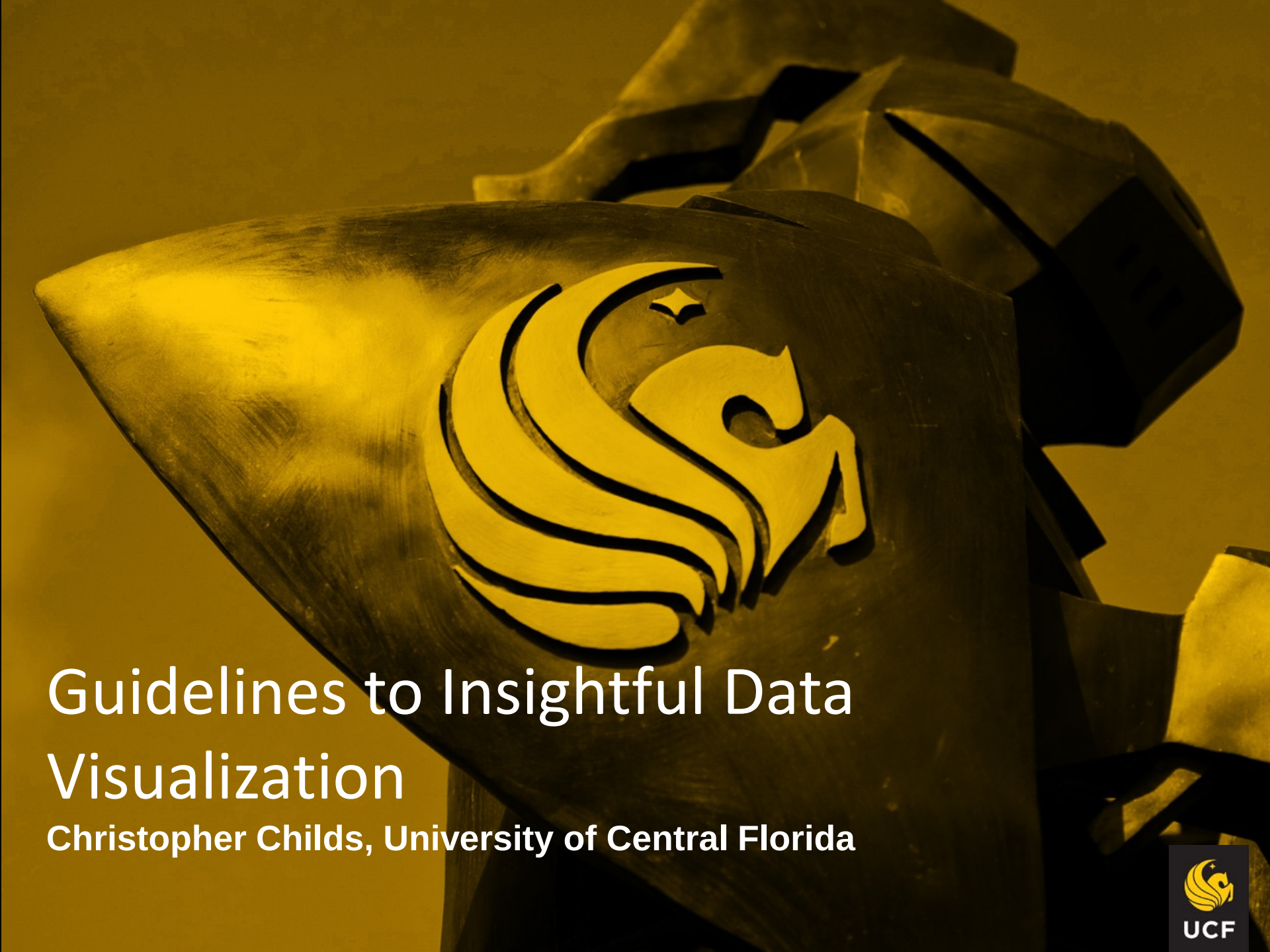

Guidelines to Insightful Data Visualization

Christopher Childs, University of Central Florida

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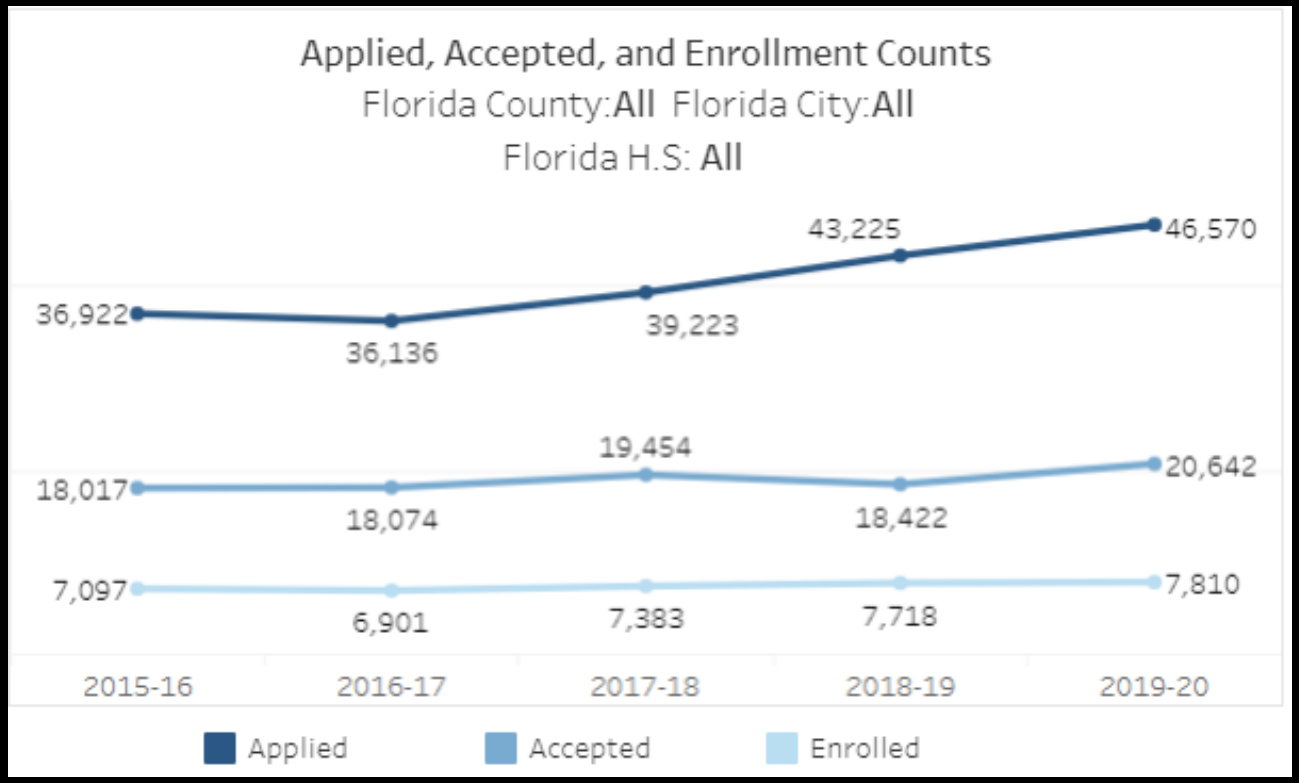
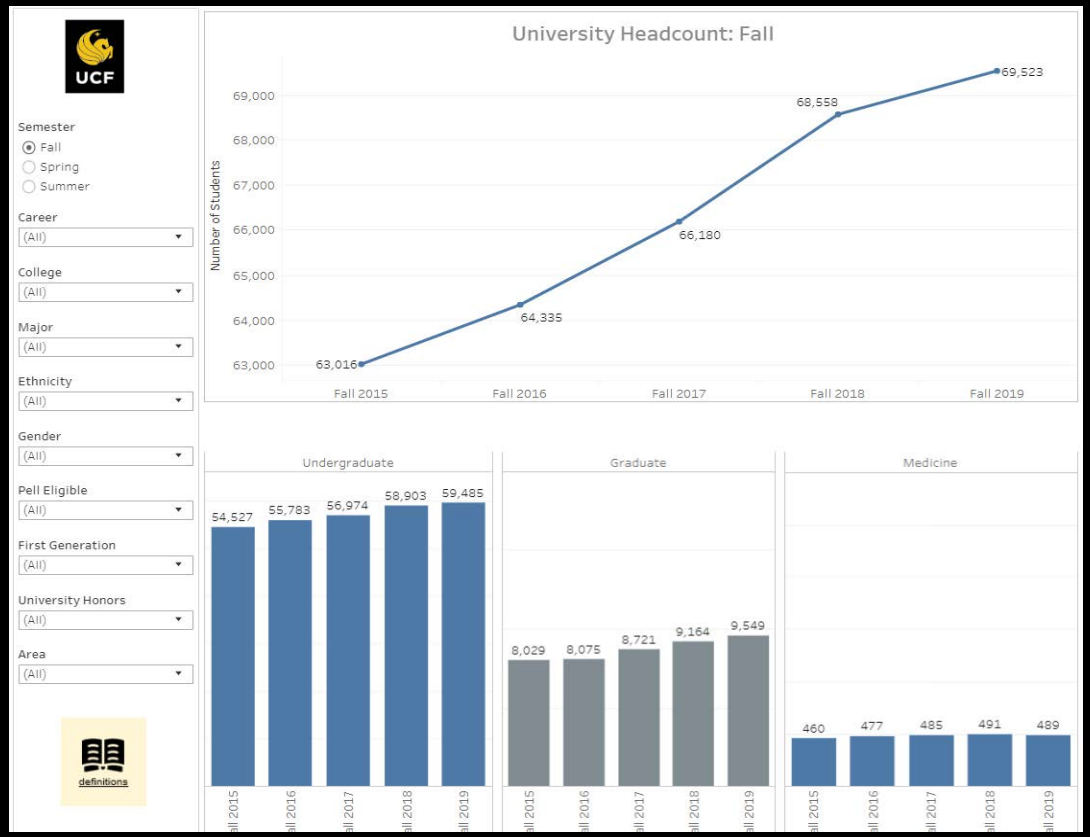
Data Visualization

A single representation of multiple sets of refined information (Datawatch, 2015)



Dashboard

A group of resources combined into one unified visual display (Keihani, 2015)



Why Talk Data Visualization

IR Professionals are charged with creating visualizations from institutional information

Since the creation of visualization tools like

Tableau, SAS Visual Analytics, and Power BI it has made data visualization very popular

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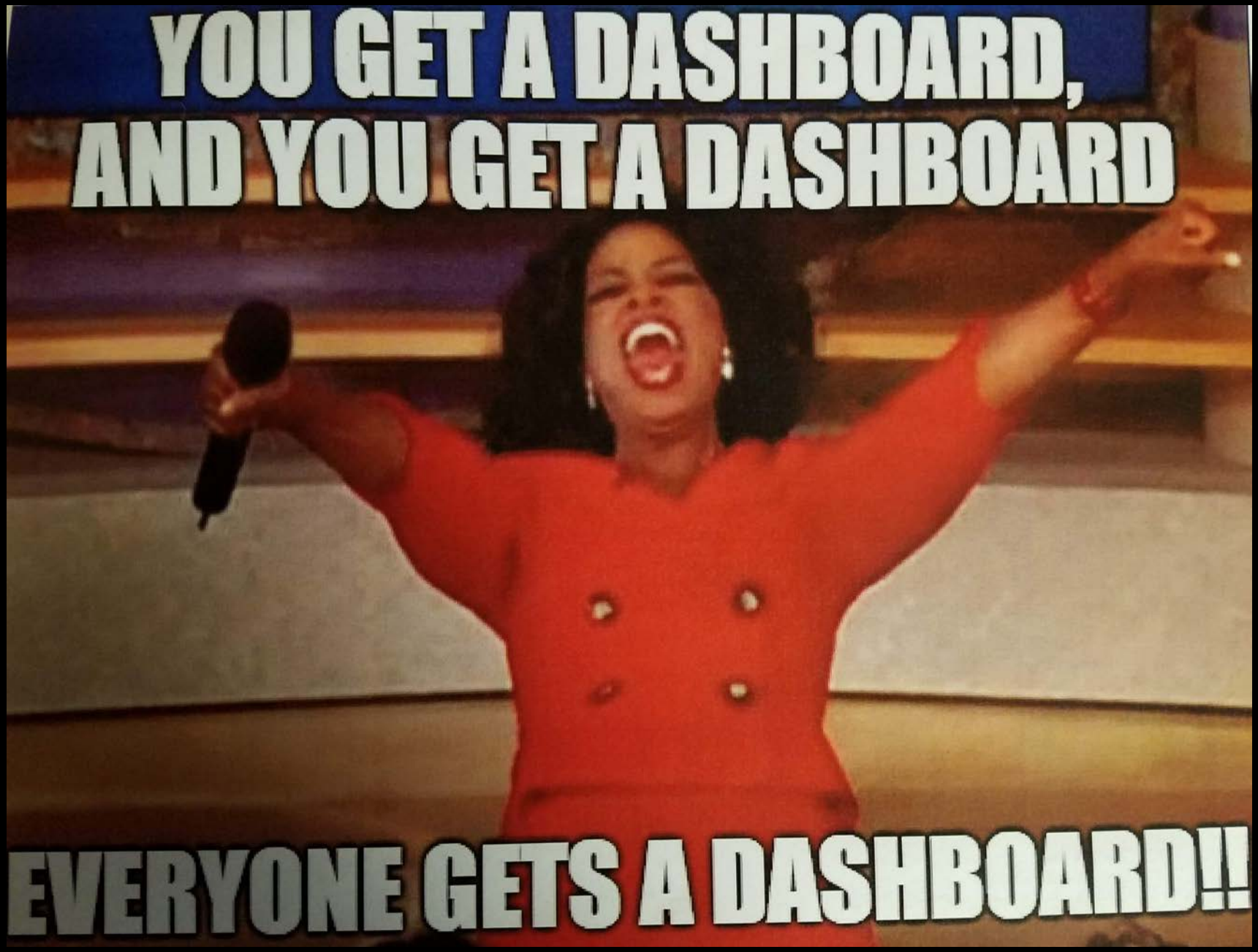
YOU GET A DASHBOARD,
AND YOU GET A DASHBOARD
EVERYONE GETS A DASHBOARD!!

Why Talk Data Visualization

Everyone wants some type interactive visualization!

Anyone can create them

Not enough professionals think about the implications visualization will have on their business processes

- Why do we need this visualization?
- What message are we trying to convey with this dashboard?
- What visualization can tell this story best?

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Why Talk Data Visualization

In order to create insightful data visualizations, IR professionals need to;

1. Understand what is important to the stakeholder

2. Employ design principles to help provide clarity to visualizations

3. Tell a consistent story with visualizations

What are we going to talk about today?

1. How to view data visualization

2. Starting the data visualization process
    -Know your audience
    -Asking the right questions

3. Design Principles for data visualization

4. Sketching out a story

5. Continuing the data visualization process

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How to view data visualization

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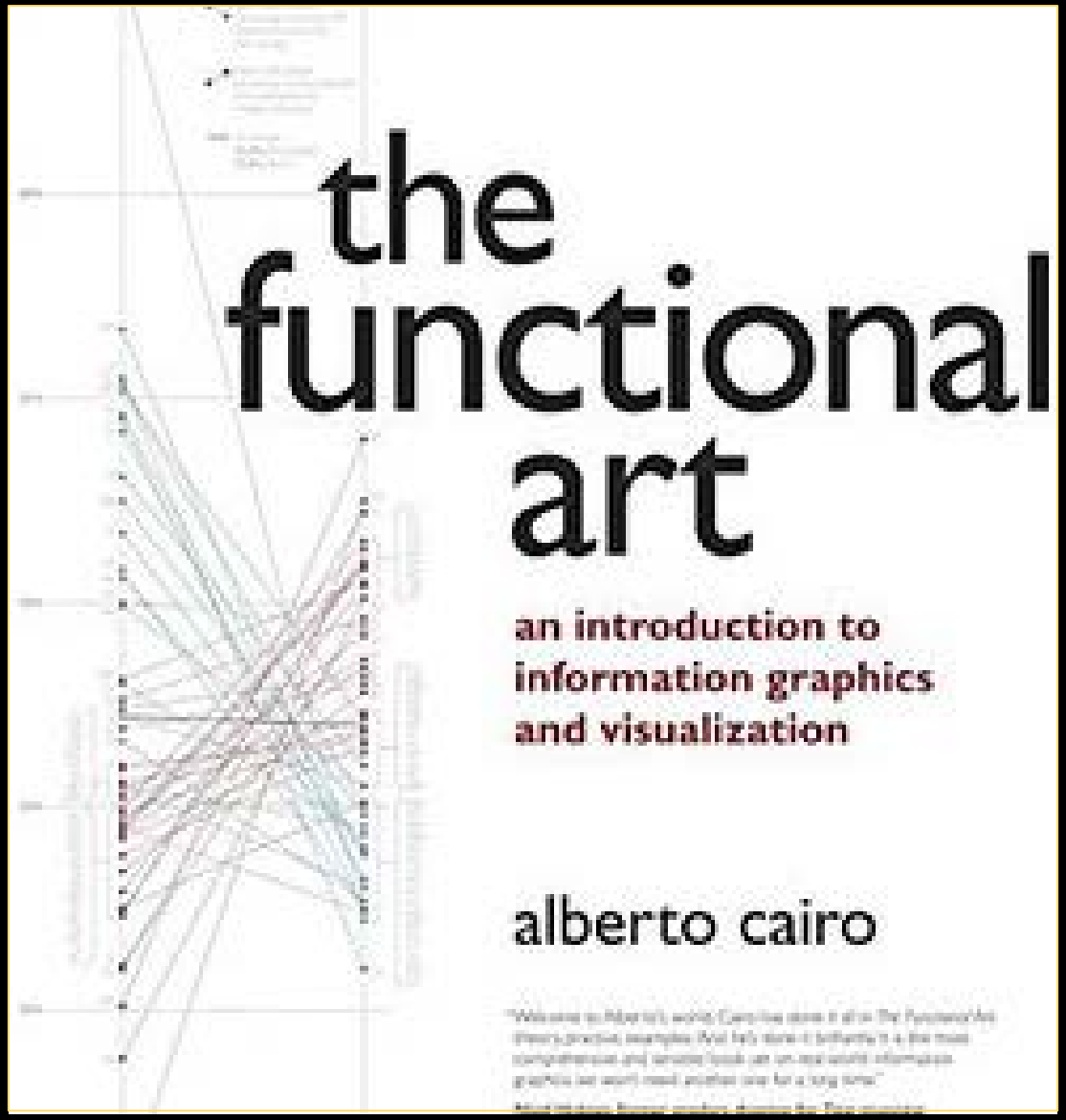
Great Resource for Data Visualization

Alberto Cairo

- Author of The Truthful Art: Data, Charts, and Maps for Communication
- Worked as a data-journalist and information designer at El Mundo

(Cairo, 2013)



The world is full of stuff

Stuff is shapeless and useless

The world is filled with raw materials, like Marble

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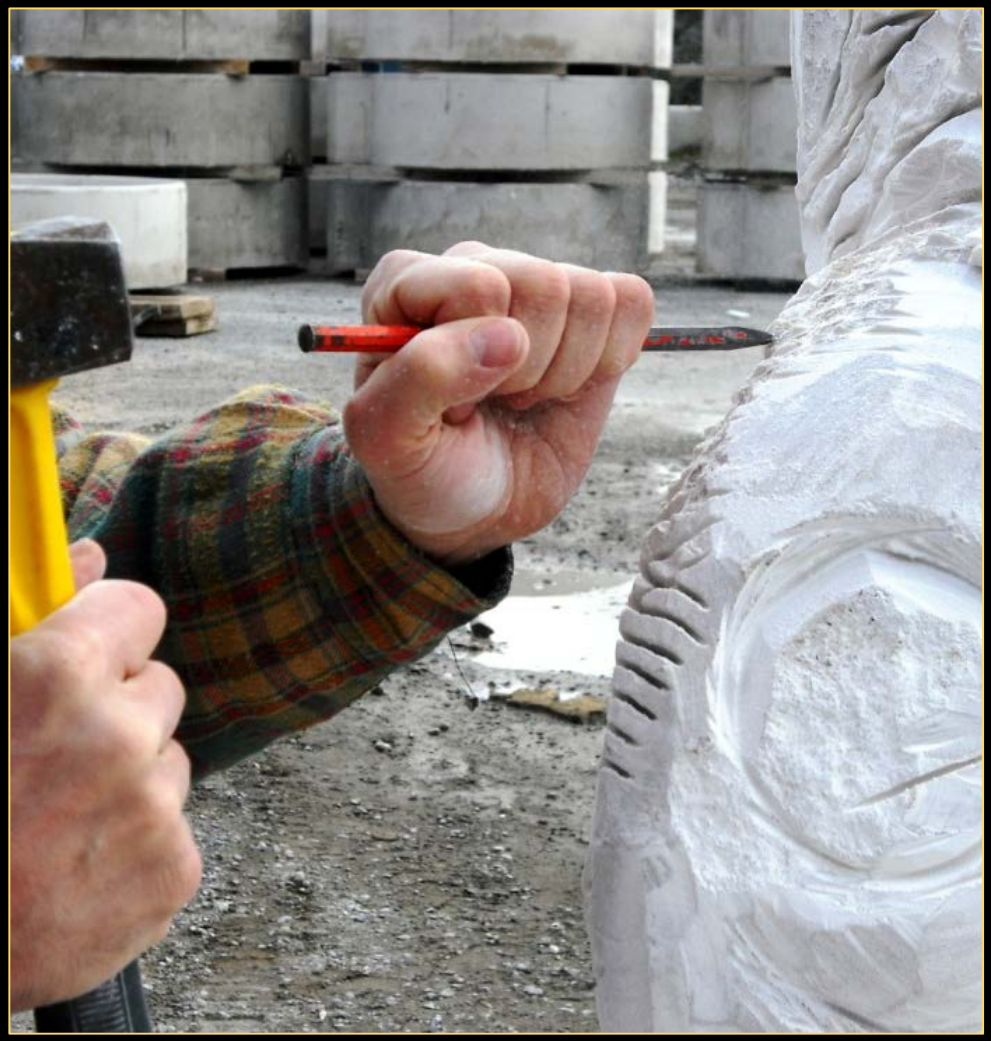
A Human brain envisions a shape that marble can adopt, and a human hand models it



But the shape the brain envisions is not any shape. It depends on a purpose (function).

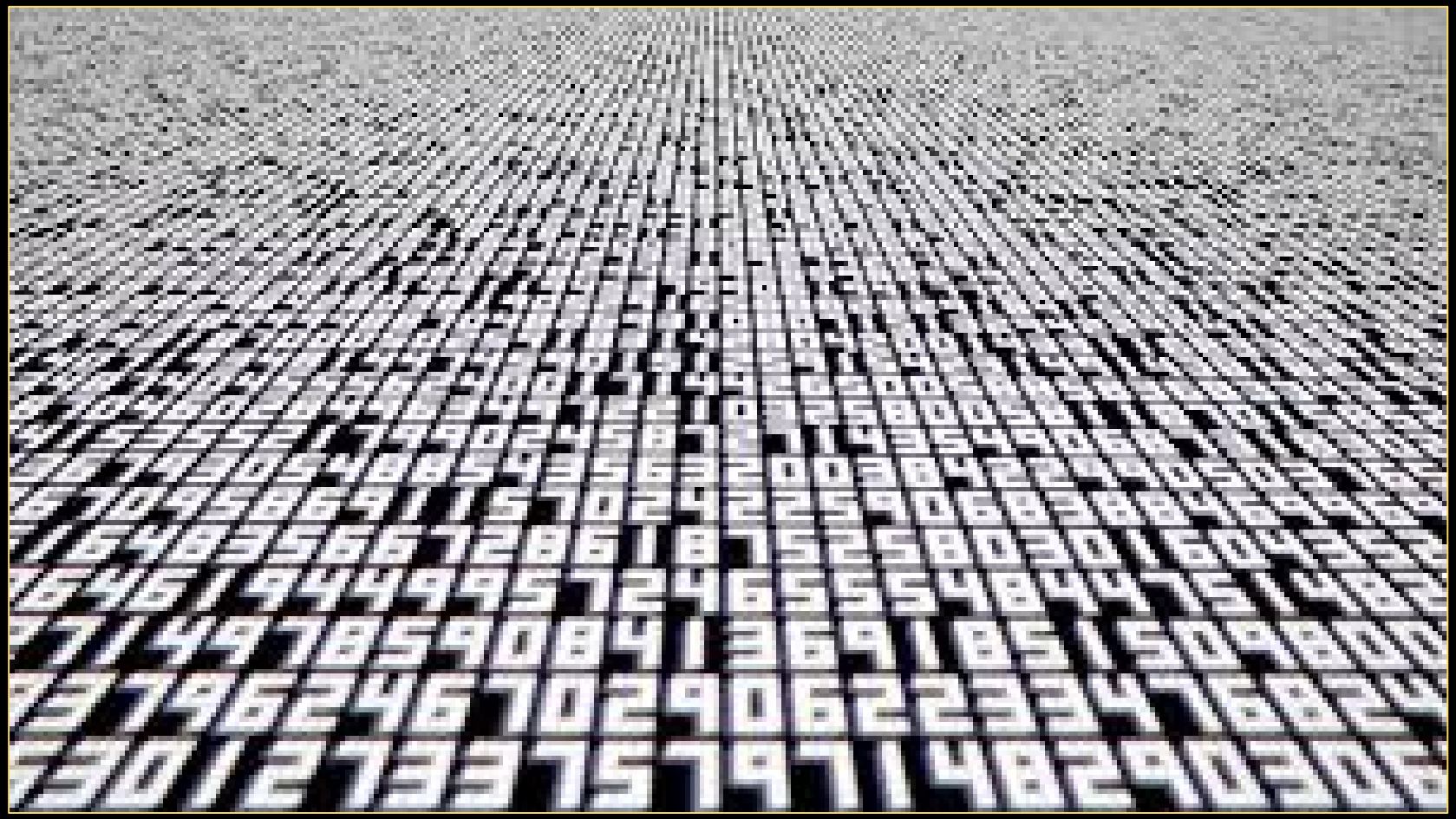
Michelangelo

“Moses”

(1513-1515)

In this case the purpose was to Inspire awe, convey a sense of power, and of majesty

Today, the world is full of even more stuff



Our world is about complexity

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Our goal is to model that raw data and make sense of it

“This is actually a traditional journalistic endeavor; to tame the world’s complexity, and then to summarize it, organize it, and present it” (Cairo, 2013)

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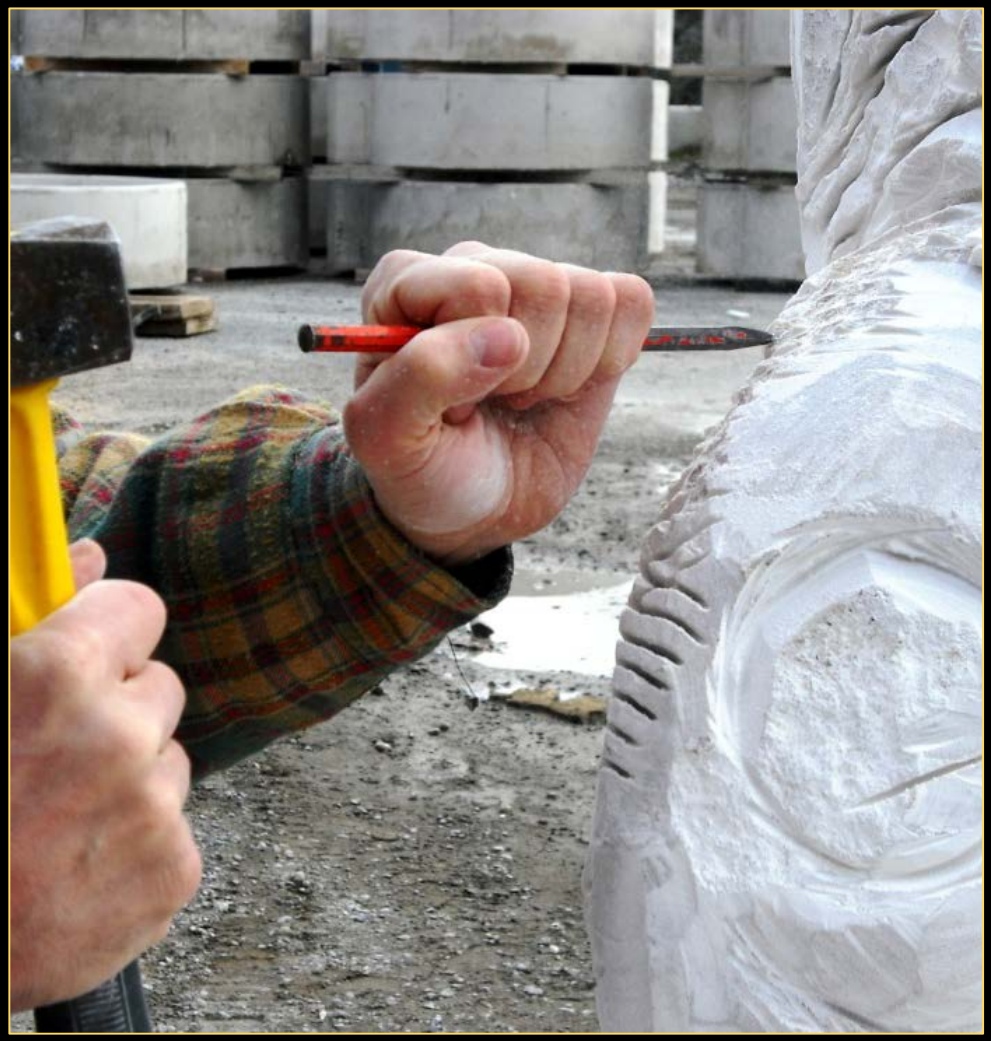
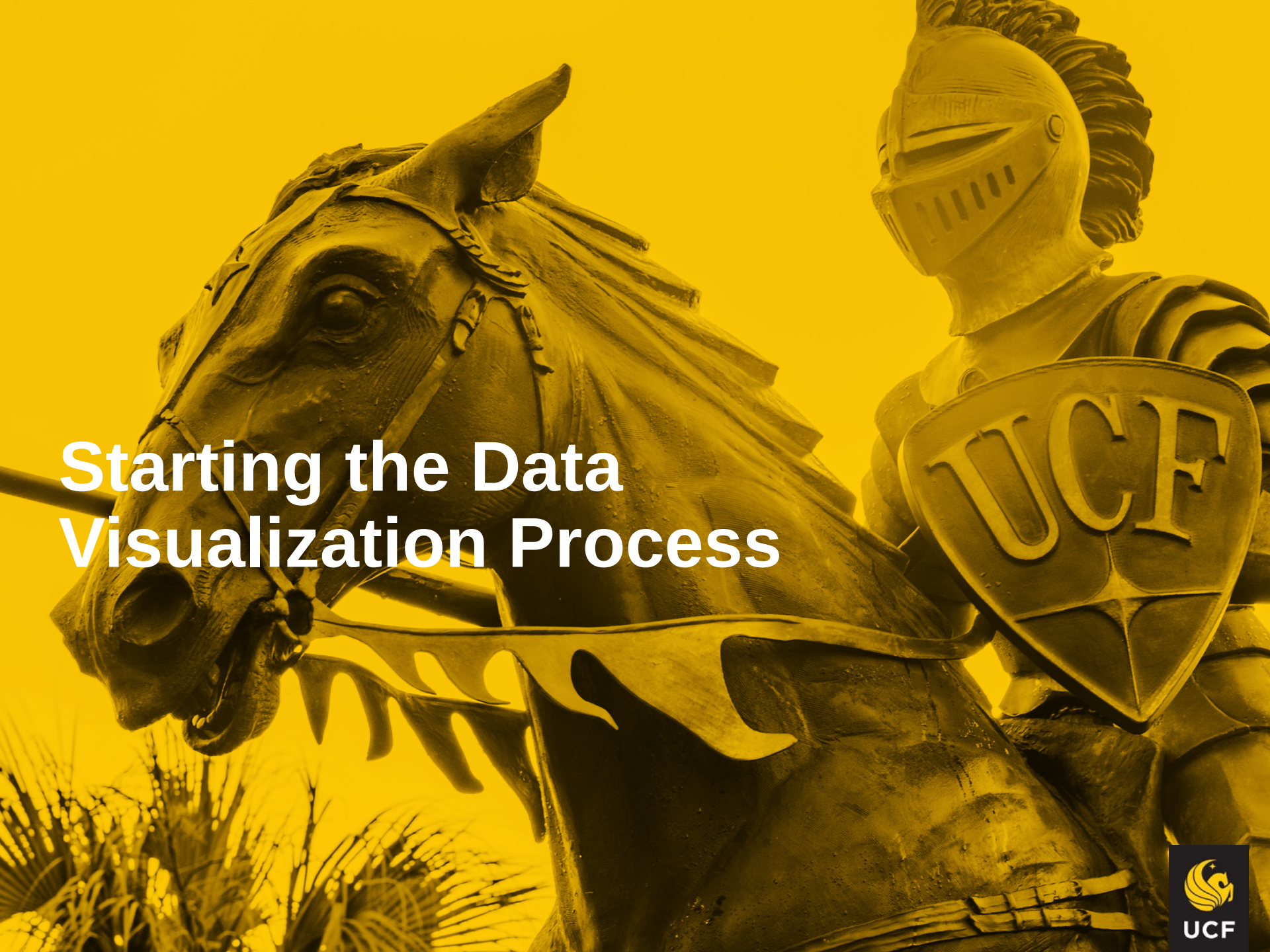
A data visualization is a tool.

It extends our skills and capacities, it lets us see beyond what we would normally see





Starting the Data Visualization Process

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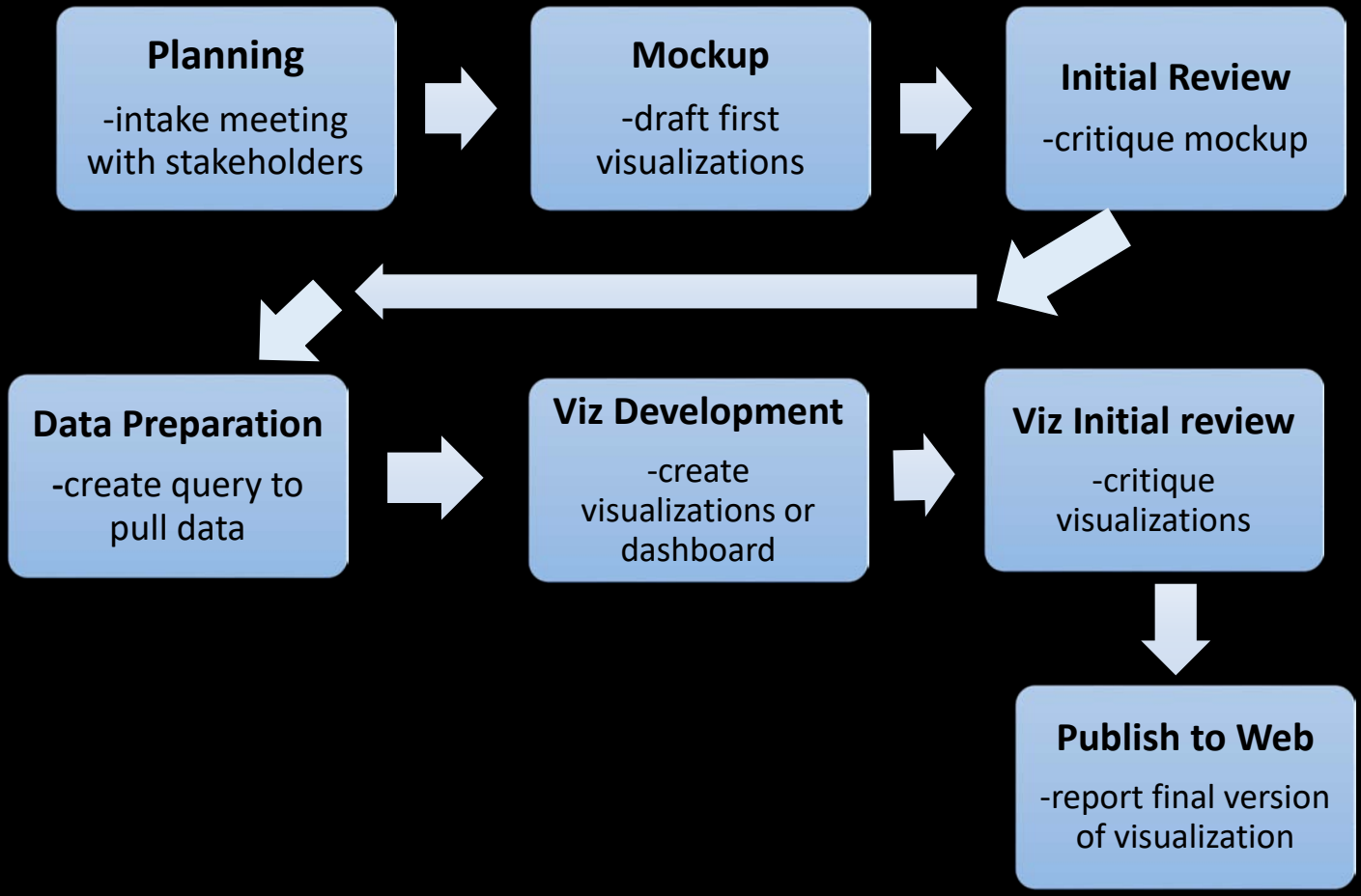
Data Visualization and Dashboard Creation is a Process

- To ensure data visualizations are insightful, there needs to be a process of creating them. This will…
  - Foster organization when creating visualizations
  - Help maintain consistency between other dashboards
  - Help identify what the stakeholder want to see

Dashboard Development Process



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Planning – the first questions to ask when visualizing data

Before you even switch on a computer, ask yourself what are the questions that your stakeholders want answered

What tasks does your visualization need to accomplish (Cairo, 2013)

Interview Question Template

(Stakeholder Interview Questions,2018)

1. What is the motivation for wanting this dashboard?

2. What is the business value and outcomes you want to see from this effort?

3. What are your current challenges in relation to reporting?

4. Has anything prevented this project from happening in the past?

5. What metrics do you currently look at?

6. What metrics would you like to see?

7. What are the top questions you want answered from the data?

Know your Audience

- What type of people will be interesting in the visualization?
- Is this open to the public or internal staff?
- How can we make a useful visualization of this metric?

FTIC Feeder School Dashboard: Audience

Who would want to see where UCF students come from?

- University Staff (Admissions, Enrollment Management, etc.)
- High School Guidance Counselors
- Parents
- Media

FTIC Feeder School Dashboard: Metrics

What information/metrics would this audience like to see

- How many people apply here and from what schools and counties?
  - Count of applications by high school, city, and county, Application Rate
- Of the students who apply, who are accepted and eventually enroll?
  - Count of enrollment at UCF
- Consider using a data glossary for a place for definitions and footnotes about metrics
  - Data Cookbook Specification for FTIC Feeder Schools

Mockup – Visualization Rough Draft

- Create a “rough draft” of visualizations
  - doesn’t involve preparing data
- Can help facilitate feedback from stakeholder
- Helps prepare for data preparation
  - Think of what variables will be needed to create visualizations

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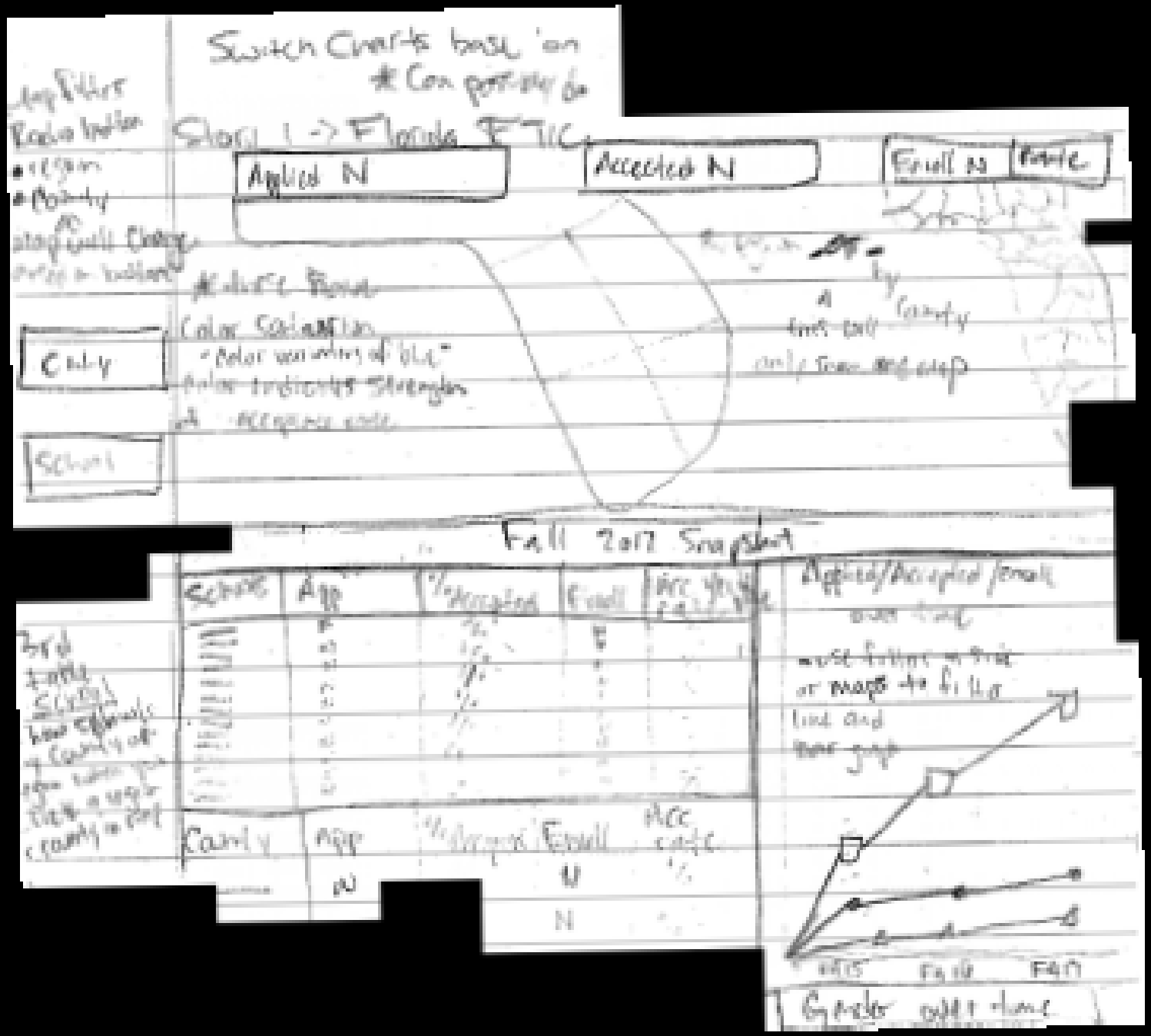

Switch Charts based on
Applied N
Accepted N
Enroll N
Rate
Color Saturation
Fall 2017 Snapshot
Applied/Accepted/Enroll
Gender split time

Current Headcount by College and Academic Career: Fall 2018 (Current Semester)

Semester
- (•) Fall
- ( ) Spring
- ( ) Summer

College: (All)

Major: (All)

Ethnicity: (All)

Gender: (All)

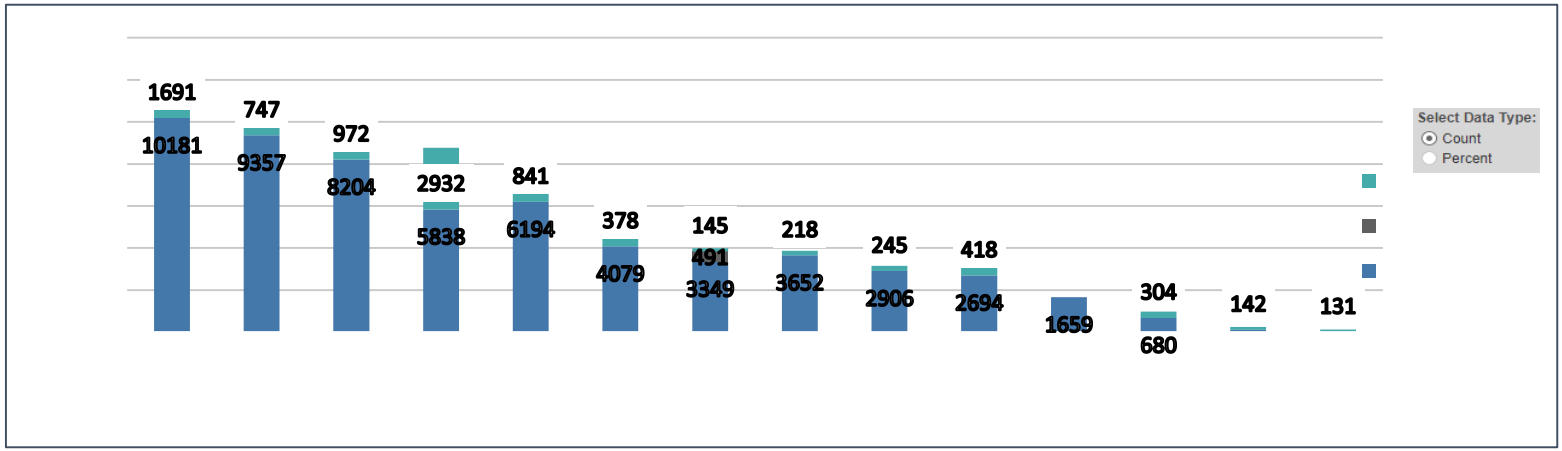
Pell Eligible: (All)

First Generation: (All)

University Honors: (All)

Area: (All)

definitions



College	Fall 2015		Fall 2016		Fall 2017		Fall 2018		Fall 2019	
	N	%	N	%	N	%	N	%	N	%
Engr & Comp Sci	9,414	15%	10,268	16%	11,047	17%	11,872	17%	12,400	18%
Cmty Innov & Educ	9,222	15%	8,727	14%	8,657	13%	8,770	13%	8,894	13%
Business Adm	9,026	14%	8,892	14%	8,999	14%	9,176	13%	8,934	13%
Sciences	8,885	14%	9,370	15%	9,561	14%	10,104	15%	10,445	15%
Health Prof & Sci	6,560	10%	6,843	11%	7,084	11%	7,035	10%	7,080	10%
Arts & Humanities	3,988	6%	4,148	6%	4,305	7%	4,457	7%	4,516	6%
Nicholson Comm & Media	3,700	6%	3,762	6%	3,853	6%	3,870	6%	4,047	6%
Medicine	3,327	5%	3,526	5%	3,741	6%	3,985	6%	3,830	6%
Rosen Hospitality Mgmt	2,984	5%	3,059	5%	3,108	5%	3,151	5%	3,140	5%
Nursing	2,724	4%	2,772	4%	2,871	4%	3,112	5%	3,206	5%
Undergrad Studies	1,775	3%	1,606	2%	1,581	2%	1,659	2%	1,621	2%
Undeclared	1,096	2%	991	2%	1,015	2%	984	1%	987	1%
Optics & Photonics	208	0%	223	0%	235	0%	252	0%	277	0%
Graduate Studies	107	0%	148	0%	123	0%	131	0%	148	0%
Grand Total	63,016	100%	64,335	100%	66,180	100%	68,558	100%	69,525	100%

Data Preparation

Where will the information come from?

- Where does the data we need live?
- Good to look at past queries made for a similar static reports

When will the visualizations be updated?

- This may depend on your stakeholder or audience
- Are there important times of the year where stakeholders need this information

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Visualization Development: Design Guidelines and Concepts

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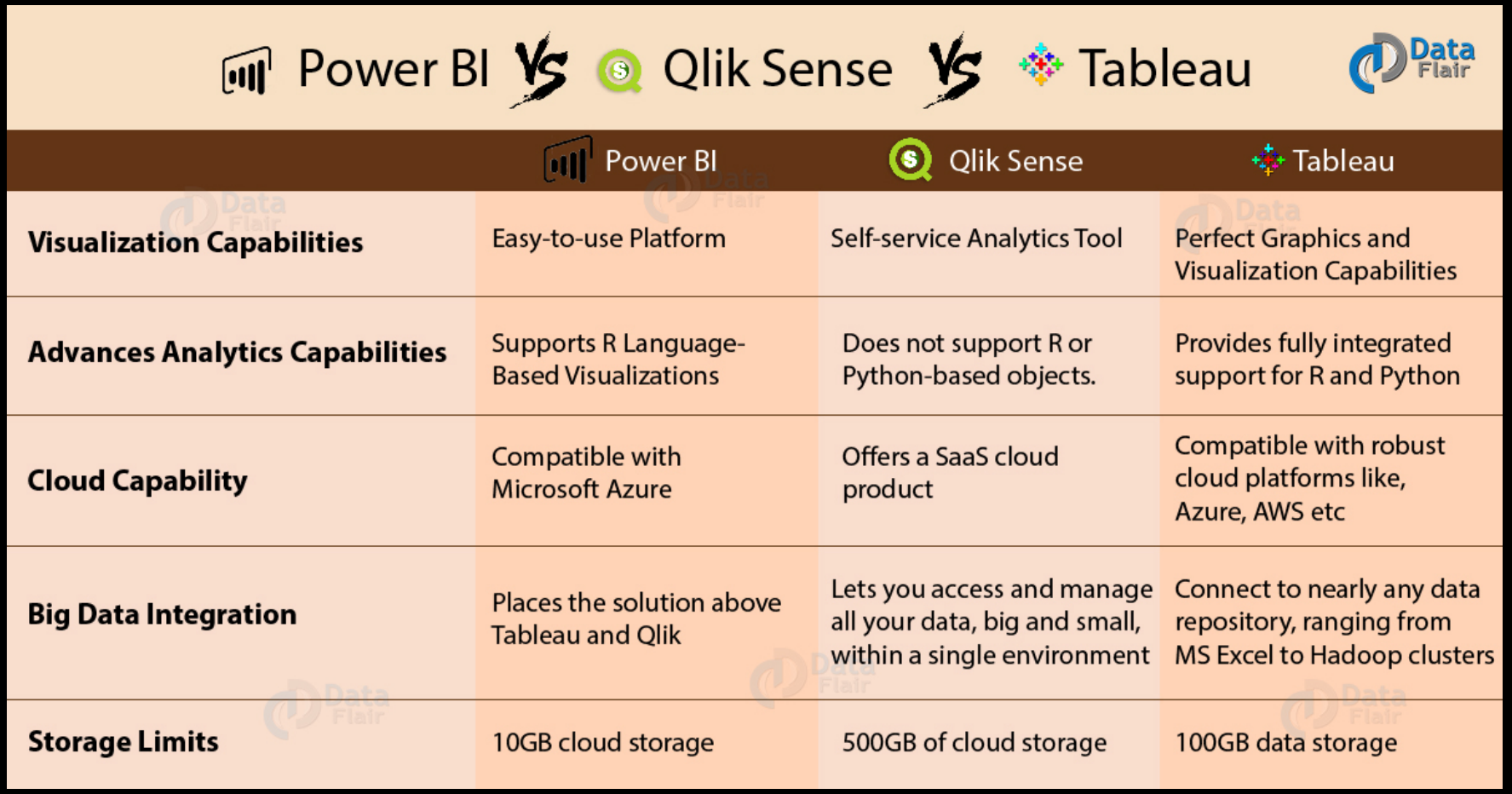
Know Your Visualization Tools



	Power BI	Qlik Sense	Tableau
Visualization Capabilities	Easy-to-use Platform	Self-service Analytics Tool	Perfect Graphics and Visualization Capabilities
Advances Analytics Capabilities	Supports R Language-Based Visualizations	Does not support R or Python-based objects.	Provides fully integrated support for R and Python
Cloud Capability	Compatible with Microsoft Azure	Offers a SaaS cloud product	Compatible with robust cloud platforms like, Azure, AWS etc
Big Data Integration	Places the solution above Tableau and Qlik	Lets you access and manage all your data, big and small, within a single environment	Connect to nearly any data repository, ranging from MS Excel to Hadoop clusters
Storage Limits	10GB cloud storage	500GB of cloud storage	100GB data storage

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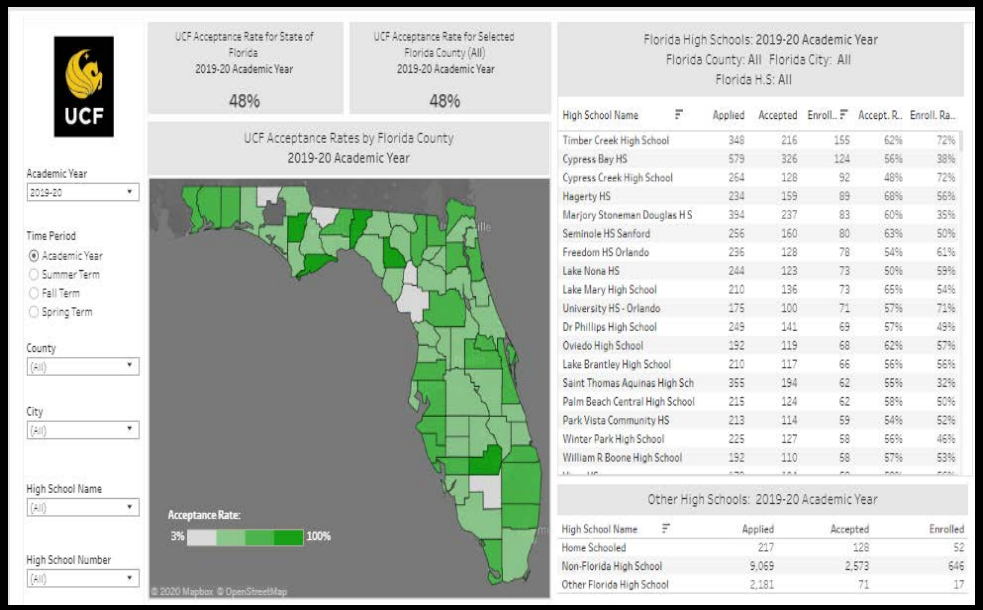
Position Visualizations

- Show important metrics on top of the page
- Direct eyes of the user by the position of visuals



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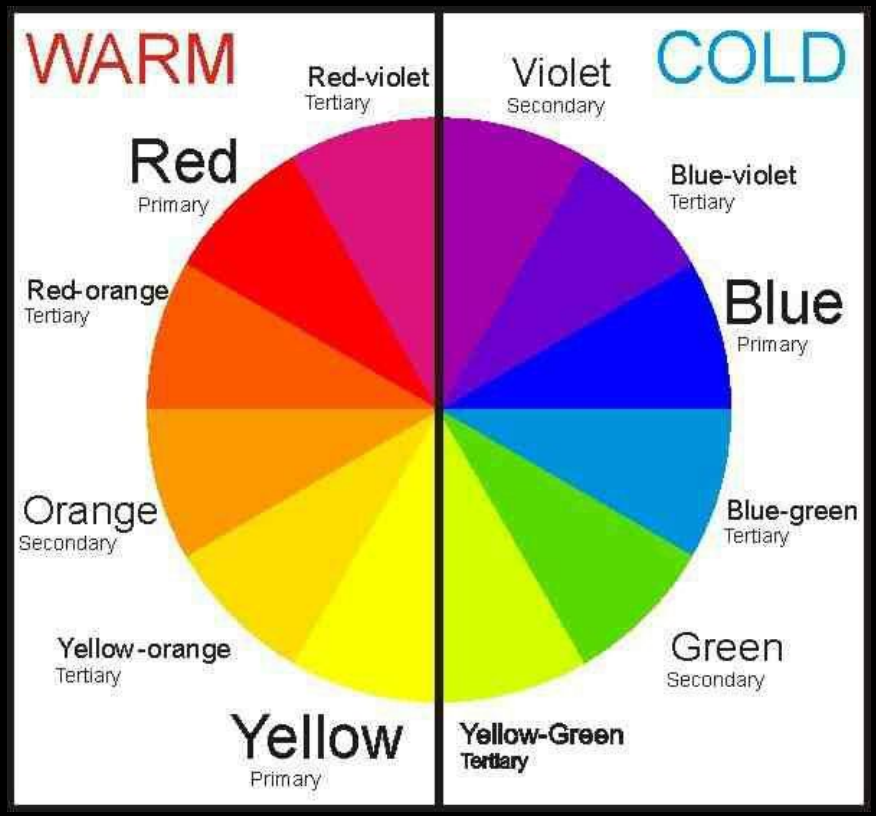
Color Scheme

- Use a color scheme
  - Using cold colors can help for aesthetic purposes
- Use grey colors to draw the users eye to other variables in the visualization
- Create a “style guide” to maintain color consistency of visualizations and dashboards



UCF Style Guide

3.1.1 Main Color 1: Blue

Blue 1	Blue 2	Blue 3	Blue 4
RGB: 165,199,233	**RGB:** 68,119,170	**RGB:** 17,68,119	**RGB:** 14,36,58
HEX: A5C7E9	**HEX:** 4477AA	**HEX:** 114477	**HEX:** 0E243A

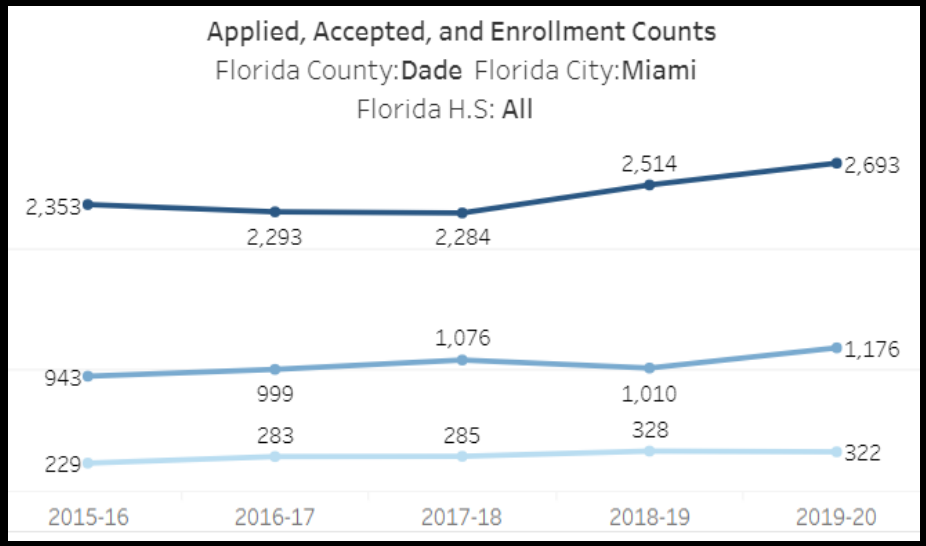
3.1.2 Main Color 2: Green

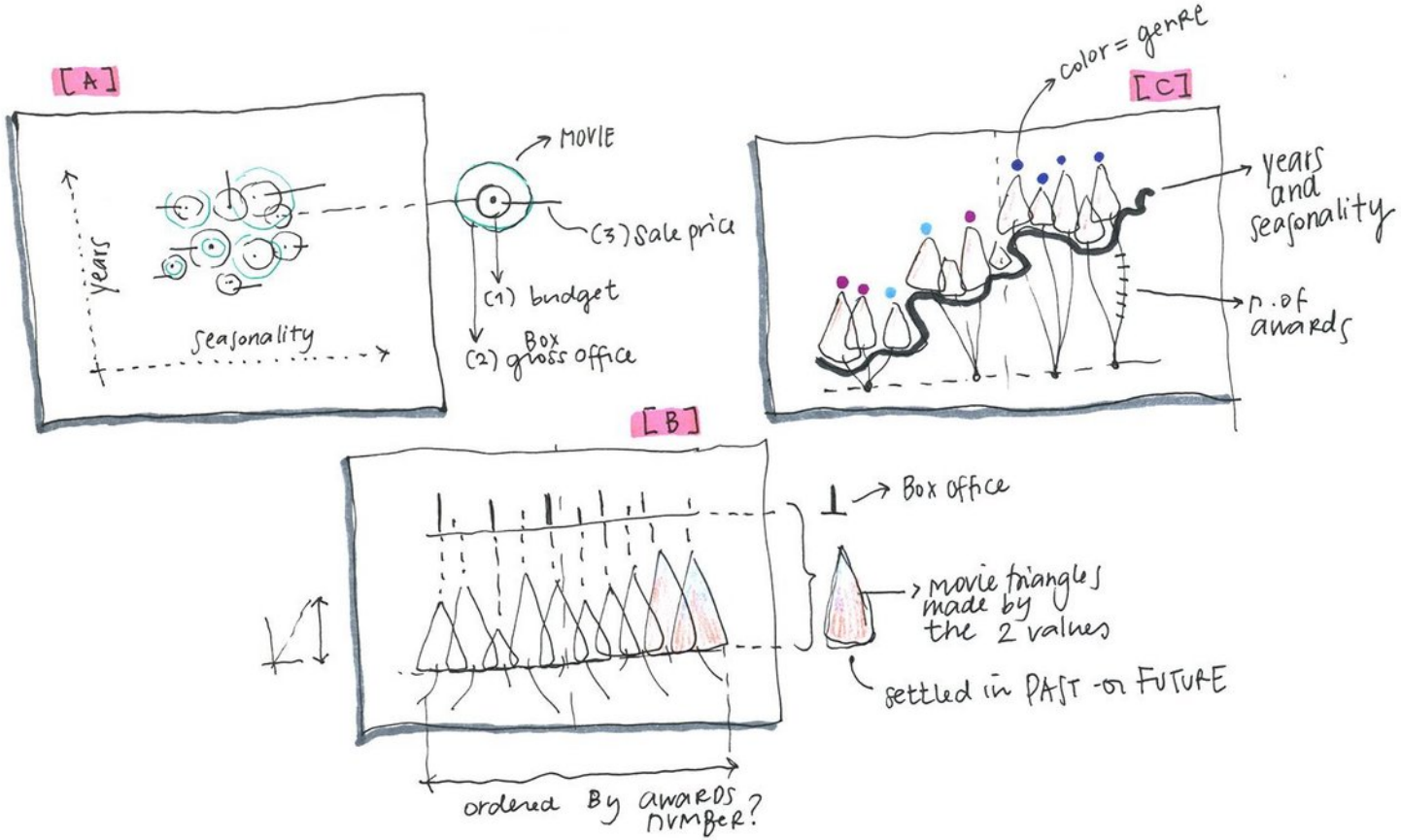
Green 1	Green 2	Green 3	Green 4

Coblis – Color Blindness Simulator https://www.color-blindness.com/coblis-color-blindness-simulator/

Font Size

- BIGGER THE FONT SIZE the more it draws readers' eyes
- **BOLDING** will make words stand out in visualizations
- Using black lettering with a simple font style is best





Sketch out the Story:

Organize your ideas for visuals into a story. Or group visuals that relate to each other to create a theme

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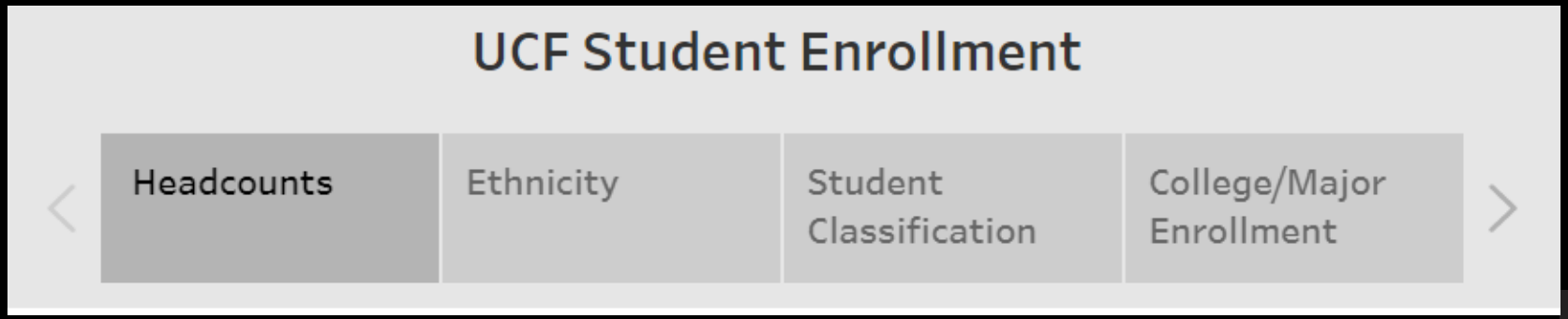
Enrollment Dashboard Stories

Created 4 pages all about UCF Enrollment

-First page: summary page, high-level look of the theme of the dashboard

-Other pages: subject-specific data, can relate to demographic information

Enrollment Dashboard Interactive Facts Webpage



Data Visualization Process is Not Complete

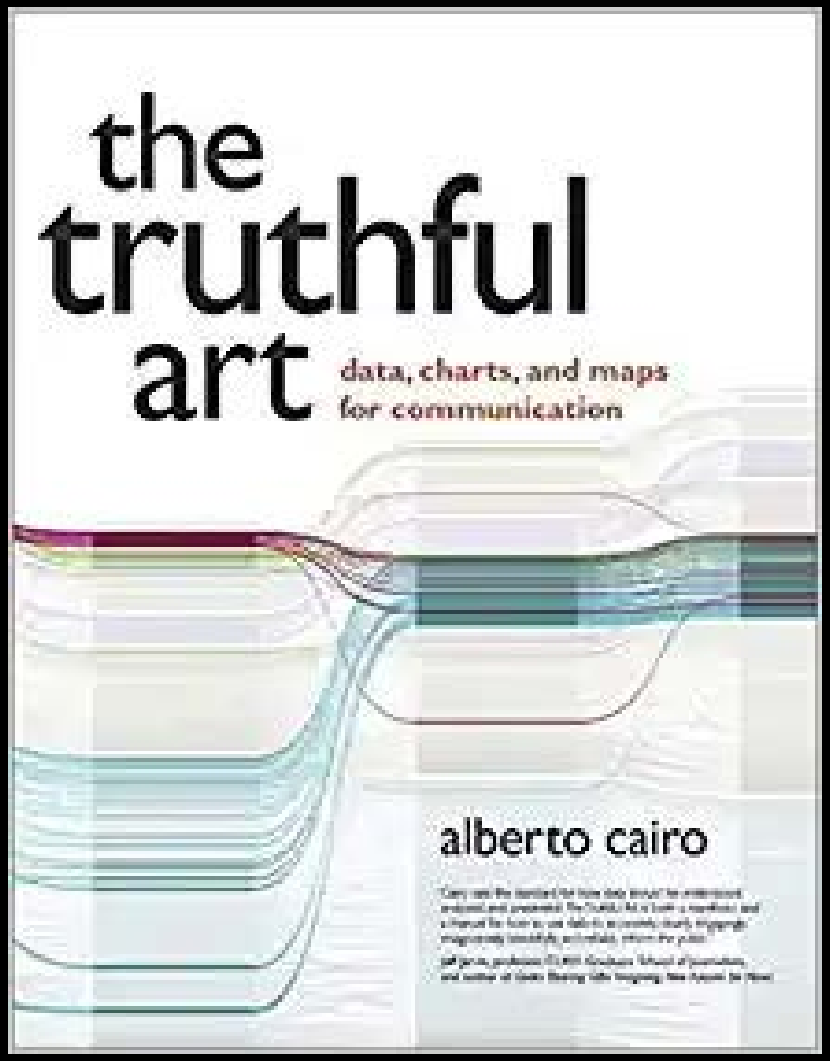
Internal Reviews with staff

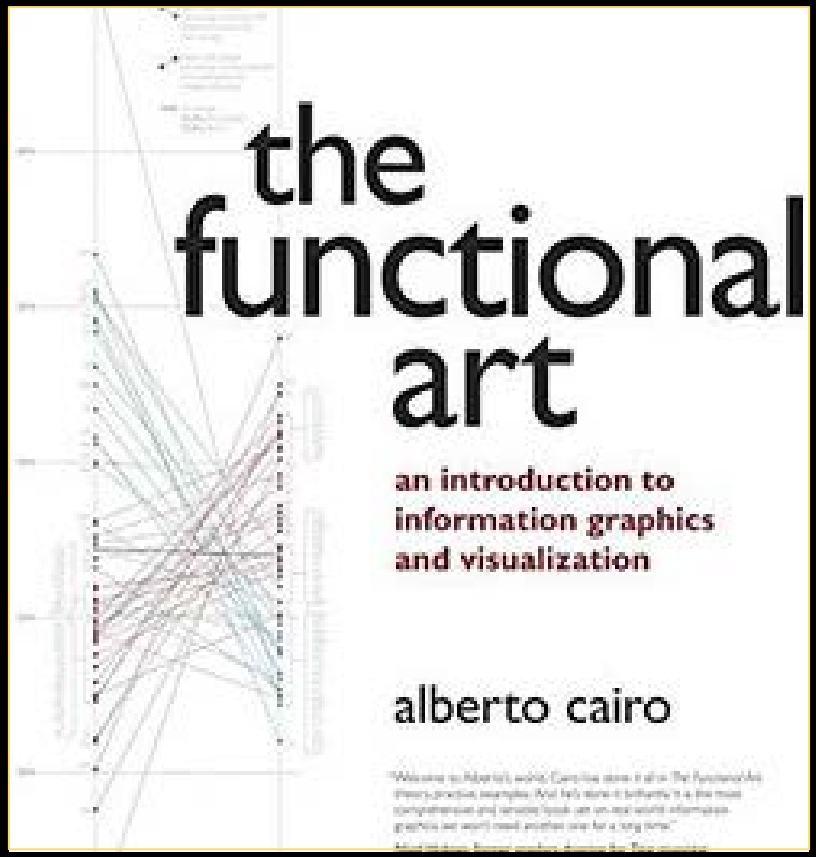
Follow-up meetings with stakeholders

Keep the lines of communication open with stakeholders

- Continue to request feedback on visualizations

Great Data Viz Resources





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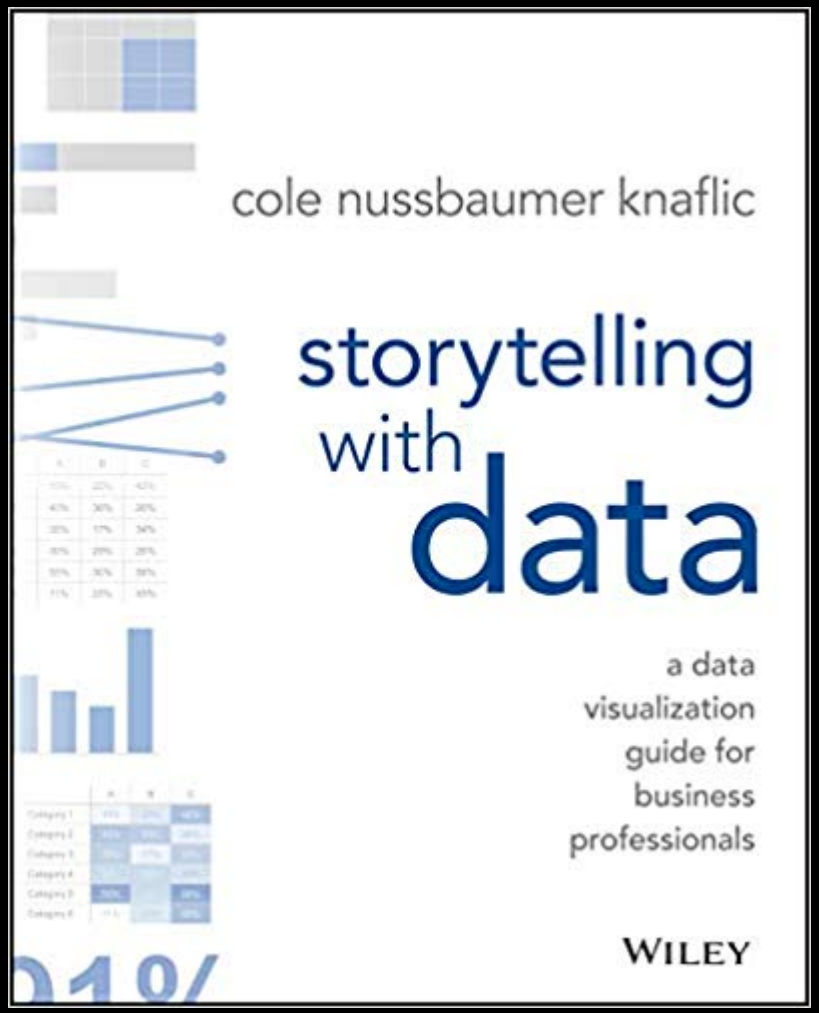
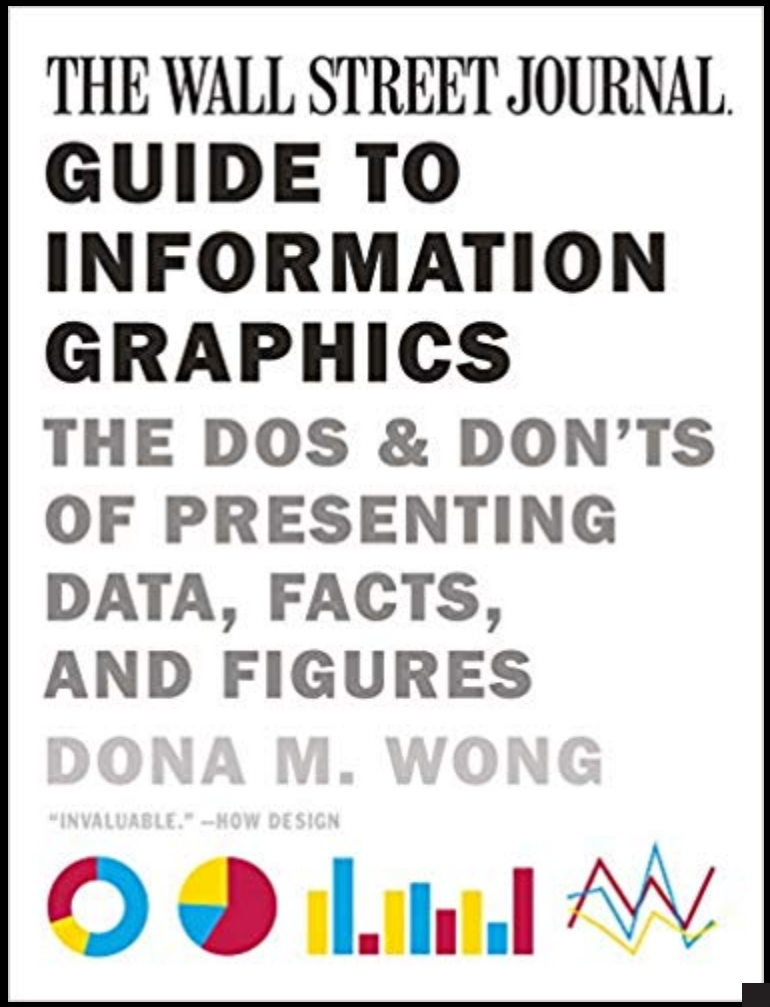
More Great Resources





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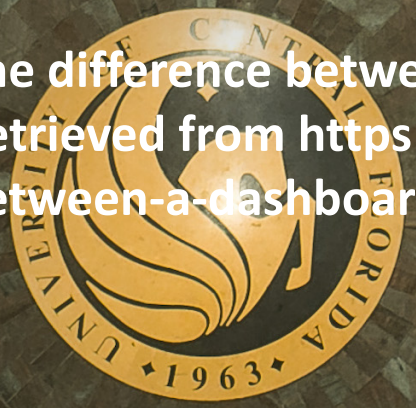

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