shape of data objects
- Jittering data objects
- Making data objects transparent
- Encoding the density of values
- Reducing the number of values
 - Aggregating the data
 - Filtering the data
 - Breaking the data into a series of separate graphs
 - Statistically sampling the data

Quantitative Data



- Fundamental visualization techniques

Time Series Data



- Patterns to be shown
 - Trend
 - Variability
 - Rate of change
 - Co-variation
 - Cycles
 - Exceptions

Time Series Visualizations



- Effective visualization techniques include...

Line Graphs



When to use:

When quantitative values change
during a continuous period of time

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Bar Graphs



When to use:

When you want to support the
comparison of individual values

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Dot Plots



When to use:

When analyzing values that are spaced at irregular intervals of time

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Radar Graphs



When to use:

When you want to represent data across the cyclical nature of time

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Heatmaps



When to use:

When you want to display a large quantity of cyclical data (too much for radar)

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Box Plots



When to use:

You want to show how values are distributed across a range and how that distribution changes over time

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Animated Scatterplots



When to use:

To compare how two quantitative variables change over time

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Banking to 45°



Same diagram, just drawn at different aspect ratios

People interpret the diagrams better when lines are around 45°, not too flat, not too steep

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Question



Which is increasing at a faster rate,
hardware sales or software sales?

Log scale shows this

Both at same rate, 10%

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Patterns



Daily sales

Average per day

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Cycle Plot



Combines visualizations
from two prior graphs

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A Story

How much wine of
different varieties is produced?



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Pareto Chart



Shows individual contributors and increasing total

80/20 rule –
80% of effect
comes from 20%

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Bump Chart



Shows how ranking
relationships change
over time

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Deviation Analysis



Do you show the two values in question
or the difference of the two?

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Distribution Analysis Views



- Histogram
- Frequency polygon
- Strip plot
- Stem-and-leaf plot

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Histogram



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Frequency Plot



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Strip Plot



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Stem-and-leaf Plot



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Comparisons



Note how first one's curve is smooth (not such a noticeable difference). Second one is more noticeable. Same data.

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Correlation Analysis



Bleah. How can we clean this up?

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Crosstab



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Color Choice in Heatmaps



Argues that black should not be used as a middle value because of its saliency (visual prominence)

Some people are red-green color blind too

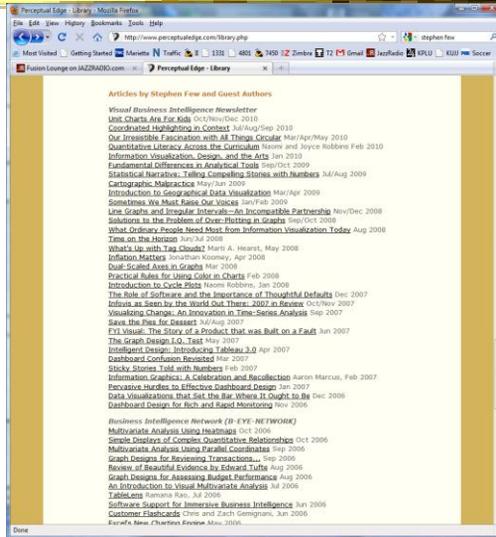
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Further Articles



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Blog

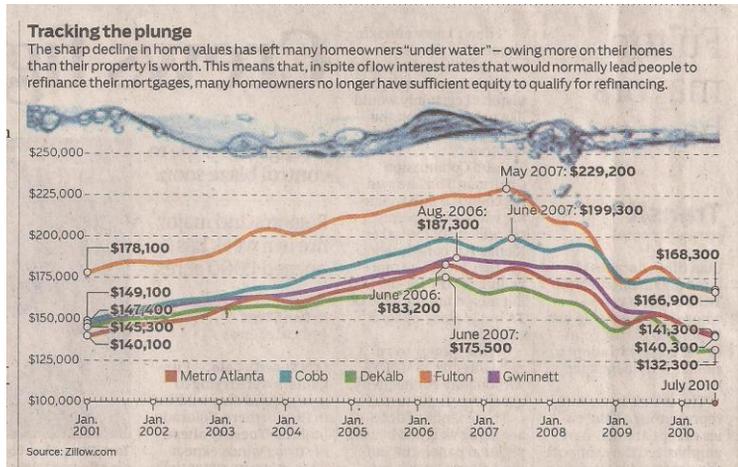


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Critique It



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AJC, July 2010

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Reminder



- HW 4 due Monday
 - Experience with Many Eyes

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Upcoming



- InfoVis system & toolkits
 - Reading
 - Viegas et al '07

- Commercial InfoVis systems
 - Reading
 - Spence & Beilken '00