Graphs and Charts

- Quantitative data can frequently be illustrated in a compelling way using charts and graphs.
  - see www.gapminder.org for fascinating, interactive charts

- Spreadsheet systems usually provide graphing and charting capabilities.
- Here are some examples.

It's a mind-set, not a skill-set. Brilliance helps, but is not required. Instead, adopt these mantras: be stubborn, bossy, lazy, **obsessive**, cynical, plodding, and importunate. Why? So you can use IT as a tool to do cool stuff…

Lotus added charting to the spreadsheet concept.

Sometimes a picture is worth 1000 words.

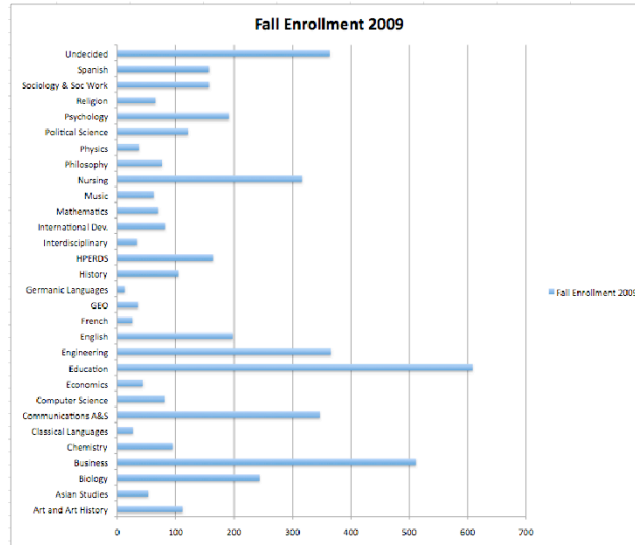|	A	B
1	**Major**	**Fall Enrollment 2009**
2	Art and Art History	112
3	Asian Studies	53
4	Biology	243
5	Business	511
6	Chemistry	95
7	Classical Languages	27
8	Communications A&S	347
9	Computer Science	81
10	Economics	44
11	Education	608
12	Engineering	366
13	English	198
14	French	26
15	GEO	35
16	Germanic Languages	13
17	History	104
18	HPERDS	164
19	Interdisciplinary	33
20	International Dev.	82
21	Mathematics	70
22	Music	62
23	Nursing	316
24	Philosophy	76
25	Physics	37
26	Political Science	121
27	Psychology	191
28	Religion	65
29	Sociology & Soc Work	157
30	Spanish	157
31	Undecided	364
32	**Total**	**4758**

This simple bar chart is much more clear than the raw numbers in the upper left.

Show them how to build this chart.

People are visually oriented, making the chart much easier to understand (provided it is illustrating the right thing the right way).
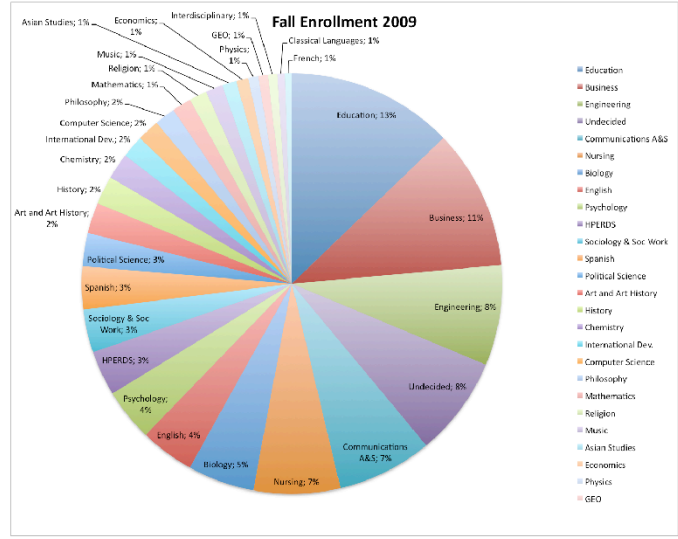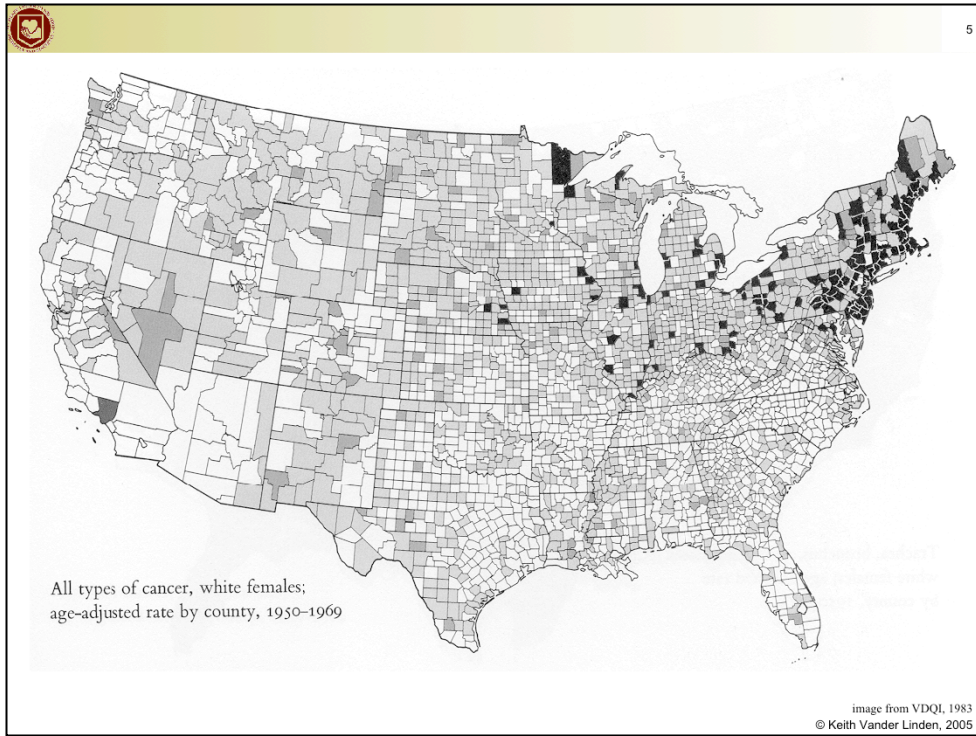
Bar chart of same data

Fall Enrollment 2009

Pie chart of same data

All types of cancer, white females; age-adjusted rate by county, 1950–1969

image from VDQI, 1983
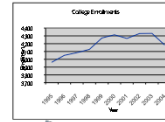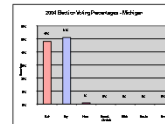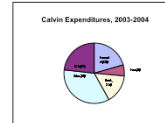© Keith Vander Linden, 2005

Tufte, page17 top here

This chart displays 21,000 data points very very well.

Chart Types

- Pie charts

- Column/bar charts

- Line charts

- Maps

Pie charts   -   proportional relationships

Column/bar charts   - relative numeric information (rather than just percentages)

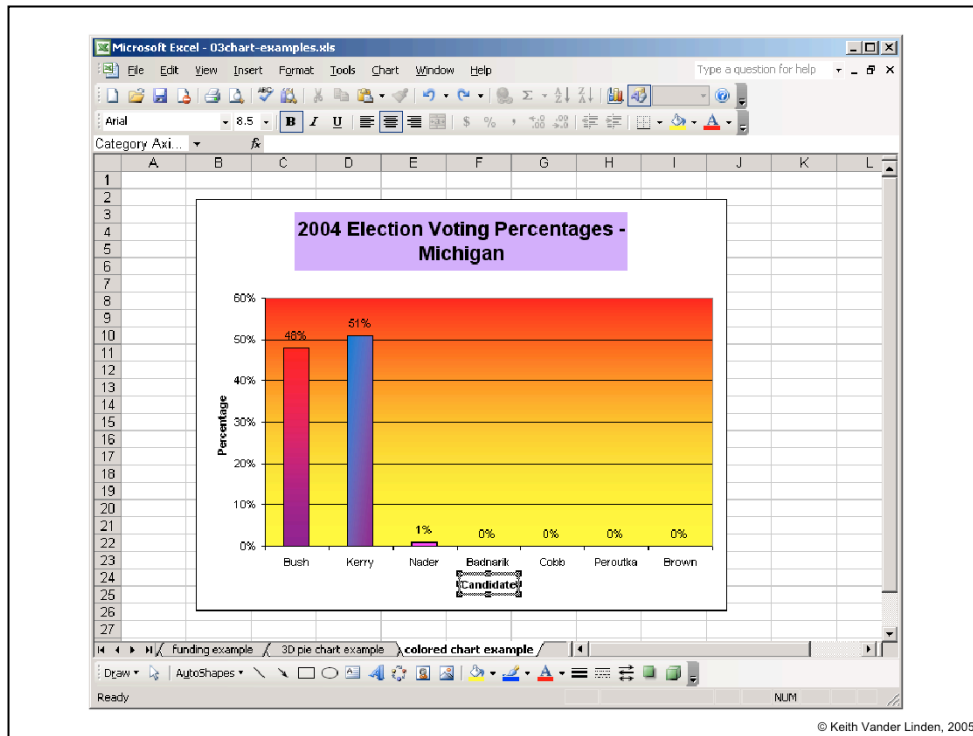Line charts – change in values over time

Maps - geographical information (obviously), people are very good at noting
                    spatial relationships.
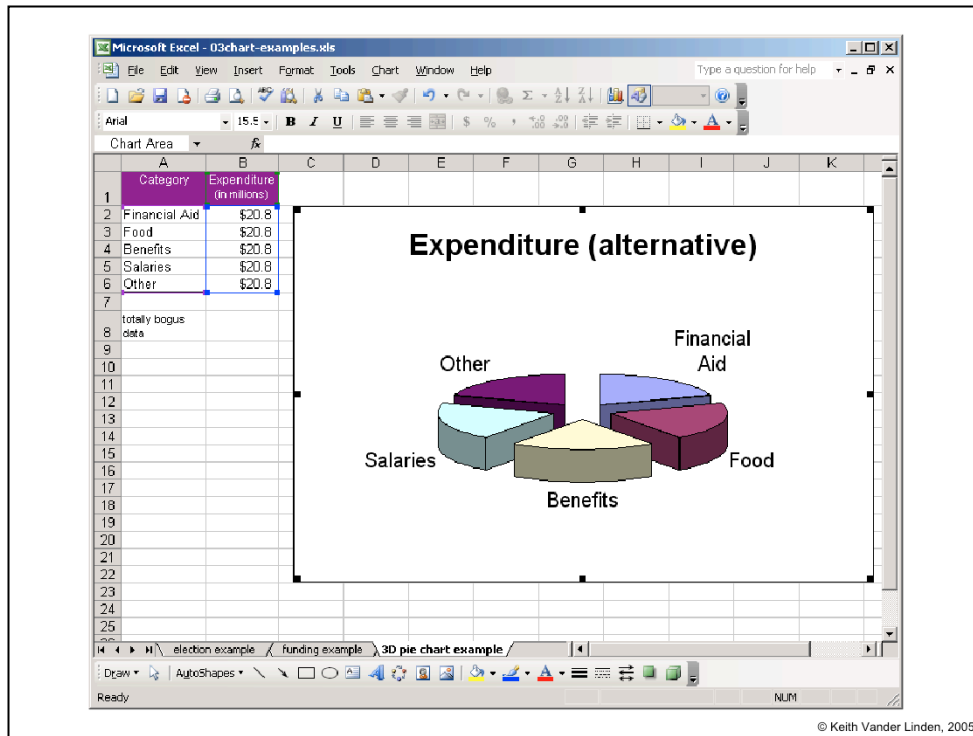
Graph/Chart Issues

- Data values can, however, be obscured or misrepresented using charts.

- Here are some examples.

Lotus added charting to the spreadsheet concept.
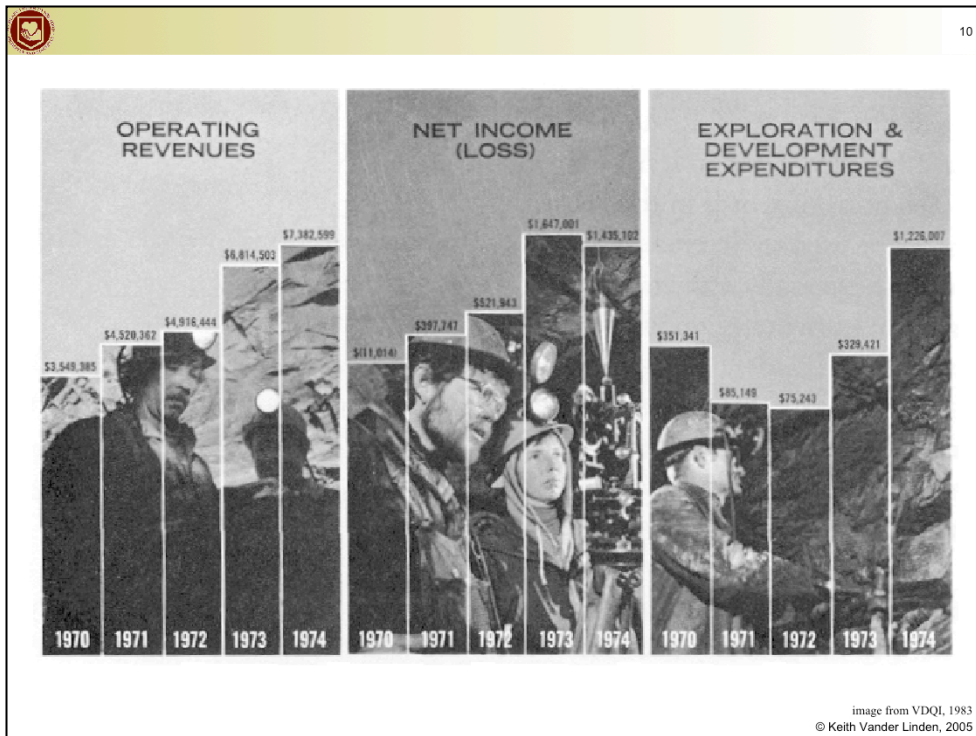
Sometimes a picture is worth 1000 lies.

These colors obscure the real message of the chart, and would basically make it hard to photocopy a legible version.

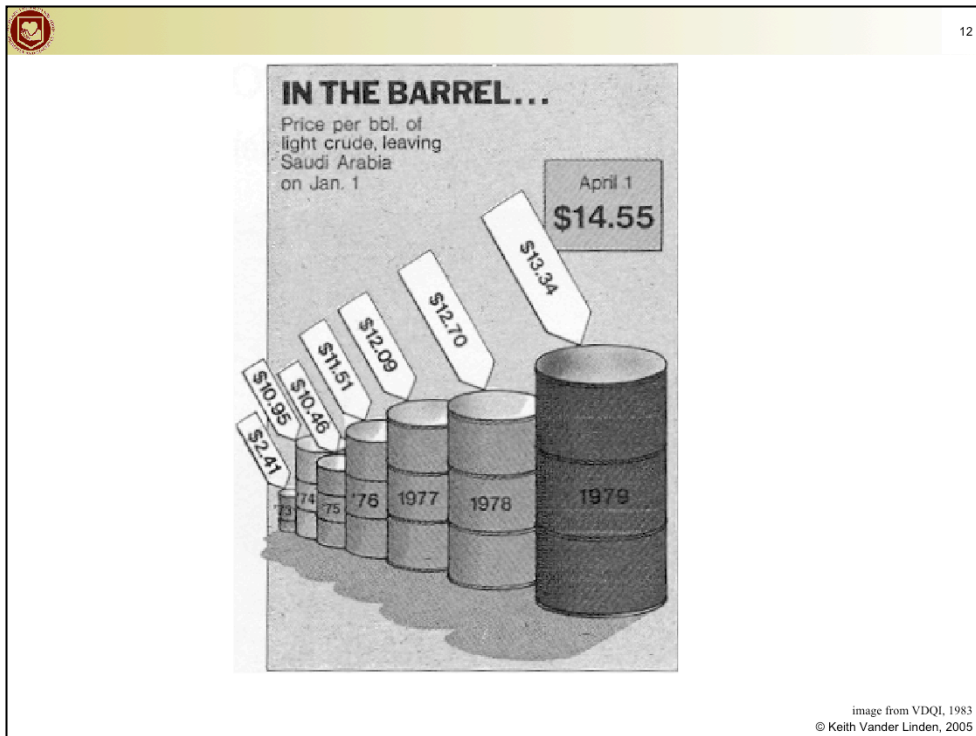Don't be cute with your slides – KISS!

This chart misrepresents the data values in a subtle way - 3D pie charts are evil. See if they can guess what the real proportion is here.

Don't be cute with your slides – KISS!

Tufte, page 54 top here

This chart masks the net loss in 1970. You're looking at the pictures and not at the y-axis manipulations.

Tufte, page 62

this has a high lie factor with a political intent.

The data variation of 454% is depicted with a surface area variation of 4280% and a volume variation of 27000%

Edward Tufte (1940-)
VDQI, 1983

Lying graphics cheapen the graphical art everywhere … When a chart on television lies, it lies millions of times over; when a New York Times chart lies, it lies 900,000 times over to a great many important and influential readers. *VDQI,* p. 53-79

SECOND EDITION

The Visual Display
of Quantitative Information

EDWARD R. TUFTE
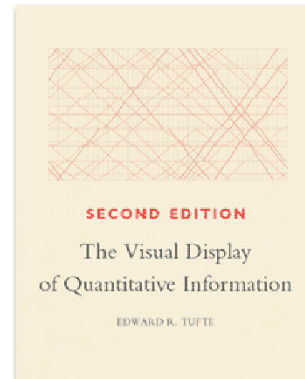
See http://www.edwardtufte.com/tufte/

Vic says that the image on the cover of Tufte's book shows a part of the British train schedule.
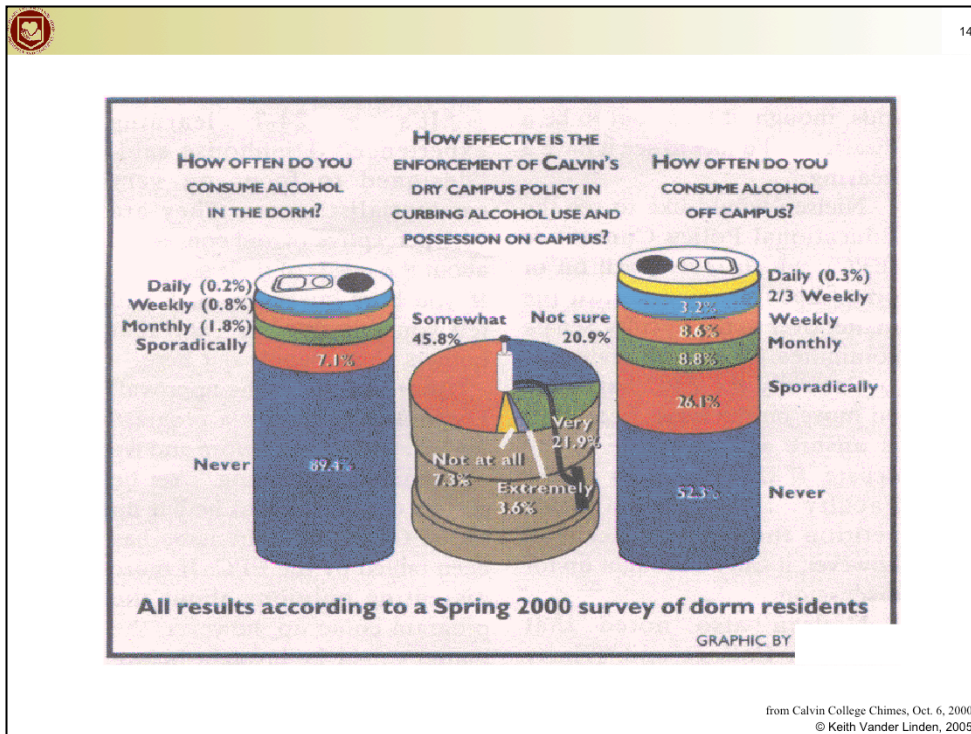
Note the differing scales on the can at left from can at right.

•L can - approx 25% of can is taken up in about 10% of data, making it seem that there's more consumption on campus than there really is.

•R can - blue 3.2% is same size as orange 8.6%

It seems that they've modified the data size in order to get the words on the page properly…

What chart would you really use to display this sort of data?

(These notes from Brenda Vander Linden)
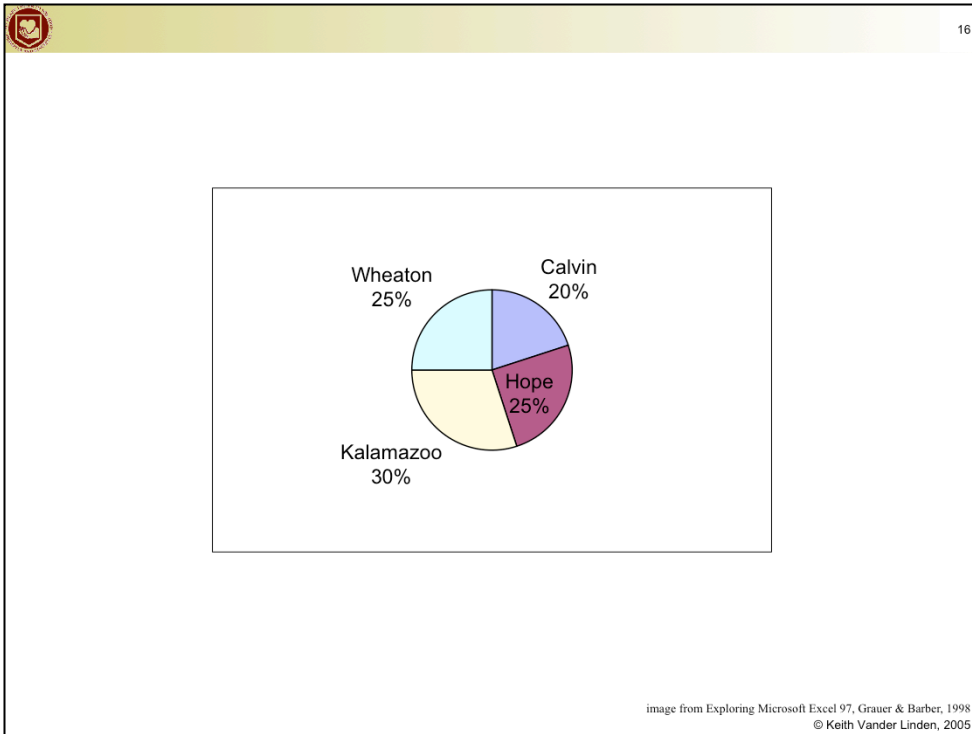
Based on Grauer, figure 14.4, page 176

Didn't label the units! Is this percentage of dumb instructors or what?

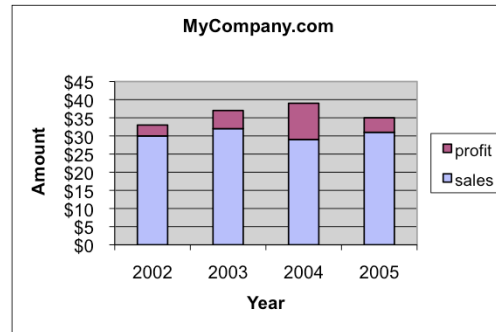MyCompany.com chart showing profit and sales by year (2002–2005).

image from Exploring Microsoft Excel 97, Grauer & Barber, 1998
© Keith Vander Linden, 2005

Based on Grauer, figure 4.15B, page 177
Added dissimilar quantities

Using Charts/Graphs Properly

- Decide what you want to present.
- Present it accurately and unambiguously.
  – Let the graphic values/change accurately depict the data values/change.
  – Clearly label all relevant details.
  – Don't graphically mix dissimilar elements.
  – Use the right type of graph.
  – Don't add "chartjunk".

Be honest. If necessary, have other people look at your work to catch any slant you may have.

Technology and Lying

- It is as easy to lie or mislead with technology.

- "When he lies, he speaks his native language, for he is a liar and the father of lies." - John 8:44

The