Uni Studies 3: The Visual Display of Quantitative Information: Graphical Excellence

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• Graphical Excellence
  • is the well-designed presentation of interesting data
    • substance
    • statistics
    • design
Graphical Excellence consists of complex ideas communicated with clarity, precision, and efficiency.
Graphical Excellence

is that which gives the viewer

- the greatest number of ideas
- in the shortest time
- with the least ink
• Graphical Excellence
  • is nearly always multivariate
  • requires telling the truth about the data
The Visual Display of Quantitative Information

ideas time

ink space

Thursday, November 8, 12
• Why graphical representations at all?
  • reveal data
  • precisely
  • in large quantity
  • leveraging the visual part of our brains
The Visual Display of Quantitative Information

\[\begin{array}{cccc}
\text{I} & \text{II} & \text{III} & \text{IV} \\
X & Y & X & Y & X & Y & X & Y \\
8.0 & 6.95 & 8.0 & 8.14 & 8.0 & 6.77 & 8.0 & 5.76 \\
13.0 & 7.58 & 13.0 & 8.74 & 13.0 & 12.74 & 8.0 & 7.71 \\
9.0 & 8.81 & 9.0 & 8.77 & 9.0 & 7.11 & 8.0 & 8.84 \\
11.0 & 8.33 & 11.0 & 9.26 & 11.0 & 7.81 & 8.0 & 8.47 \\
14.0 & 9.96 & 14.0 & 8.10 & 14.0 & 8.84 & 8.0 & 7.04 \\
6.0 & 7.24 & 6.0 & 6.13 & 6.0 & 6.08 & 8.0 & 5.25 \\
4.0 & 4.26 & 4.0 & 3.10 & 4.0 & 5.39 & 19.0 & 12.50 \\
12.0 & 10.84 & 12.0 & 9.13 & 12.0 & 8.15 & 8.0 & 5.56 \\
7.0 & 4.82 & 7.0 & 7.26 & 7.0 & 6.42 & 8.0 & 7.91 \\
5.0 & 5.68 & 5.0 & 4.74 & 5.0 & 5.73 & 8.0 & 6.89 \\
\end{array}\]

\(N = 11\)
mean of X's = 9.0
mean of Y's = 7.5
equation of regression line: \(Y = 3 + 0.5X\)
standard error of estimate of slope = 0.118
t = 4.24
sum of squares \(X - \bar{X}\) = 110.0
regression sum of squares = 27.50
residual sum of squares of Y = 13.75
correlation coefficient = .82
\(r^2 = .67\)
The story...

Infographics comes from
- geographical representation
- time-series representation
- combinations
- abstractions
Data maps took a long time to be used

- 17th century
- early Chinese map c. 1137AD
- European equivalents not until 1550
• Data maps took a long time to be used
  • 17th century
  • early Chinese map c. 1137AD
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- Edmond Halley’s 1686 chart showing trade winds on a world map
- data map
• Minard 1845
• data map
Credit: John Snow, On the Mode of Communication of Cholera, 1855
- 10th century monastic diagram of celestial bodies
- time series
It was not until 1700s that time-series charts began to appear in scientific writings.

The Visual Display of Quantitative Information

- 1861
- combination space and time
• 1885

• combination
• combination
1765

abstraction

By 1800’s graphical design was no longer dependent on direct analogy to the physical world. Any quantity could be placed in relationship to any other variable quantity. [Infographics] became relevant to all quantitative inquiry.
• Support and deny causal relationships