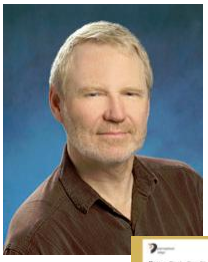
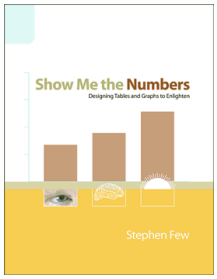
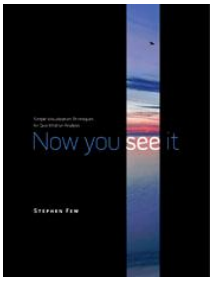
# Few's Design Guidance

CS 7450 - Information Visualization
February 24, 2011
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

p. 96



# More Reference Lines

p. 97

# Trellis Display

Typically varies on one variable

p. 100



# Crosstab

Varies across more than one variable

p. 102

# Crosstab

p. 103



# Multiple Concurrent Views

Vintage infovis

p. 107

# 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

p. 118

# 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

p. 151



# Bar Graphs

When to use:

When you want to support the comparison of individual values

p. 152

# Dot Plots

When to use:

When analyzing values that are spaced at irregular intervals of time

p. 153



# Radar Graphs

When to use:

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

p. 154

# Heatmaps

When to use:

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

p. 157



# Box Plots

When to use:

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

p. 157

# Animated Scatterplots

When to use:

To compare how two quantitative variables change over time

p. 159



# 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

p. 171

# Question

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

Both at same rate, 10%

Log scale shows this

p. 172



# Patterns

Daily sales

Average per day

p. 176

# Cycle Plot

Combines visualizations from two prior graphs

p. 177



# A Story

How much wine of different varieties is produced?

p. 191-2

# Pareto Chart

Shows individual contributors and increasing total

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

p. 194



# Bump Chart

Shows how ranking relationships change over time

p. 201

# Deviation Analysis

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

p. 203



# Distribution Analysis Views

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

# Histogram

p. 225



# Frequency Plot

p. 226

# Strip Plot

p. 227



# Stem-and-leaf Plot

p. 228

# Comparisons

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

p. 234



# Correlation Analysis

Bleah. How can we clean this up?

p. 276

# Crosstab

p. 277



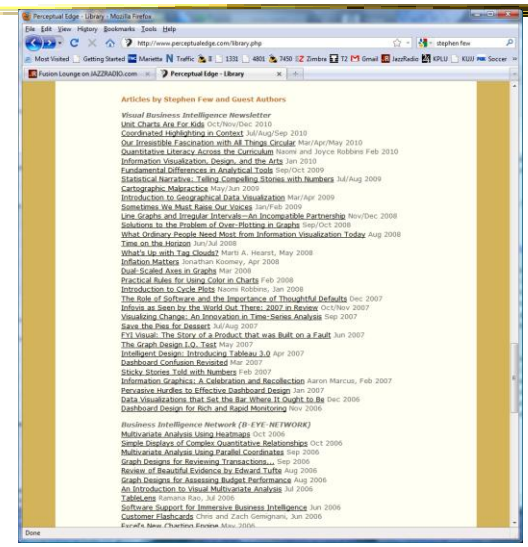
# Color Choice in Heatmaps

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

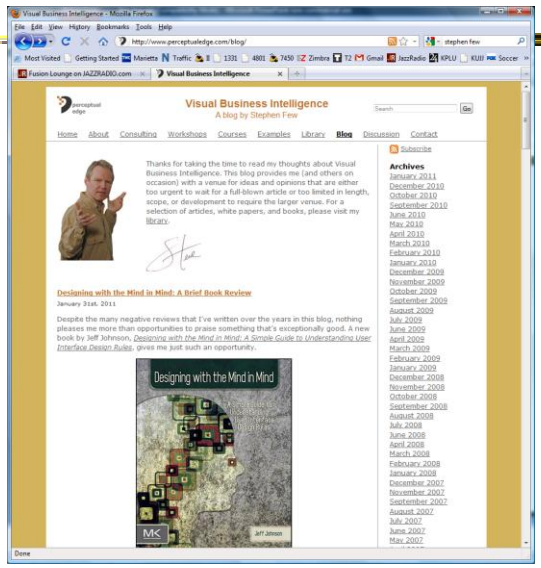
p. 285-7

# Further Articles

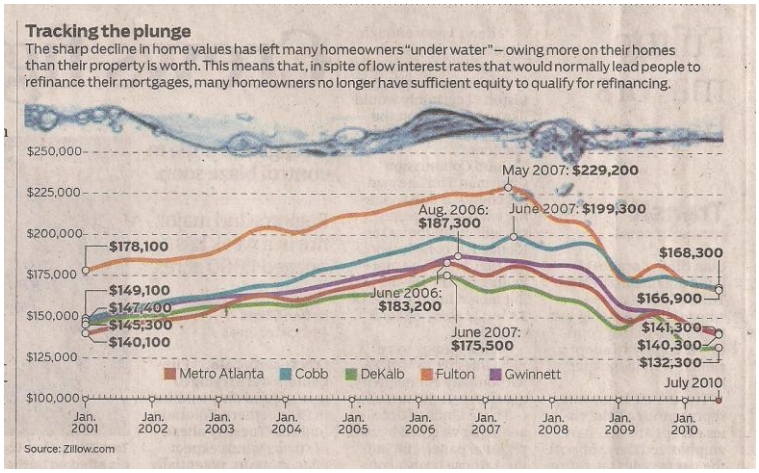





# Blog



# Critique It




AJC, July 2010



# Reminder

- HW 5 due a week from today
  - T-square wiki tips & tricks page
  - Focus on thoughtful critiques, illustrate your points

# HW 4 Reactions

- What we noticed



# Upcoming

- Hierarchical Data (Node-link reps)
  - Reading
    Card & Nation
- Hierarchical Data (Space-filling reps)
  - Reading
    Johnson & Shneiderman

# Sources Used

E. Tufte, *The Visual Display of Quantitative Information*
E. Tufte, *Envisioning Information*
E. Tufte, *Visual Explanations*