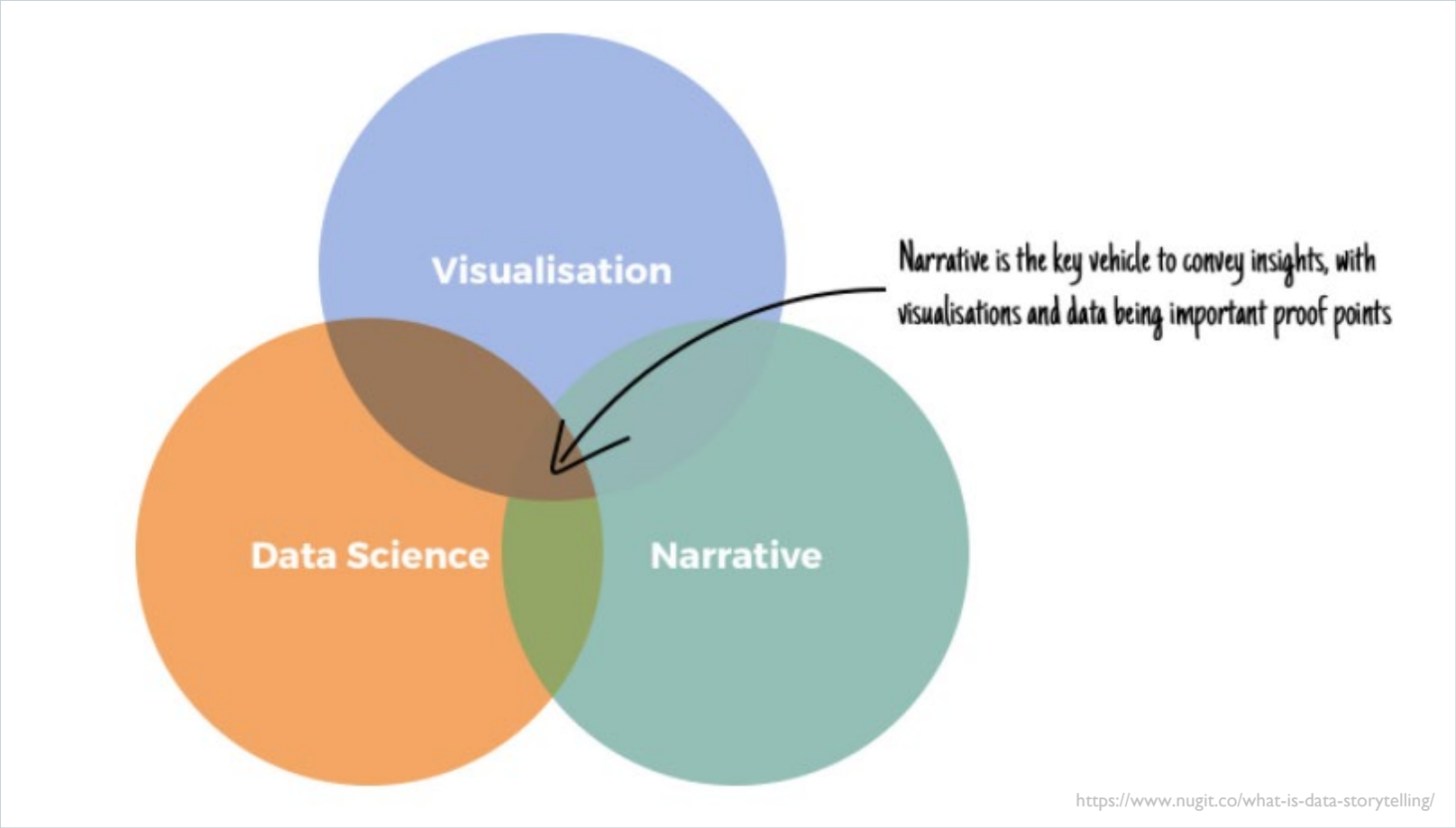
FINDING THE STORY IN YOUR DATA



Karen Richey Mislick, Senior Lecturer

Department of Operations Research

Dashboards and spreadsheets only tell you *what* is happening. But, they do not tell you why

Facts simply present data; whereas, a story's narrative provides context, which augments our understanding and drives valuable insights.

Source: https://www.nugit.co/what-is-data-storytelling/

A COST ESTIMATE CONTAINS MANY STORIES

Bid Item No.		Bid Item Description	Total Material Cost	Total Labor Cost	Total Equipment Cost	Total Direct Construction Costs
Bid Item: 1		Replace Pit Toilets with New Comfort Station				
	A10	Foundations	$ 30,028	$ 33,082	$ 7,293	$ 70,403
	A20	Basement Construction	$ -	$ -	$ -	$ -
	B10	Superstructure	$ 15,622	$ 13,198	$ 460	$ 29,280
	B20	Exterior Enclosure	$ 35,992	$ 29,477	$ -	$ 65,469
	B30	Roofing	$ 18,471	$ 8,706	$ -	$ 27,177
	C10	Interior Construction	$ 25,573	$ 9,308	$ -	$ 34,881
	C30	Interior Finishes	$ 4,476	$ 13,424	$ -	$ 17,900
	D20	Plumbing Systems	$ 26,655	$ 16,121	$ -	$ 42,776
	D30	HVAC	$ 1,269	$ 1,170	$ -	$ 2,439
	D50	Electrical	$ 8,753	$ 9,366	$ -	$ 18,119
	F20	Selective Building Demolition	$ 463	$ 1,990	$ 3,862	$ 6,315
	G10	Site Preparation	$ 2,188	$ 4,362	$ 6,952	$ 13,502
	G20	Site Improvements	$ 8,900	$ 7,300	$ -	$ 16,200
	G30	Site Mechanical	$ 86,213	$ 32,582	$ 44,542	$ 163,337
	G40	Site Electrical	$ 5,000	$ -	$ -	$ 5,000
	XX	Standard General Conditions	$ 31,900	$ 101,200	$ 18,610	$ 151,710
Total - Bid Item	1	Replace Pit Toilets with New Comfort Station	$ 301,503	$ 281,286	$ 81,719	$ 664,508
Bid Item: 2		Construct New Parking Lot & Site Utilities				
	G10	Site Preparation	$ 2,500	$ 11,711	$ 19,776	$ 33,987
	G20	Site Improvements	$ 143,581	$ 36,335	$ 43,670	$ 223,586
	G30	Site Mechanical	$ 12,153	$ 14,232	$ 4,241	$ 30,626
	XX	Standard General Conditions	$ 12,925	$ 8,350	$ 6,500	$ 27,775
			$ -	$ -	$ -	$ -
Total - Bid Item	2	Construct New Parking Lot & Site Utilities	$ 171,159	$ 70,628	$ 74,187	$ 315,974
Bid Item: 3		Picnic Area & Trailhead Improvements				
	G10	Site Preparation	$ -	$ 11,860	$ 4,845	$ 16,705
	G20	Site Improvements	$ 59,448	$ 25,960	$ 12,270	$ 97,678
	G30	Site Mechanical	$ 2,125	$ 2,275	$ 330	$ 4,730
	XX	Standard General Conditions	$ 5,775	$ 7,550	$ 2,500	$ 15,825
			$ -	$ -	$ -	$ -
Total - Bid Item	3	Picnic Area & Trailhead Improvements	$ 67,348	$ 47,645	$ 19,945	$ 134,938
		Total Bid Items 1-3	$ 540,010	$ 399,559	$ 175,851	$ 1,115,420

POLL QUESTION

What type of data visualization would be most effective for telling this story?

- **Table**
- **Bar chart**
- **Pie chart**
- **Heat map**

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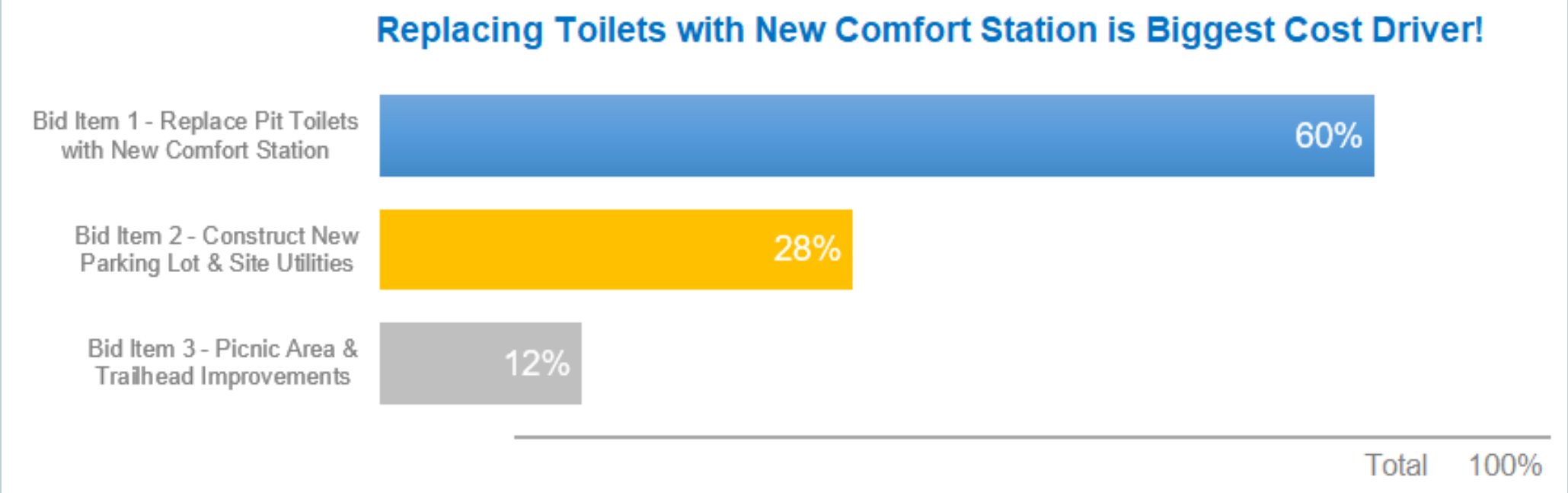
		Total Bid Items 1-3	$ 540,010	$ 399,559	$ 175,851	$ 1,115,420

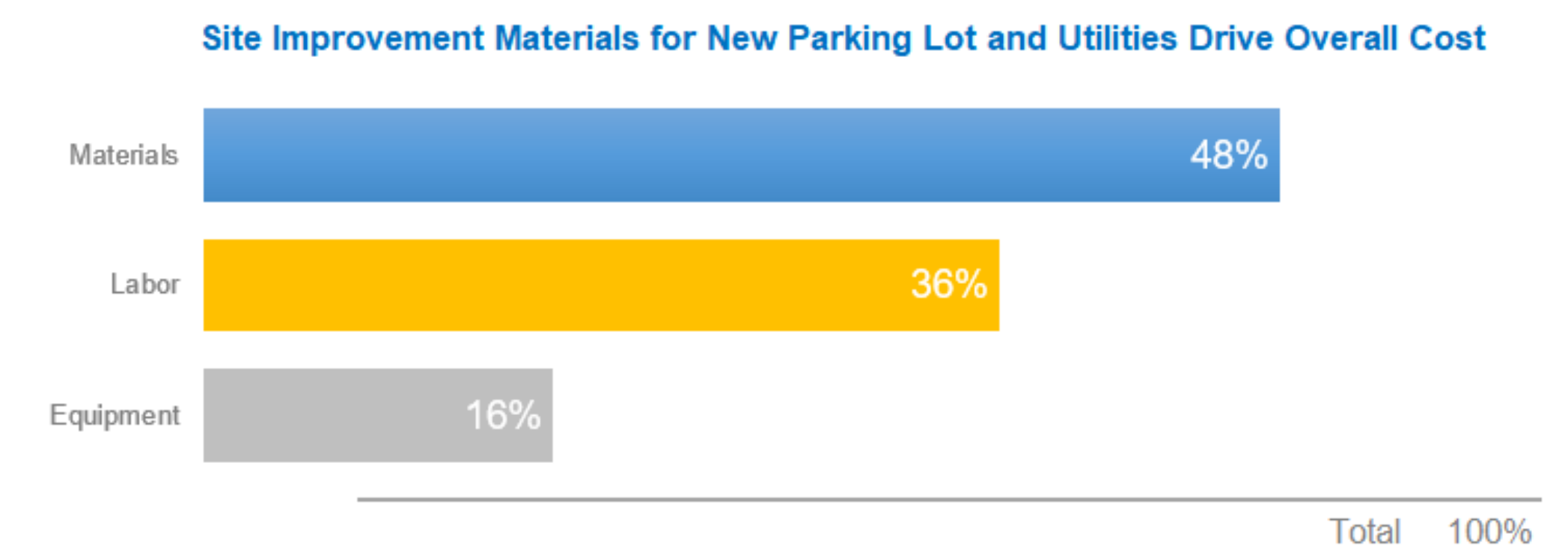
COST DRIVER STORY – USING A TABLE

	Materials		Labor		Equipment	
Bid Item 1 - Replace Pit Toilets with New Comfort Station	**$301,503**	**70%**	**$281,286**	**76%**	**$81,719**	**86%**
Site Mechanical	$86,213	29%	$32,582	12%	$44,452	54%
Exterior Enclosure	$35,992	12%	$29,477	10%	$0	0%
Standard General Conditions	$31,900	11%	$101,200	36%	$18,610	23%
Foundations	$30,028	10%	$33,082	12%	$7,293	9%
Plumbing Systems	$26,655	9%	$16,121	6%	$0	0%
Bid Item 2 - Construct New Parking Lot & Site Utilities	**$171,159**	**92%**	**$70,628**	**88%**	**$74,187**	**91%**
Site Improvements	$143,581	84%	$36,335	51%	$43,670	59%
Site Preparation	$2,500	1%	$11,711	17%	$19,776	27%
Site Mechanical	$12,153	7%	$14,232	20%	$4,241	6%
Bid Item 3 - Picnic Area & Trailhead Improvements	**$67,348**	**88%**	**$47,645**	**54%**	**$19,945**	**62%**
Site Improvements	$59,448	88%	$25,960	54%	$12,270	62%

TOP WBS COST DRIVER STORY – USING A HORIZONTAL BAR CHART



DIFFERENT STORY – SAME DATA!



SAME STORY, DIFFERENT VISUAL – USING SIMPLE TEXT

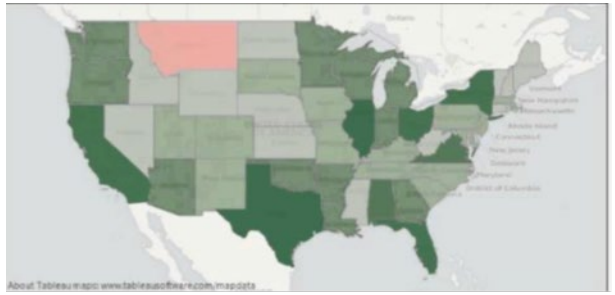
54%

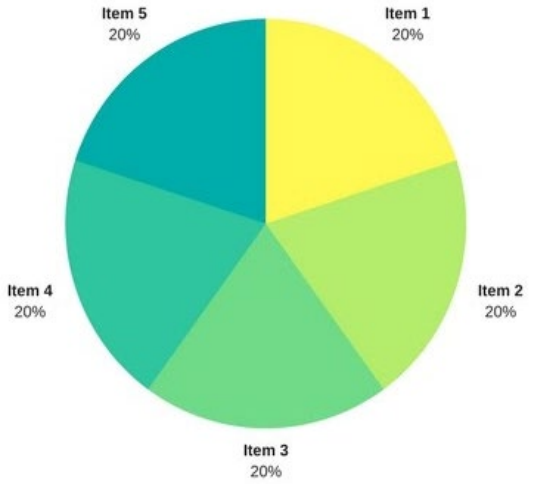
of material costs are driven by **site improvements** or **mechanical upgrades**

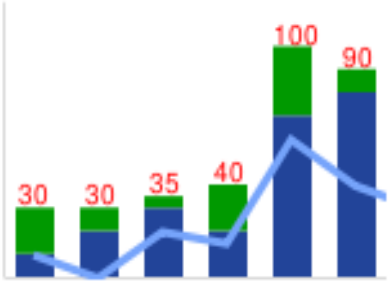
POLL QUESTION

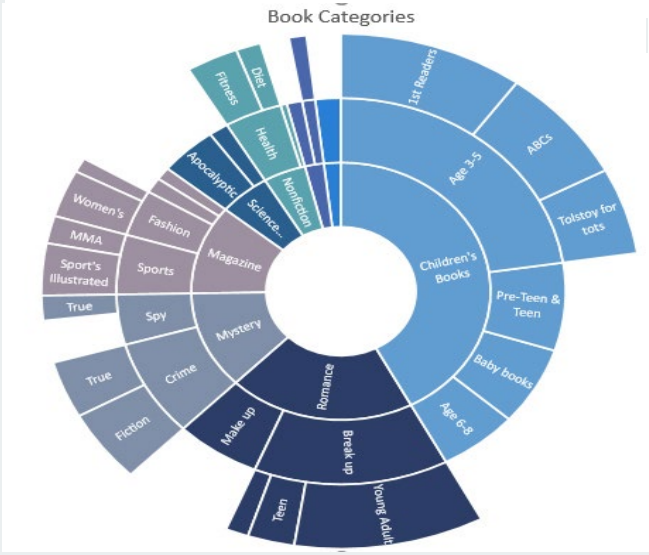
What data visualization tools are you using?

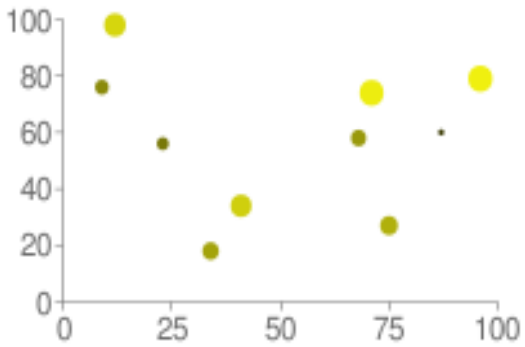
- **Tableau**
- **Power BI**
- **Google charts**
- **Excel**



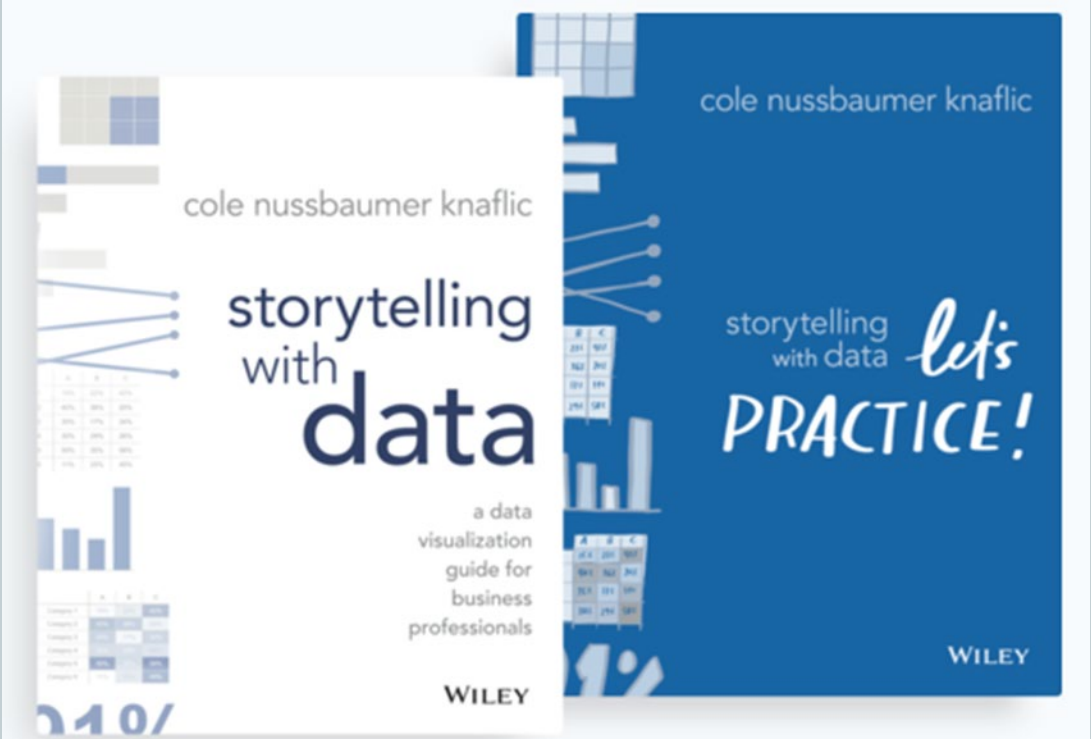








STORYTELLING WITH DATA



INTRODUCTION

The Storytelling with Data and Let's Practice books were written for anyone who plans to **use data to communicate** something to others with the goals of

- Creating effective data visuals,
- Keeping your audience's attention on your presentation, and
- Influencing decisions using your data story

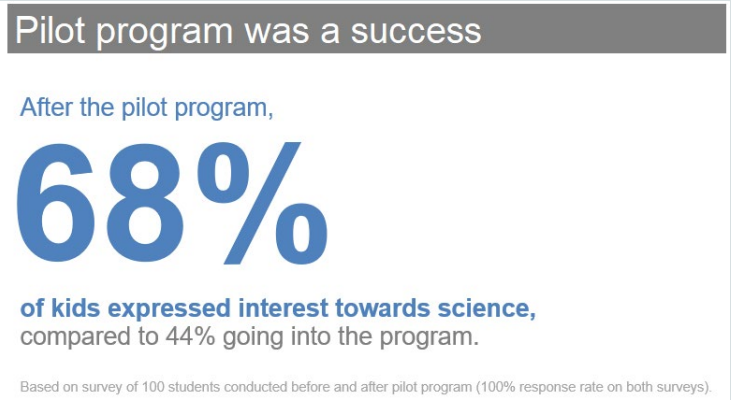
https://infographicworld.com/data-visualization-data-storytelling/

THE IMPORTANCE OF STORYTELLING

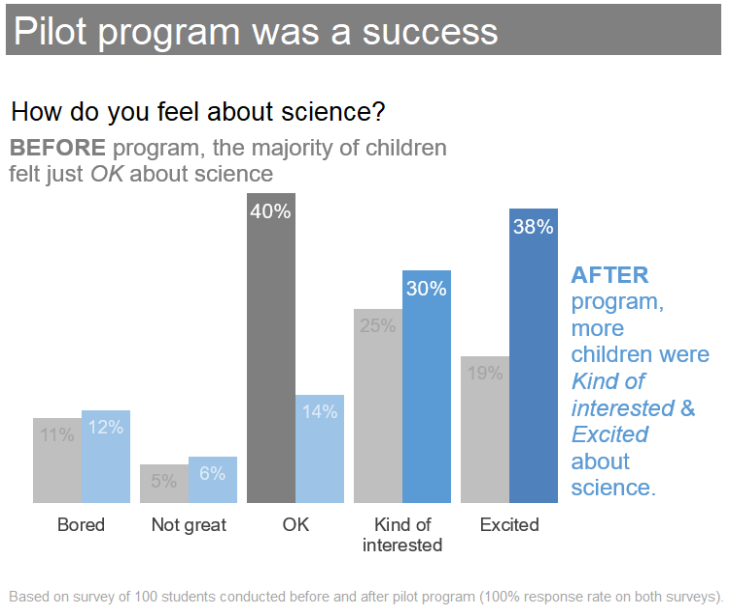
- People love to hear stories!
  - They are useful for both entertaining as well as educating by providing a fun way to share knowledge and experiences
  - Storytelling helps your audience to connect with your data and care about your message
    - https://www.youtube.com/watch?v=mSi0kmqOBu4
- The world is getting inundated with information
  - Data is the new "oil"
    - Determining meaningful ways to sift the gold nuggets from all the dirt requires new skills

STORYTELLING WITH DATA OVERVIEW

- Understand the context
  - Know with whom you will be communicating to, what they need to know, and how you will deliver your message
    - Employ the 3-minute story, the Big Idea, and storyboarding to articulate your findings
- Choose an appropriate visual display
  - When highlighting a number or two, simple text is best
  - Line charts work well with continuous data
  - Bar charts are perfect for showing categorical data, but must have a zero baseline
  - **Avoid 3D, pie charts, and secondary axes**



Show the numbers directly



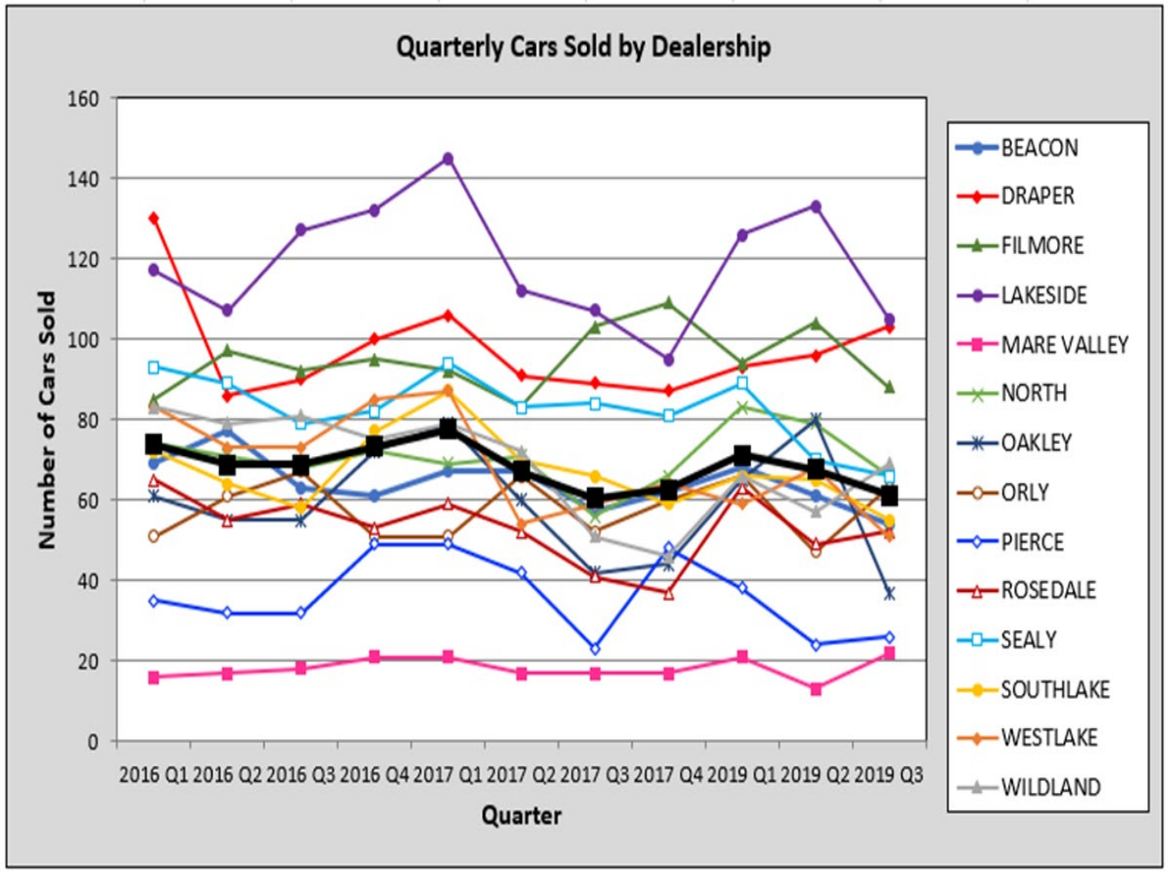
Use a simple bar graph when comparing two things

- Keep them close together
- Align them to a common baseline

STORYTELLING TECHNIQUES

Eliminate clutter!

- Anything that does not support your message should be excluded
- Leverage Gestalt principles for how people see things and use contrast strategically
- Align all elements and maintain adequate white space



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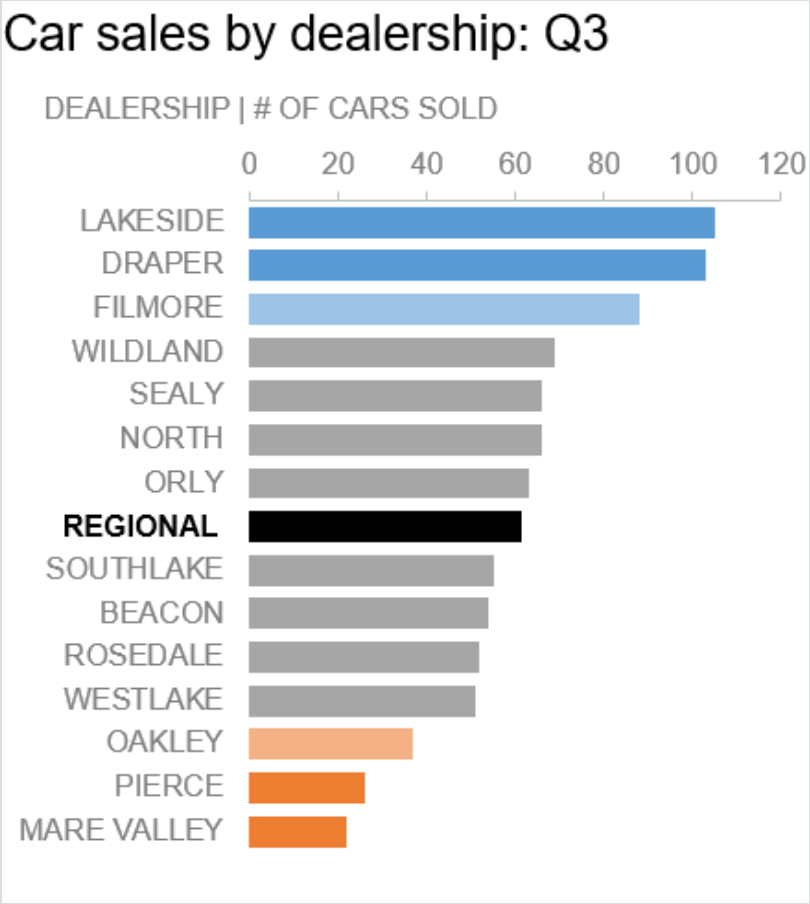
STORYTELLING TECHNIQUES

Focus attention where you want it

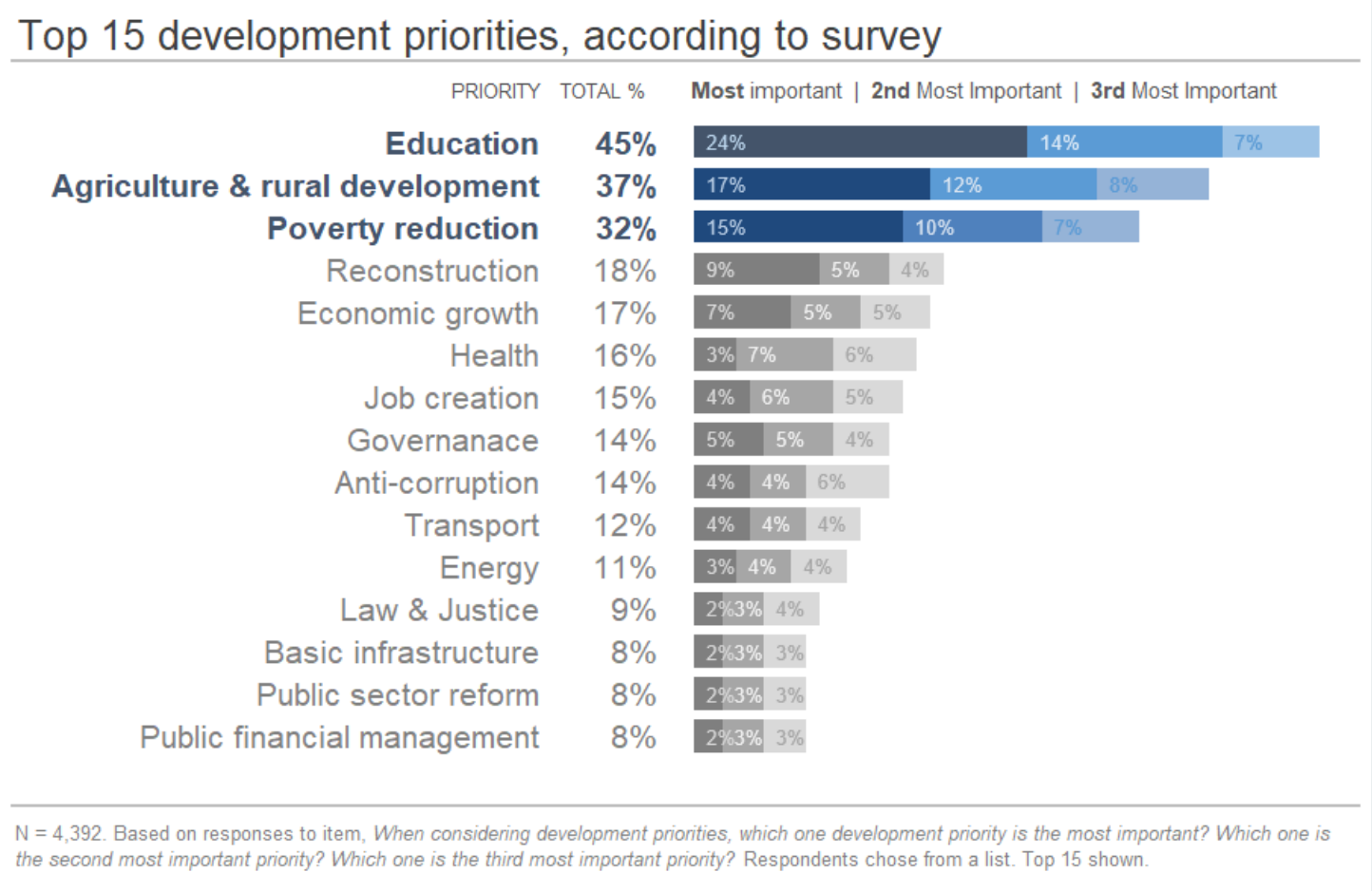
- Rely on the power of preattentive attributes to signal where to look

Think like a designer

- Include visual affordances that tell the audience how to read your graphic
  - Use highlighting and text to label and explain the story



PACK LOTS OF DATA INTO A STACKED HORIZONTAL BAR GRAPH



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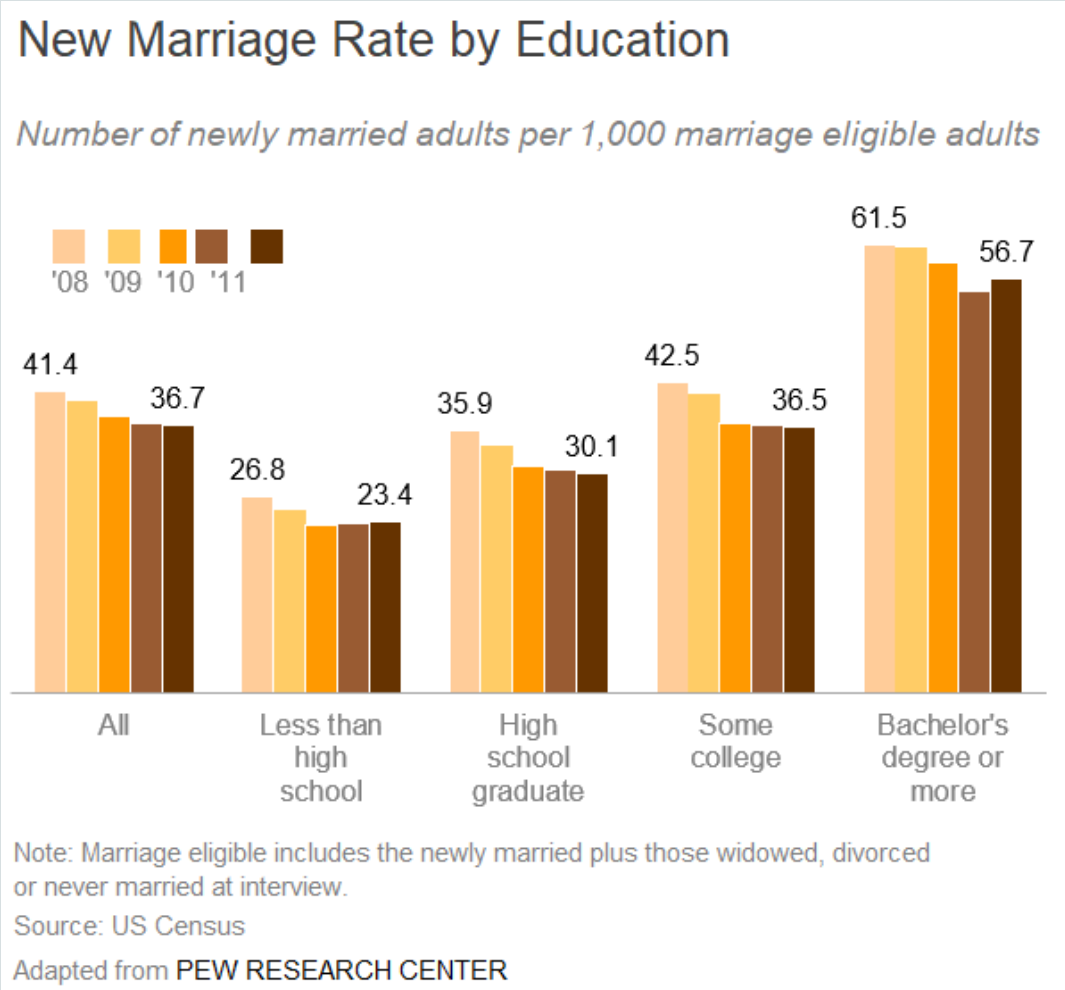
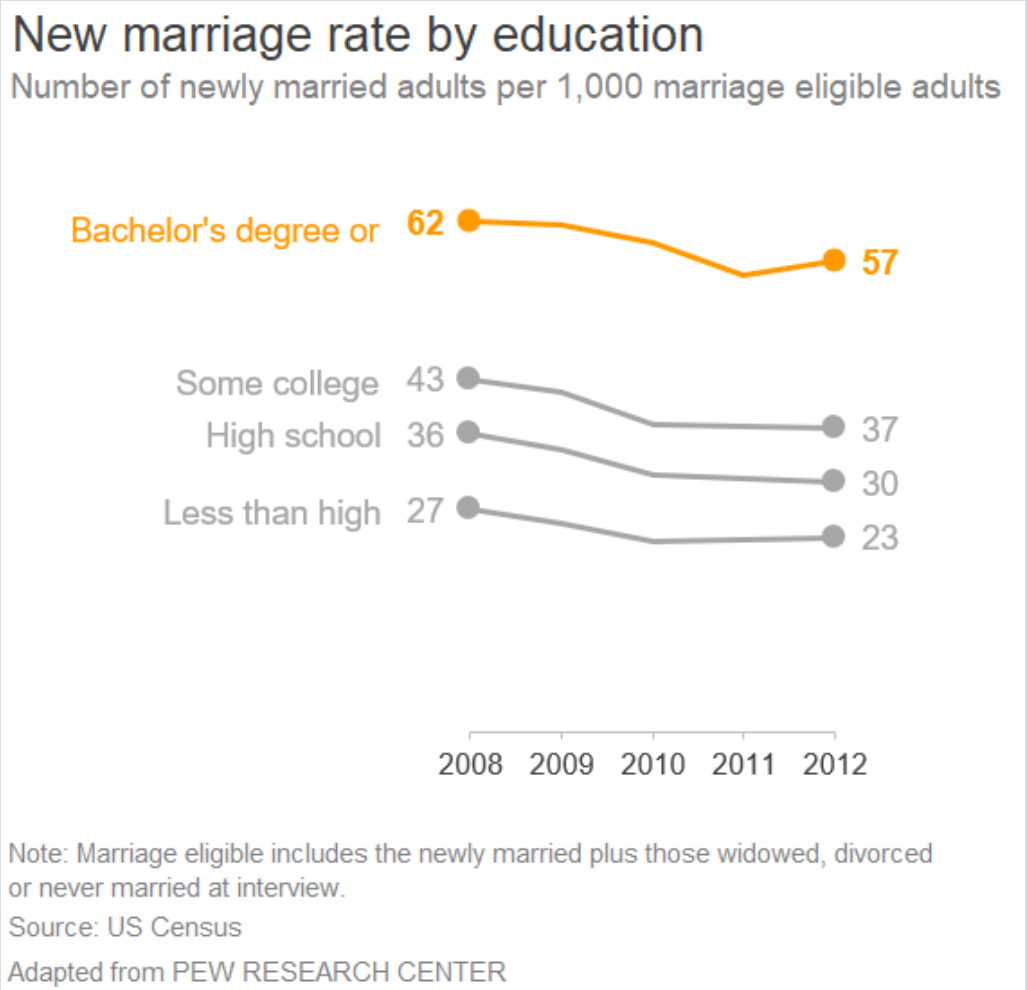
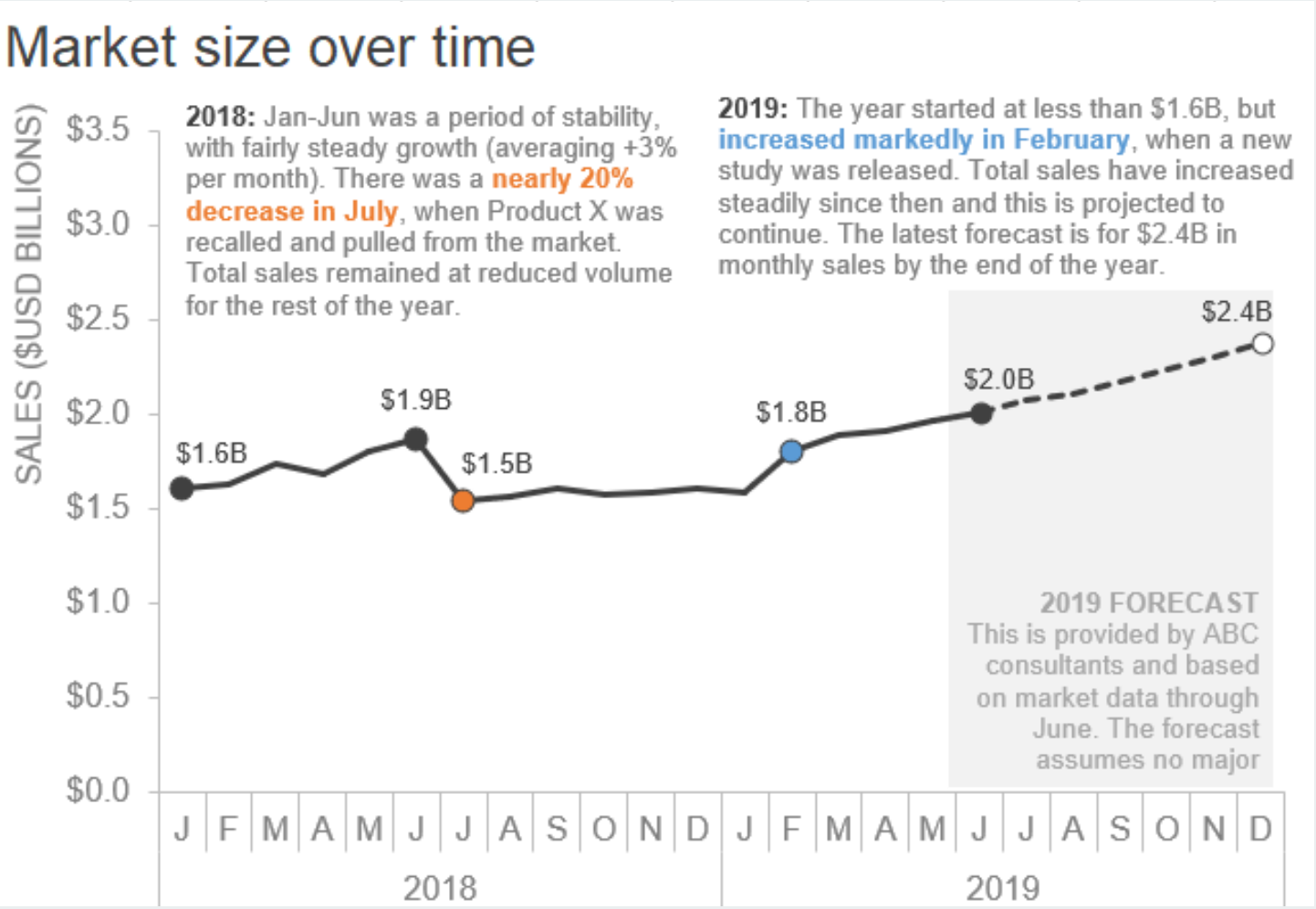
SIMPLIFY THE DATA





CREATE A VISUAL HIERARCHY

Use color, create super categories to bucket data, and apply shading to highlight forecasts



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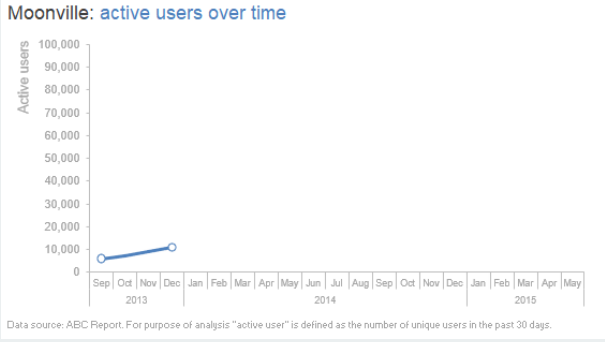
TELL A STORY USING ANIMATION

- Have a plot, some twists, and a call to action in order to create tension
- Live presentations allow you to "walk" the audience through the story of the visual
  - You build up to the overall results and conclusions over a series of slides or animation
  - However, a standalone annotated version is necessary
    - Tells the story without the voiceover
    - Ignoring these different needs can result in "slideument"
  - Challenge is when you provide too much data at once, you lose your audience's attention
    - Leveraging animation to walk the audience through the story is better
    - First step is to start with just a view of the blank graphic
      - Audience will have to listen to you to understand the finer details of what they are seeing

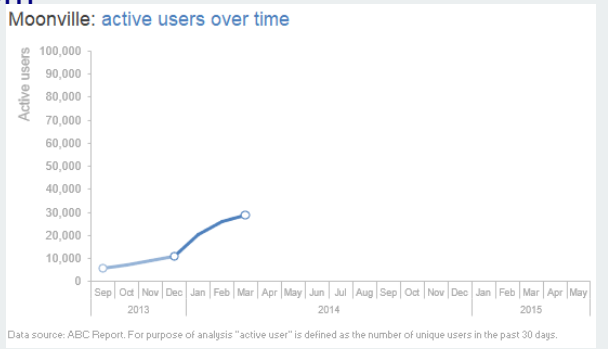
STORY PROGRESSION

Build **anticipation** and retain audience's attention

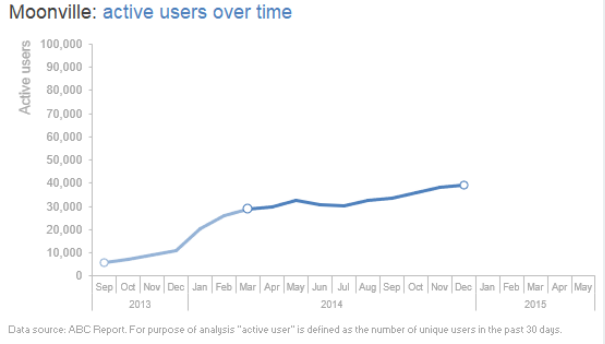
Blue dot is **starting point** for the story



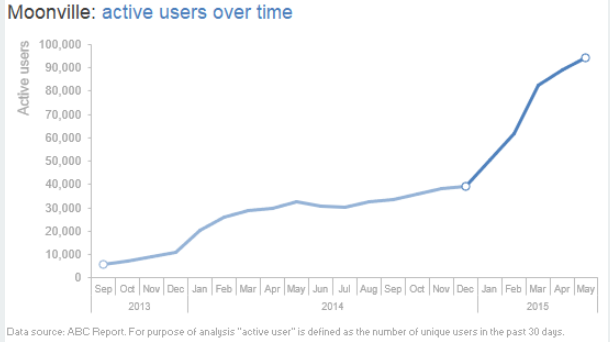
Despite no marketing, # of **users doubled**



Users increased due to **friends and family promotion**



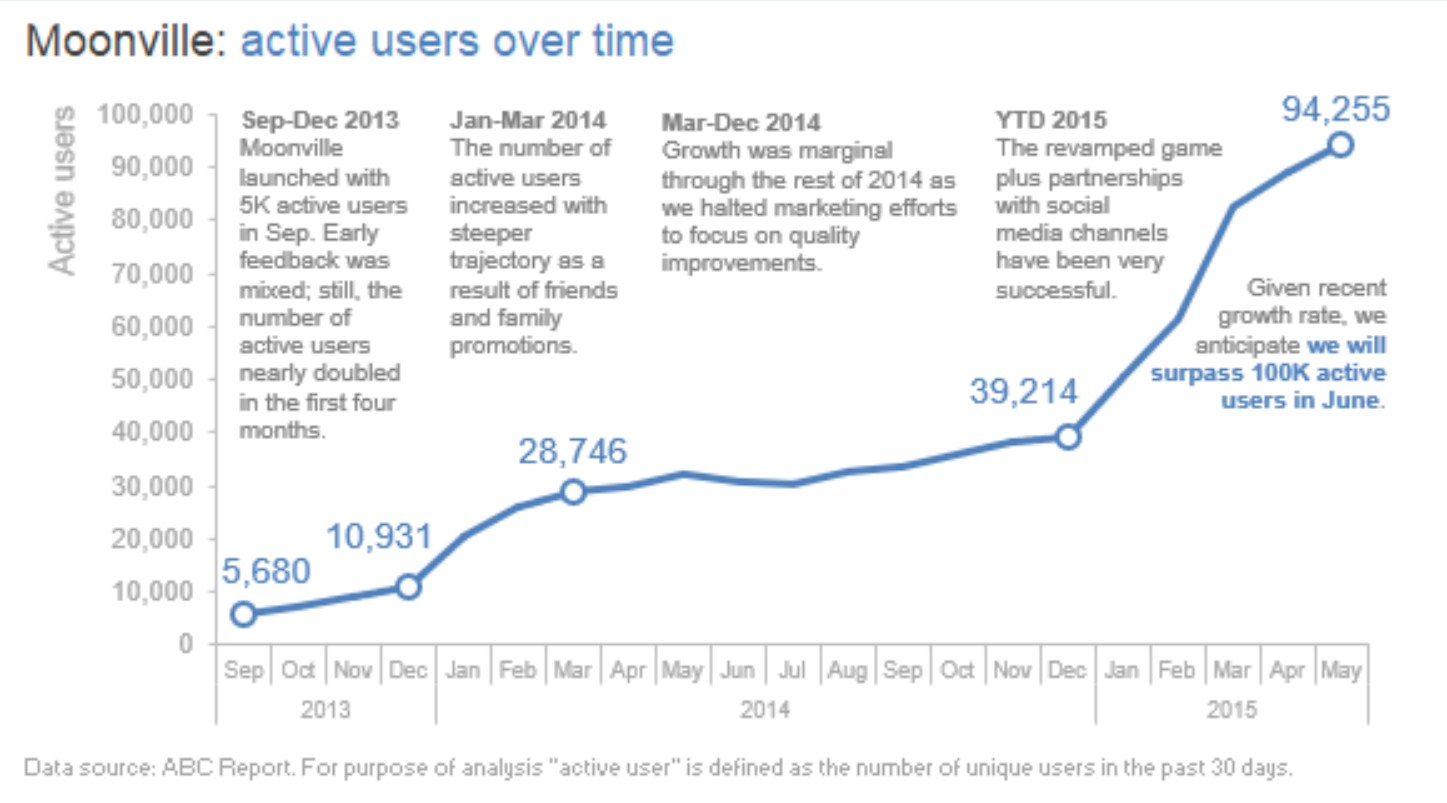
Growth flattened during time when **game was updated**



Revamped game and **social media** partnerships helped game to **go viral**

DETAILED ANNOTATED VERSION

Annotated version captures **salient points** made during live story telling



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TIPS FOR FINDING THE STORY IN YOUR DATA

Data storytelling is part science and part art (like cost estimating!)

- There are several **best practices** and **guidelines** to follow including
  - Knowing your audience and composing your story to meet their needs
  - Leveraging Gestalt design principles, using preattentive attributes, etc. to create a **visual hierarchy of information**

Rely on your artistic side to be **creative** and embrace **diversity**

- There are multiple ways to communicate with data and have fun
  - Exploring alternate visuals can help you discover your data story
  - Declutter your visuals so that you draw attention to what matters most
    - Push data to the back so it does not compete for the main message
    - Include only what you need to tell the story so it is easy to understand
- **Iterate** and seek **feedback** from others about your graphics

SEEK INSPIRATION THROUGH GOOD EXAMPLES

- Use these websites to inspire you as you create your presentations
  - Chart Chooser http://labs.juiceanalytics.com/chartchooser/index.html
    - Download as Excel or PowerPoint templates and insert your own data
  - Chartmaker Directory http://chartmaker.visualisingdata.com/
    - Explore the matrix of chart type by tool and click the circles to see solutions and examples
  - Graphic Continuum https://policyviz.com/?s=graphic+continuum
    - The poster includes more than 90 graphic types grouped into six categories
      - Also, check out the related Match It Game and Cards as well as three ways to annotate your graphs
  - Interactive Chart Chooser https://depictdatastudio.com/charts/
    - Explore the interactive chart chooser using filters

EXPLORE ADDITIONAL RESOURCES

- With Datawrapper, you can create visualizations like the one below from Let's Practice in minutes instead of hours!
    - https://www.datawrapper.de/_/FqaTB/
    - It's free to use and no sign-in is needed to try it out yourself
- With Flourish, explore and explain your data with stunning visualizations and stories
    - https://flourish.studio/features/
    - Publish, present or download a free public version (No need to code or install software)
- With Google Data Studio, unlock the power of your data with interactive dashboards and beautiful reports that inspire smarter business decisions
    - https://datastudio.google.com/overview
    - It is easy and free!