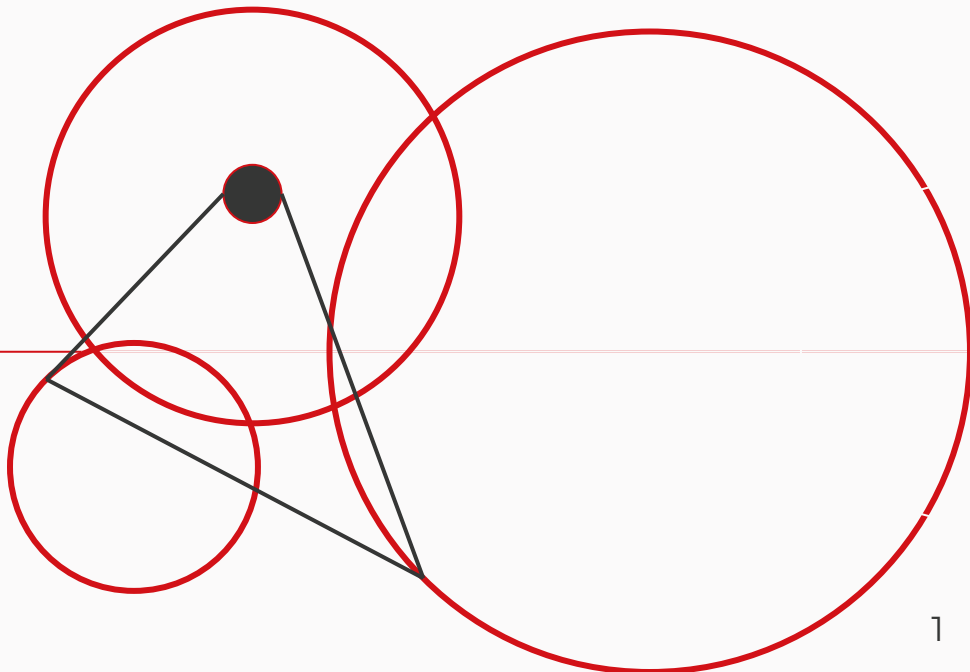


Introduction to Data Visualization

Fall 2025



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SJSU CS 133

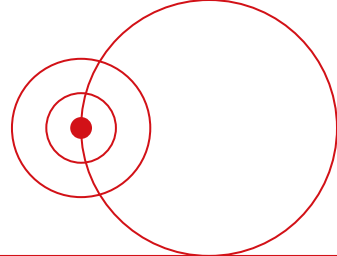


Agenda

CS 133 - Data visualization

- Storytelling with data
- Different data plots

What is the purpose of visualizing data?

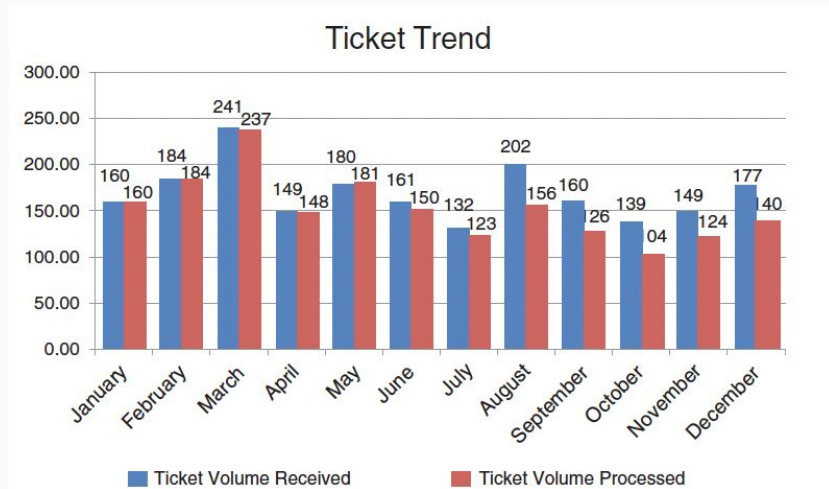


We can use visualization to communicate

- ❖ To communicate using data
 - Analysts sharing results of their statistical models
 - Business communicating profit results in a data-driven way
 - Researcher sharing scientific findings
- ❖ Communicate stories with data to make data-driven decisions
- ❖ Poorly communicated data can lead to confusion, lost of revenue, poor decision making

How would you convey this data?

Two employees quit in May. Based on the volume of tickets received versus processing ...

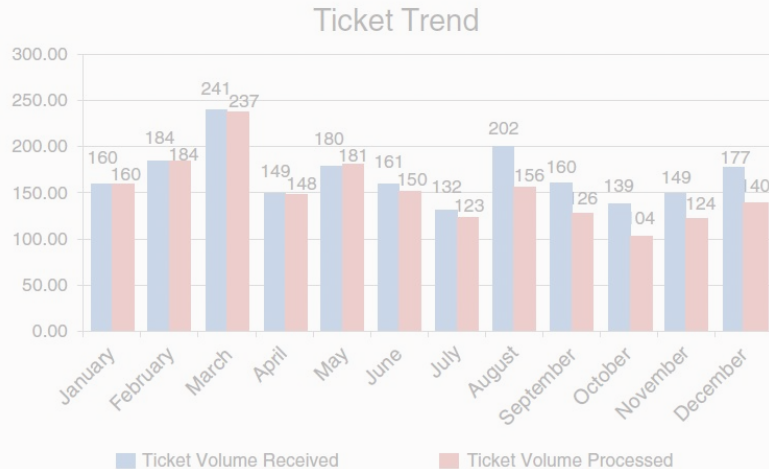


Think (1 min), Pair (3 mins), Share (3 mins)

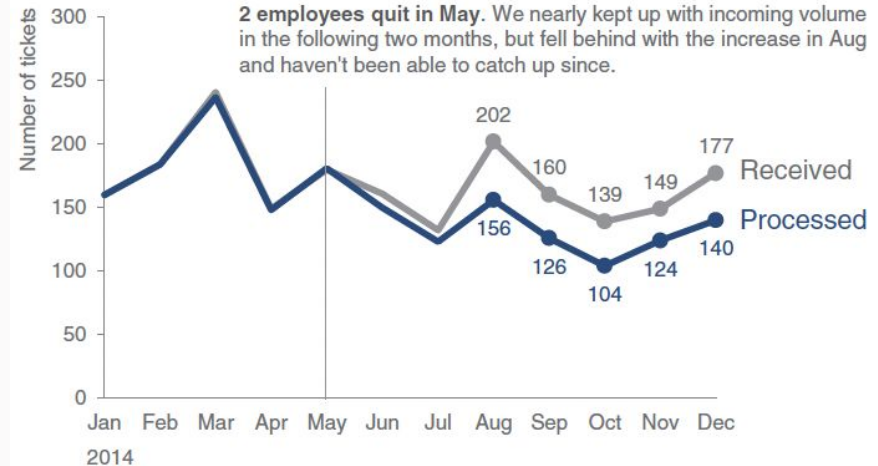
- Was there any affect on employees workload?
- Are there any trends in the amount of tickets received or processed?
- Could this data better be communicated?

Use line graph to emphasize trend

Two employees quit in May. Based on the volume of tickets received versus processing, was there any affect on employees workload? Are there any trends in the amount of tickets received or processed?



Ticket volume over time



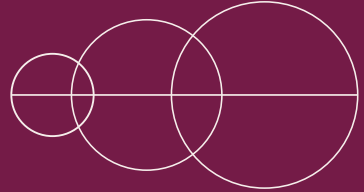
Knaflig, Cole Nussbaumer. *Storytelling with data: A data visualization guide for business professionals*. John Wiley & Sons, 2015.

Using GitHub to store files and code

Use GitHub to manage your code and changes

- ❖ Store, change, merge and collaborate on files or code
- ❖ Use Git for version control
- ❖ Visibly tracking iterative changes
- ❖ Team can look back at previous versions of the code to track changes and reverse if necessary
- ❖ Work with unlimited collaborators on project

Key consideration to communicate visually with data



- ❖ Understand the context
- ❖ Select an appropriate visual display
- ❖ Remove unnecessary clutter
- ❖ Focus attention on the data you want to communicate with
- ❖ Tell a story with the data

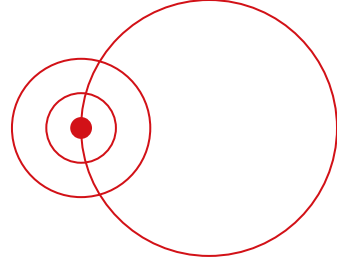
The importance of context



Consider your target audience

- ❖ Who is your audience?
- ❖ What do you want your audience to know or do?
- ❖ How will the information be communicated with your audience?
- ❖ Data becomes supporting evidence to the story you want to tell

Example to illustrate concept

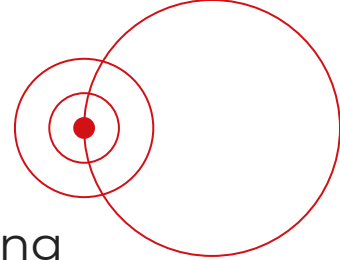


You are a grade school teacher and you are finishing up an experimental pilot summer program on science.

- ❖ Kids are surveyed at onset and end of program to understand their perception toward science
- ❖ Who is our audience?
- ❖ What is your “Call of action”?



What do these charts convey to you?



Survey asked students in a pilot program their thoughts on doing science

Think (1 min), Pair (3 mins), Share (3 mins)
Your goal is to communicate whether the pilot science program was a success and if it should be further funded.

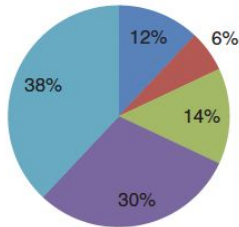
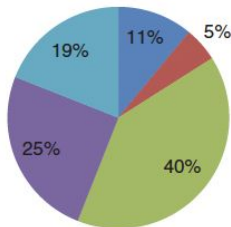
Survey Results

PRE: How do you feel about doing science?

POST: How do you feel about doing science?

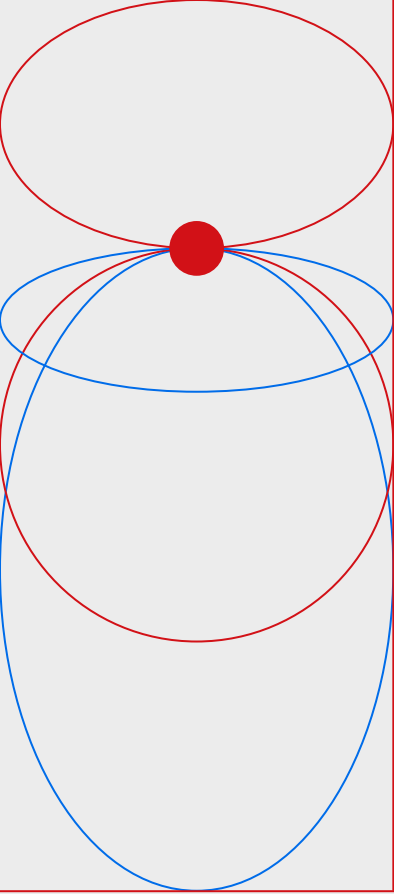
■ Bored ■ Not great ■ OK ■ Kind of interested ■ Excited

■ Bored ■ Not great ■ OK ■ Kind of interested ■ Excited



- What is the main take-away from these plots?
- Was the program a success?
- What message do you want to communicate?
- How would you change these plots to better communicate your message?

Storyboarding what we want to communicate



Issue:

Kids have bad attitudes about Science

Demonstrate Issue:
show student assignment grades over course of year

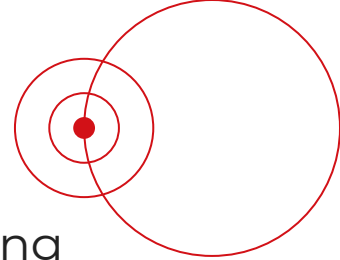
Ideas for overcoming issue, including pilot program

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 \$\$\$

What do these charts convey to you?



Survey asked students in a pilot program their thoughts on doing science

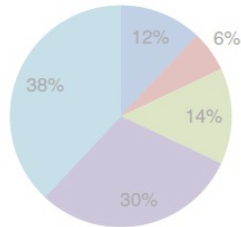
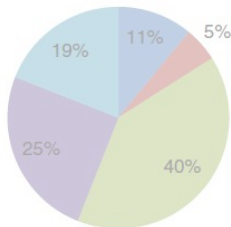
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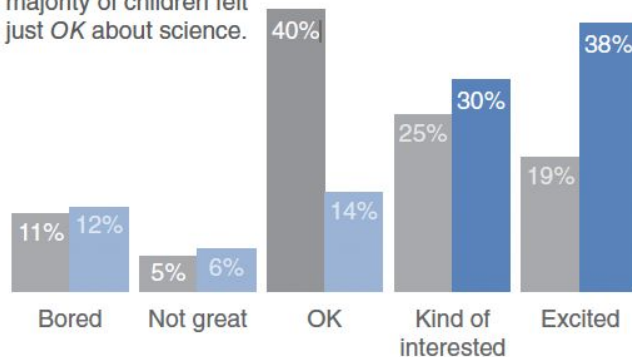
■ Bored ■ Not great ■ OK ■ Kind of interested ■ Excited



Pilot program was a success

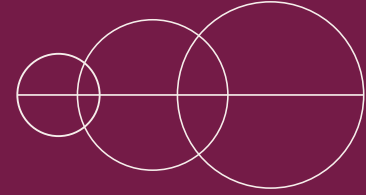
How do you feel about science?

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



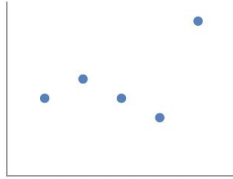
AFTER program, more children were *Kind of interested* & *Excited* about science.

Choose an effective visual

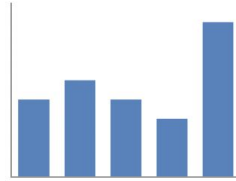


91%

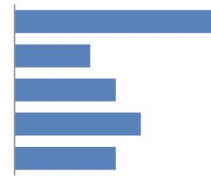
Simple text



Scatterplot



Vertical bar



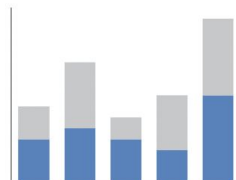
Horizontal bar

| | A | B | C |
|------------|-----|-----|-----|
| Category 1 | 15% | 22% | 42% |
| Category 2 | 40% | 36% | 20% |
| Category 3 | 35% | 17% | 34% |
| Category 4 | 30% | 29% | 26% |
| Category 5 | 55% | 30% | 58% |
| Category 6 | 11% | 25% | 49% |

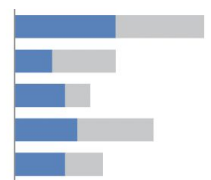
Table



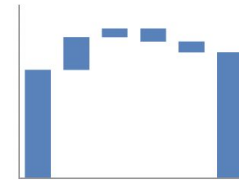
Line



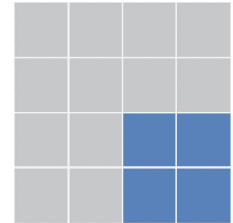
Stacked vertical bar



Stacked horizontal bar



Waterfall



Square area

Knafllic, Cole Nussbaumer. *Storytelling with data: A data visualization guide for business professionals*. John Wiley & Sons, 2015.