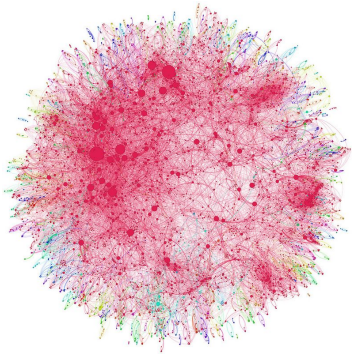


Welcome to CIS 4170 -

The creation and study of

Data Visualization

w Anna O'Connell

Agenda

1. What is Data Visualization? Is it the same as Infographic?
2. Charles Joseph Minard's 1869 diagram.
3. Your first required textbook (Intro and Chapter 1).
4. Course milestones.

What is Data Visualization?

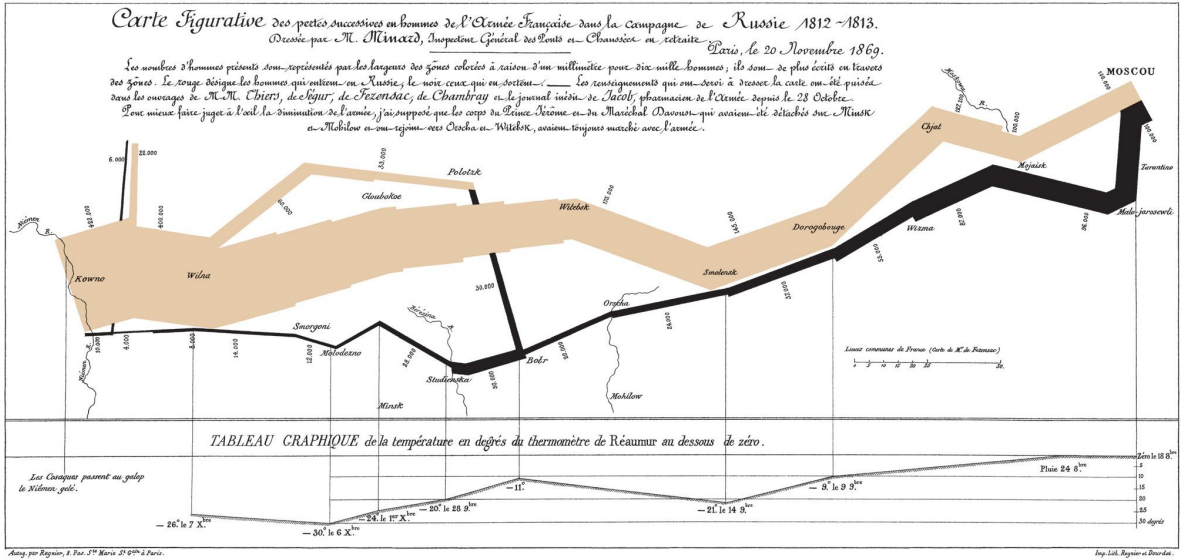
A systematic **mapping** exists between **data values** and **graphic marks** in the creation of **the visualization**.

This mapping establishes how data values are represented visually to communicate information.

https://en.wikipedia.org/wiki/Data_visualization

Charles Joseph Minard's 1869 diagram

1812 Napoleonic Invasion of Russia by France*



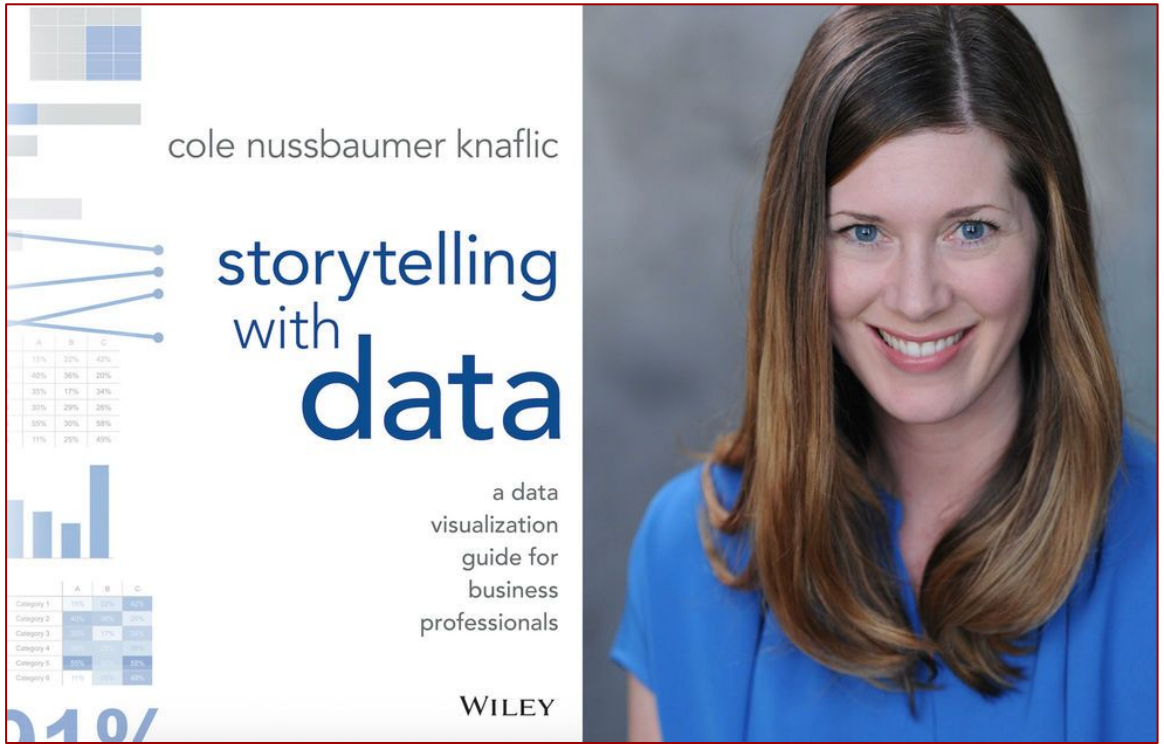
* Tufte Chapter 1.

Both a Data Map & Time Series

The space-time story is **multivariate**. How many variables can you count?

1. **Size** of the Army: 422,000 on the Polish-Russian border. 10,000 remaining.
2. **Direction** of the army's movement.
3. **Location** of the army on a **two-dimensional** surface.
4. Napoleon's retreat from Moscow is mapped to a **temperature** scale on various **dates**.

Your first required textbook.



Cole Nussbaumer Knaflic

In 2007, worked for Google **People Analytics** Team to make data-driven people decisions:

- How to build productive teams
- What makes a manager effective

Today, specializes in teaching data visualization courses:

http://www.storytellingwithdata.com/

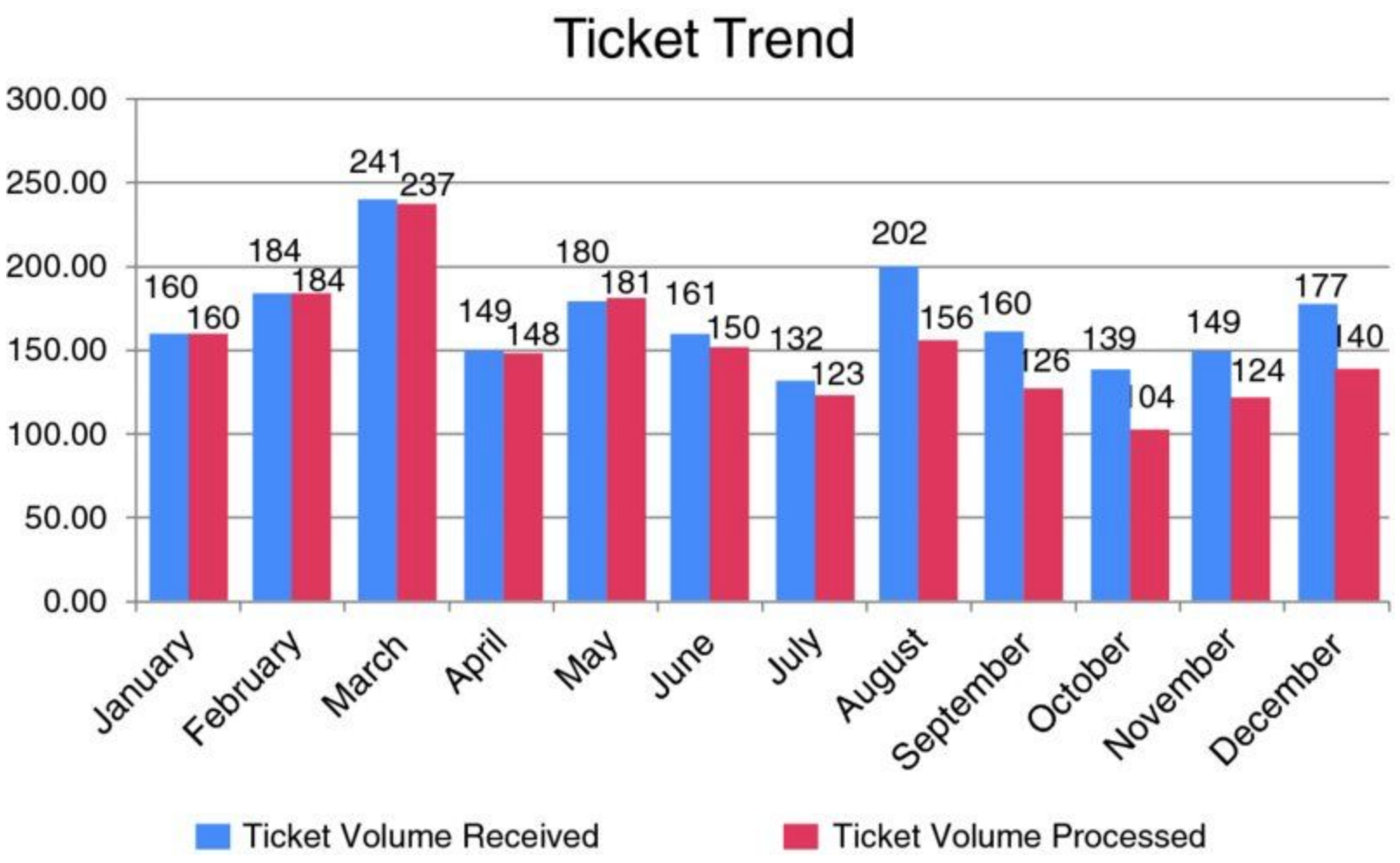
Safari Database

Introduction.

Bad graphs are everywhere.

A Grouped Bar Chart vs Line Charts.

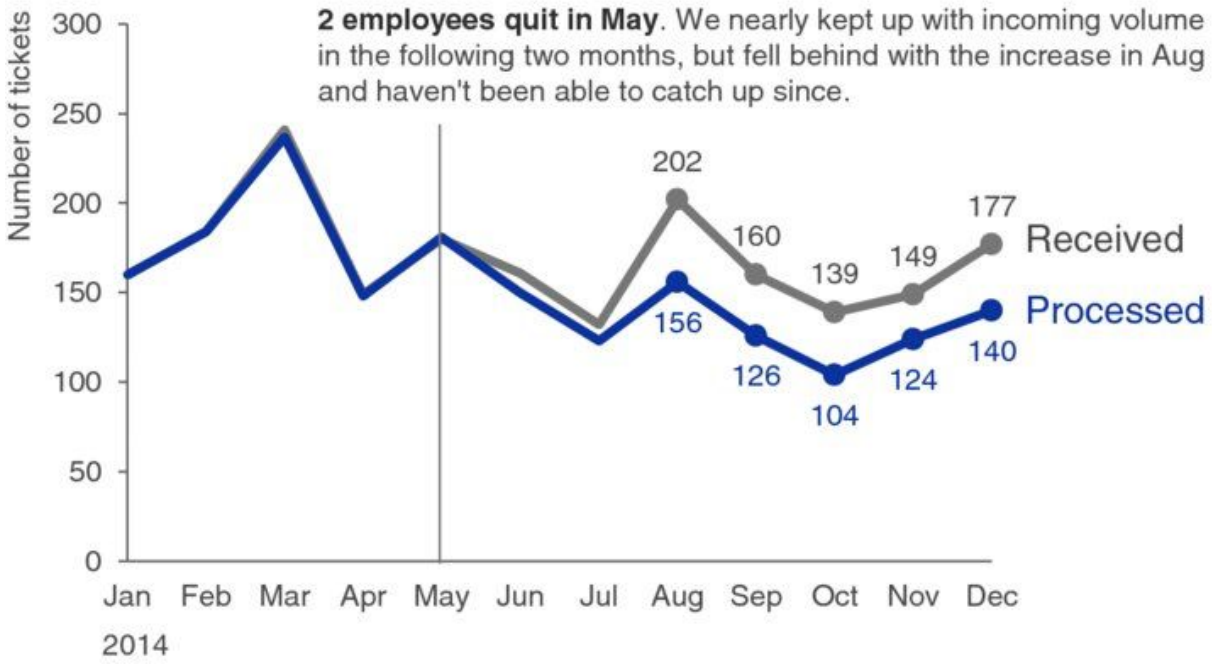
In a **Grouped Bar Chart**
(or a grouped column chart
or a clustered chart)
bars are clustered in groups of more than one.


Ticket Trend
300.00
250.00
200.00
150.00
100.00
50.00
0.00
160
160
184
184
241
237
149
148
180
181
161
150
132
123
202
156
160
126
139
104
149
124
177
140
January
February
March
April
May
June
July
August
September
October
November
December
Ticket Volume Received
Ticket Volume Processed

Please approve the hire of 2 FTEs

to backfill those who quit in the past year

Ticket volume over time

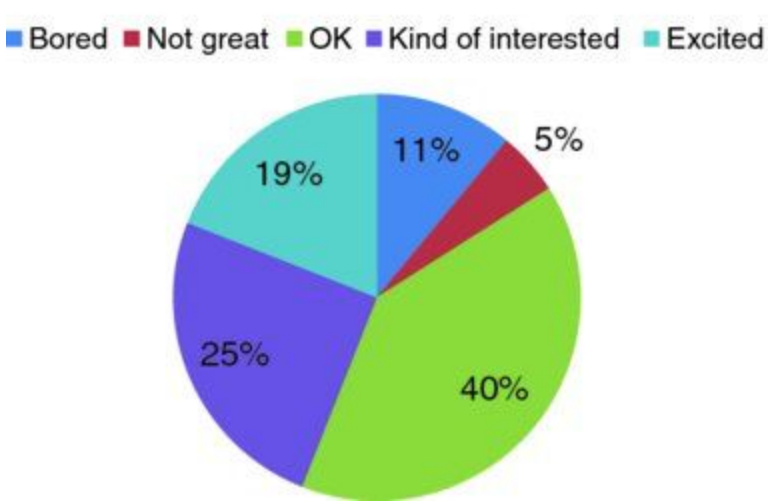


Data source: XYZ Dashboard, as of 12/31/2014 | A detailed analysis on tickets processed per person and time to resolve issues was undertaken to inform this request and can be provided if needed.

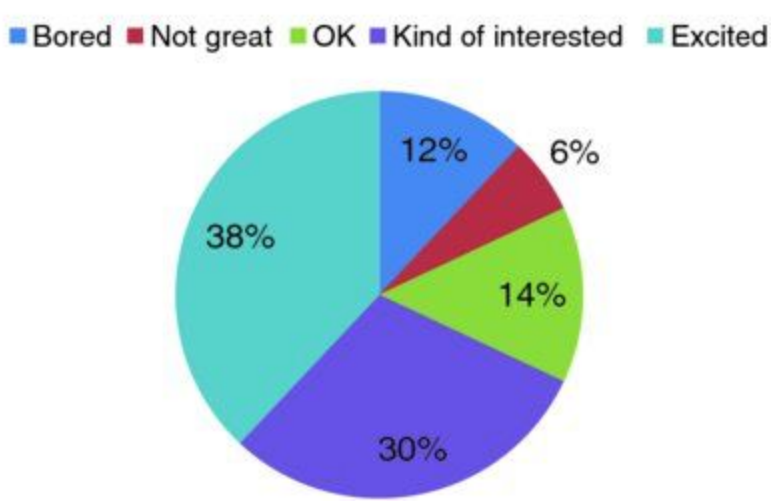
Pie Charts vs Bar Charts.

Survey Results

PRE: How do you feel about doing science?



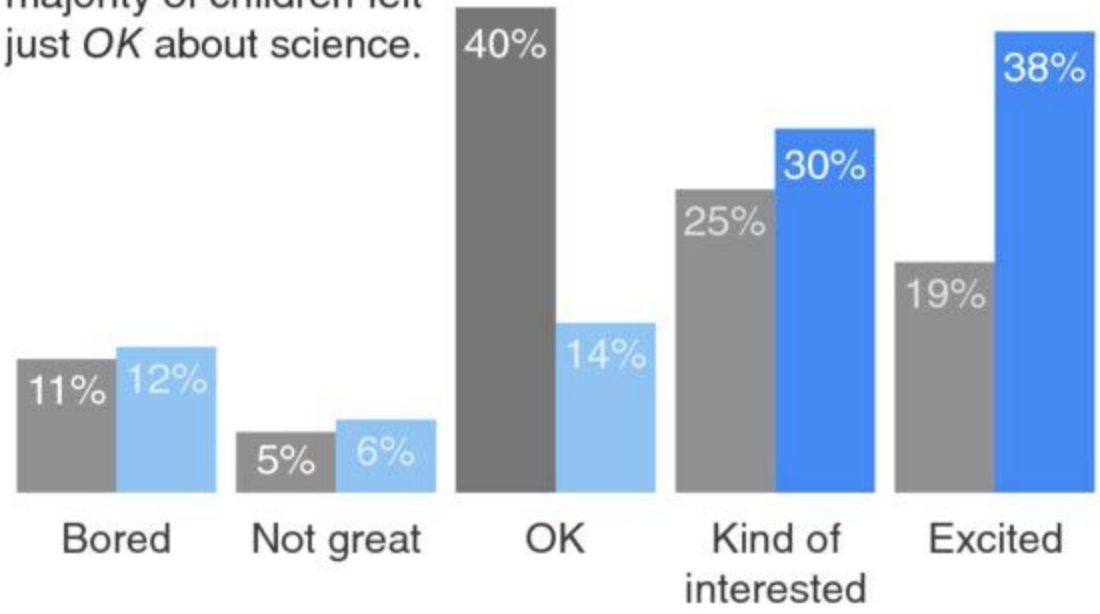
POST: How do you feel about doing science?



Pilot program was a success

How do you feel about science?

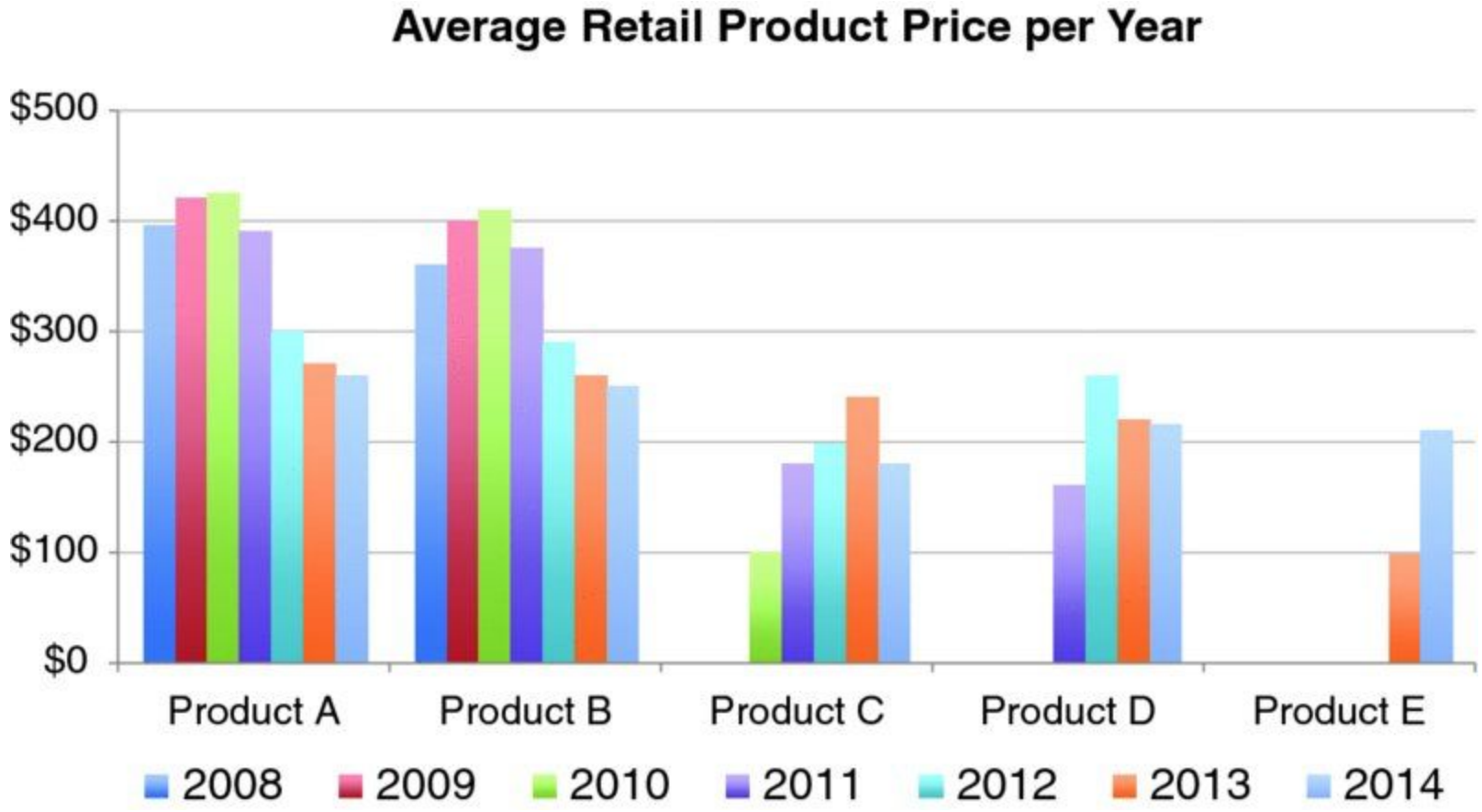
BEFORE program, the majority of children felt just *OK* about science.



AFTER program, more children were *Kind of interested* & *Excited* about science.

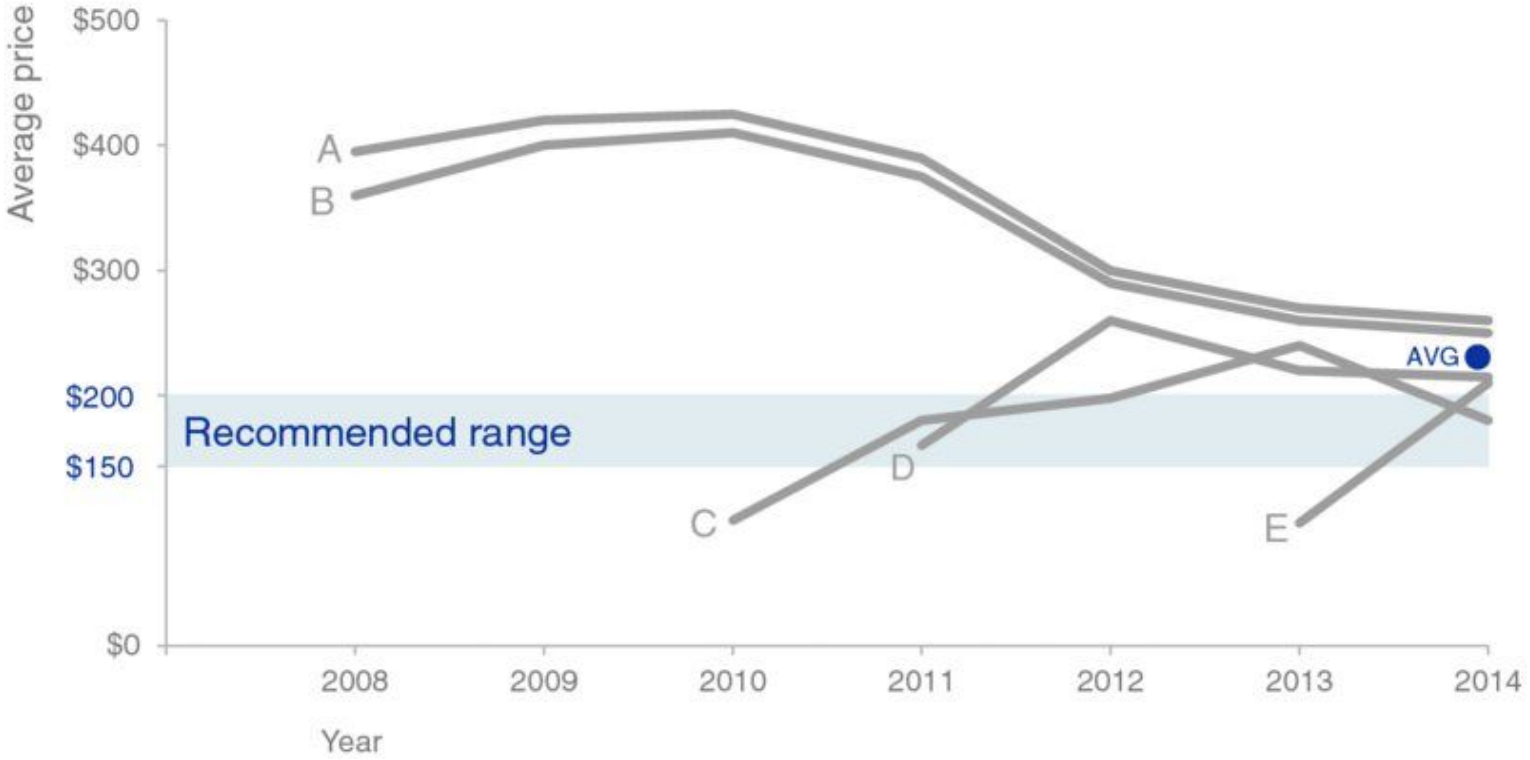
Based on survey of 100 students conducted before and after pilot program (100% response rate on both surveys).

A Grouped Bar Chart vs Line Charts.


Average Retail Product Price per Year
$500
$400
$300
$200
$100
$0
Product A
Product B
Product C
Product D
Product E
2008
2009
2010
2011
2012
2013
2014

To be competitive, we recommend introducing our product *below the $223 average* price point in the **$150–$200 range**

Retail price over time by product



Conclusion

Effective Data Visualization:

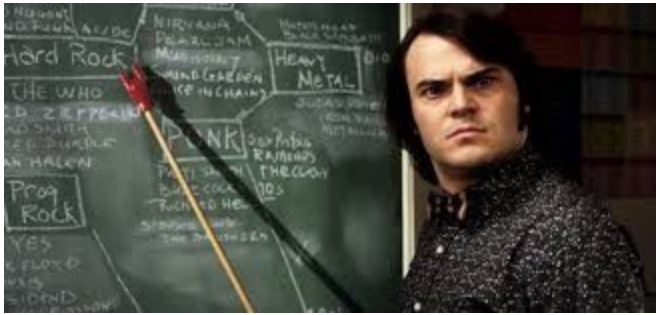
- tells a clear story / a call to action
- the choice of visual aid makes the story obvious
- title contains the summary of findings
- text reinforces the message

The importance of context.

Chapter 1.

Exploratory vs. Explanatory analysis

Don’t just present all data…



What story would you like to tell?

WHO: **The budget committee** that can approve funding for continuation of the summer learning program.

WHAT: The summer learning program on science was a success; **please approve the budget** to continue.

HOW: Illustrate success with the data collected through the **survey** conducted before and after the pilot season.

3-minute story

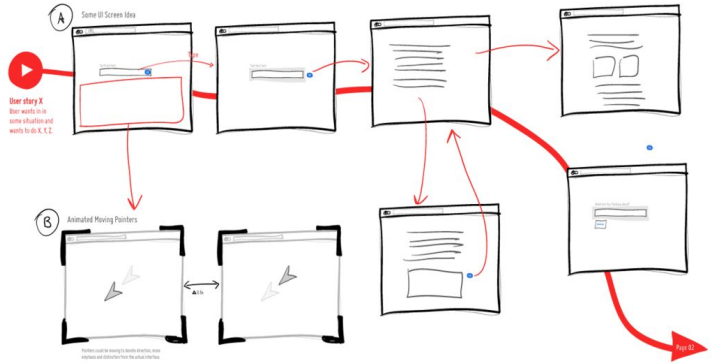
What would you say **if you only had three minutes** to tell your audience what they need to know?

vs. Big Idea

One Sentence:

"The pilot summer learning program was successful at improving students' perceptions of science and, because of this success, we recommend continuing to offer it going forward; ***please approve our budget*** *for this program."*

The **storyboard** establishes the structure for your communication. It's a visual outline of the content you plan to create.



Issue:

Kids have bad attitudes about science

Demonstrate issue: show student assignment grades over course of year

Ideas for overcoming issue, including pilot program

Describe pilot program – goals, etc.

Show before & after survey data to demonstrate success of program

RECOMMENDATION: pilot was a success let's expand it we need $$

To summarize...

Before you start creating content:

- Arrive with **explanatory** analysis.
- Decide **who** is your client and **what** you want to convey.
- The 3-minute story and the Big Idea will help you tell your story clearly.
- **Storyboarding** will help to narrow down the desired story.

Have a solid understanding of your story.

True or False?

To communicate your idea to the audience, you really want to be in **exploratory** analysis space.

ANS: False.

List the components of understanding the context:

Explanatory Analysis

Who - Who is the audience?

What - what do you need your audience to know or do?

Mechanism - Live presentation / written doc / email / slideument.

Tone

How - what data is available?

The 3-minute story and big idea

The **storyboard** establishes the structure for your communication.

Which one is longer?

a. The 3-minute story
b. The big idea

ANS: a. The 3-min story. Big idea is just one sentence.

DataViz Videos

Ted Talks - Ideas about visualizations - Making sense of too much data:

https://www.ted.com/playlists/56/making_sense_of_too_much_data

Class Milestones

Your Presentation will be scheduled (alphabetically).

Please email me your topic one week prior.

Choose the DataViz, Tell the Story, Decipher the visual.

Length: 4-6 min individual contribution.

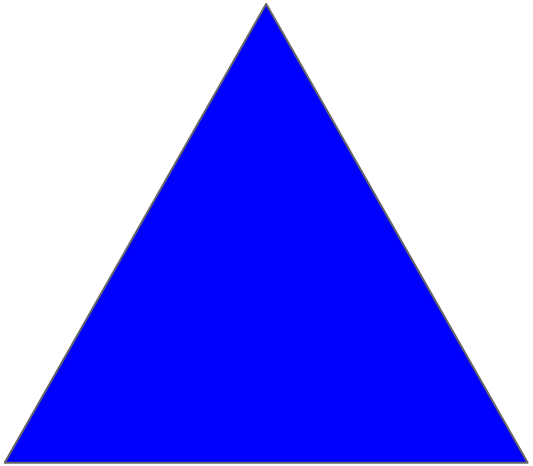
Structure:

- Intro, body (2-3 points), conclusion.

Your Presentation: The Triangle of Rhetoric

Aristotle

ETHOS
credibility - trust



PATHOS
emotion - imagination

LOGOS
consistency - logic

Tableau Top 10

https://www.tableau.com/learn/articles/best-beautiful-data-visualization-examples