



Data Visualization

Dr. Ken Kwong-Kay Wong

Boston, MA
Mar 3, 2023







Data Visualization

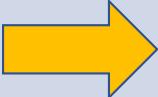
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Course Schedule (Day 5)

Class	Topics
Fri, Mar 3, 2023:	
5 	Ethical Considerations in Data Visualization <ol style="list-style-type: none">1. Ethics in Data Visualization<ol style="list-style-type: none">a. Unethical Data Visualizationb. The Misleading Data Dashboardc. 10 Data Visualization Mistakes to Avoidd. A Code of Ethics for Data Visualization Professionals2. Sharing and Publishing Data<ol style="list-style-type: none">a. E-mailing Tableau Workbook fileb. Publishing to Tableau Serverc. Publishing to Tableau Online<ul style="list-style-type: none">- Using the “Ask Data” Functiond. Publishing to Tableau Publice. Publishing to Web Sites and Blogs via HTML Embeddingf. Using Tableau Reader and Tableau Mobile App

Course Schedule (Day 6)

Class	Topics
Mon, Mar 6, 2023:	
6	Calculated Field, Parameters, and Quick Table <ul style="list-style-type: none">1. Create Calculated Field Using Text Operators:<ul style="list-style-type: none">a. SPLITb. LEFT and RIGHTc. LOWER and UPPERd. REPLACEe. DATEADDf. DATEDIFFg. DATEPARTh. DATEPARSEi. CASEj. IF-THEN-ELSE / Group Creationk. IIFl. IFNULL2. Create Parameters<ul style="list-style-type: none">a. What If Analysisb. Text Fields Search3. Quick Table<ul style="list-style-type: none">a. Running Totalb. Cohort Analysis4. The Analytics Pane<ul style="list-style-type: none">a. Constant, Average, and Reference Lineb. Trend Line5. Advanced Visualization Techniques<ul style="list-style-type: none">a. Timelinesb. Gantt Chartc. Bar-in-bar Chartd. Radar Charte. Interactive View: Top 5 Clients



Course Schedule (Day 7)

Class	Topics
Tues, Mar 7, 2023:	
7	Elevating Your Tableau Knowledge <ul style="list-style-type: none">1. What's next after QTM-6032?<ul style="list-style-type: none">a. The Tableau Communityb. The Tableau Conferencec. The Iron Viz competitiond. Blogs about DataVize. Tableau Zen Master2. Fun Stuff – Arts3. Team Presentation

Class 5:

Ethical Considerations in Data Visualization

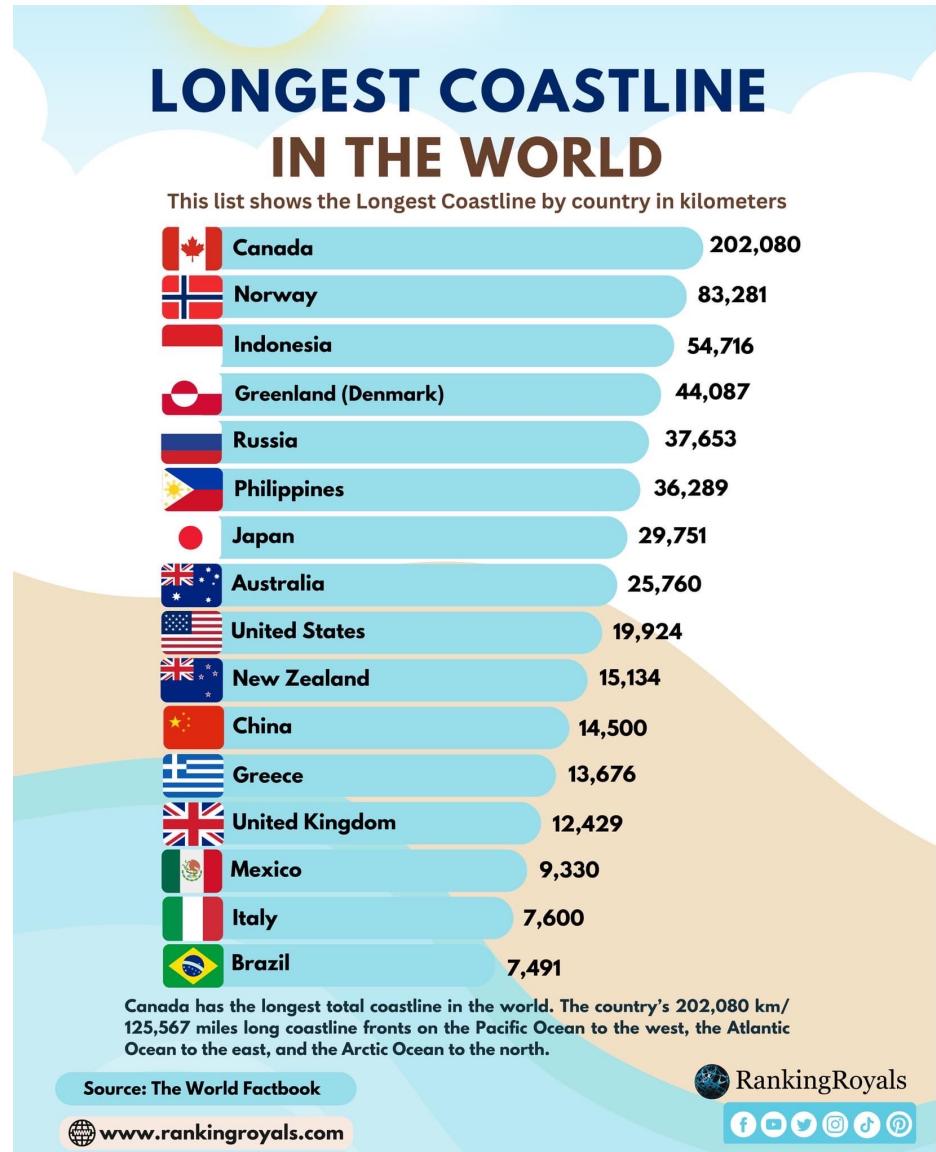
Mar 3, 2023



Unethical Data Visualization



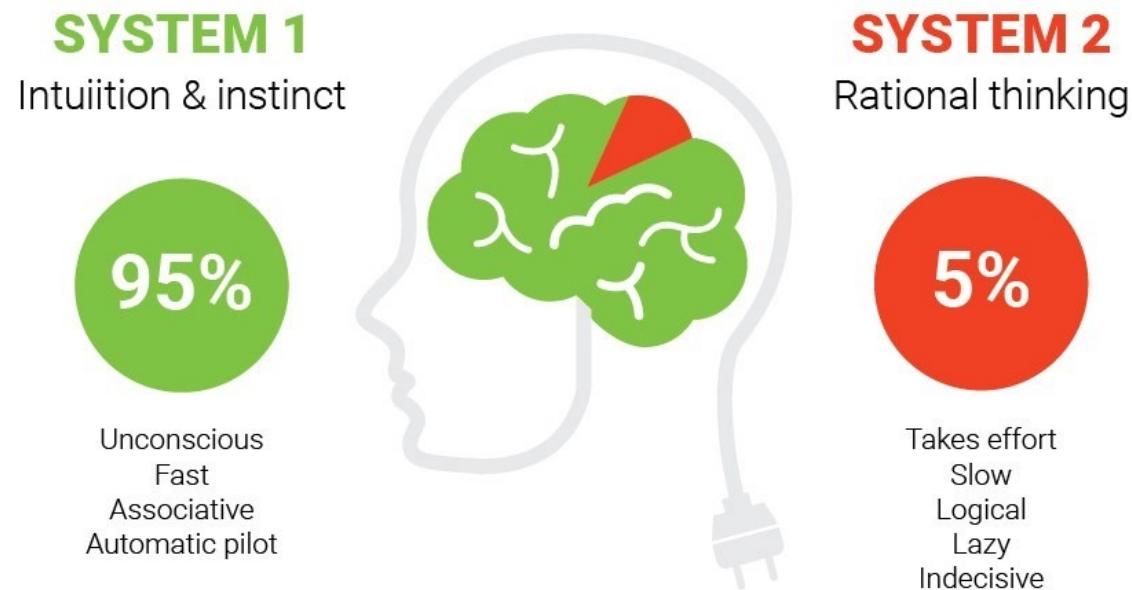
Any problem?





1. System 2 thinking...

(Proposed by the famous economist and Noble prize winner Daniel Kahneman)



Source: <https://fbs.eu/en/analytics/tips/trading-fast-and-slow-26041>

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1. System 2 thinking...

- We can become mindful and say,
 - “Wait a second. Let me stop and read the chart more carefully...”
 - What’s the source of this graphic?
 - What lies beyond the chart?
 - What could this chart be hiding?
 - Is the chart oversimplifying the data?
 - Is it displaying the uncertainty in the data, and if it isn’t, is that uncertainty important enough that it should have been displayed?



1. Good readers of chart → Good creators of charts

- First analyze the data to see what the data shows or hides.
- Then, write down a list of goals for what they want the visualization to communicate.
 - What is the purpose?
 - What do they want the visualization to accomplish?
 - This activity will give students a script that they can use later to make choices about what kind of headline, intro, or other notations to write; what graphic form to use; what encoding to use.
 - E.g., length, type, position, shape, color, or any combination of those used to display the data.

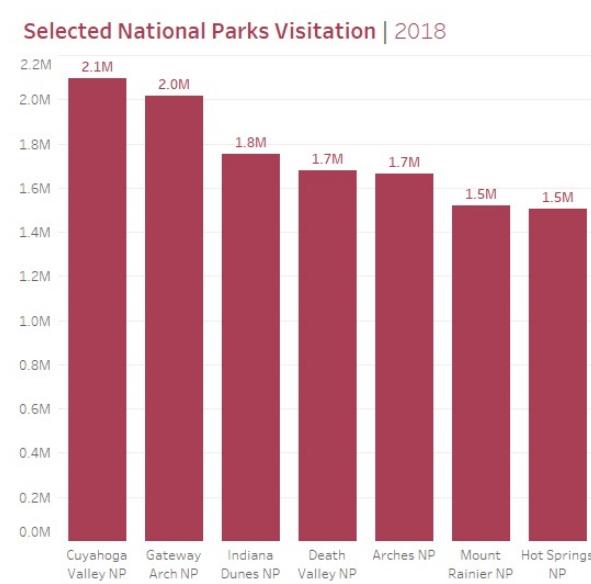
Source: <https://www.aacsb.edu/insights/articles/2019/12/the-ethics-of-data-visualization>

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1a. Unethical Data Visualization Examples

- 1. Abbreviated Axes



Source: <https://www.phdata.io/blog/top-five-ways-mislead-data-visualization/>

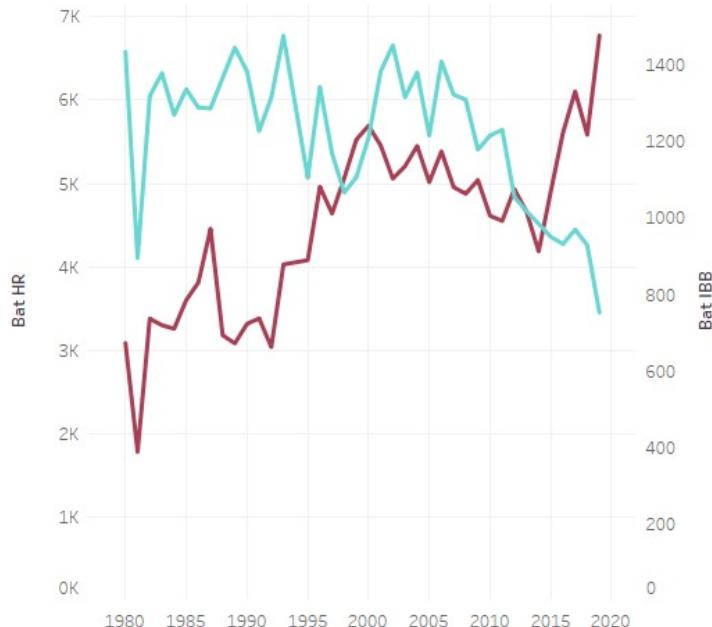
13



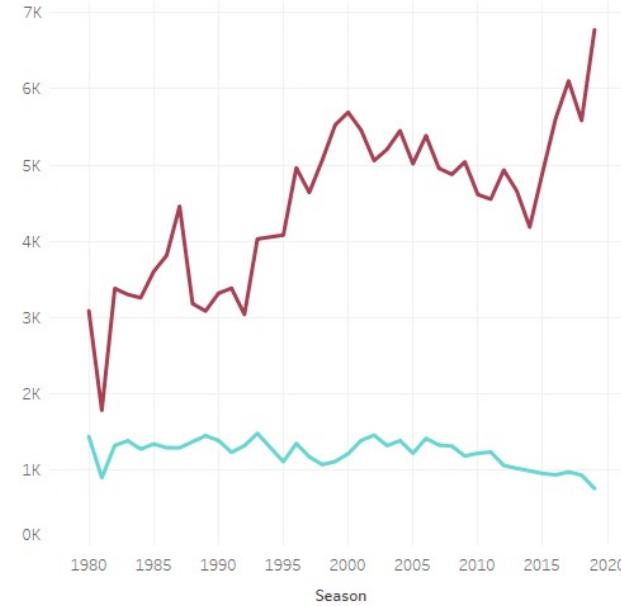
1a. Unethical Data Visualization Examples

• 2. Dualing Data

Home Runs vs. Intentional Walks by Season



Home Runs vs. Intentional Walks by Season



Source: <https://www.phdata.io/blog/top-five-ways-mislead-data-visualization/>

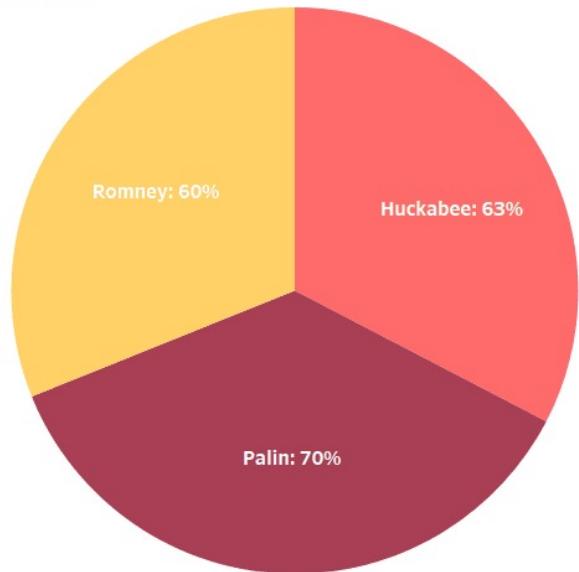
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1a. Unethical Data Visualization Examples

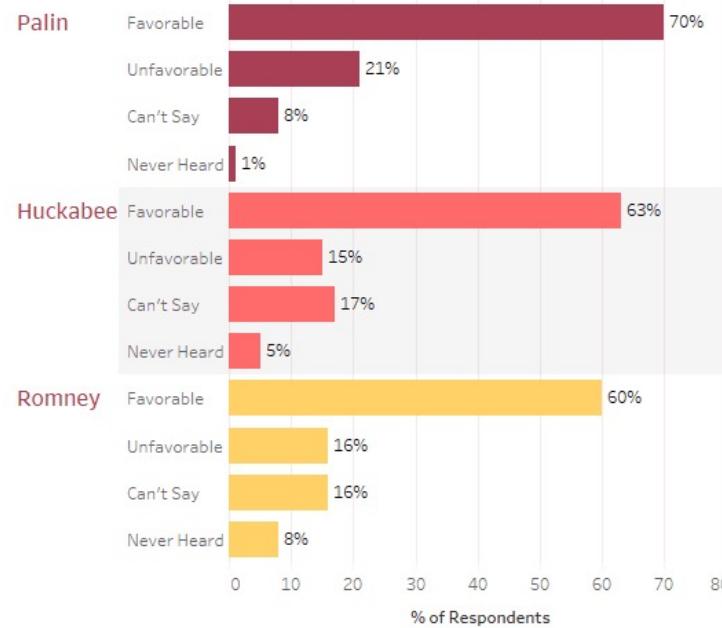
- 3. Confusing Charts

% of Respondents with a Favorable Opinion of Each Candidate



% Republicans by Opinion of Candidate

respondents were asked for their opinion of each candidate



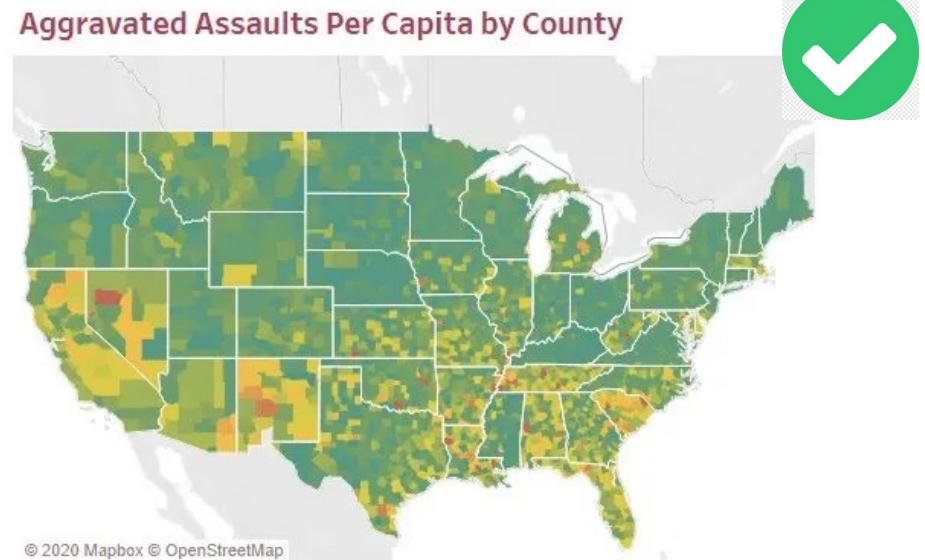
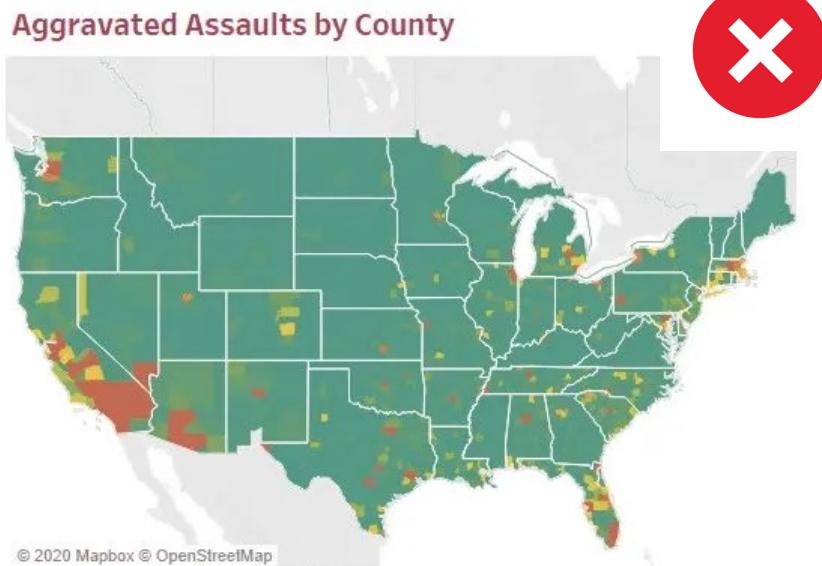
Source: <https://www.phdata.io/blog/top-five-ways-mislead-data-visualization/>

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1a. Data Visualization Examples

- 4. Absolute vs. Relative Coloring



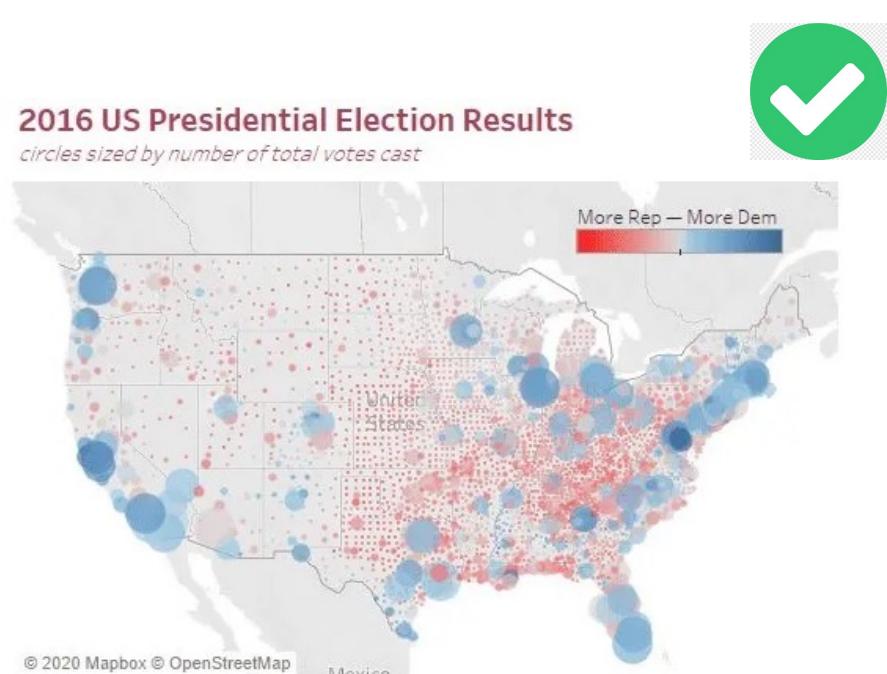
Source: <https://www.phdata.io/blog/top-five-ways-mislead-data-visualization/>

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1a. Unethical Data Visualization Examples

- 5. Binning



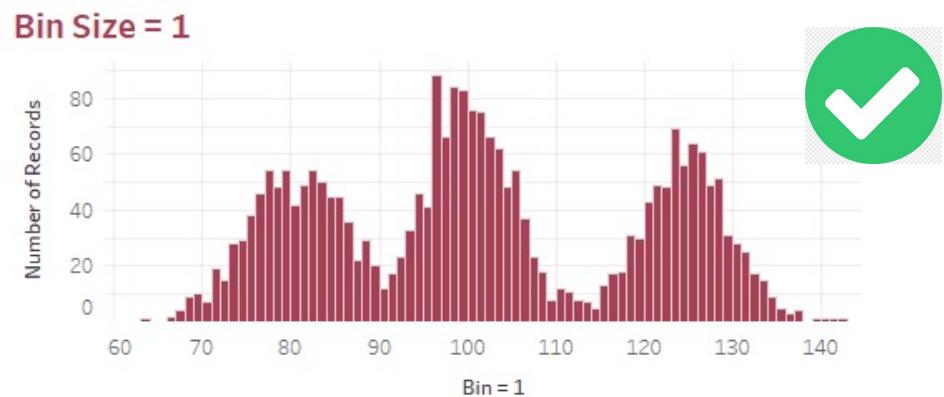
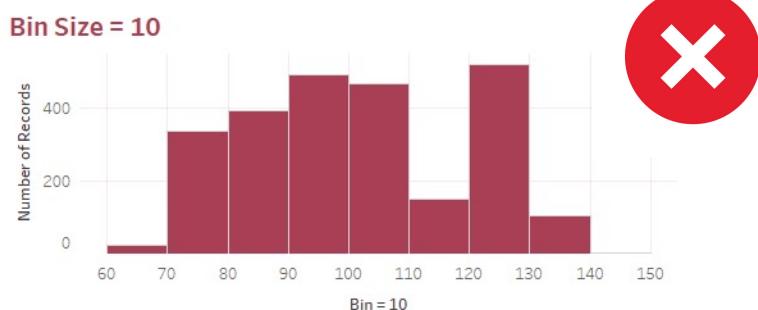
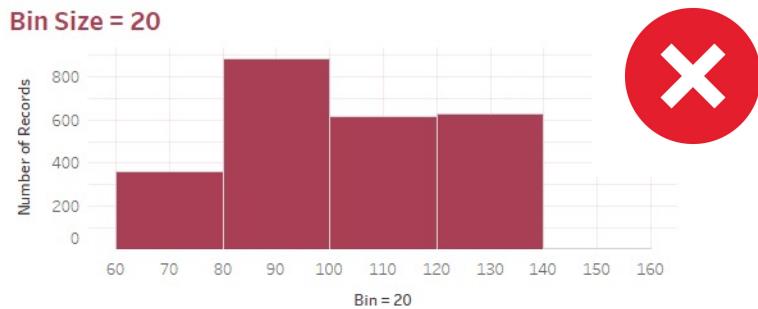
Source: <https://www.phdata.io/blog/top-five-ways-mislead-data-visualization/>

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1a. Unethical Data Visualization Examples

- 6. Incorrect Bin Size in Histogram



Source: <https://www.phdata.io/blog/top-five-ways-mislead-data-visualization/>

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The Misleading Data Dashboard



1b. The Misleading Data Dashboard

- Although dashboards can convey snapshots of important measures, they are poor at providing the nuance and context that effective data-driven decision-making demands.
- Data analytics typically does a few things:
 - Describes existing or past phenomena [Yes, Dashboard]
 - Predicts future events based on past data [Dashboard can't do it]
 - Prescribes a course of action [Dashboard can't do it]
- 3 Drawbacks to dashboards
 - The Importance Trap
 - The Context Trap
 - The Causality Trap

Source: <https://hbr.org/2017/01/3-ways-data-dashboards-can-mislead-you>

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1b. The Misleading Data Dashboard

- The Importance Trap
 - Priorities are defined by IT, a DataViz expert, or a consultant who may not know the company that well.
 - Data views that do not align with business priorities
 - Is the data on the dashboard ***relevant*** and ***important*** to the viewer?

Source: <https://hbr.org/2017/01/3-ways-data-dashboards-can-mislead-you>

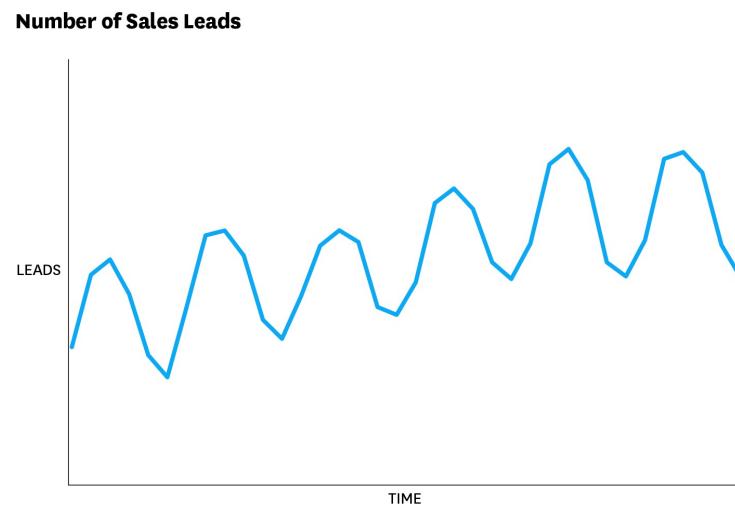
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1b. The Misleading Data Dashboard

- The Context Trap

- It's dangerous to equate "empirical" and "quantitative" with "objective".
- The most notable time period may be where expected leads peak, but actual leads are low.



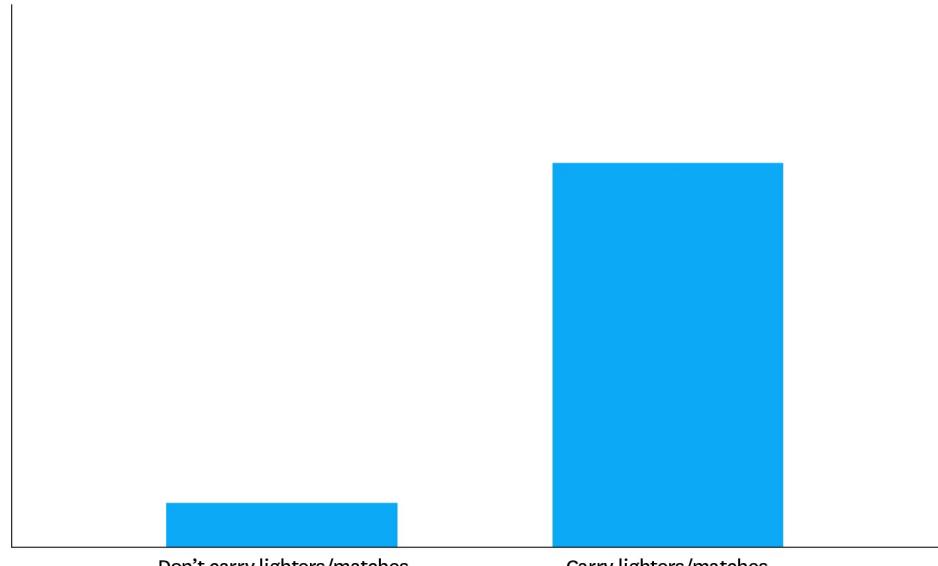


1b. The Misleading Data Dashboard

- The Causality Trap

- Dashboards lead people to assign causality when they shouldn't.
- Would you conclude from this comparison that carrying lighters and matches causes lung cancer?
- Probably not. You would instead surmise that people who carry lighters and matches are more likely to smoke, and that smoking causes cancer.

Lung Cancer Rate



SOURCE JOEL SHAPIRO

© HBR.ORG

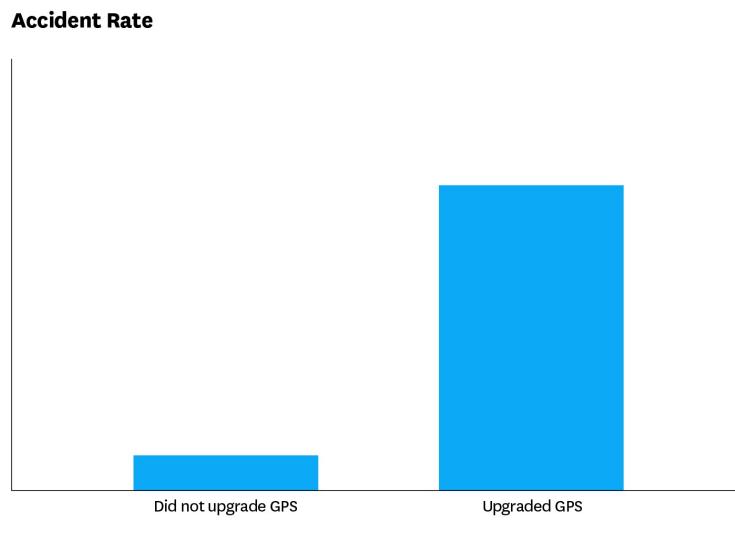
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1b. The Misleading Data Dashboard

- The Causality Trap

- Consider a large package delivery company that wanted to reduce vehicle accidents. To do so, they offered drivers the option to upgrade their GPS to a system that would help them avoid high-risk traffic areas.

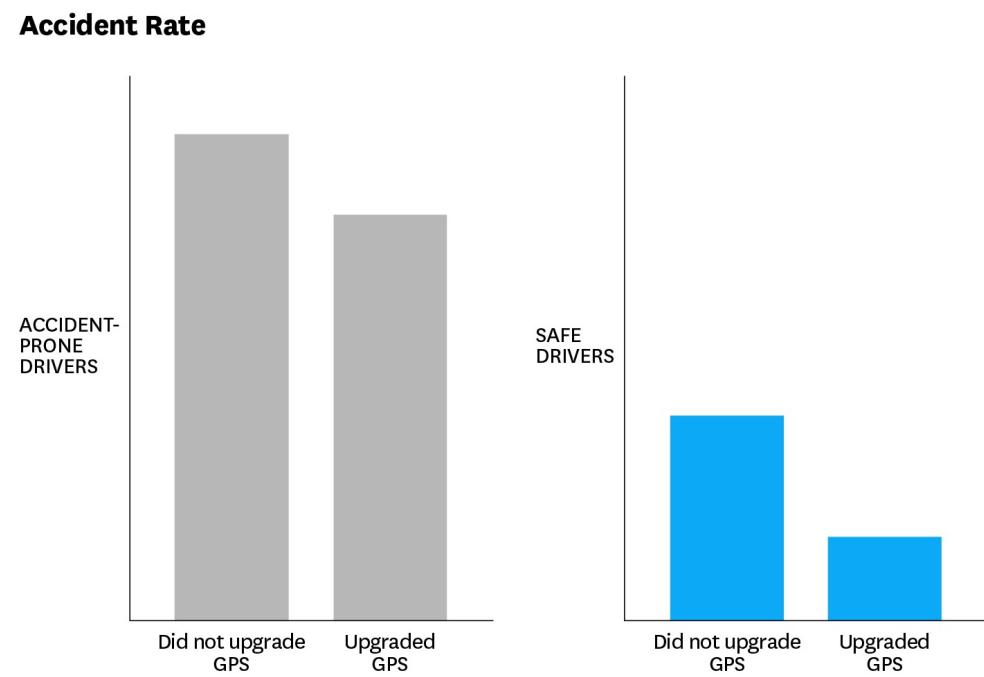


“But....what else, other than the GPS upgrade, might be responsible for the increase in accidents?”



1b. The Misleading Data Dashboard

- For both groups, the upgrade made them safer. So why did the accident rate increase for the entire fleet of drivers while decreasing for each group?
- This is because in this case almost all of the accident-prone drivers chose to use the upgraded device, and almost all of the safe drivers kept the old device.
- Preexisting driver behavior was confused with the effectiveness of the upgrade.



Source: <https://hbr.org/2017/01/3-ways-data-dashboards-can-mislead-you>



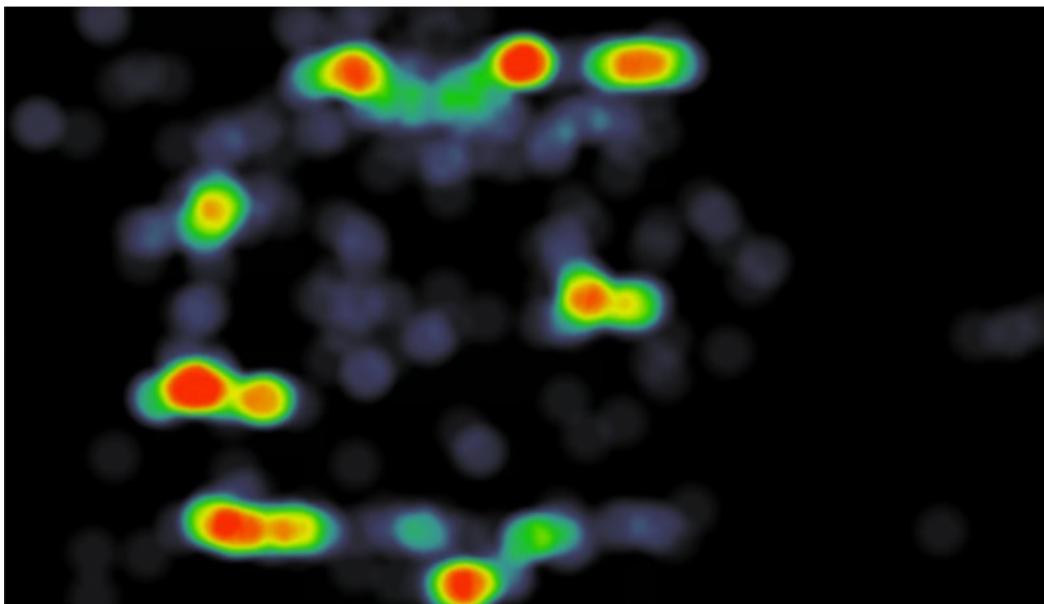
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INTERNATIONAL
BUSINESS SCHOOL

10 Data Visualization Mistakes to Avoid



1c. 10 Data Visualization Mistakes to Avoid

- 1. Misleading Color Contrast



Source: <https://www.toptal.com/designers/ux/data-visualization-mistakes>

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1c. 10 Data Visualization Mistakes to Avoid

- 2. Improper Use of 3D Graphics



Source: <https://www.toptal.com/designers/ux/data-visualization-mistakes>

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1c. 10 Data Visualization Mistakes to Avoid

- 3. Too Much Data



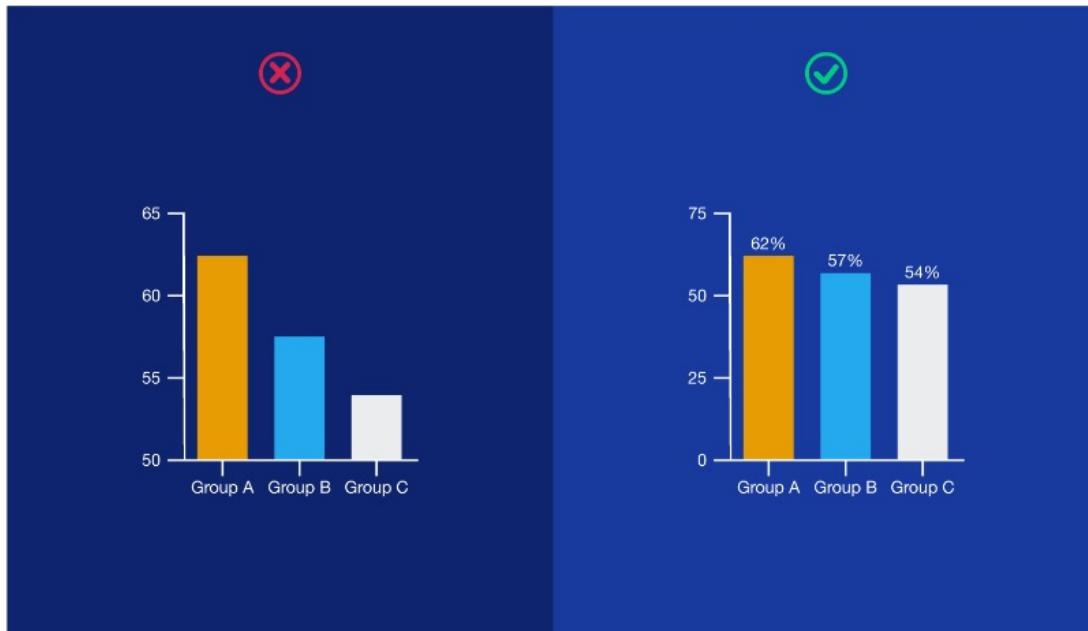
Source: <https://www.toptal.com/designers/ux/data-visualization-mistakes>

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1c. 10 Data Visualization Mistakes to Avoid

- 4. Omitting Baselines and Truncating Scale



Source: <https://www.toptal.com/designers/ux/data-visualization-mistakes>

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1c. 10 Data Visualization Mistakes to Avoid

- 5. Biased Text Descriptions

- The act of suggestion is the art of persuasion. Tell someone what they should see in an image, and they probably will. The text that accompanies visualizations (supporting copy, titles, labels, captions) is meant to give viewers objective context, not manipulate their perception of the data.

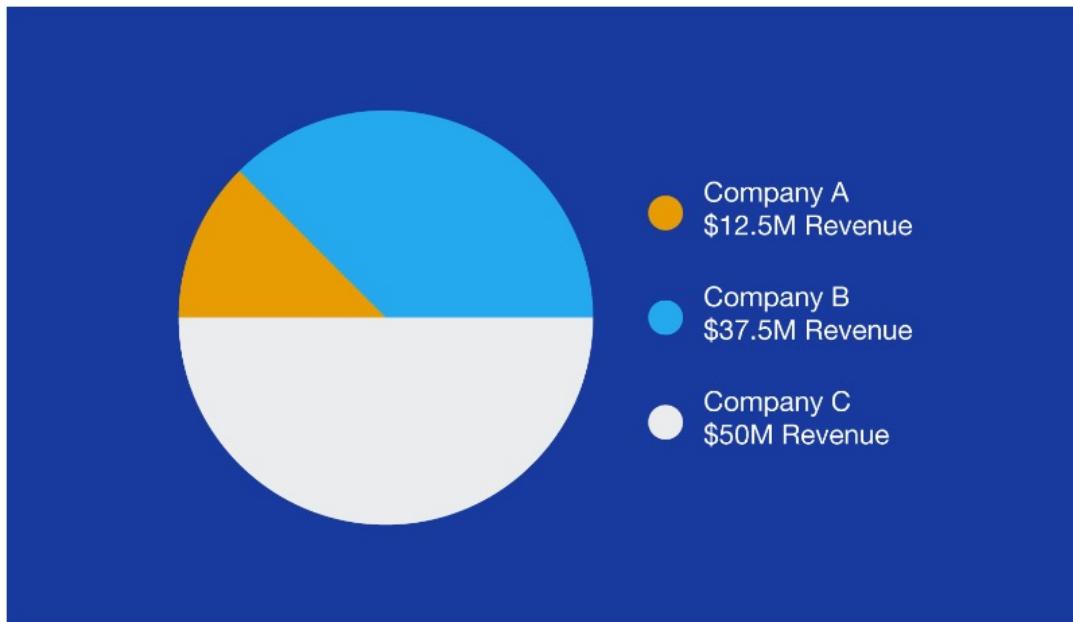
Designer Takeaways:

- Biased text commonly appears when drawing correlations between datasets (and implying causation).
- Often, biased text comes from clients, and it's on designers to flag the issue.



1c. 10 Data Visualization Mistakes to Avoid

- 6. Choosing the Wrong Visualization Method



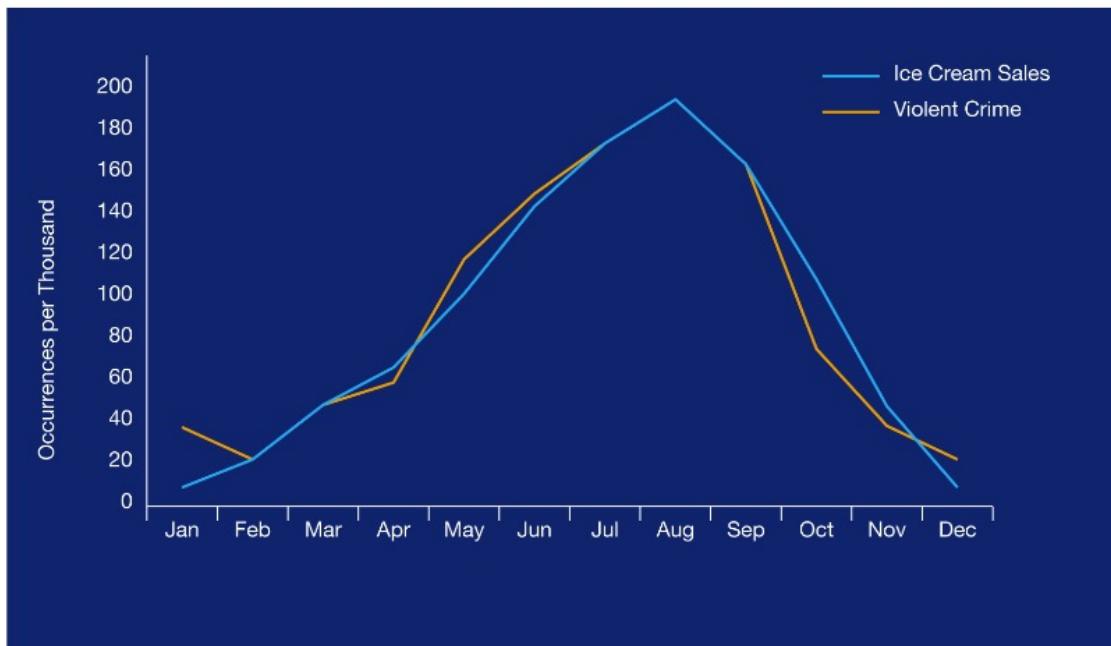
Source: <https://www.toptal.com/designers/ux/data-visualization-mistakes>

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1c. 10 Data Visualization Mistakes to Avoid

- 7. Confusing Correlations



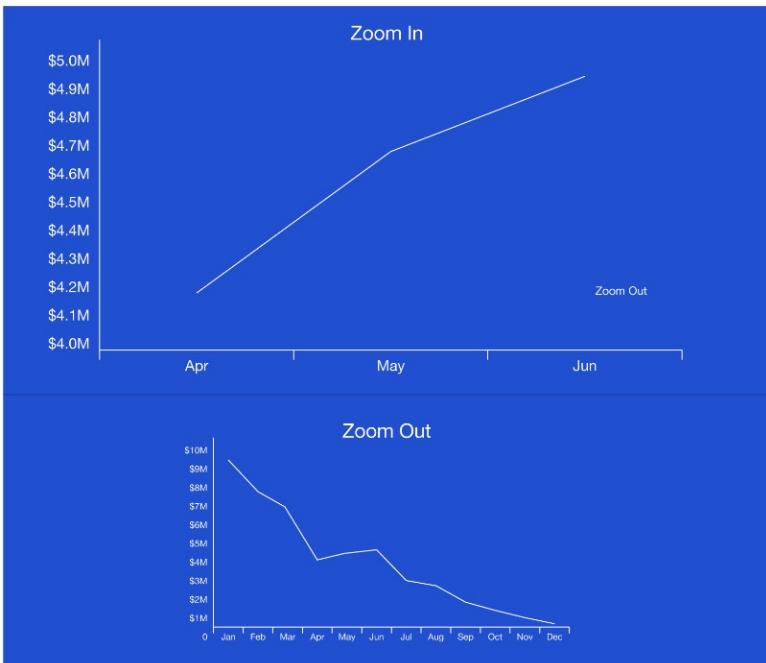
Source: <https://www.toptal.com/designers/ux/data-visualization-mistakes>

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1c. 10 Data Visualization Mistakes to Avoid

- 8. Zooming in on Favorable Data



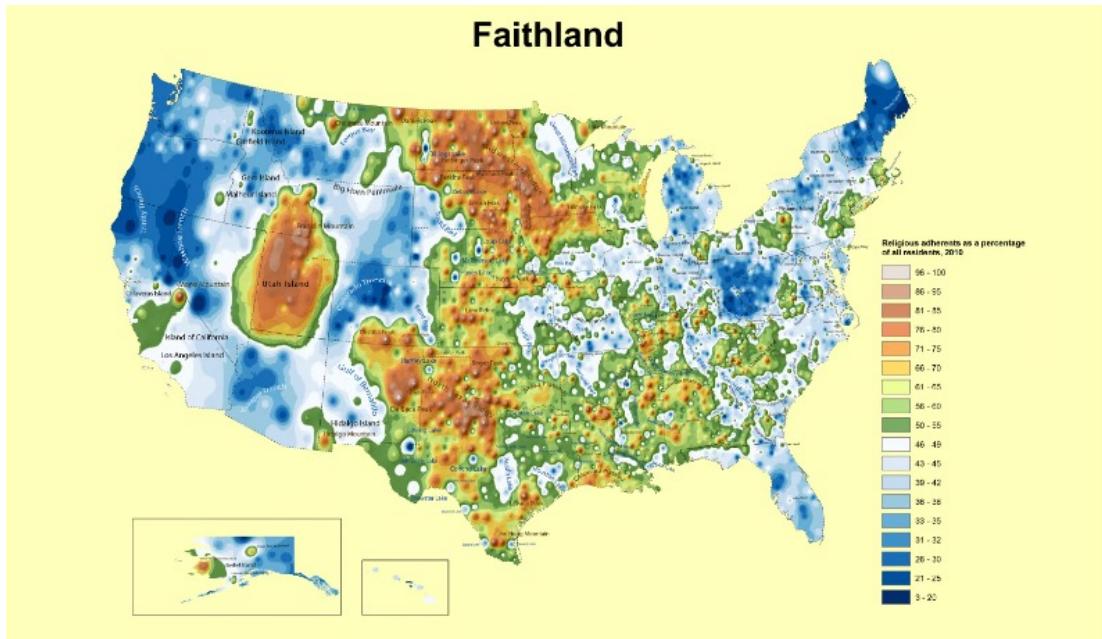
Source: <https://www.toptal.com/designers/ux/data-visualization-mistakes>

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1c. 10 Data Visualization Mistakes to Avoid

- ## • 9. Eschewing Common Visual Associations



Source: <https://www.toptal.com/designers/ux/data-visualization-mistakes>

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1c. 10 Data Visualization Mistakes to Avoid

- 10. Using Data Visualizations in the First Place

“The purchase likelihood for a product with five reviews is **270%** greater than a product with zero reviews.”

Spiegel Research Center, *How Online Reviews Influence Sales*

Source: <https://www.toptal.com/designers/ux/data-visualization-mistakes>

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A Code of Ethics for Data Visualization Professionals



1d. A Code of Ethics for Data Visualization Professionals

1. Data collection

- Data sources must be reliable and verifiable, attribution should be given whenever possible, dates should be included

2. Data Analysis

- Leave out assumptions and only look at what the source data actually shows.
- If you have to make some basic assumptions, you need to make them known with annotations.

3. Design

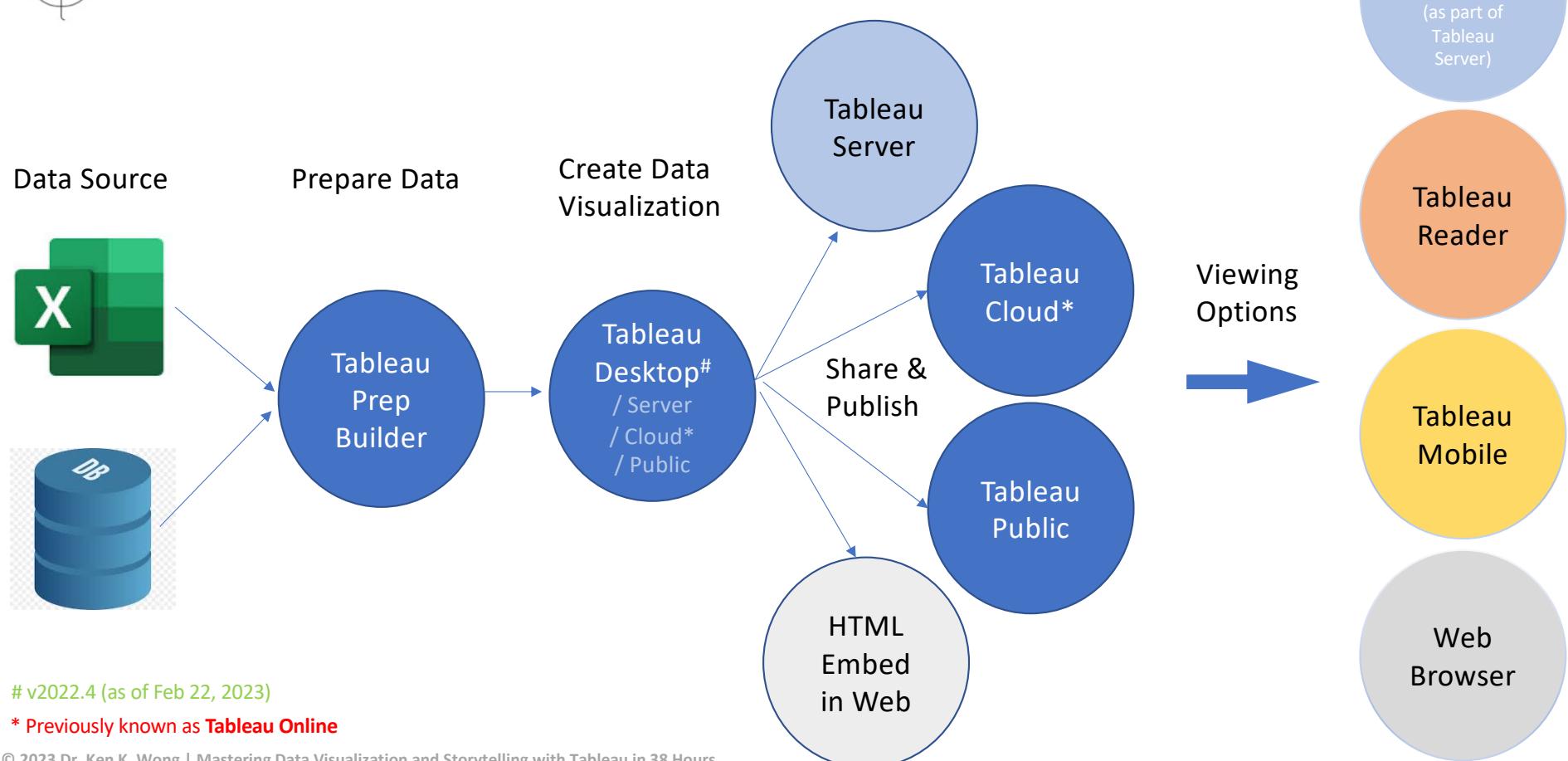
- Accurately portray the data and analysis
- Be aware of things like the hierarchy of importance of visual properties and best labeling practices.
- Colors alone have a huge range of issues, from cultural meaning to isoluminance to colorblindness.



2. Sharing and Publishing Data



2. Re-cap: the Tableau Ecosystem

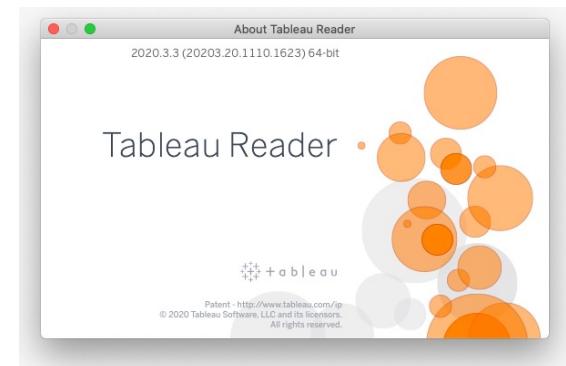




2a. Publishing to Tableau Cloud, Tableau Server, and Tableau Public

To share insights with colleagues, you can

1. E-mail them the Tableau workbook (.twbx file), they can open it in Tableau Desktop or in **Tableau Reader [525MB → 1.68GB]**.
 - <https://www.tableau.com/products/reader/download>
 - E.g., Let's say I open my **Likertscale.twbx** file (141KB)
 - Sort data (ascending, descending)
 - View tabs “Crosstab, Likert Scale”
 - Exclude data by right clicking





2a. Publishing to Tableau Cloud, Tableau Server, and Tableau Public

To share insights with colleagues, you can

2. Make your dashboards available online via the **web browser**, using one of the three Tableau products built for this purpose:

- Tableau Cloud, Tableau Server, or Tableau Public.
- Shared by emailing the browser link.
 - Tableau Public
 - https://public.tableau.com/profile/ken.wong1538#!vizhome/Forecast_16069545360790/Cluster



2a. Publishing to Tableau Cloud, Tableau Server, and Tableau Public

To share insights with colleagues, you can

3. Use the Tableau Mobile app to access dashboard on Tableau server or Tableau Cloud.

- Tableau Mobile can't open packaged workbooks in TWB or TWBX format (packaged workbooks).
 - Sign into:
 - Tableau Server
 - Tableau Cloud
 - If you see a blank screen on iOS, scroll up.



Sign in to Tableau Cloud

Email address

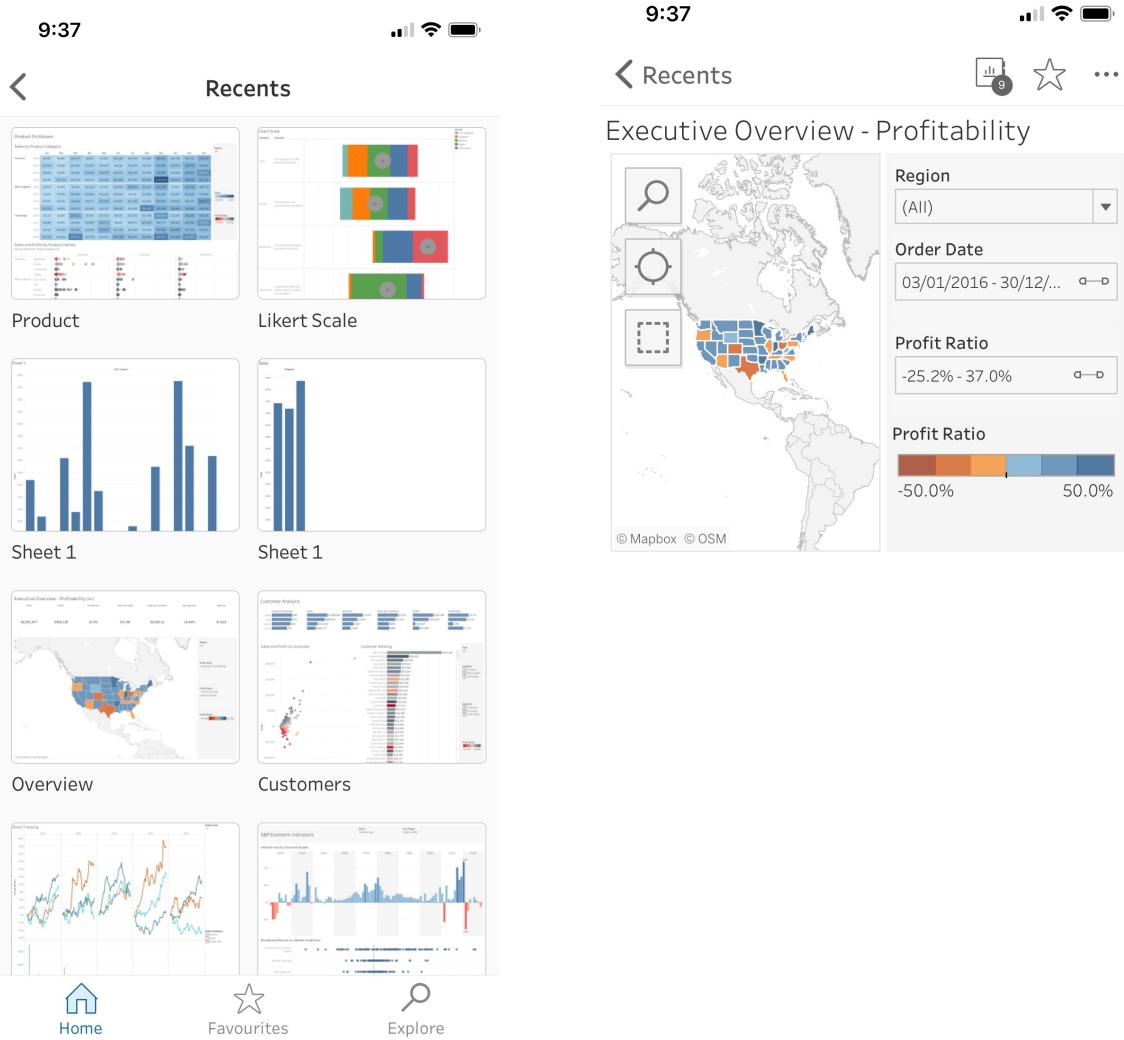
Remember me [Forgot password](#)

[Sign In](#)

[Sign Up](#)

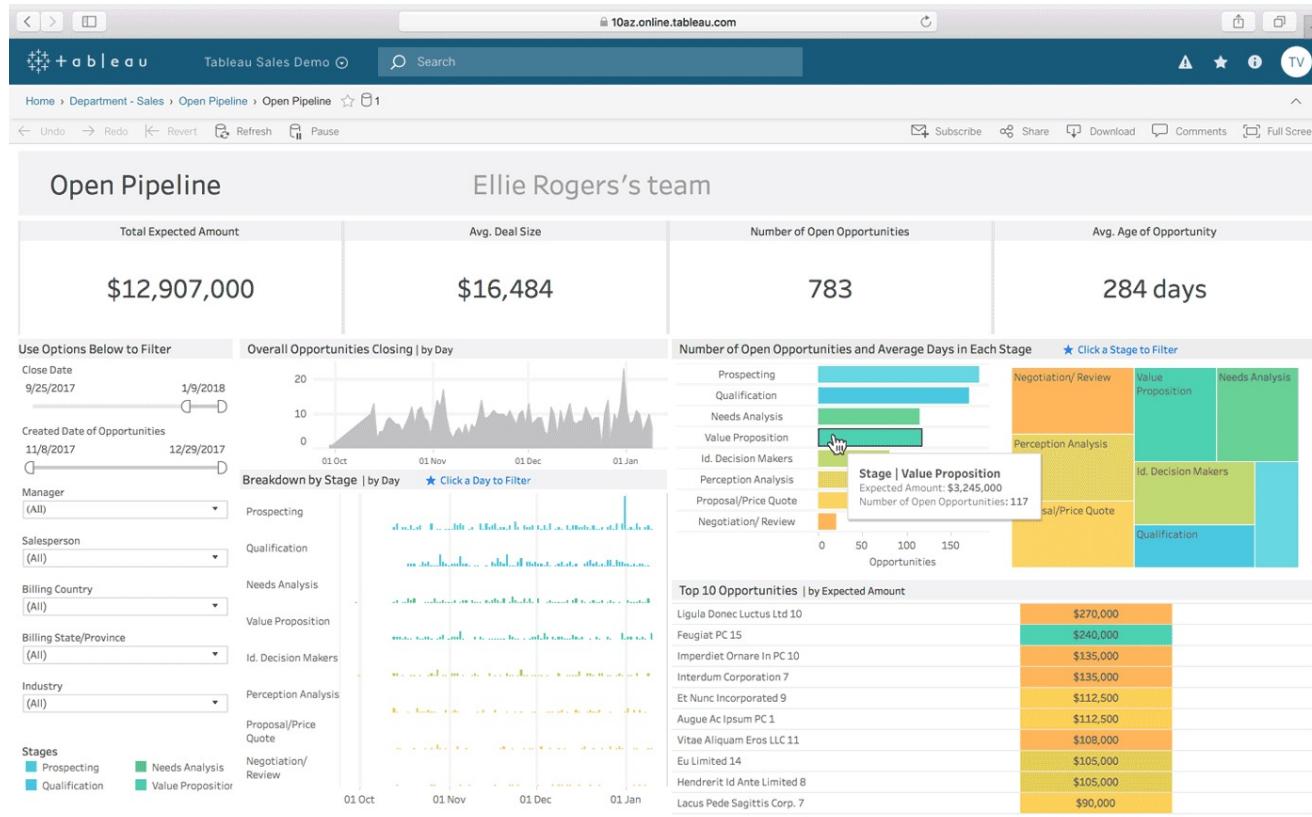
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2a. Tableau Viewer in Tableau Server/Cloud

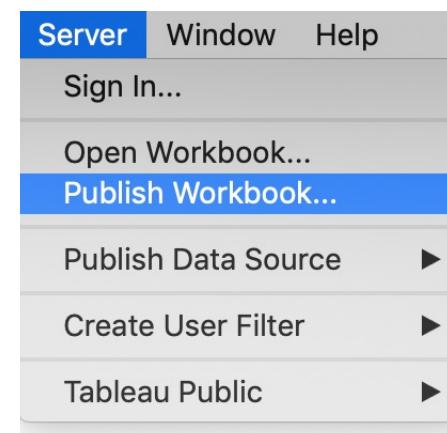
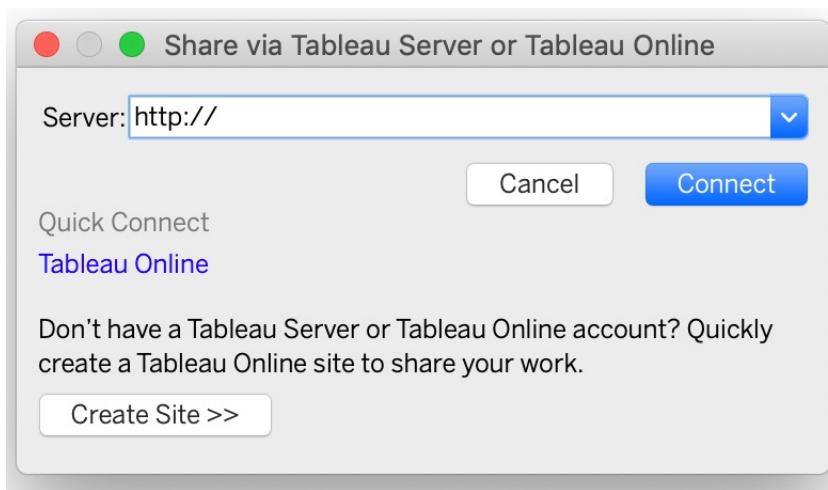


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2b. Publishing to Tableau Server

- Server menu, Publish Workbook...
- Type in server address





2c. Publishing to Tableau Cloud

- <https://online.tableau.com>

Let's me do a demo online, just watch.

Publish Workbook to Tableau Online

Project
Default

Name
Sales (Hult - Lesson 1)

Description
Lesson 1

Tags
[Add](#)

Sheets
All [Edit](#)

Permissions
Same as project (Default) [Edit](#)

Data Sources
1 embedded in workbook [Edit](#)

More Options

Show sheets as tabs
 Show selections

[Publish](#)

Sales (Hult - Lesson 1) [Edit](#) [...](#)

Owner: Ken Wong Modified: Jul 27, 2020, 12:13 a.m. Extract Last refreshed: Jul 27, 2020, 12:13 a.m.

Lesson 1

Views 1 Data Sources 0 Connected Metrics 0 Extract Refreshes 0 Subscriptions 0 Lineage

Select All

Sheet 1

Publishing Complete

Workbook
Sales (Hult - Lesson 1)

Preview layouts on different types of devices.

[Done](#)

<https://prod-useast-a.online.tableau.com/#/site/kenwong/workbooks/197396/views>

You can't view this one because it's not public; sign-in required.



2c. Publishing to Tableau Cloud

- Let me open up **Hult– Superstore.xls**
- >
- Explore
- New workbook
- Files
- Drag Orders to canvas, Update Now
- Sheet 1, bar chart, double click sales and then sub-category
- Click the save icon (3rd one at top)...Class 7 Demo, file menu..close
- Default, class 7 demo, ..., share with others or **copy URL link**



2c. Publishing to Tableau Cloud

A screenshot of a Tableau dashboard titled "Sheet 1". It features a single bar chart with three blue bars. The y-axis is labeled "Sales" and ranges from 0 to 8000. The x-axis is labeled "Category". The chart shows sales values of approximately 5500, 5000, and 7500 respectively. Below the chart is a context menu with the following options: "Edit View", "Share...", "Tag...", "Permissions...", "Who Has Seen This View?", and "Delete...". The "Share..." option is highlighted with a light gray background.

I can share my viz by either stating the person's name, or using a shared URL link

A screenshot of the "Share View" dialog box for "Sheet 1". The dialog has a title bar with "Share View" and a close button "X". It contains the following sections: "Sheet 1" (with a checkbox), "Only people with permission can see this view.", "Share with people" (with a placeholder "Enter a username."), and "Share using a link" (with a URL "https://prod-useast-a.online.tableau.com/t/kenwong/views/Sa" and a "Copy Link" button). Blue arrows point from the "Share..." option in the context menu on the left to the "Share with people" input field and the "Share using a link" URL field.

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2c. Publishing to Tableau Cloud

- Let's share the chart that I've built and published to Tableau online already.
- Open the graph, click the "Share" icon on the upper-right hand corner
- Copy the URL link (e.g. it varies based on your graph)
 - https://prod-useast-a.online.tableau.com/t/kenwong/views/likertscale/LikertScale?:showAppBanner=false&:display_count=n&:showVizHome=n&:origin=viz_share_link
 - Your audience (colleague or boss) can view it in their own Tableau Online account.



2c. Publishing to Tableau Cloud

- You can also copy the embed code for HTML publishing later.
 - ```
<script type='text/javascript' src='https://prod-useast-a.online.tableau.com/javascripts/api/viz_v1.js'></script><div class='tableauPlaceholder' style='width: 1420px; height: 792px;'><object class='tableauViz' width='1420' height='792' style='display:none;'><param name='host_url' value='https%3A%2F%2Fprod-useast-a.online.tableau.com%2F' /> <param name='embed_code_version' value='3' /> <param name='site_root' value='tkenwong' /><param name='name' value='likertscale/LikertScale' /><param name='tabs' value='no' /><param name='toolbar' value='yes' /><param name='showAppBanner' value='false' /></object></div>
```



## 2c. Publishing to Tableau Cloud

## User management

- Explore icon (left),
  - Folder icon “...” lower right-hand corner
  - Permissions
  - Add Group/User Rule      tick/cross

Users 1

Creator: 1/100 Explorer: 0/0 Viewer: 0/0 Unlicensed: 0

Add Users Select All

| Actions                                                                                                         | Username | Site role                  |
|-----------------------------------------------------------------------------------------------------------------|----------|----------------------------|
| <input type="checkbox"/>  KW | Ken Wong | Site Administrator Creator |

Add Users to this Site

Enter Email Addresses Add one or more users by email

Import From File Import users from a CSV file.



# Alternatively, if you just need a static image

- Do this in Tableau Desktop
- To create a BMP on Windows or a TIFF on a Mac
  - **Worksheet** menu (top) > **Copy** > **Image...**
- On Windows, save the image as Enhanced Metafile (\*.emf)
  - **Worksheet** menu (top) > **Export** > **Image...**
- Or, you can publish one or more views to PDF by selecting
  - **File** > **Export as Powerpoint**
  - **File** > **Print to PDF** [in other versions]
  - These static views can be embedded in Microsoft PowerPoint or Word documents or sent in an email.



# Acquisition of ClearGraph in 2017

The screenshot shows the Tableau homepage with the navigation bar: Why Tableau, Products, Solutions, Resources, Partners, COVID-19. On the right, there are buttons for PRICING, SIGN IN, TRY NOW (orange), and BUY NOW (orange). The main headline reads "Tableau Acquires Natural Language Query Startup ClearGraph". Below it, a sub-headline says "Acquisition accelerates plans to add natural language into Tableau platform, helping more people interact with data naturally". A publish date of "AUGUST 9, 2017 - 12:30PM" is shown. The main text of the article discusses the acquisition of ClearGraph and its integration into the Tableau platform.

## Tableau Acquires Natural Language Query Startup ClearGraph

Acquisition accelerates plans to add natural language into Tableau platform, helping more people interact with data naturally

PUBLISH DATE: AUGUST 9, 2017 - 12:30PM

SEATTLE, WA – August 9, 2017 – Tableau Software (NYSE: DATA) today announced it has acquired ClearGraph, a cutting edge Palo Alto startup that enables smart data discovery and data analysis through natural language query technology. Tableau plans to integrate ClearGraph's technology into Tableau's products, making it even easier for more people to interact with their data by using natural language to ask questions and search for insights.



## 2c. Publishing to Tableau Cloud – Ask Data

- **Ask Data (formerly Cleargraph)** is Tableau's natural-language interface for **Tableau Server and Tableau Online**
  - Only for “Creator” and “Explorer” user type, not “Viewer”
  - **Not available for Tableau Desktop**
- It works with any “live” online published data source
- “>” > Explore > Samples > **Superstore Datasource [this is the 3<sup>rd</sup> one]**

<https://interworks.com/blog/2020/06/22/using-tableaus-ask-data-for-self-service-analytics/>

<https://senturus.com/blog/tableaus-new-ask-data-feature-a-primer/>

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## 2c. Publishing to Tableau Cloud – Ask Data

The image shows two screenshots of the Tableau Cloud interface. The left screenshot displays the 'Explore' page with 'Top-Level Projects'. It features a sidebar with navigation links like Home, Explore, Favorites, Recents, Recommendations, External Assets, Users, Groups, Schedules, Jobs, Tasks, Site Status, and Settings. Two projects are listed: 'default' (the default project) and 'Samples'. The 'Samples' project is described as including automatically uploaded samples. A blue arrow points from the 'Samples' project towards the right screenshot. The right screenshot shows the 'Samples' project details page. It includes a sidebar with options like Home, Explore, Favorites, Recents, Recommendations, External Assets, Users, Groups, Schedules, Jobs, Tasks, Site Status, and Settings. The main content area shows three items: 'Regional' (a bar chart), 'Superstore' (a map visualization), and 'Live' (a data source card for 'Superstore Datasource' which connects to 'Sample - Superstore.xls' and is owned by Ken Wong). A yellow arrow highlights the 'Superstore' item.

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## 2c. Ask Me...

- What's the top shipping mode of technology? [Standard class]
- How many office supplies were shipped using same day service? [326]
- How many transactions in office supplies? [6026]
- How many transactions in office supplies in the West? [1897]
- How many transactions in office supplies in Los Angeles? [443]
- What's the sales revenue in office supplies in Los Angeles? [\$48,822]
- How many orders of furniture in 2016? [371]
- What's the total sales between May and July? [\$302,267]
- Andrew has purchased



## 2c. Publishing to Tableau Cloud – Ask Data

Type “**Most expensive sales**”

The screenshot shows the Tableau Cloud interface. On the left is a sidebar with navigation links like Home, Explore, Favorites, Recents, Recommendations, Users, Groups, Schedules, Jobs, Tasks, Site Status, and Settings. The main area is titled 'Superstore Datasource' and shows a search bar with 'most expensive sales' typed in. Below the search bar is a section titled 'Questions to Ask' with several options listed under 'Basic Data Analysis' such as 'sum of Sales', 'by State', 'Sales at least \$0.44', 'sort State in alphabetical order', and 'top State by count of Migrated Data (Count)'. At the bottom right of the main area are 'Feedback' and 'Usage Analytics' buttons.

The screenshot shows the Tableau Cloud interface with the search bar containing 'most expensive Sales'. The results pane on the right displays the value '\$22,638'. The sidebar on the left is identical to the one in the first screenshot.

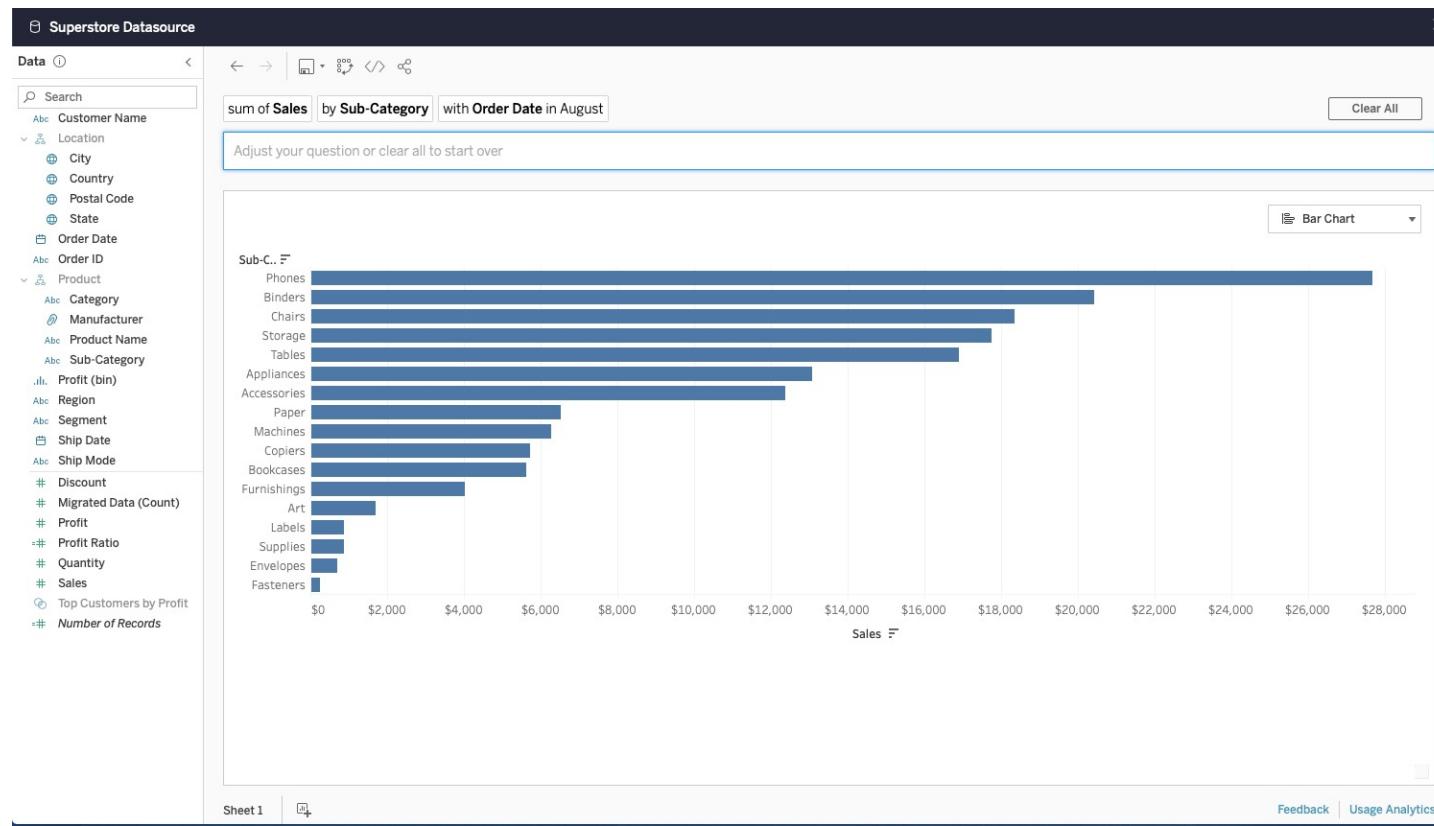


## 2c. Publishing to Tableau Cloud – Ask Data

- In the text box, do any of the following:
  - Change the viz type with phrasing like “**as a bar chart**”.
  - Add functions with phrasing like “**by country**” or “**in December**”.
  - Replace fields by typing “replace [existing field name] with [new field name]”
  - Remove fields by typing “remove [field name]”
  - Clear the viz by typing “reset” or “clear”.
- “Sum of sales by category”
- “Sum of sales by sub-category”
- “**Sum of sales by sub-category with order date in August**”
  - Change the chart type in the pull-down menu



## 2c. Publishing to Tableau Cloud – Ask Data



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## 2c. Publishing to Tableau Cloud – Ask Data

3<sup>rd</sup> party demo, same thing showing on a web site:

- [https://demo2.portals.interworks.com/page/ask-data-demo?user\\_id=1](https://demo2.portals.interworks.com/page/ask-data-demo?user_id=1)

<https://demo2.portals.interworks.com>

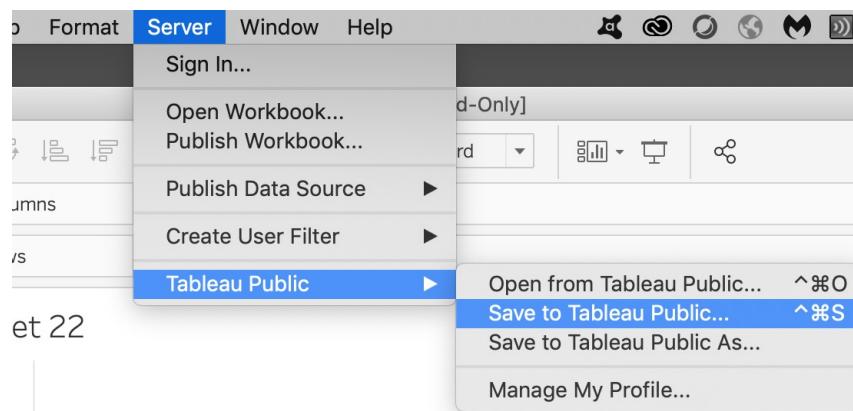
The screenshot shows the Tableau Ask Data interface. At the top, there's a navigation bar with the InterBurger logo, Home, Sales, Geos, Documents, Floor Plan, a search bar, and a 'Switch User Experience' button. Below the header, a title reads 'Tableau's Ask Data'. A descriptive text block explains that Ask Data is a user-friendly self-service experience using natural language to ask questions of data sources. It mentions that this demo uses the Daily Sales dataset from the InterBurger Dashboards. A text input field contains the query 'sum of Sales with Business Date in the last month and filter Destination to Drive-Thru'. To the right of the input field is a 'Clear All' button. On the left, a sidebar titled 'Data' lists various dimensions and measures, such as Area Leader Name, Business Date, City, Close Date, Country, District Name, Description, Distribution Center, District Leader Name, Fiscal Period Num, Fiscal Period Name, Fiscal Year Name, Fiscal Year Num, Franchisee Name, Franchisee or Corp..., Last Remodel Date, Location Text, Open Date, POS Num, POS System, Region Leader Name, Restaurant Hierarchy, STATE, DMA\_NAME, REGION, CITY, Zip, Restaurant Status, Restaurant Type, Street Address, Check Average, Check Growth %, Comp Avg %, Comp Trans %, CT Openings, and Drive Thru Lanes. At the bottom right, there's a 'Text Table' button, a 'Sheet 1' link, and a 'Learn more' button.

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## 2d. Publishing to Tableau Public

- In Tableau Desktop, Server menu > Save to Tableau Public...
- Log into Tableau Public



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## 2d. Publishing to Tableau Public

- Fun Stuff: Tableau Public Profile
- Sign up for a free Tableau Public account. Then, publish your work to it.
- Your viz is shown in your personal profile.
- “You favorite a viz by clicking the star icon” and to lists of authors you follow and those who follow you.



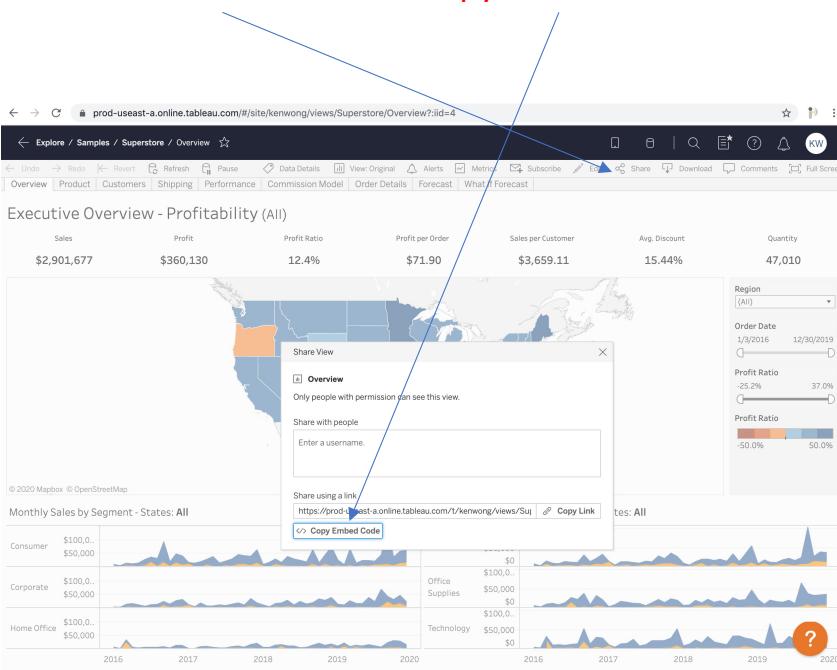
## 2e. Publishing to web and blogs: Web Embedding

- When published via Tableau Cloud, Tableau Server, or Tableau Public (but not Tableau Desktop), **visualizations can be embedded into websites and blogs with a few clicks.**
- Click the “Share” icon in Tableau Cloud/Server/Public, and the embed code will be shown. Copy and paste this HTML onto your site to show the viz.
- If possible, share dashboard, even if it’s just 1 sheet. This is because it helps responsive design for various device screen.



## 2e. Example of the embed HTML code

Share button > Copy Embed Code

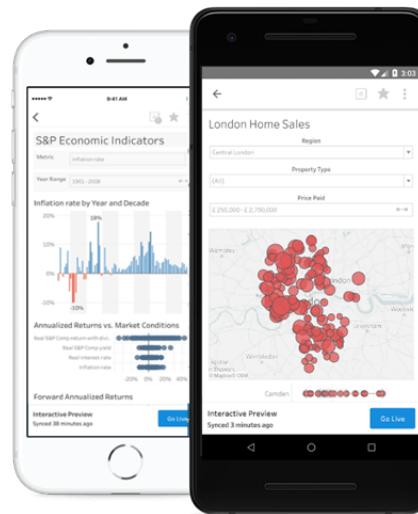


- ```
<script type='text/javascript'
src='https://prod-useast-
a.online.tableau.com/javascripts/api/viz_v1.j
s'></script><div class='tableauPlaceholder'
style='width: 1282px; height: 780px;'><object
class='tableauViz' width='1282' height='780'
style='display:none;'><param
name='host_url'
value='https%3A%2F%2Fprod-useast-
a.online.tableau.com%2F' /><param
name='embed_code_version' value='3' />
<param name='site_root'
value='&#47;t&#47;kenwong' /><param
name='name'
value='Superstore&#47;Overview' /><param
name='tabs' value='yes' /><param
name='toolbar' value='yes' /><param
name='showAppBanner' value='false'
/></object></div>
```



2f. Using Tableau Reader and Tableau Mobile app

- Tableau Reader
 - <https://www.tableau.com/products/reader/download>
- Tableau Mobile



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Assignments



Overview of Assignments



- A1: (Individual): Data-Driven Strategic Recommendations and Business Report **60%**
 - Mar 11, 11:59pm Boston Time



- A2: (Team): Visual Data Storytelling **30%**
 - Mar 7, 11:59pm Boston Time



- A3: (Individual): Tableau Chart Building Exercise **10%**
 - Mar 10, 11:59pm Boston Time



A1: (Individual): Data-Driven Strategic Recommendations and Business Report 60%



- Mar 11, 11:59pm Boston Time
- Let's assume that you're the marketing director of a company and would like to **spend some advertising dollars to boost the sales of those products that are not selling well**. The company just sold California's operation last week to its competitor, so you don't need to worry about that market.
- You need to deliver a presentation to your boss for the budget approval. Your boss is interested in knowing about the sales situation of the sub-category over the **most recent 24-month period** (according to the dataset).



A1: (Individual): Data-Driven Strategic Recommendations and Business Report 60%



- Use the “**Hult – Superstore.xlsx**” dataset to **build a 4-page story point (title page included, if applicable) using interactive dashboard** to show how sales in each sub-category are performing across the USA (except California), over the most recent 24-month period.
- These 4 pages should be linked together using the **story point** function.
- You are also required to **make use of at least 2 of the following actions** in your dashboard:
 1. Filter actions
 2. Highlight actions
 3. URL actions

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A1: (Individual): Data-Driven Strategic Recommendations and Business Report 60%



- In addition to publishing the interactive dashboard on Tableau Public for your boss to view (and submitting screenshots of each part to Canvas), you are also required to write a short business report for your boss to tell him/her which sub-category and which cities (or states) you are planning on spending most of your advertising budget.
- Length: 1,000-2,000 words.
- Significant marks will be deducted if you write less than 1000 words.
- **Failure to publish your dashboard on Tableau Public will result in a zero (F) grade for this deliverable, even if you have written the report.**
 - If you only publish individual charts and not a dashboard/story point, significant grades will be deducted because dashboard is a requirement for this assignment.



A1: (Individual): Data-Driven Strategic Recommendations and Business Report 60%



- General Dashboard Design
- Use of at least 2 actions in dashboard
- Story Point Function
- Story Business Report

Data-Driven Strategic Recommendations and Business Report						
Criteria	Ratings					Pts
General Dashboard Design	25 pts Excellent Dashboard is well designed with excellent combination of graphics and text.	18 pts Good Dashboard has good combination of graphs and text, with a few minor errors.	10 pts Satisfactory Some errors have been detected in the dashboard design. The choice of graphs and texts can be better.	5 pts Unsatisfactory Poor choice of graphs and text. The dashboard does not deliver message properly to the audience.	0 pts No Marks Wholly fails to demonstrate knowledge of a dashboard.	25 pts
Use of at least 2 actions in dashboard	25 pts Excellent Excellent use of 2 or more actions in the dashboard, with no errors.	18 pts Good Good use of 2 or more actions in the dashboard, with some minor errors.	10 pts Satisfactory Use of 2 or more actions in the dashboard, with some significant errors.	5 pts Unsatisfactory There is only one action in the dashboard and the choice of action can be better.	0 pts No Marks No action is being used in the dashboard.	25 pts
Story Point Function	25 pts Excellent Excellent use of the story point function. The slides were presented well in the right sequence.	18 pts Good Good use of the story point function. The sequence and content of the slides can still be improved.	10 pts Satisfactory There is evidence of the use of the story point function. The slide sequence should be improved and the content has some errors.	5 pts Unsatisfactory The story point function was used incorrectly, with confusing slide sequence and problematic content.	0 pts No Marks No story point function has been demonstrated in the published work.	25 pts
Story Business Report	25 pts Excellent Organized and well written. Presents an insightful and thorough analysis of all identified issues.	18 pts Good Organized and clearly written in most places. Presents a good analysis of most of the issues, but lacks depth in many areas.	10 pts Satisfactory Somewhat lacking in organization and clarity. Presents an adequate analysis of most of the issues, but lacks depth in many areas.	5 pts Satisfactory The report is poorly written. Present an incomplete analysis of some of the identified issues.	0 pts No Marks Analysis is missing or entirely inadequate.	25 pts



A2: (Group): Visual Data Storytelling 30%



- Mar 7, 11:59pm Boston Time
- The objective of this assignment is to help students master the concept of visual data storytelling through the analysis of a dataset.
- In this assignment, the dataset comes from the Office for Diversity, Inclusion, and Belonging at Harvard University. The office surveyed **3 major groups of community members**, namely (i) Academic/Faculty, (ii) Staff, and (iii) Students. The purpose of this survey was to measure their perception about inclusion and belonging at Harvard.
- The survey asked approximately 20,600 community members to indicate their agreements on **9 different statements (questions)**. The dataset is attached. [pilot_pulse_survey_ib_data_tables.xlsx](#)



A2: (Group): Visual Data Storytelling 30%



1. I feel like I belong at Harvard.
2. My relationships at Harvard are as satisfying as I would want them to be.
3. I feel like I can be my authentic self at Harvard.
4. The academic/professional goals I have for myself are being met at Harvard.
5. I know what constitutes good performance in my role.
6. I receive meaningful recognition for doing good work.
7. I feel comfortable expressing my opinions to others at Harvard.
8. I believe Harvard leadership will take appropriate action in response to incidents of harassment and discrimination.
9. I have the skills to address hostile behavior that I witness.



A2: (Group): Visual Data Storytelling 30%



- Let's assume that you're the prime for this project at the Office for Diversity, Inclusion, and Belonging. **You're invited to the President's Office at Harvard to give a 15-minute presentation on the key findings of this survey.** The senior academic administrative team is interested in identifying the specific demographic groups that gave **low scores** on the survey, so that the university can use such insights to guide their future priorities, programs, policies, and procedures.

DO NOT CREATE A POWERPOINT FILE. Please publish your work on Tableau Public.

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A2: (Group): Visual Data Storytelling 30%



- In this assignment, each team is required to perform the following tasks with this dataset:
 - Get rid of irrelevant data.
 - Prepare data to make it Tableau-friendly.
 - Visualize data using relevant charts.
 - Analyze these charts to generate insights.
 - Create a Tableau “presentation” (10 pages max, including the cover page, if applicable) using a combination of charts, dashboards, and story points. Then, publish it on Tableau Public.
 - Students should demonstrate their understanding of the storytelling process when preparing this 15-minute presentation.
 - Deliver the presentation in class on Session 7.

¹

DO NOT CREATE A POWERPOINT FILE. Please publish your work on Tableau Public.

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A2: (Group): Visual Data Storytelling 30%



- In addition to publishing the data on Tableau Public, each team should also submit to Canvas a MSWord (or PDF) file that includes (i) the **URL of their Tableau Public site** and (ii) **screenshots** of these presentation pages for auditing/grading purpose.
- No written narrative or explanation is required in this file.



A2: (Group): Visual Data Storytelling 30%



- Composition
- Subject Knowledge
- Analysis

Team Deliverable					
Criteria	Ratings				
	30 pts Excellent	25 pts Good	20 pts Satisfactory	15 pts Unsatisfactory	0 pts No Marks
Deliverable Composition	Organized and well written. Underlying logic is clearly articulated and easy to follow. Words expressed the intended meaning and supported reader comprehension. Sentences were grammatical with few spelling errors.	Organized and clearly written in most places. In some areas, the logic and flow of ideas is difficult to follow. Sentences were mostly grammatical and only a few spelling errors were present but did not hinder the reader.	Somewhat lacking in organization and clarity, making the logic and flow of ideas difficult to follow. Sentences include grammatical and spelling errors that occasionally hinder the reader.	The reader had to make considerable effort to understand logic and flow of ideas due to the grammatical and spelling errors.	The deliverable was largely unintelligible due to the flow of logic, grammar, and/or spelling.
Deliverable Subject Knowledge	Deliverable demonstrated knowledge of course content, and integrated many major and minor concepts. There is evidence of extensive research and depth of thinking about the topic.	Deliverable demonstrated knowledge of course content, integrated major concepts, and demonstrated evidence of some research and thinking about the topic.	Deliverable partially demonstrated knowledge of course content, partially integrated major concepts, and demonstrated limited evidence of some research and thinking about the topic.	Deliverables struggle to demonstrate knowledge of course content and concepts that could be shown through evidence, research or original thinking about the topic.	Wholly fails to demonstrate knowledge of course content and concepts.
Deliverable Analysis	Presents an insightful and thorough analysis of all identified issues. Includes all necessary evidence and/or calculations.	Presents a good analysis of most of the issues, but lacks depth in some areas. Is missing some necessary evidence and/or calculations.	Presents an adequate analysis of most of the issues, but lacks depth in many areas. Is missing some necessary evidence and/or calculations.	Presents an incomplete analysis of some of the identified issues. Omits necessary evidence and/or calculations.	Analysis is missing or entirely inadequate.
Total Points: 100					



A3: (Individual): Tableau Chart Building 10%

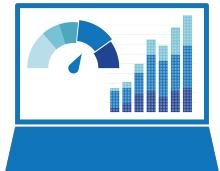


- Mar 10, 11:59pm Boston Time

1. Use the “Hult – Cellphone Brand.xlsx” file to create a **word cloud** graphic to show the phone brands that are used by the 100 employees in the company. Each word should be shown in different color and BOLD.
2. Use the “Hult – Superstore.xlsx” file to create a **line chart** that includes a “2-year forecast” of sales. [Y-axis: “Sales”; X-axis: “Month of Order Date”]
3. Use the “Hult – Superstore.xlsx” file to create a **scatterplot** that includes 5 clusters. [Y-axis: “Profit”; X-axis: “Sales”]
4. Use the “Hult – Superstore.xlsx” file to create a **dual axis map** that combines a filled map (showing “Profits”) and a pie chart map (showing revenue and the 3 categories: Furniture, Office Supplies, and Technology).
5. Use the “Hult – Superstore.xlsx” file to create a **waterfall chart**. [Y-axis: Running Sum of Sales; X-axis: Sub-Category]. The bars should be moving upwards to the right just like my example.



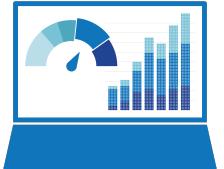
A3: (Individual): Tableau Chart Building 10%



6. Use the “Hult – Superstore.xlsx” file to create **highlight table** that includes a white border around each cell. The cells should be in yellow (or Orange-Gold) color and the text should be shown in Brown color. [Y-axis: Sub-Category; X-axis: Order Date].
7. Use the “Hult – Superstore.xlsx” file to create a **donut chart**, showing the ship mode on the outer arc together with the percentage of total sales revenue right next to each segment. In the middle of the donut chart, it should show the total sales revenue figure.
8. Use the “Hult – Superstore.xlsx” file to create a **box-and-whisker plot**. [Y-axis: Sales; X-axis: Sub-category]. I need to see the dots in light green color in the background.
9. Use the “Hult – Gantt Chart.xlsx” file to create a **Gantt chart**, in which the first column displays “Task”, the 2nd column displays “Employee”, and that there is a reference line of “May 30, 2020” in the chart. The date “May 30, 2020” has to be displayed next to the reference line.
10. Use the “Hult – Linkert Restaurant” file to create a **Likert scale chart**. The Y-axis should show the 5 survey statements. Also, you must display the Gantt Percent on the X-axis, with the value -100% showing clearly on the left and 100% on the right of the X-axis.



A3: (Individual): Tableau Chart Building 10%



Important notes:

1. Publish the charts on your Tableau Public Profile, this is a requirement.
You'll receive a zero if you don't publish your charts online.
2. You also do a screen capture of each chart and paste it onto a MSWord or PDF file, and then upload it to Canvas for auditing purpose.
3. In this MSWord or PDF file, you list your Tableau Public URL at the beginning of the file. **Failure to include this link in your file will result in 1 level grade reduction.**
4. There are 10 graphs that you need to draw in this A3 assignment. Each graph is worth 10 points for a total of 100 points.



A3: (Individual): Tableau Chart Building 10%

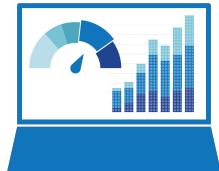


Tableau Chart Building Exercise



Criteria	Ratings												Pts
	100 pts 10 graphs plotted correctly	90 pts 9 graphs plotted correctly	80 pts 8 graphs plotted correctly	70 pts 7 graphs plotted correctly	60 pts 6 graphs plotted correctly	50 pts 5 graphs plotted correctly	40 pts 4 graphs plotted correctly	30 pts 3 graphs plotted correctly	20 pts 2 graphs plotted correctly	10 pts 1 graph plotted correctly	0 pts 0 graphs plotted correctly		
General Data Visualization Design	Data visualization is well designed with excellent combination of graphs and text.	Data visualization is well designed with excellent combination of graphs and text, with a few minor errors.	Data visualization has good combination of graphs and text, with a few minor errors.	Data visualization has good combination of graphs and text, with a few minor errors.	Data visualization design. The choice of graphs and text can be better.	Data visualization design. The choice of graphs and text can be better.	Data visualization design. The choice of graphs and text can be better.	Data visualization design. The choice of graphs and text can be better.	Data visualization design. The choice of graphs and text can be better.	Data visualization design. The choice of graphs and text can be better.	Data visualization design. The choice of graphs and text can be better.	100 pts	

Total Points: 100



Presentria.com

Language
English ▾

 Presentria

Session Number (Required) _____

Student ID (Optional) _____

Student Name (Optional) _____

Remember my student ID and student name

JOIN

Tableau Knowledge and Class Attendance

Thank You

