Tufte’s Design Principles

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Based on slides from John Stasko, GTECH
Summary of Tufte’s Principles

1. Tell the truth
   Graphical integrity
2. Do it effectively with clarity, precision...
   Design aesthetics
2. Design Aesthetics

Set of principles to help guide designers in arriving at a visually pleasing result that properly conveys the data
Design Principles

Maximize data-ink ratio

\[
\text{Data ink ratio} = \frac{\text{Data ink}}{\text{Total ink used in graphic}}
\]

= proportion of graphic’s ink devoted to the *non-redundant* display of data-information
Example

Images: Volume 1, page 94-95

Erase non-data-ink (within reason)
Erase redundant data-ink
Redesign – Bar Chart

Images: Vol 1, Pages 100 - 101
Redesign – line graph

Image: Vol 1, page 102
Image: Vol 1, page 105

Revise and Edit
BoxPlot Redesign

Image: Vol 1, page 125
Bar Chart Redesign

Image: Vol1, page 128
Avoid Chartjunk

Extraneous visual elements that detract from message

“Chartjunk promoters imagine that numbers and details are boring, dull, and tedious, requiring ornament to enliven.

If the numbers are boring...then you’ve got the wrong numbers”
Nigel Holmes
Multifunctioning Elements

“Mobilize every graphical element, perhaps several times over, to show the data”
Vol1, pg 139

In other words, try to make all graphical elements data encoding elements.
Stem and Leaf Plots

What is the mark?
How is value encoded?
Chernoff Faces
Playfair’s Grid

Irregular grid shows important events
Coordinate Labels as Marks

Images: Vol1 page 150-151
Maximize Data Density

Maximize data density and the size of the data matrix within reason

\[
\text{Data Density} = \frac{\# \text{ entries in data matrix}}{\text{area of data graphic}}
\]
Data Density Examples

Maximize data density and the size of the data matrix within reason

181 numbers / square inch

Image: Vol1 page 164
Horizon Graphs
Small Multiples

Previous examples improved data density by using a LARGE data matrix.

Alternatively, we can reduce the size of the graphic = the Shrink Principle.

Repeated application of this principle leads to a Small Multiples design.
Small Multiples

Image: Vol 1, page 174
Graphical Excellence

Show the data

Guide viewer to substance, not method

Avoid distorting

Many #’s in small space

Make LARGE datasets coherent

Encourage comparison of pieces of data

Multiple levels of detail

Know your purpose

Integrate with stats/text descriptions