

Introduction to Business Analytics: Communicating with Data

Module 3

Professor Kevin Hartman

In This Module

Module 3: Your Guide to Creating Visualizations

Key Concepts

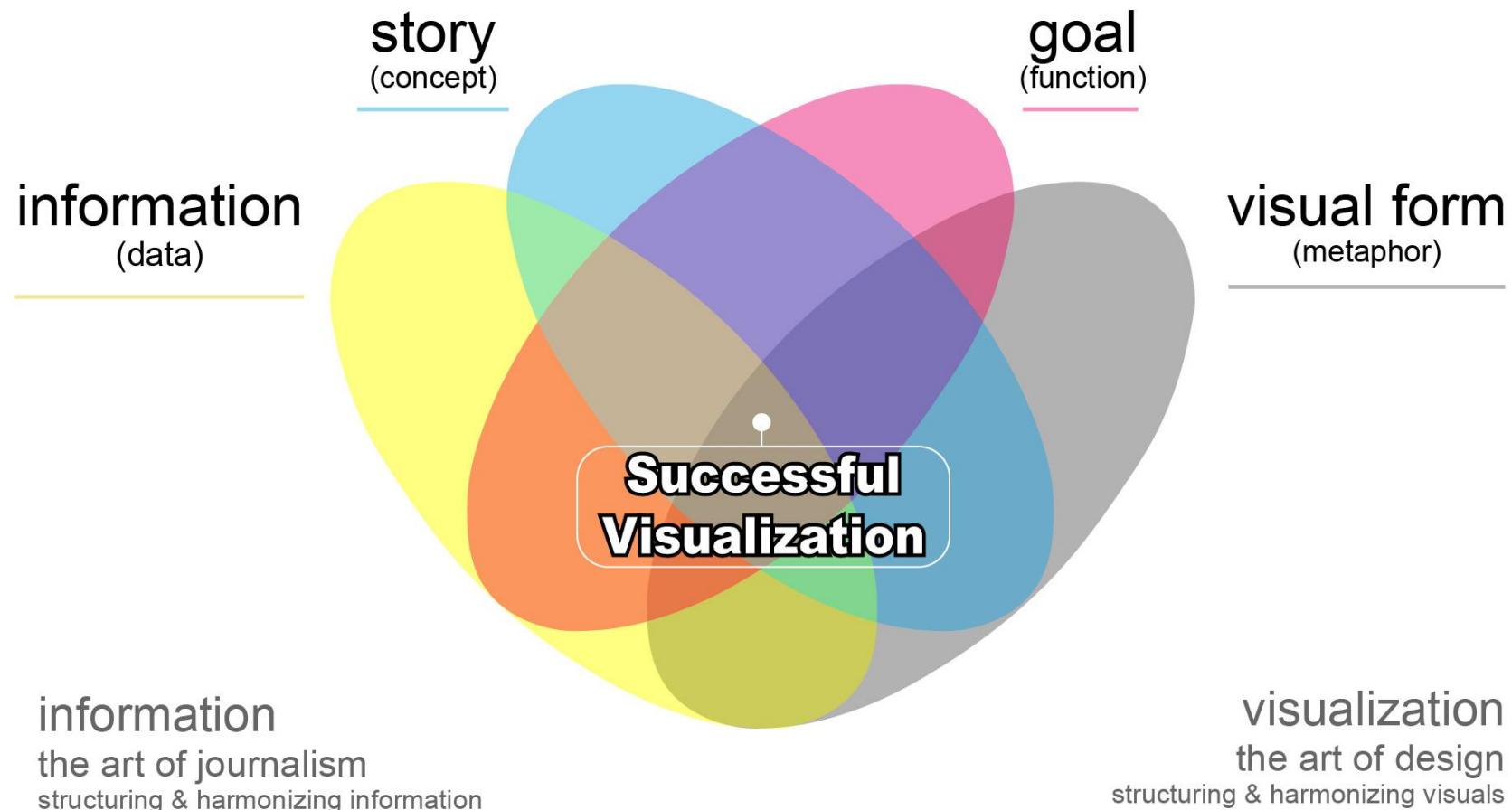
Finding patterns in data

Being planful when creating dataviz

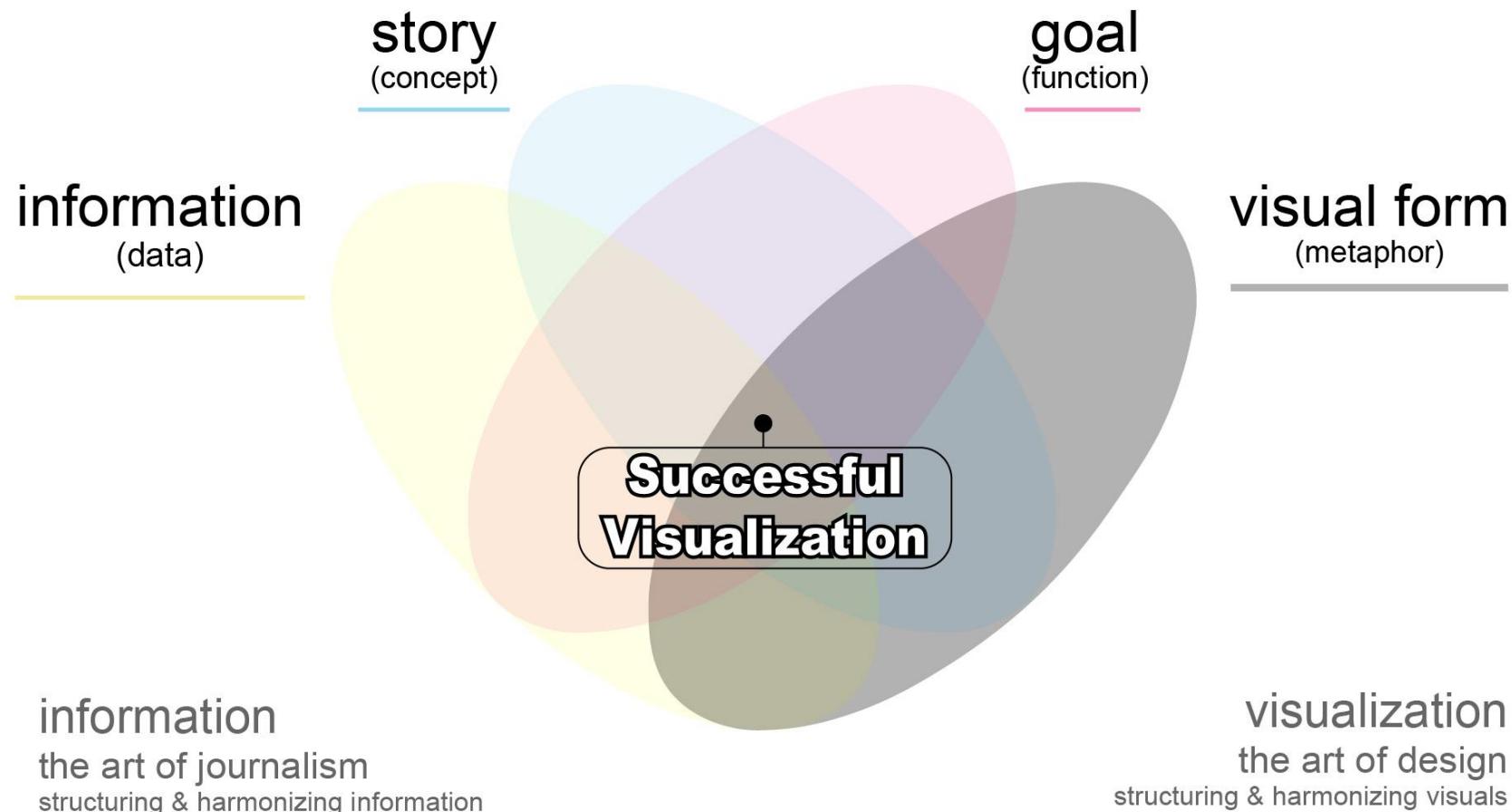
Understanding the components of visual form

Creating inviting dataviz

McCandless Offers a Thorough Definition of Good Data Stories



McCandless Offers a Thorough Definition of Good Data Stories

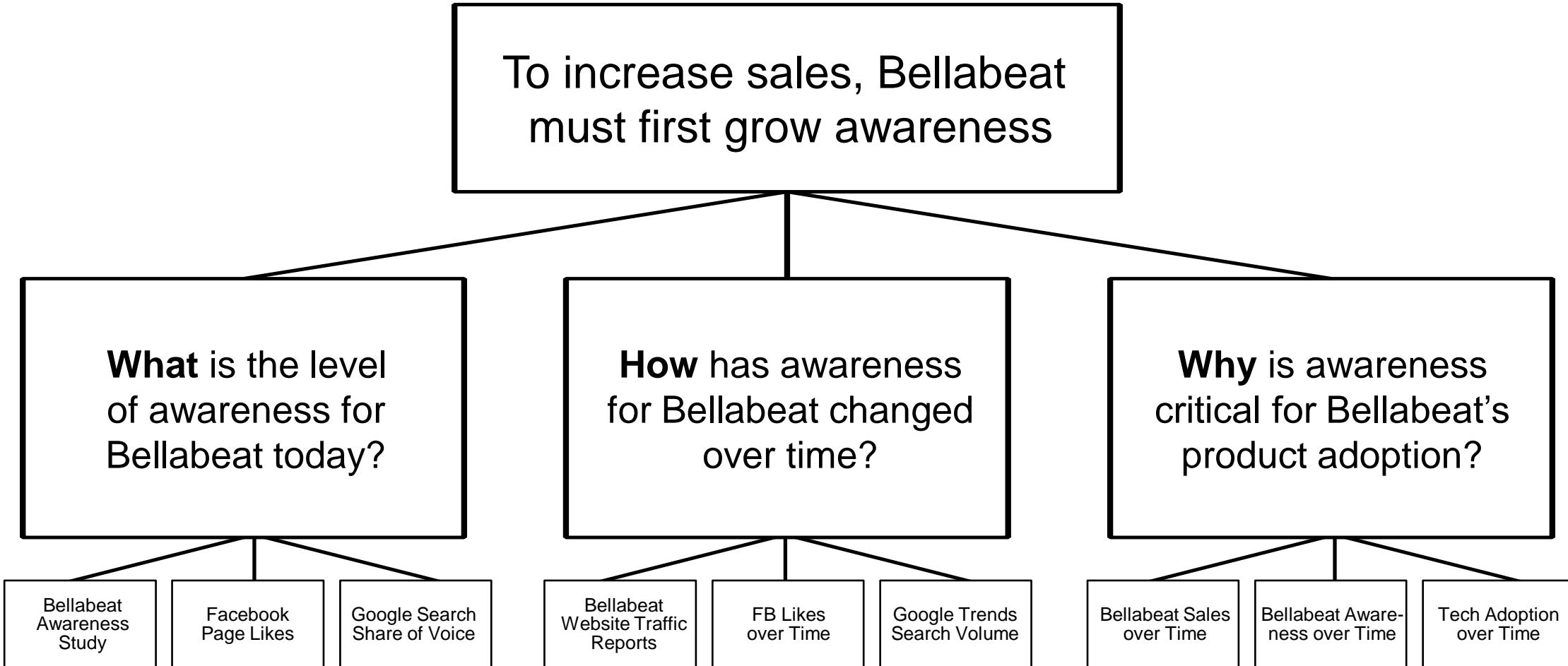


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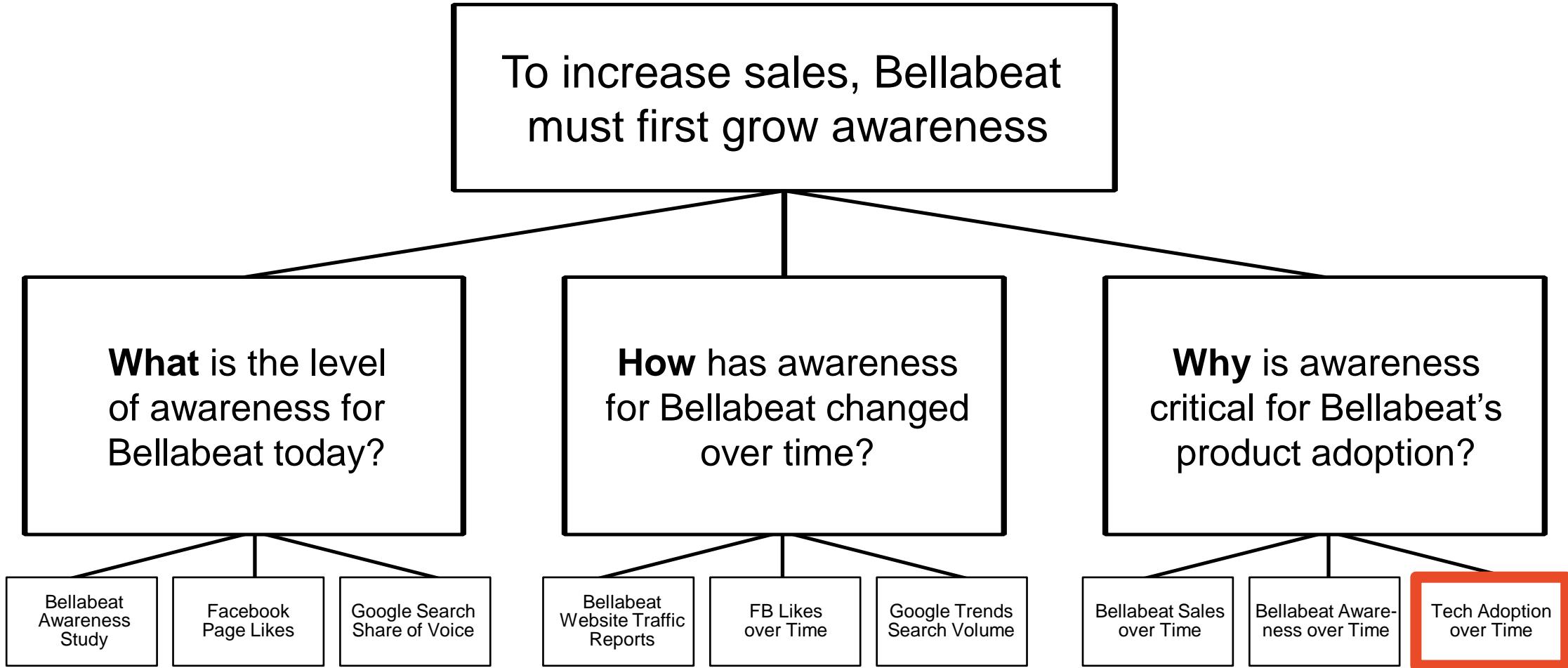
Applying Minto's Ideas to Data Pursuit Ensures a Sound Approach

I



Applying Minto's Ideas to Data Pursuit Ensures a Sound Approach

I



A photograph of several students sitting on a bench in a hallway, looking at their notebooks and smiling. One student in the foreground is holding a blue folder labeled 'Biology'. The background shows other students and architectural details like columns and doors.

Module 3 Lesson 1

Finding Patterns in Data

Finding Patterns in Data

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Visualizing data can unlock insights previously unseen, but the approach you select must match your meaning

Analyzing Data Effectively Begins with Understanding

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Conceptual or data-driven?

Focus Conceptual
Ideas

Data-driven
Statistics

Goals Simplify, teach: "Here's how our organization is structured"

Inform, enlighten: "Here are our revenues for the past two years"

Declarative or exploratory?

Focus Declarative
Documenting,
designing

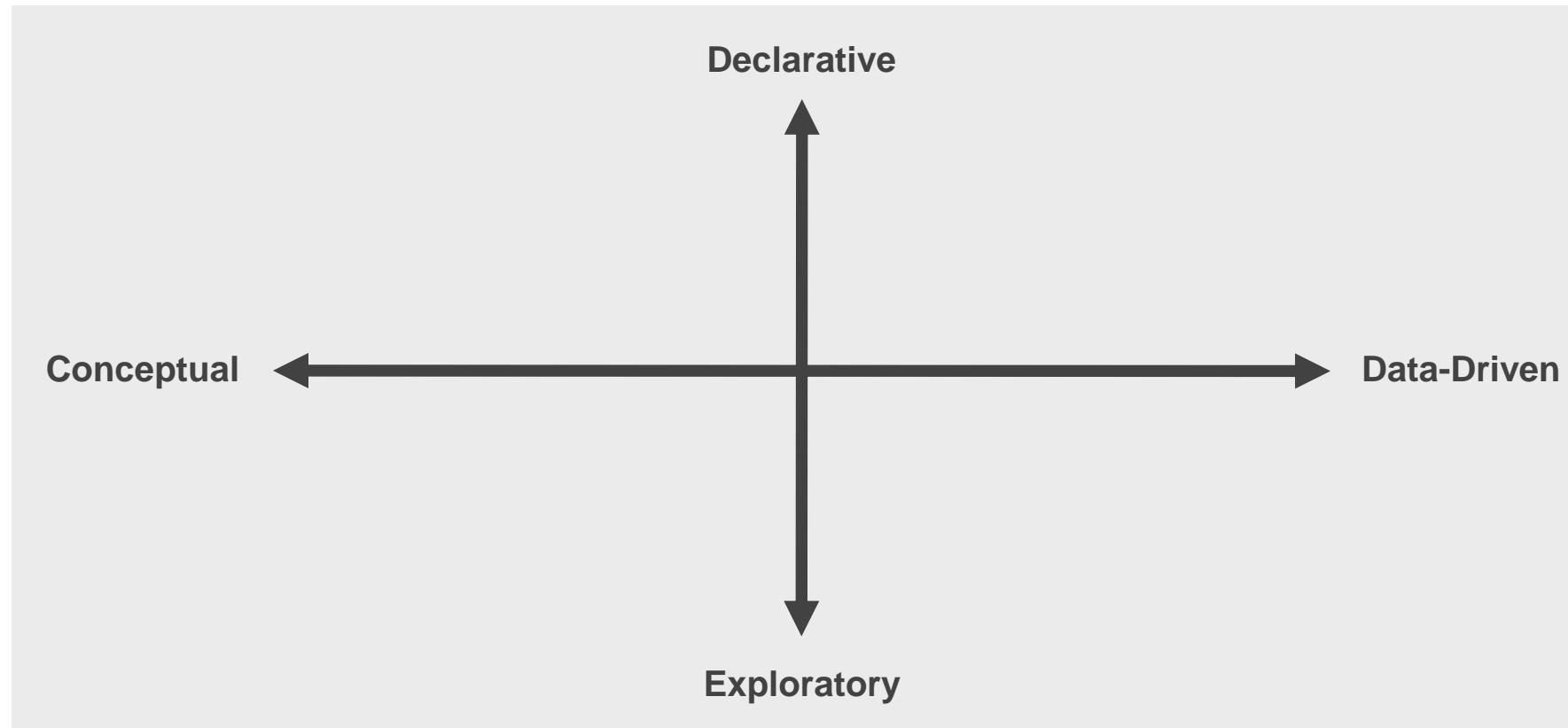
Goals Affirm: "Here is our search spend over the past five years"

Exploratory
Prototyping, iterating,
interacting, automating

Discover: "What would we see if we visualized customer purchases by gender?"

Your dataviz nature and purpose are framed well on a 2 x 2

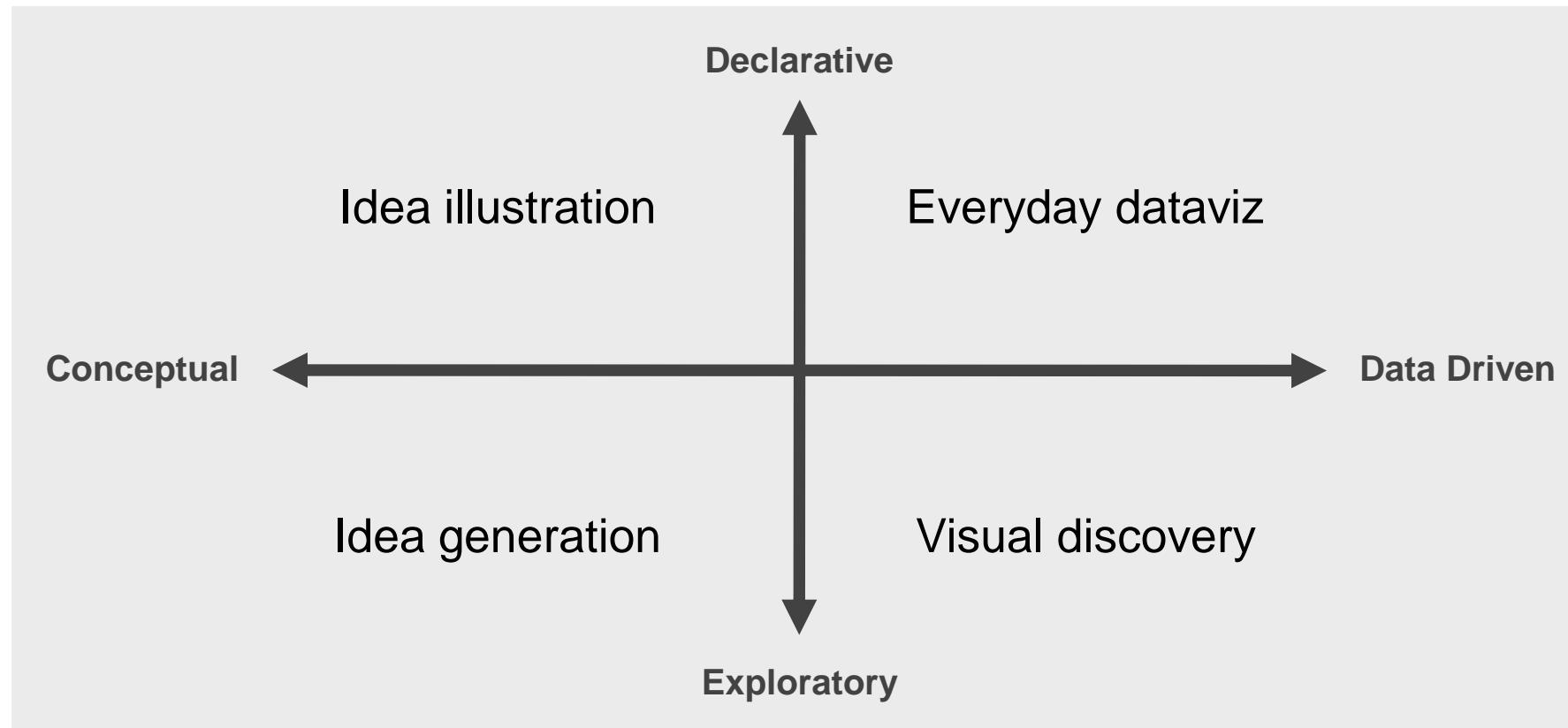
The four types of charts



Source: Adapted from Scott Berinato, "Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations."

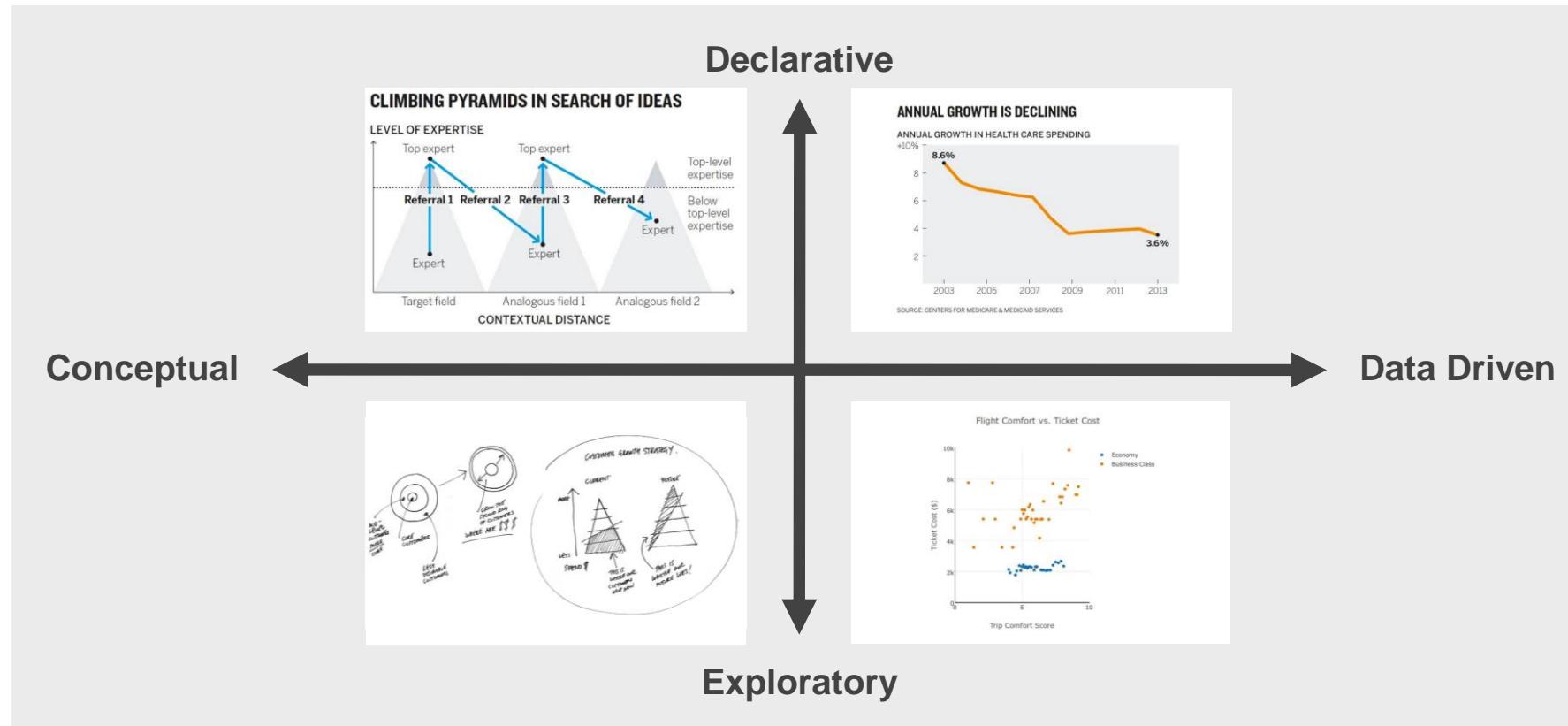
Each quadrant requires different forms of visualization

The four types of charts



Data storytelling is best done when charts are involved

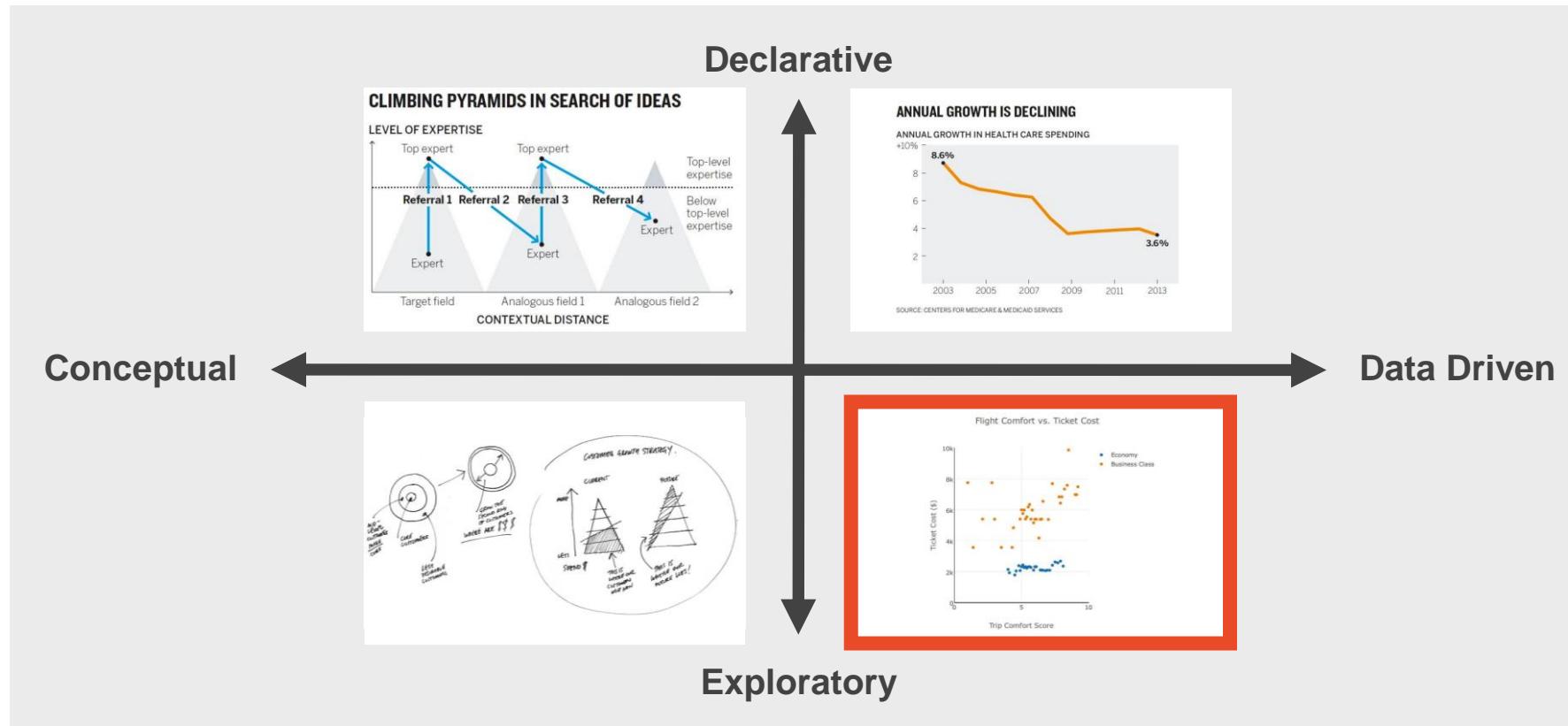
The four types of charts



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Data storytelling is best done when charts are involved

The four types of charts



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Meaningful Patterns in Data-Driven Charts Take Many Forms

Change: The trend or instance of observations becoming different over time

Clustering: Collection of data points with similar values

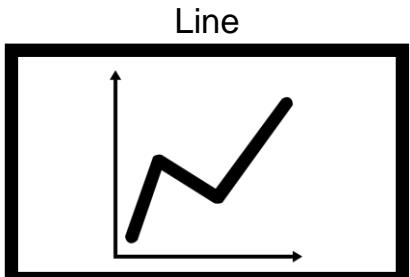
Relativity: Observations considered in relation or in proportion to something else

Ranking: A position in a scale of achievement or status

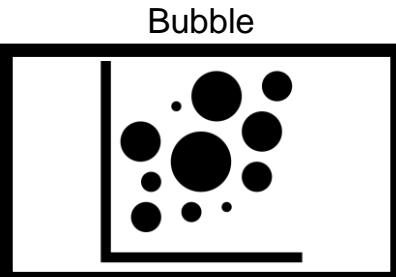
Correlation: A mutual relationship or connection between two or more things

Specific Visualizations Best Express Data-Driven Patterns

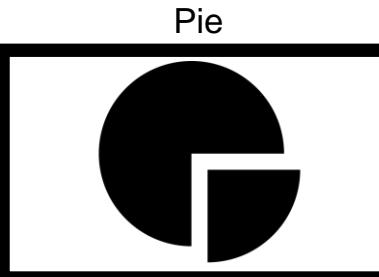
Change



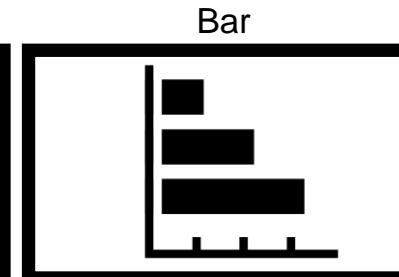
Clustering



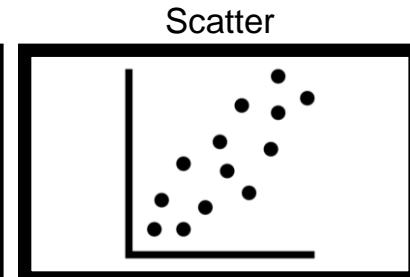
Relativity



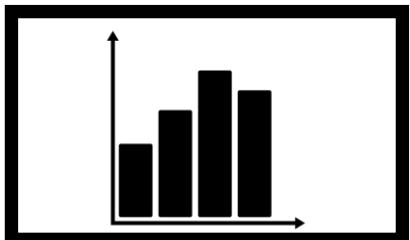
Ranking



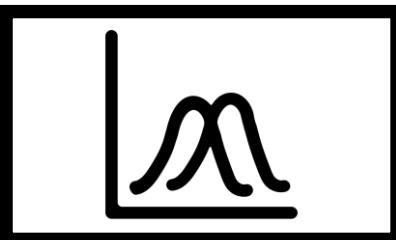
Correlation



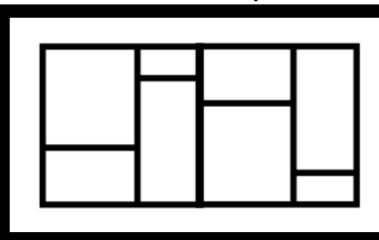
Column



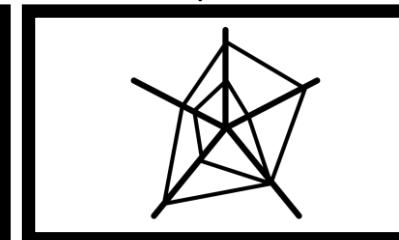
Distribution



Tree Map



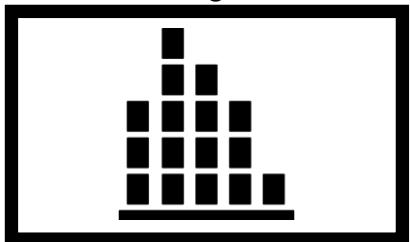
Spider



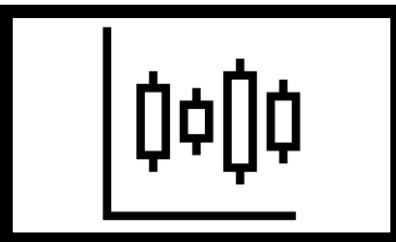
Regression



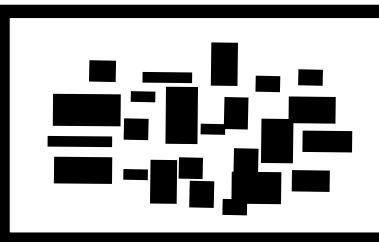
Histogram



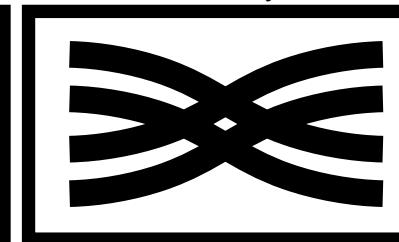
Candlestick



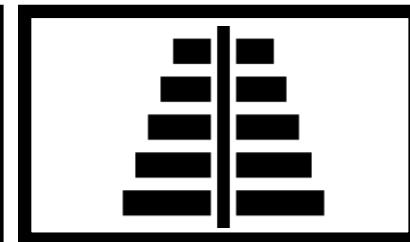
Word Cloud



Sankey



Double Bar



Visuals Aid in the Communication of Conceptual Ideas

I

Description: An account of an object or observation that aids in furthering understanding

Classification: A sort of something according to qualities or characteristics it shares with others

Visuals Aid in the Communication of Conceptual Ideas

I

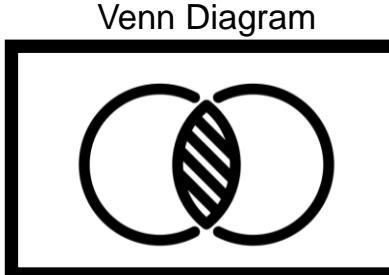
Structure: The arrangement of and relations between parts or elements of something complex

Evaluation: A judgment about the amount, number, or value of something

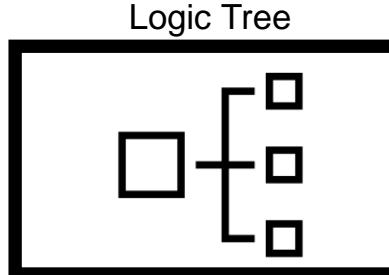
Process: A series of actions or steps taken in order to achieve a particular end

Conceptual Ideas Come to Life via Effective Visualization

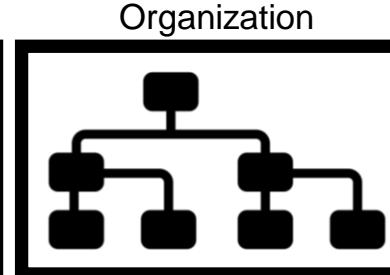
Description



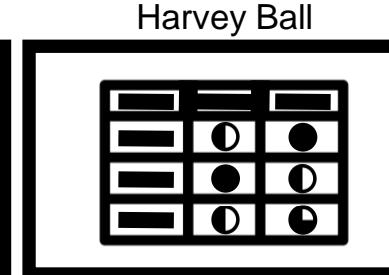
Classification



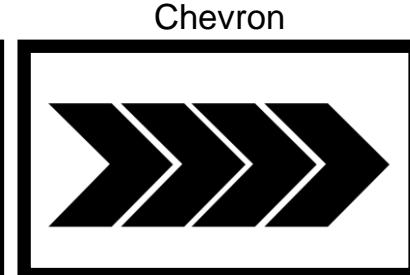
Structure



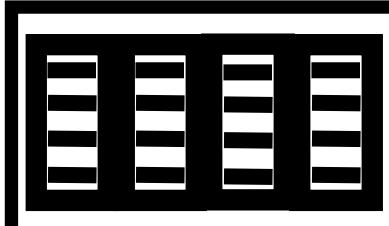
Evaluation



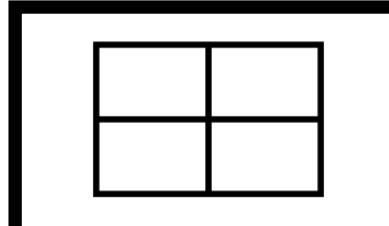
Process



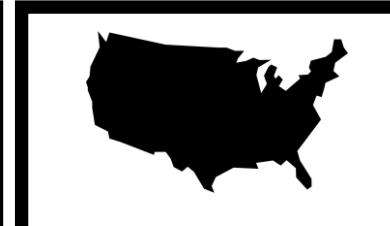
Inductive Diagram



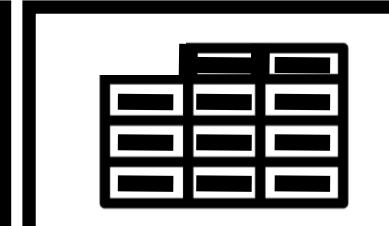
2 x 2 Matrix



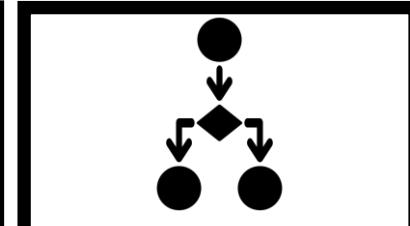
Map



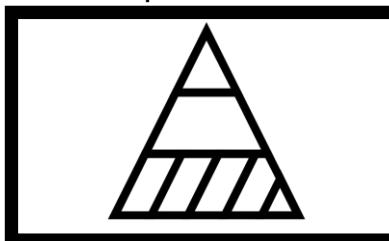
Comparison Matrix



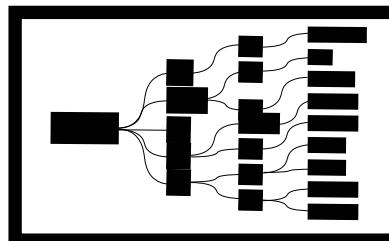
Flow



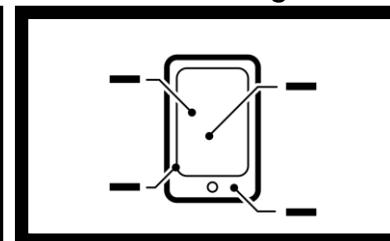
Conceptual Structure



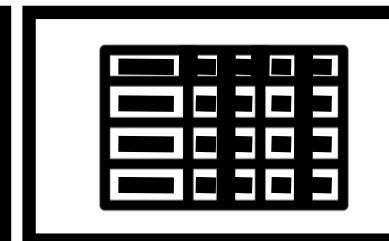
Word Tree



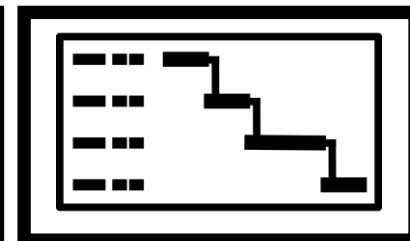
Labeled Diagram



Score Card



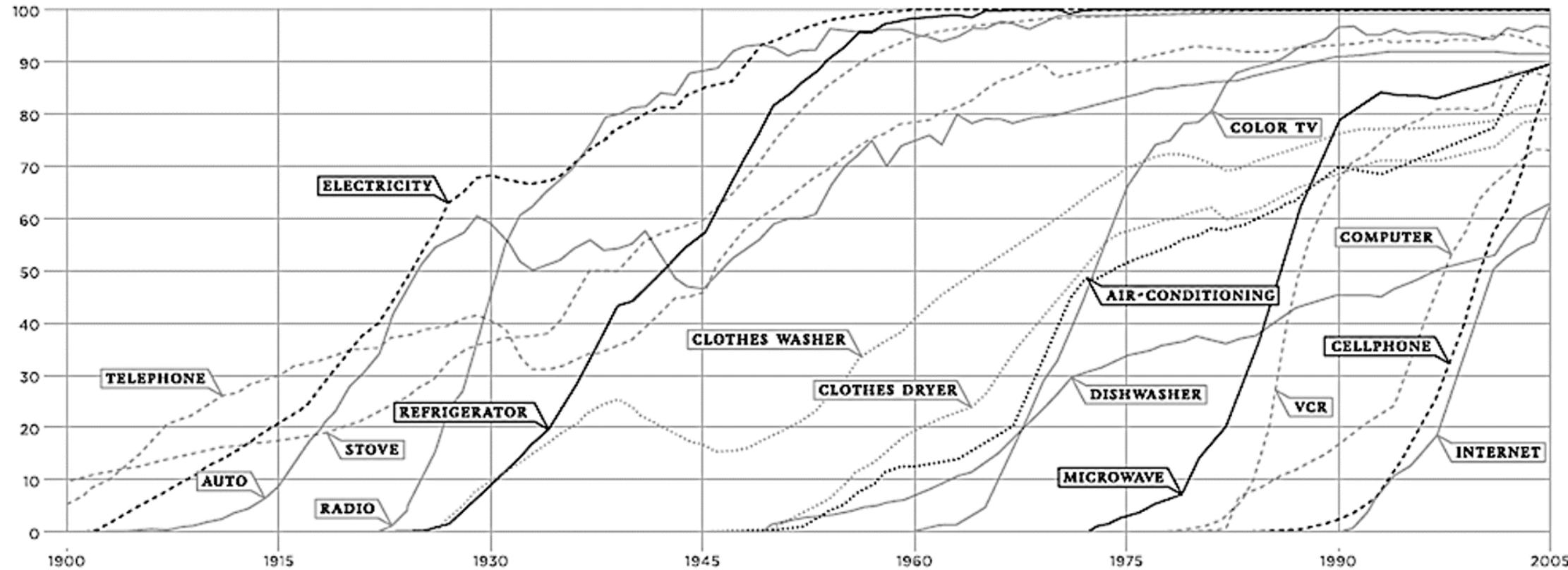
Gantt



bellabeat



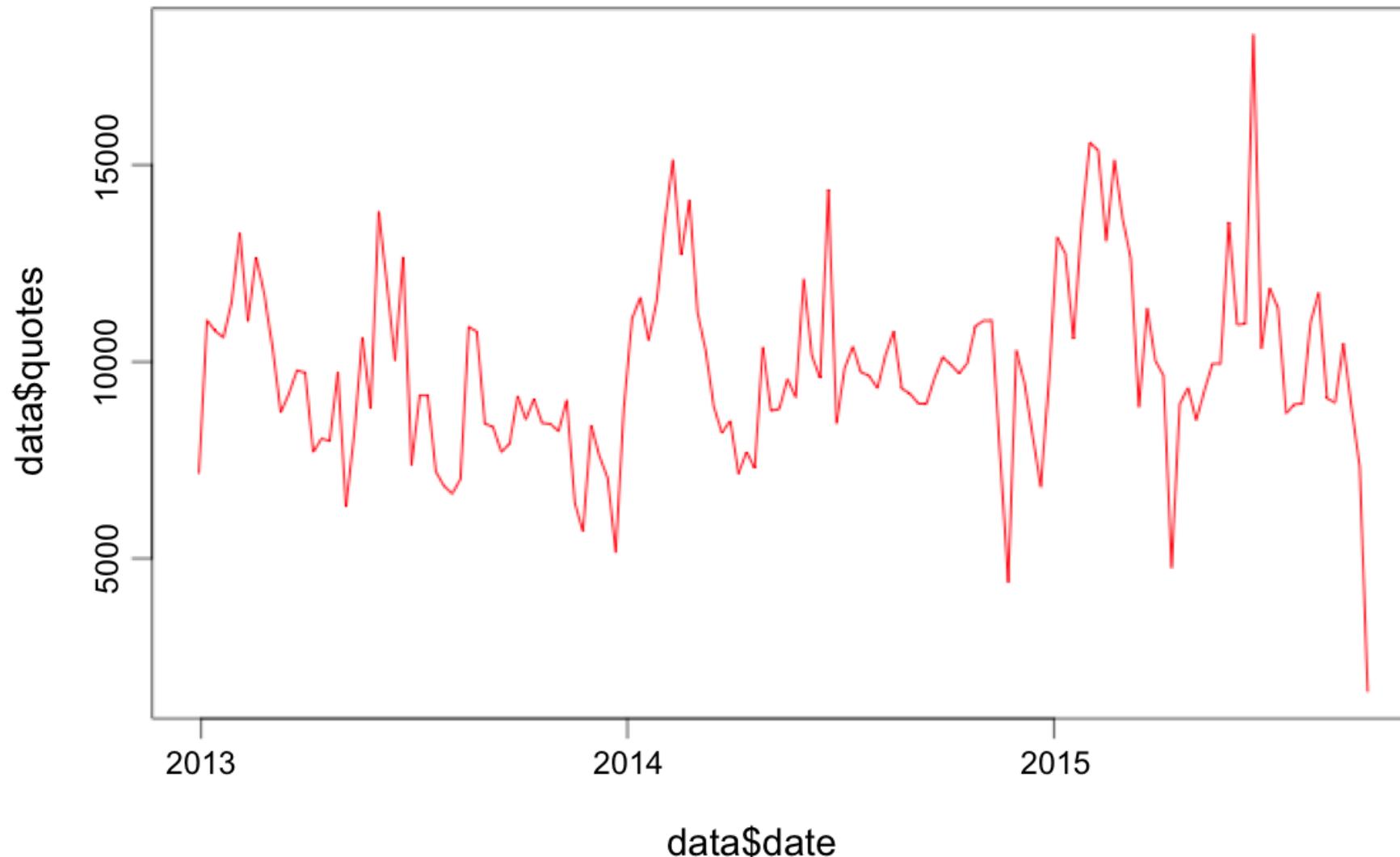
PERCENT OF
U.S. HOUSEHOLDS



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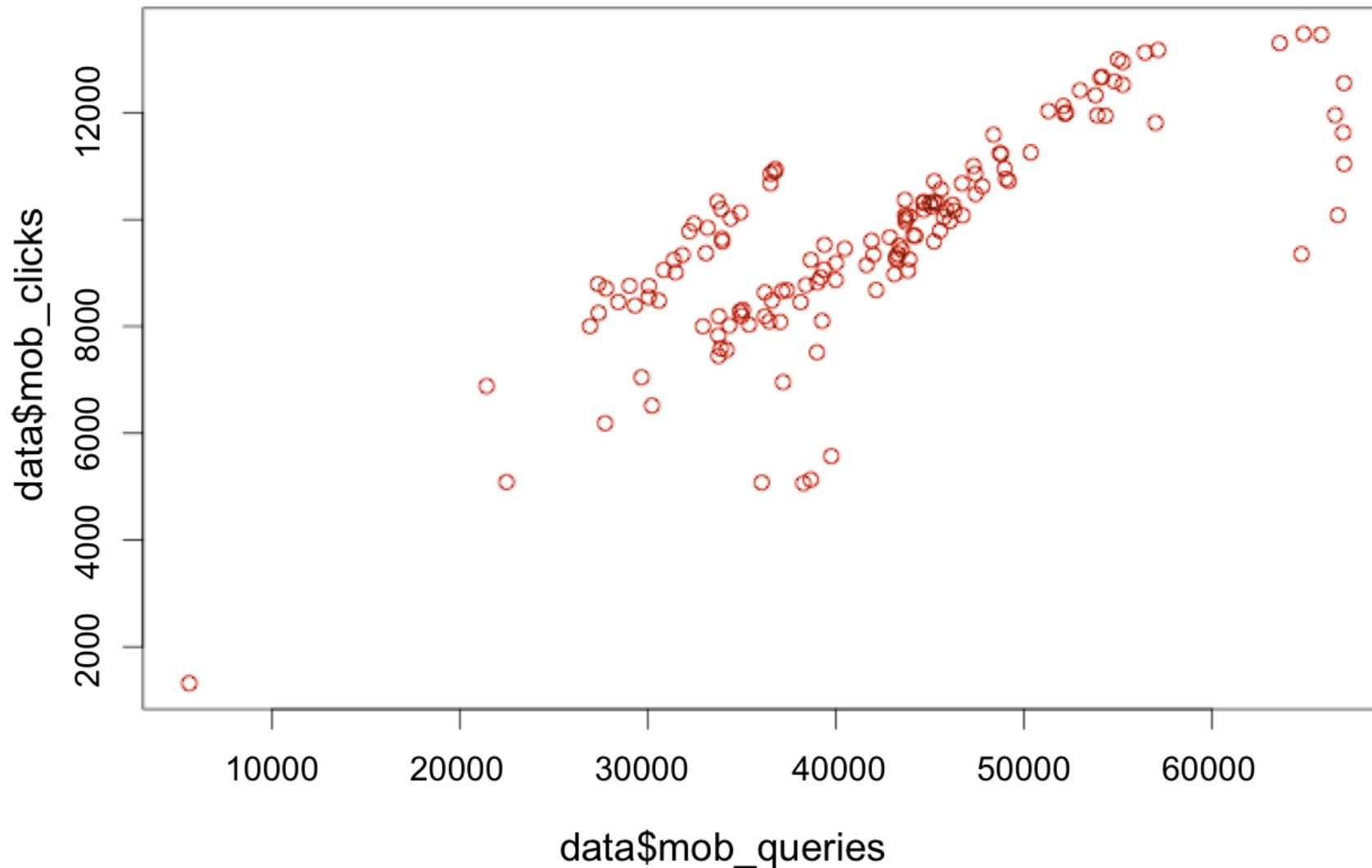
Plot — Time Series

I



Plot — Relationship

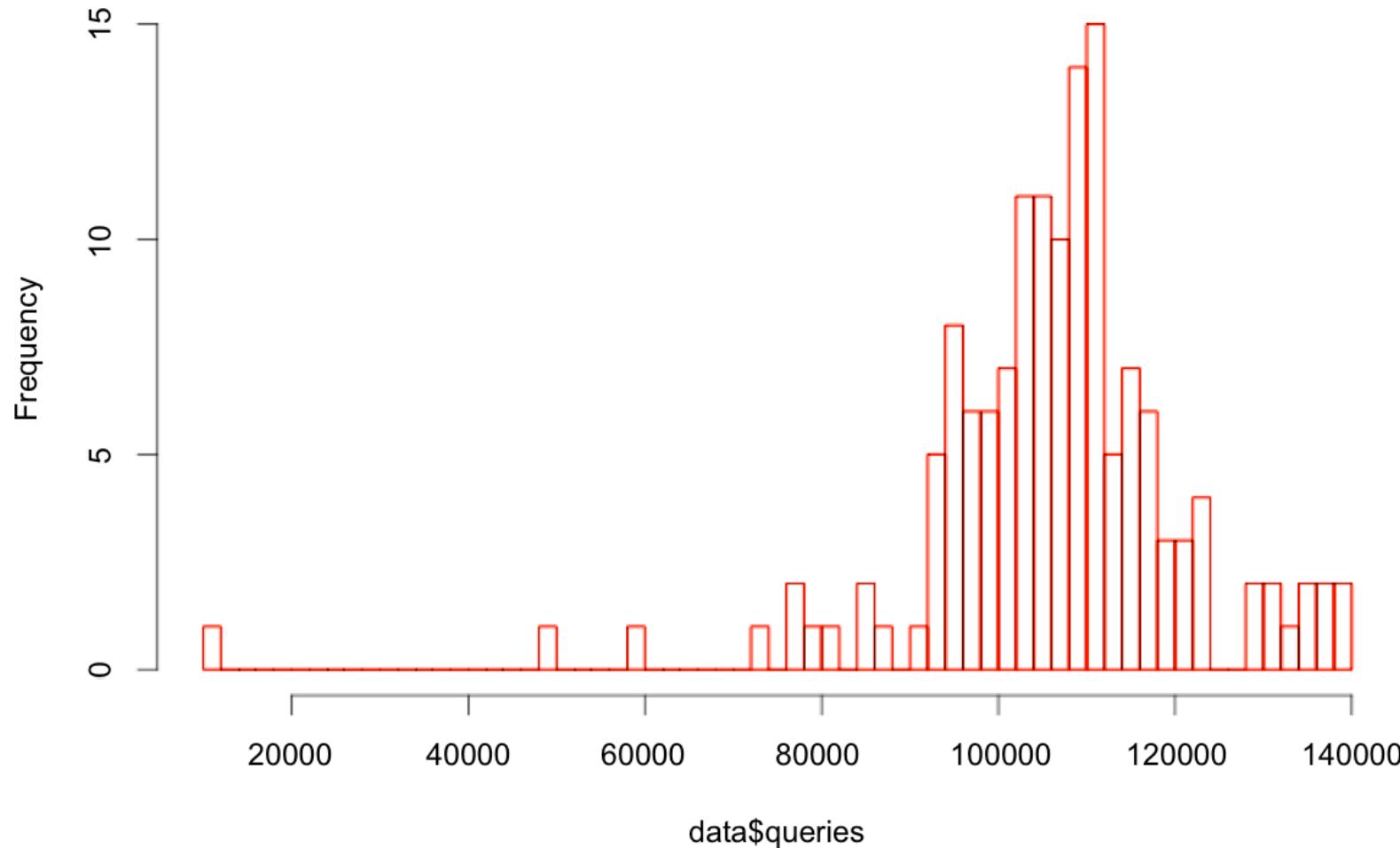
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Histograms

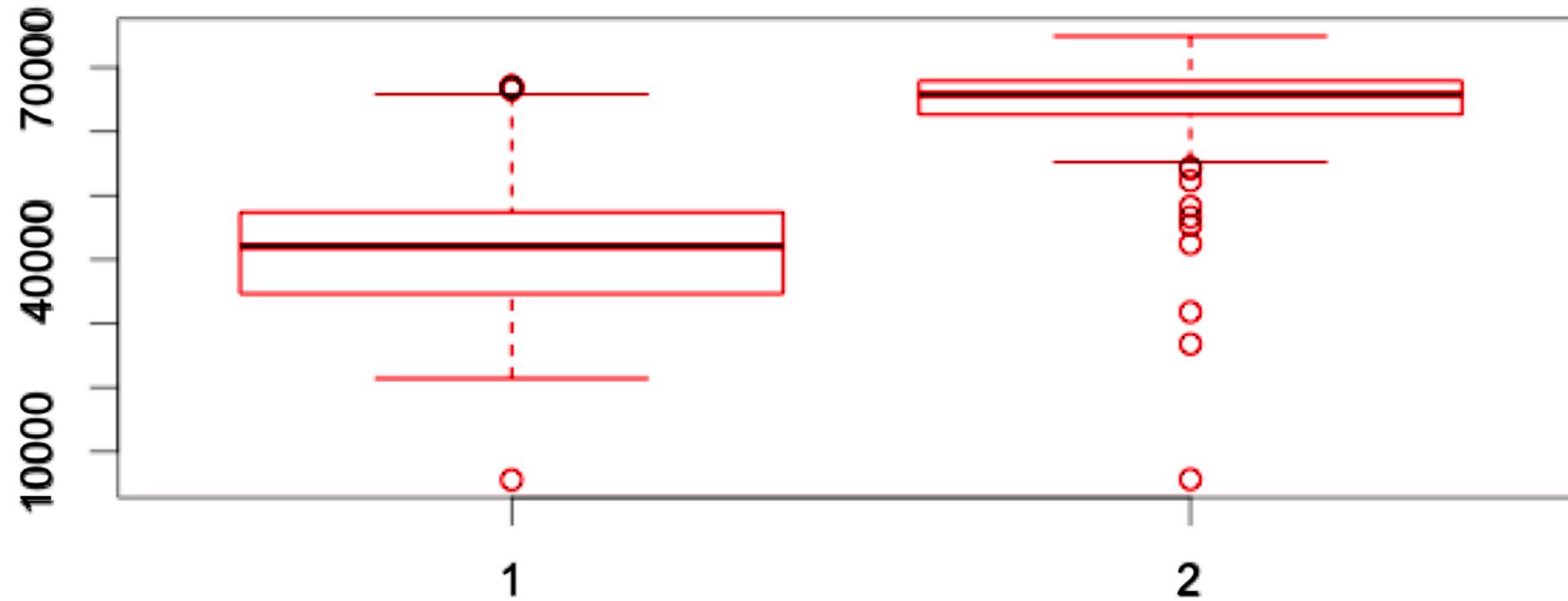
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Histogram of data\$queries

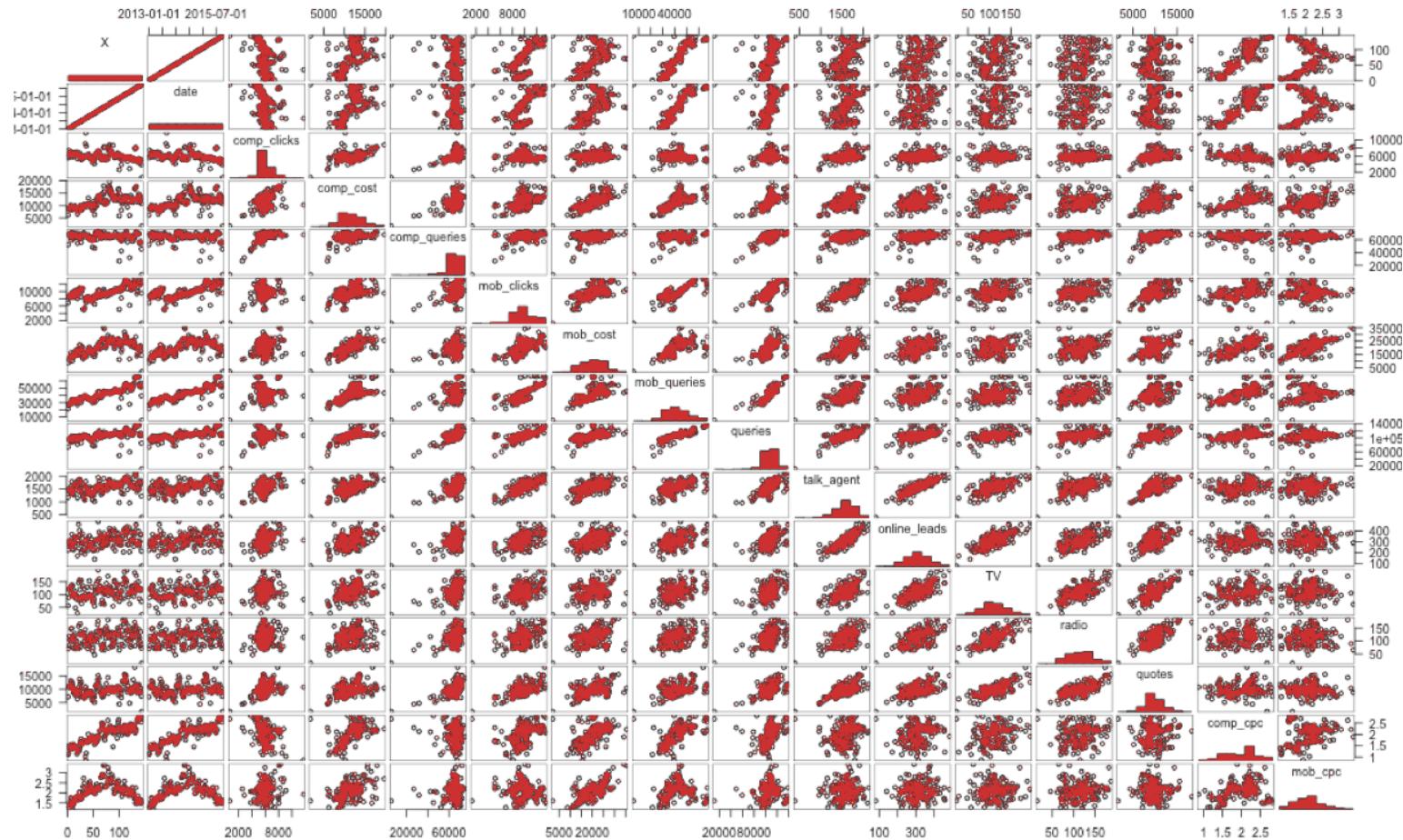


Boxplot

I



Bonus: Package Gpairs (the power of R)



Use Visualization to Reveal Patterns and Stories in Data

Understand the analysis situation you face: Conceptual or data driven? Declarative or exploratory?

Choose the visualization technique that will most effectively illuminate the pattern you seek

Use a tool that efficiently creates the visualization you need

Calibrate the amount of chart polish you apply to where you are on your communication journey

References

Felton, N. (2008). *How Americans Spend Their Money* [Online image]. Retrieved from <https://goo.gl/vNNdYH>

The background of the slide features a photograph of several students in a hallway. In the foreground, two female students are sitting on a bench, looking at a yellow notebook together and smiling. Behind them, two other students are seated, one looking at a laptop and the other looking down. The hallway has white walls and doors. A blue banner with white text is overlaid on the bottom half of the image.

Module 3 Lesson 2

Being Planful When Creating Dataviz

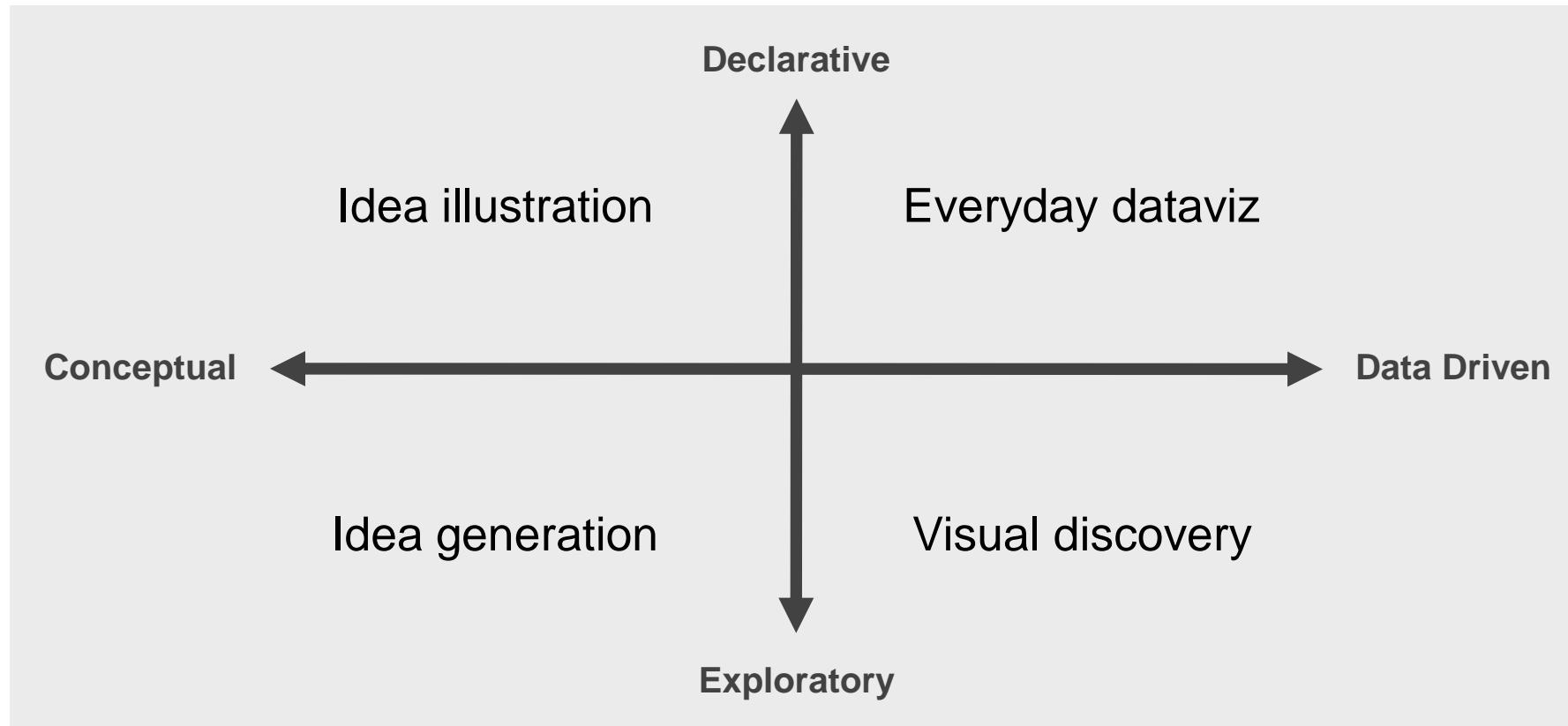
Being Planful When Creating Dataviz

Planning the approach to dataviz,
with careful attention to each phase,
will save time and improve the end
product

Each Quadrant Requires Different Forms of Visualization

I

The four types of charts

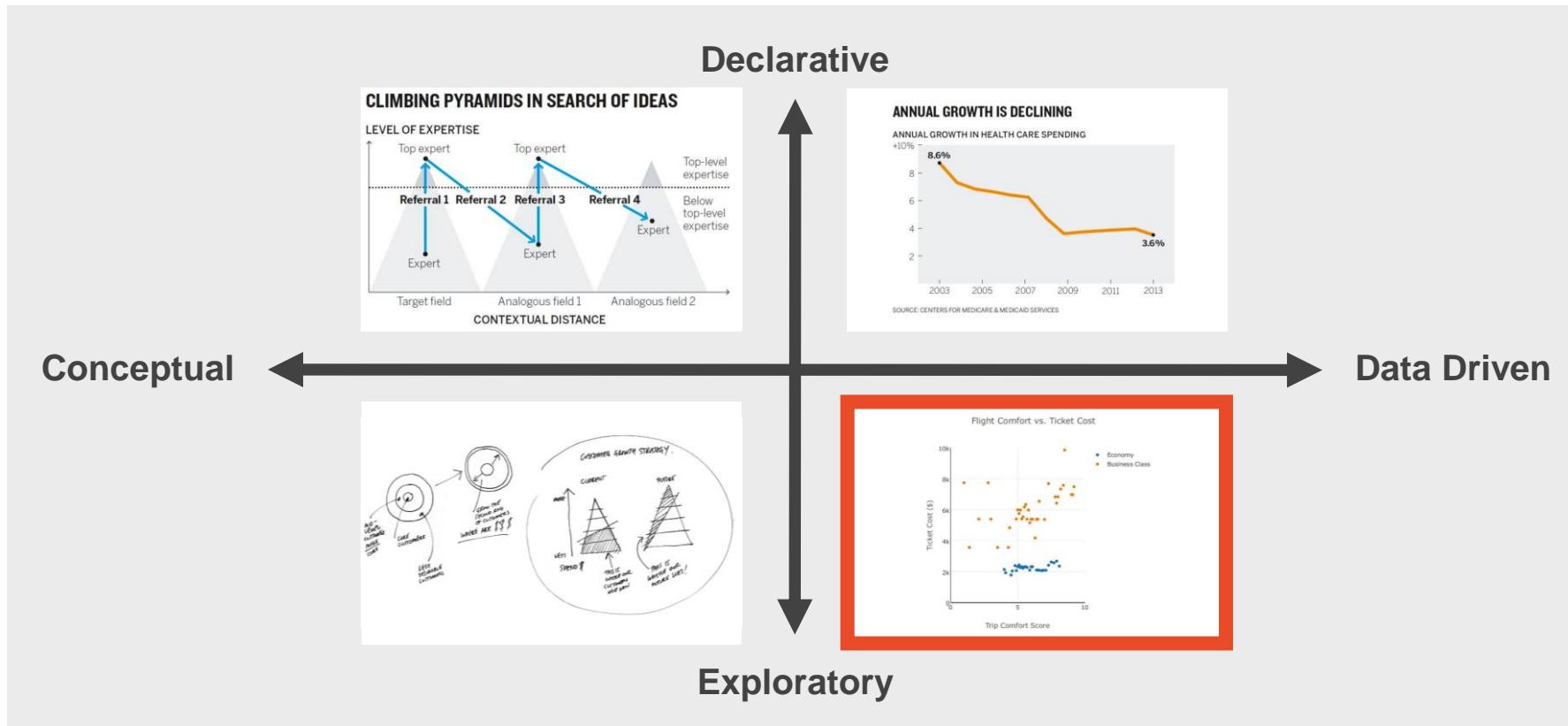


Source: Adapted from Scott Berinato, "Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations."

Data Storytelling Is Best Done When Charts Are Involved

I

The four types of charts

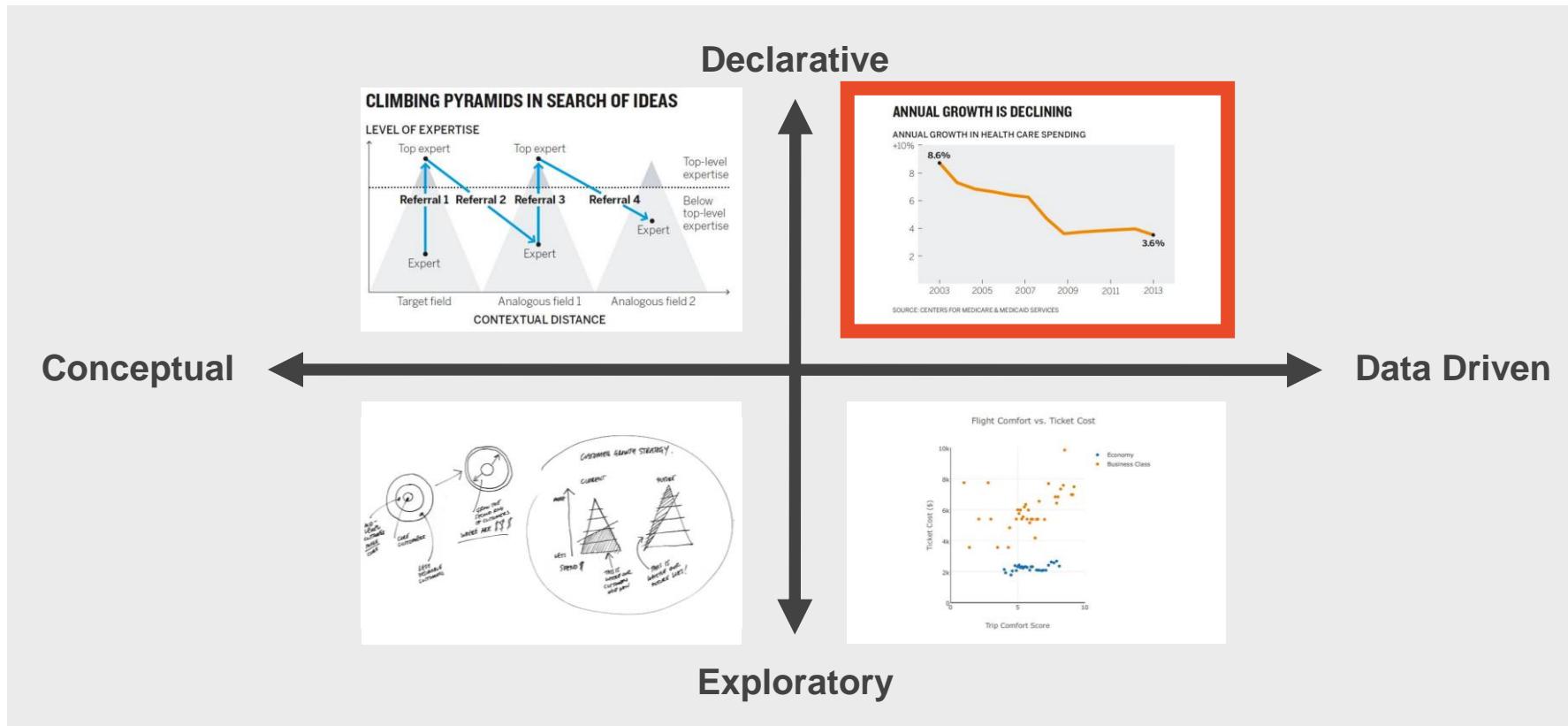


Source: Adapted from Scott Berinato, "Good Charts: The HBR Guide to Making Smarter, More Persuasive Data Visualizations."

Data Storytelling Is Best Done When Charts Are Involved

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The four types of charts



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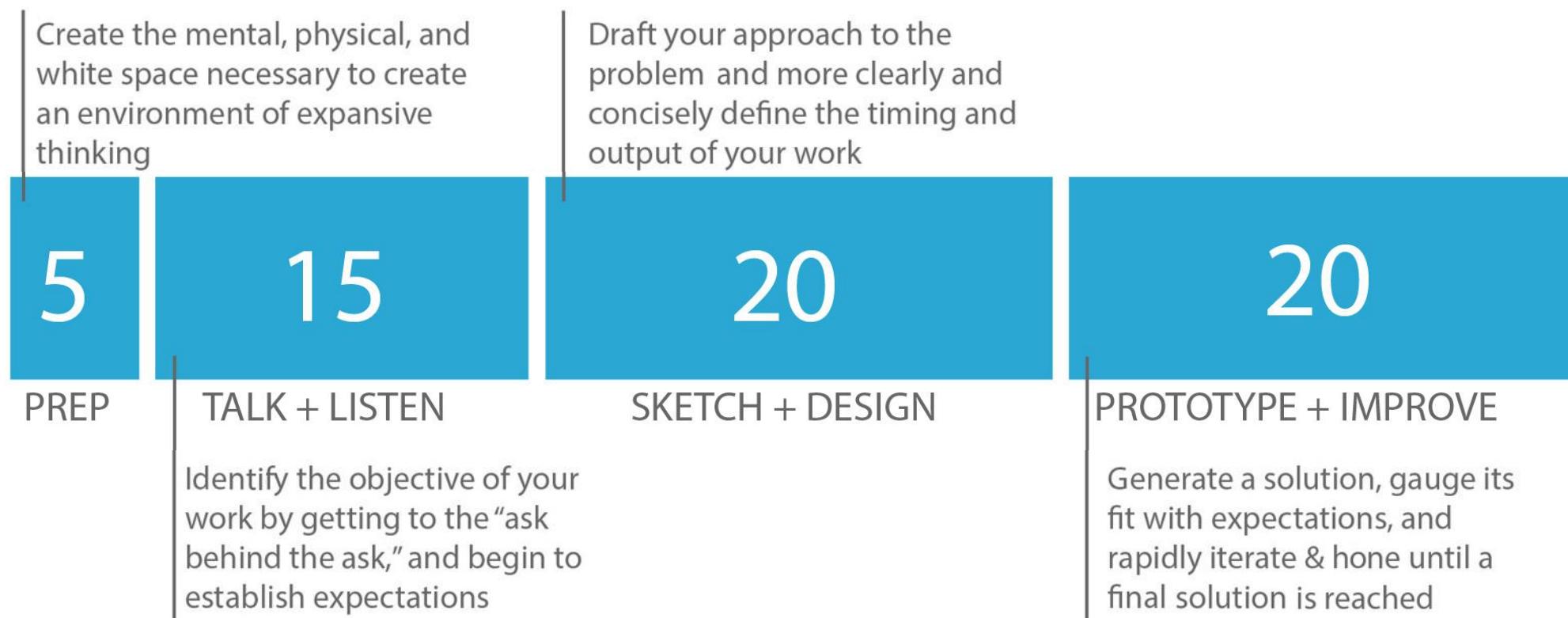
Thorough Process Is an Antidote to Auto- Generated Charts

Minutes spent on each task



Each Step Is Necessary to Producing High Quality Dataviz

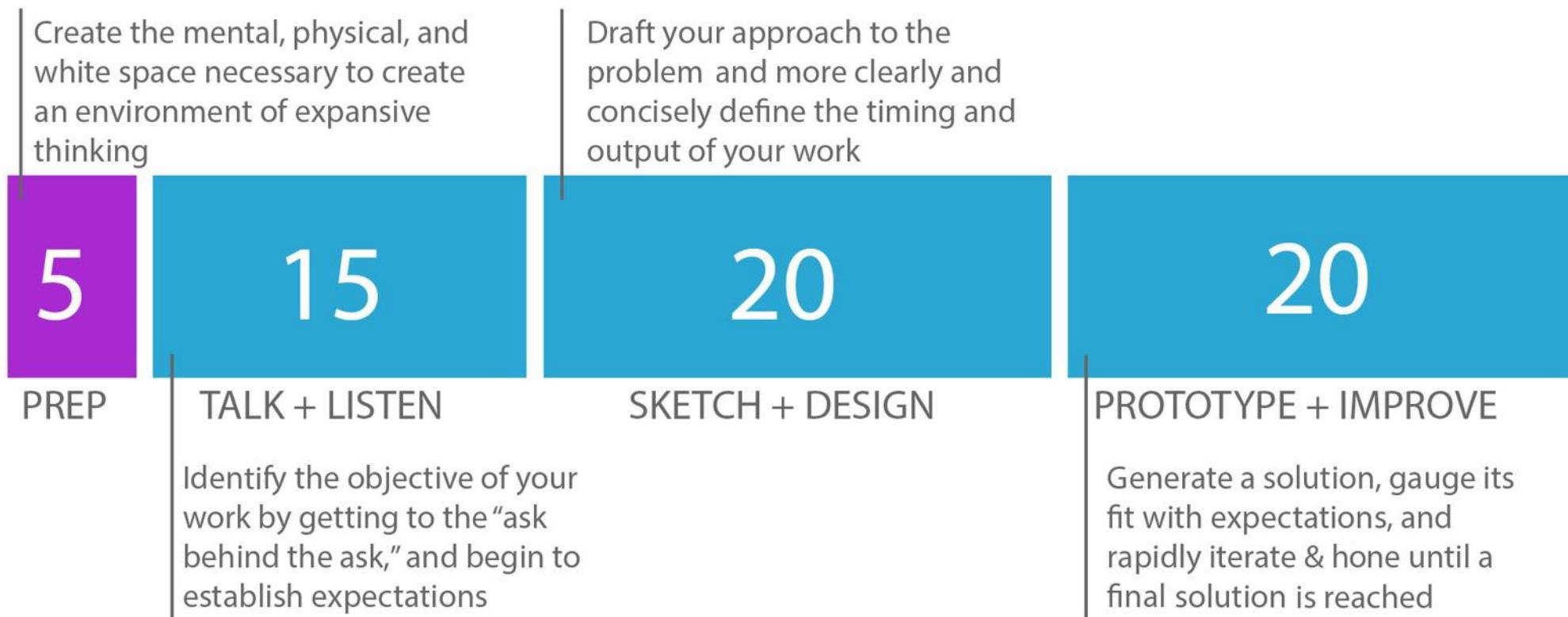
Minutes spent on each task



Each Step Is Necessary to Producing High Quality Dataviz

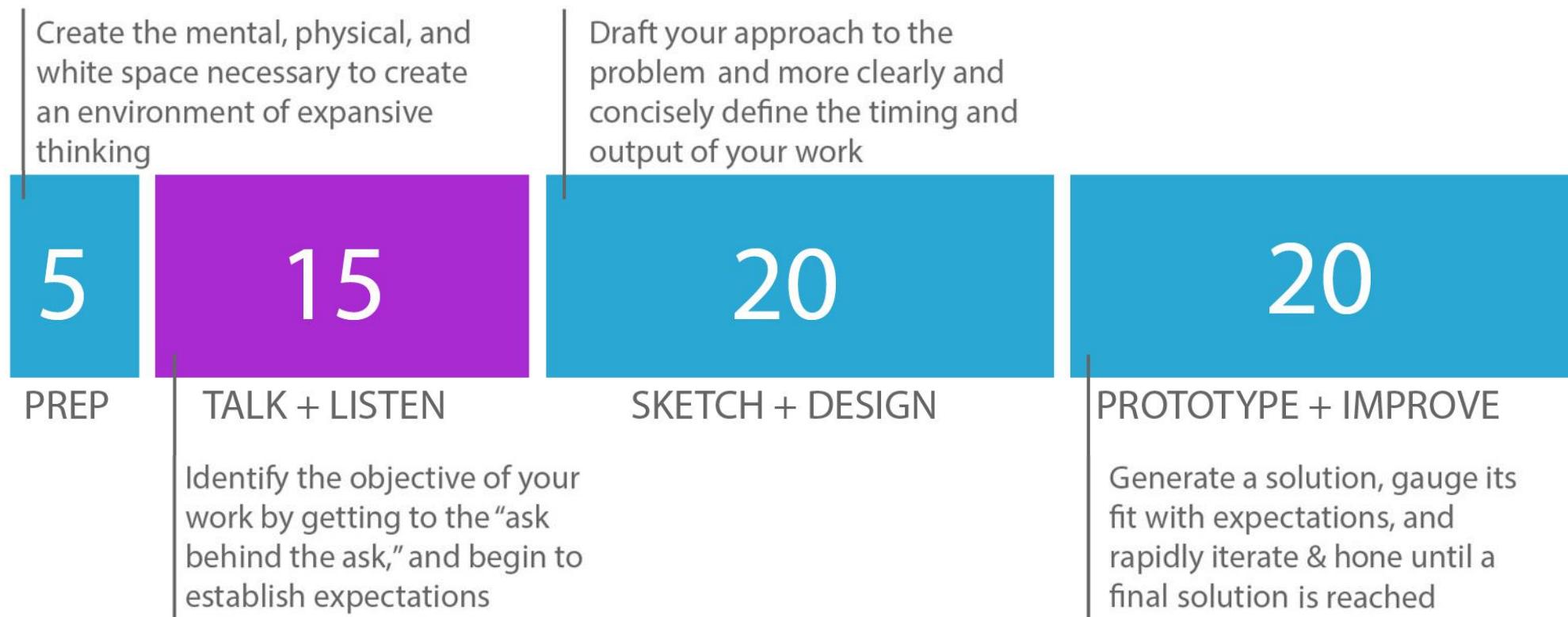
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Minutes spent on each task



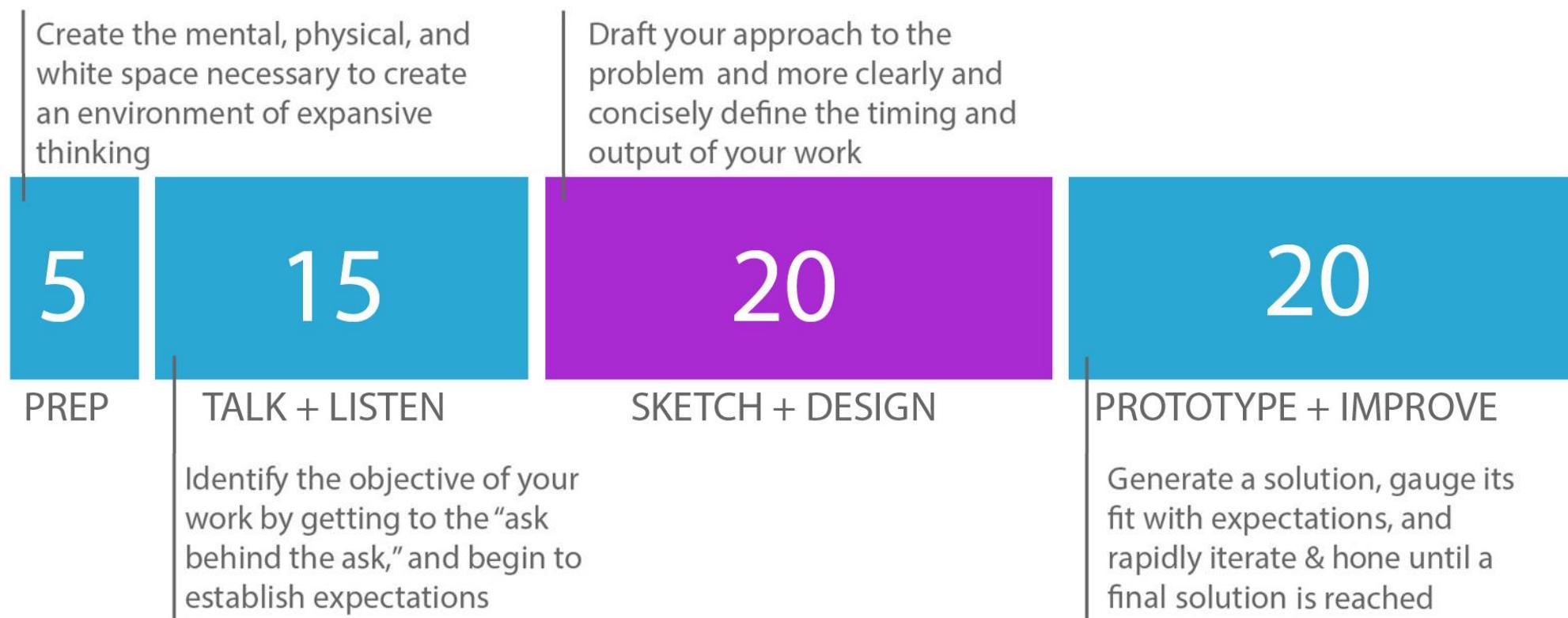
Each Step is Necessary to Producing High Quality Dataviz

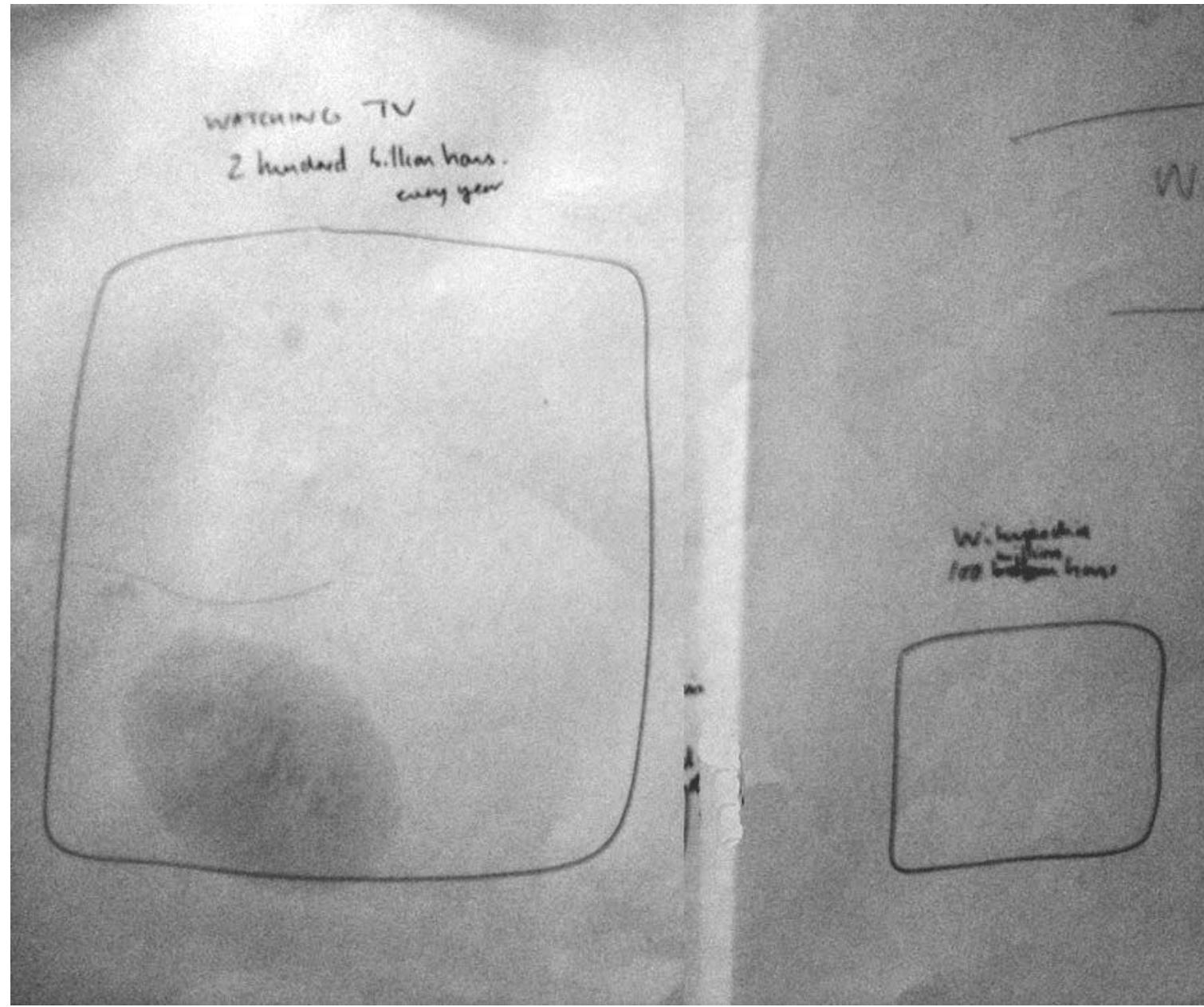
Minutes spent on each task



Each Step is Necessary to Producing High Quality Dataviz

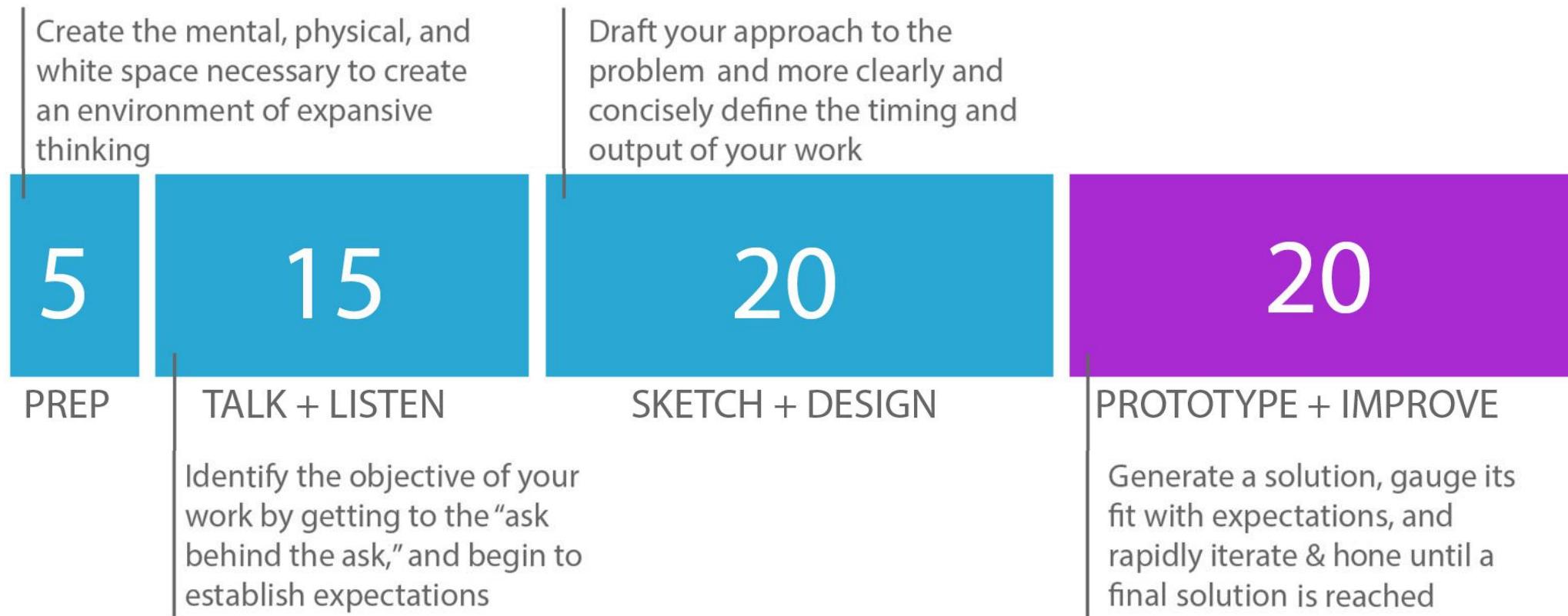
Minutes spent on each task





Each Step is Necessary to Producing High Quality Dataviz

Minutes spent on each task



Dutifully Approaching Dataviz Creation Produces Better Results

Transitioning visualizations from “work product” to “client ready” requires attention to detail

Planning the approach to dataviz creation helps ensure each element of the process is sound

Sketching visualizations will ultimately save time and effort

Producing a final dataviz is a study in iteration, not a “one-and-done” experience

A photograph of several students sitting on a long bench in a hallway, focused on their work. In the foreground, a student is looking at a blue folder. Behind them, two girls are laughing while looking at a yellow notebook. Two boys are also visible in the background, one sitting and one standing. The scene is set in a bright, modern school hallway.

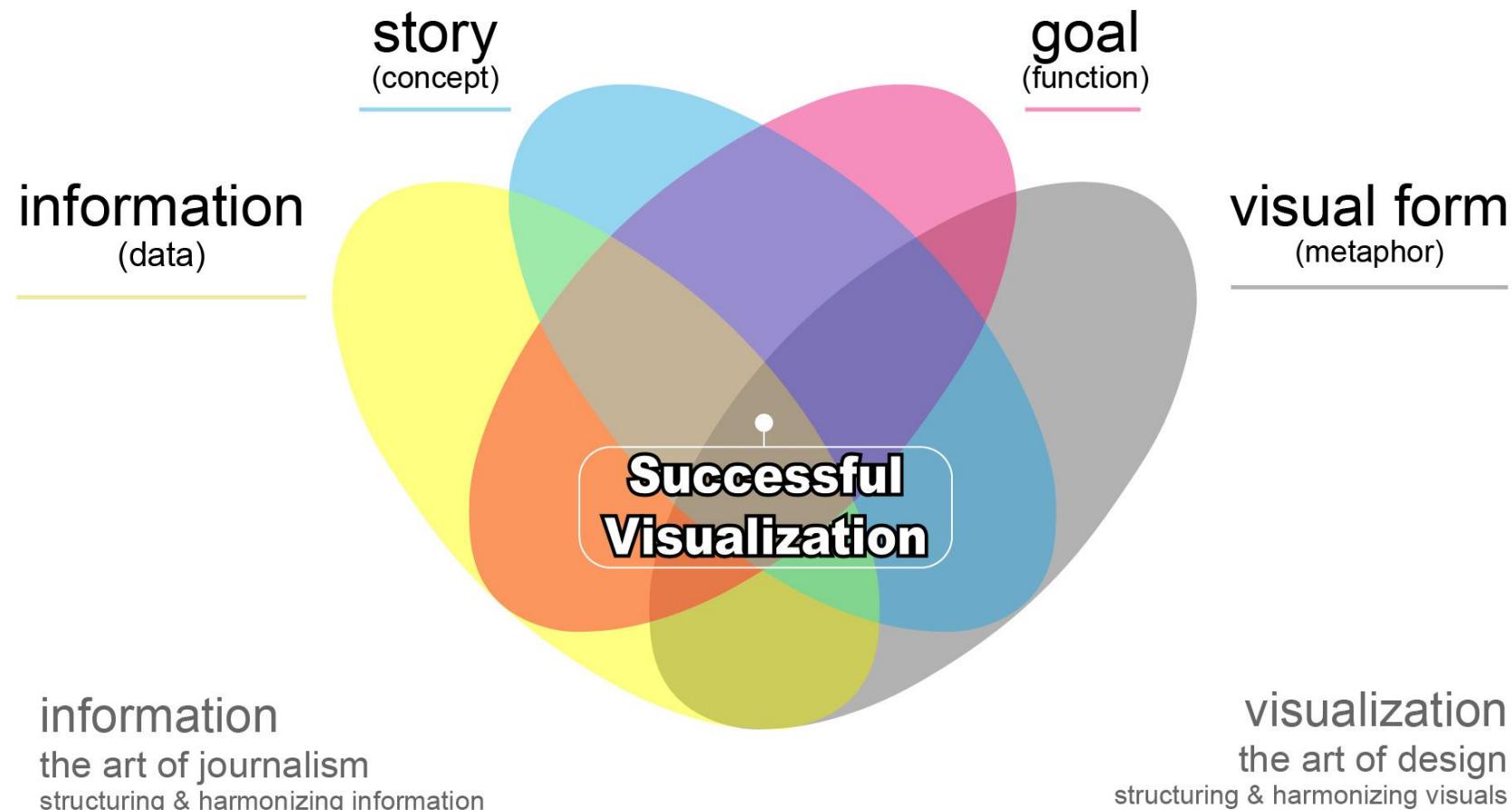
Module 3 Lesson 3

Understanding the Components of Visual Form

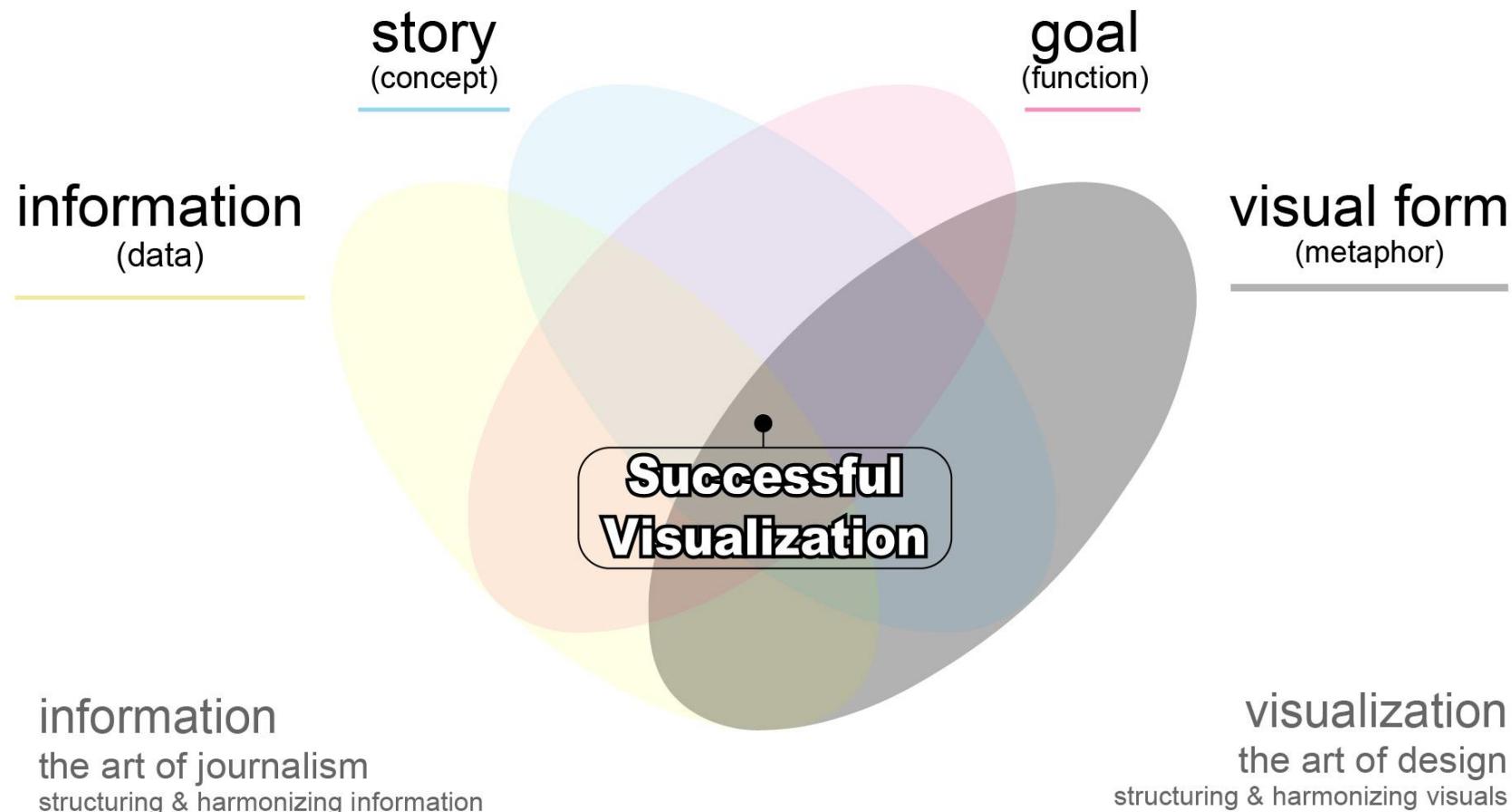
Understanding the Components of Visual Form

Knowing what comprises visual form — and what constitutes “good” for each element — is crucial to create great dataviz

McCandless Offers a Thorough Definition of Good Data Stories

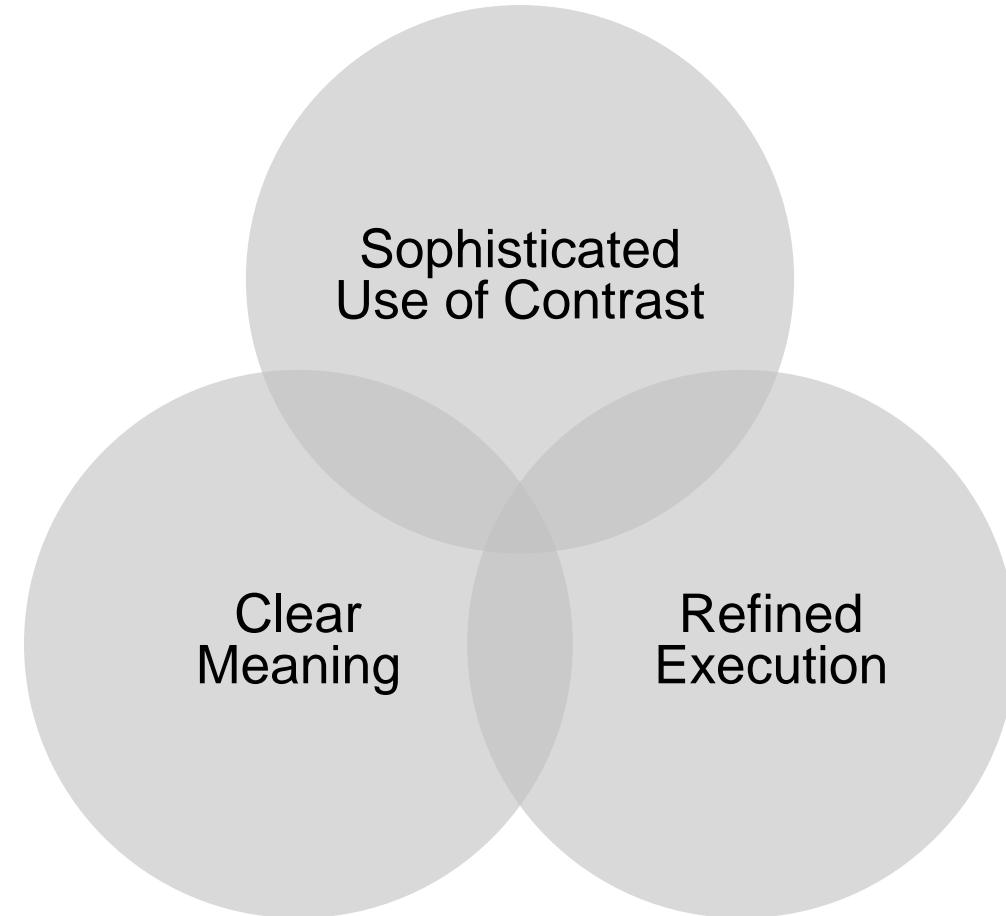


McCandless Offers a Thorough Definition of Good Data Stories



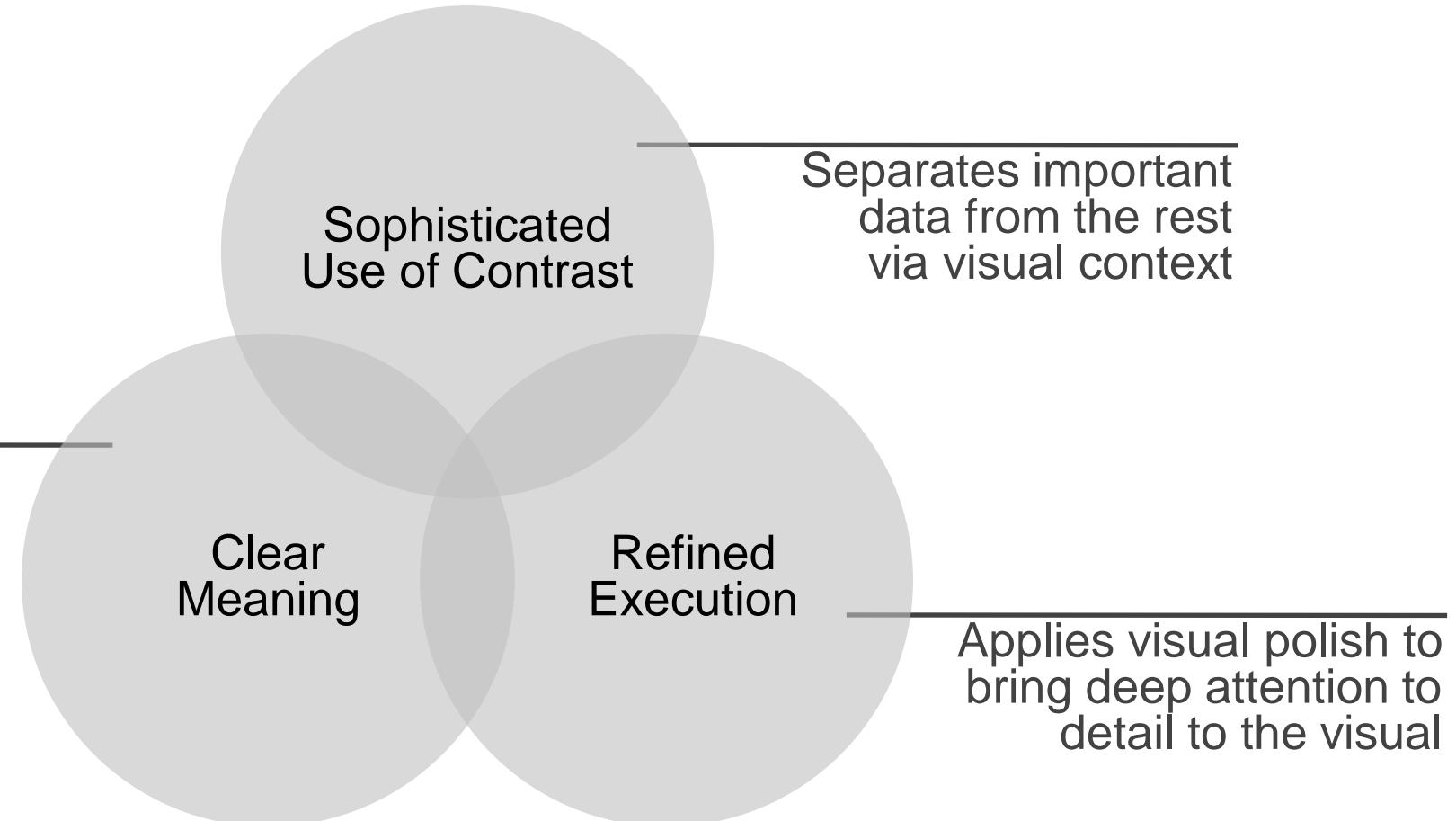
Good Visual Form Has Three Essential Elements

I



Good Visual Form Has Three Essential Elements

I



This Framework Offers an Useful View of I Dataviz Execution

Provides a detailed definition to McCandless's concept of visual form

Defines elements that the dataviz author can reasonably affect and control

Reveals the connection between the process of data analysis and the final image that is produced

The background of the slide features a photograph of several students in a hallway. In the foreground, three female students are sitting on a bench, looking at a yellow notebook together and smiling. Behind them, two male students are sitting on a bench, looking at a laptop. The scene is set in a bright, modern school hallway.

Module 3 Lesson 4

Enriching Content Through Connection

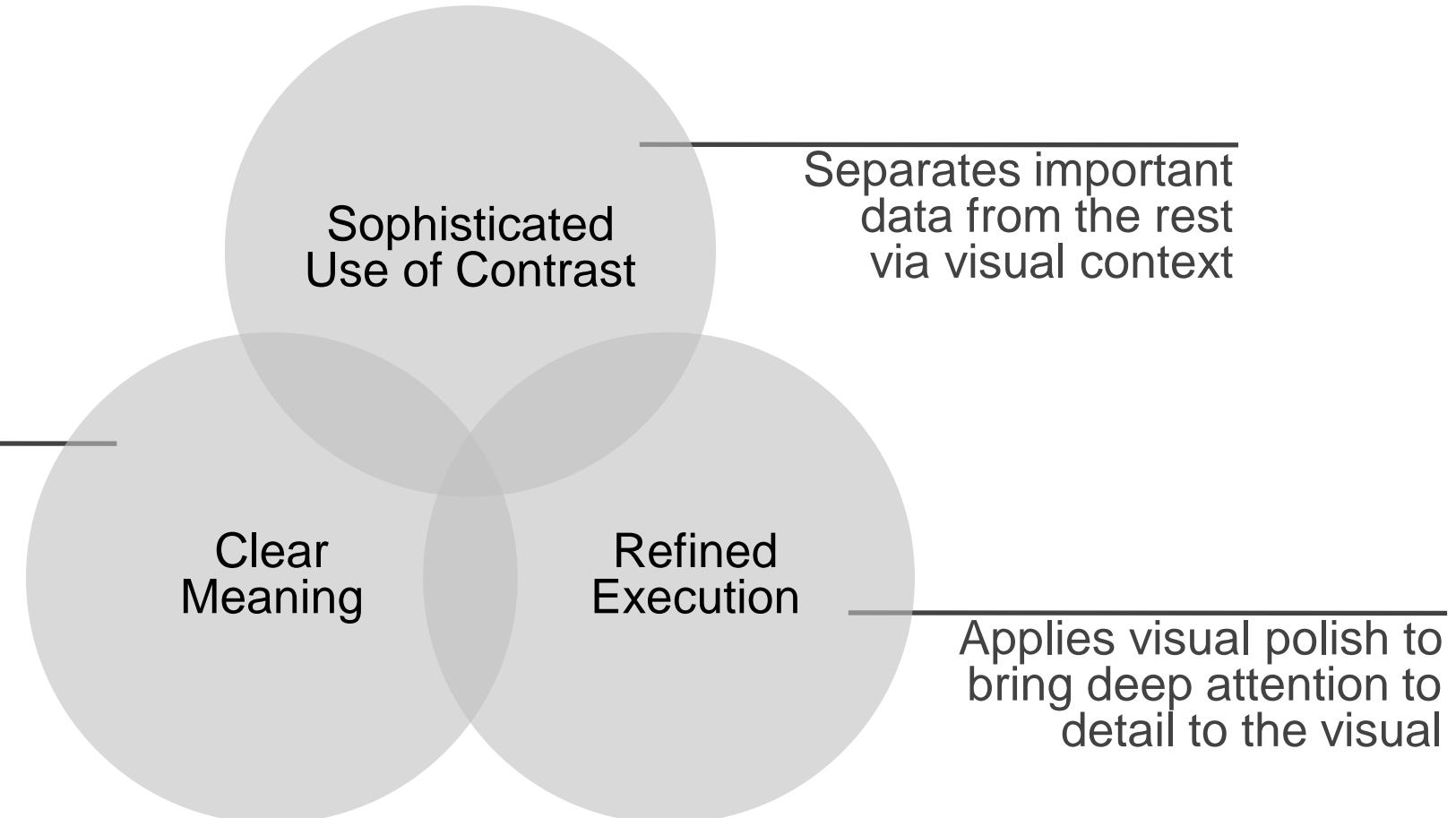
Enriching Content Through Connection

I

Giving meaning to dataviz and the numbers that comprise them requires a shift from facts to emotional connection

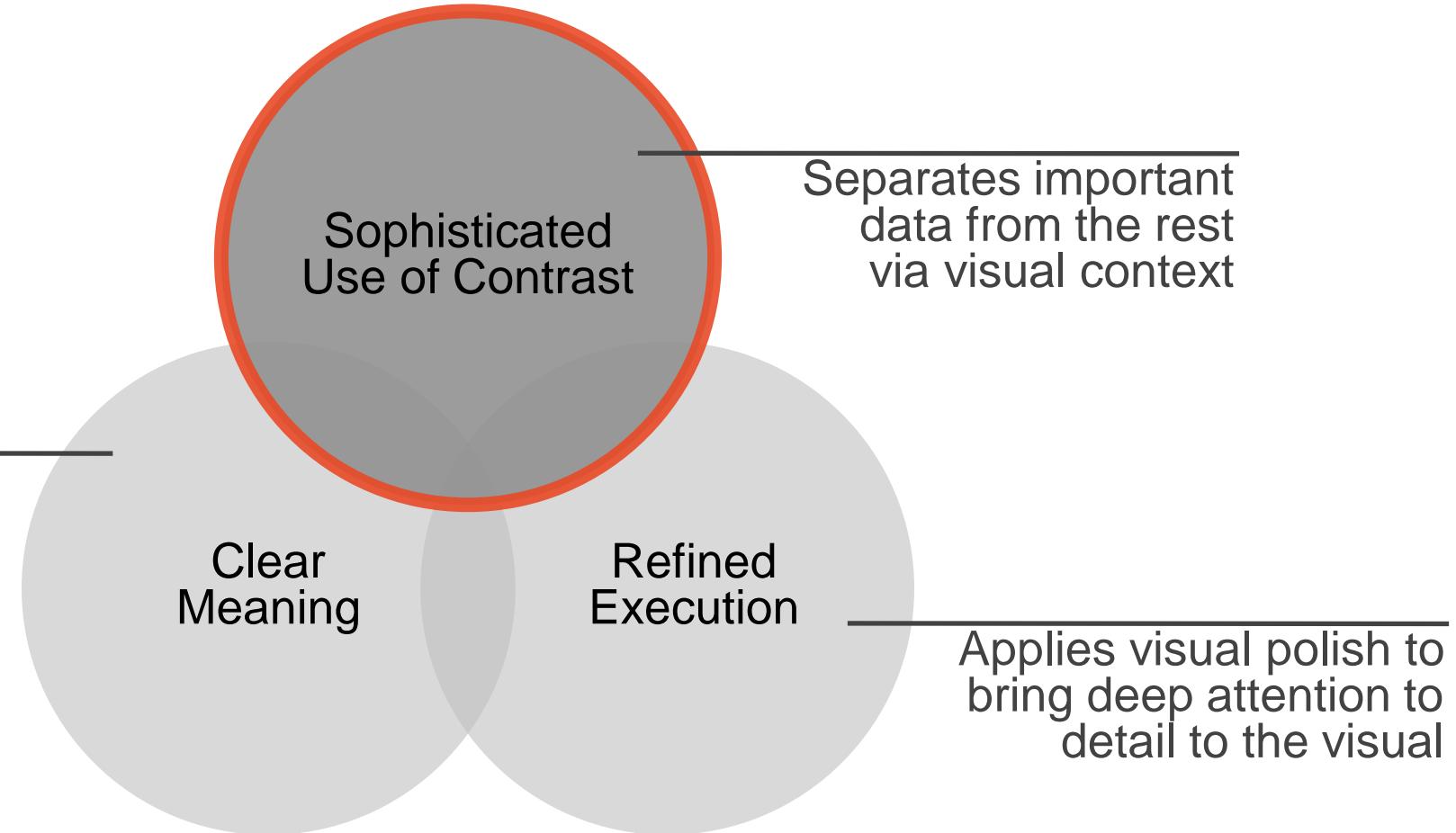
Good Visual Form Has Three Essential Elements

I



Good Visual Form Has Three Essential Elements

I



Contrast comes in four primary forms

I



Size contrast

Introducing different-size objects on a page captures attention. The more striking and apparent the size difference, the more attention the objects will attract.



Color contrast

Contrasting colors in an image can be an effective way to attract attention. A muted color for a chart background can draw attention to important elements in a vibrant color.



Shape contrast

Differences in shapes express the uniqueness of each element instantly. Icons are a particularly effective form of Shape Contrast that immediately communicate differences.



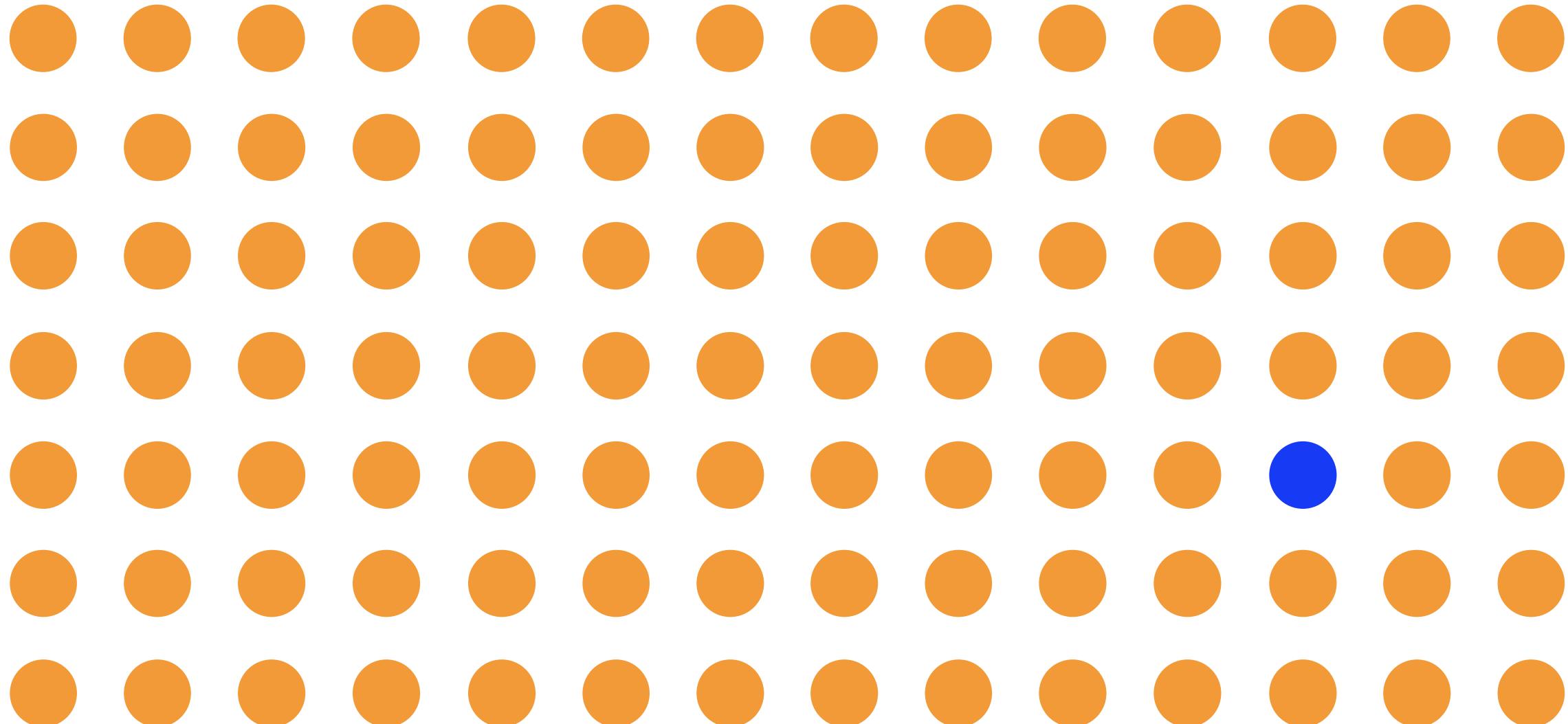
Contrived contrast

Use of boxes, callouts, annotations and other preattentive attributes to distinguish items in a visual. These are planned introductions of contrast to attract attention.

I

200 billion hours
per year spent watching TV by US adults

■ **100 million hours**
to create Wikipedia





Form
submissions



Newsletter
sign-ups



Chat
contacts



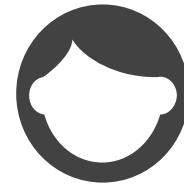
Email
contacts



Phone
calls



Cross-device
activity



Profile
fill-outs



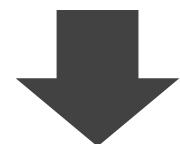
Return site
visits



Offline dealer
lookups



Perception
change



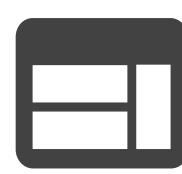
App
downloads



In-app
purchases



Video
views



Page
visits



Enrich Your Content by Connecting to Your Audience

I

Contrast separates the important data from the unimportant through visual context

Visual contrast comes in four primary forms – size, color, shape, and contrived

Each technique is effective at drawing our audience's attention to elements of our chart

In This Module

I

Module 3: Your Guide to Creating Visualizations

Key Concepts

Finding patterns in data

Being planful when creating dataviz

Understanding the components of visual form

Enriching Content Through Connection

References

- Felton, N. (2008). *How Americans Spend Their Money* [Online image]. Retrieved from <https://goo.gl/vNNdYH>
- Joint Economic Committee. (2010). [Health care chart](#) [Online image]
- Stanley, M. (2008). [Peak Break-Up Times](#) [Online image]