Visualization (Vis)

Storytelling with Interactive Data Visualizations

Lecture 1
–
Introduction & Vis Design Process

Introduction & Vis Design Process

1.  Good Vis, Bad Vis: Interactive Data Visualizations
2. Great Vis: Storytelling with Interactive Data Visualizations
3. Vis Design Process

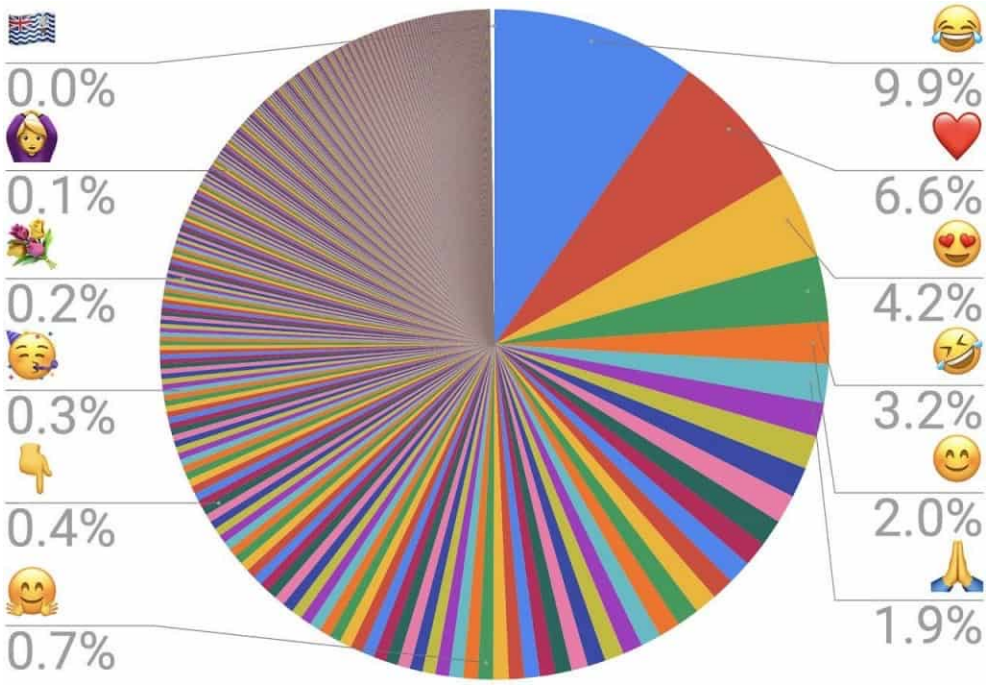
What is Data Visualization?

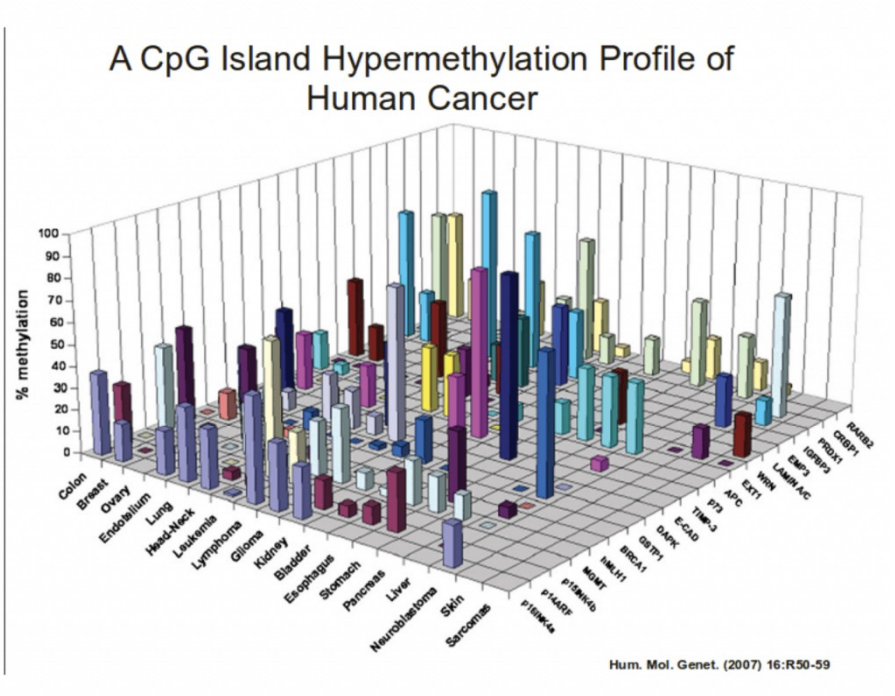
Data visualization = graphical representation of data to facilitate understanding

- Common types of Visualizations
  - **Charts / Graphs**: Bar charts, pie charts, line charts, scatter plots, histograms, box plots, …
  - **Maps**: Heat maps, geographical maps, etc.
  - **Infographics**: Visual representations that combine data with design elements

- Applications in various fields
  - Business intelligence
  - Scientific research
  - Journalism
  - Finance
  - Healthcare
  - …

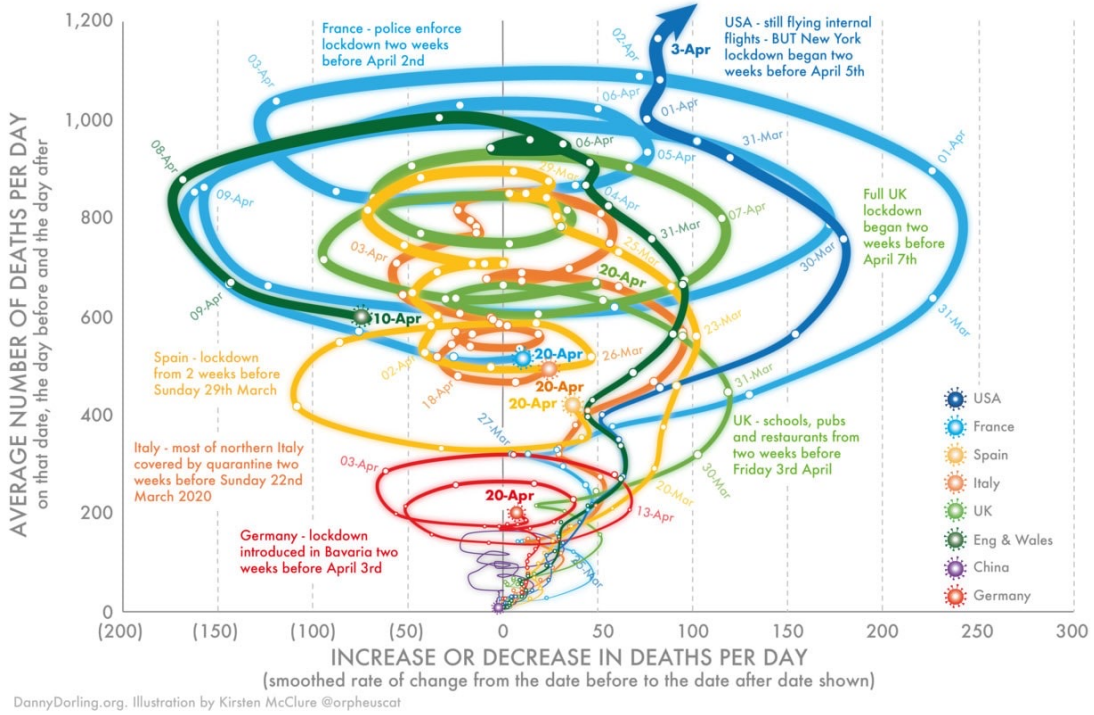
Examples of (bad) Visualizations (1)

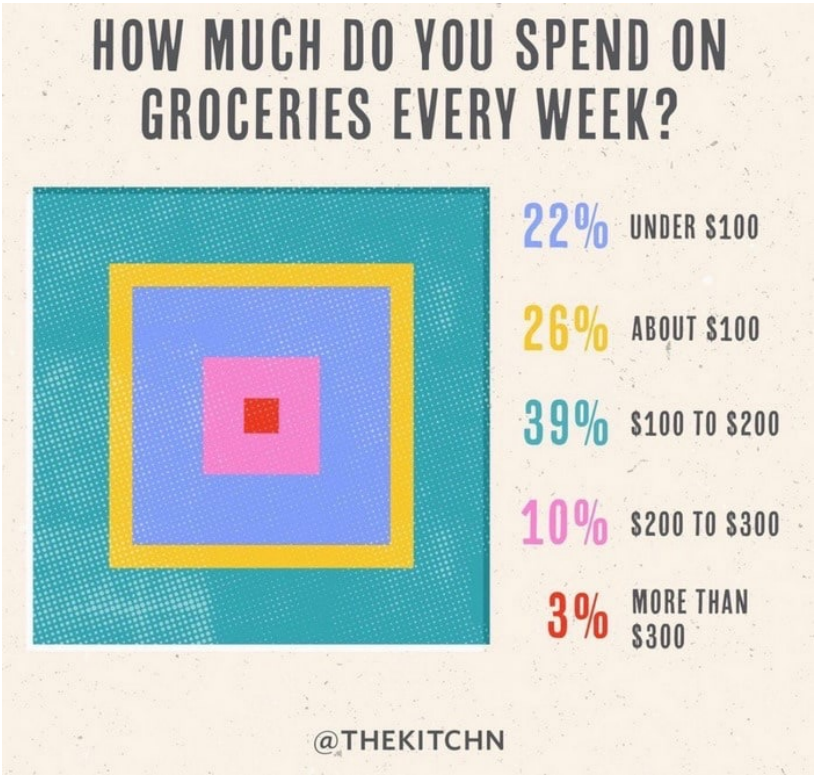




Source: https://www.oldstreetsolutions.com/good-and-bad-data-visualization

Examples of (bad) Visualizations (2)





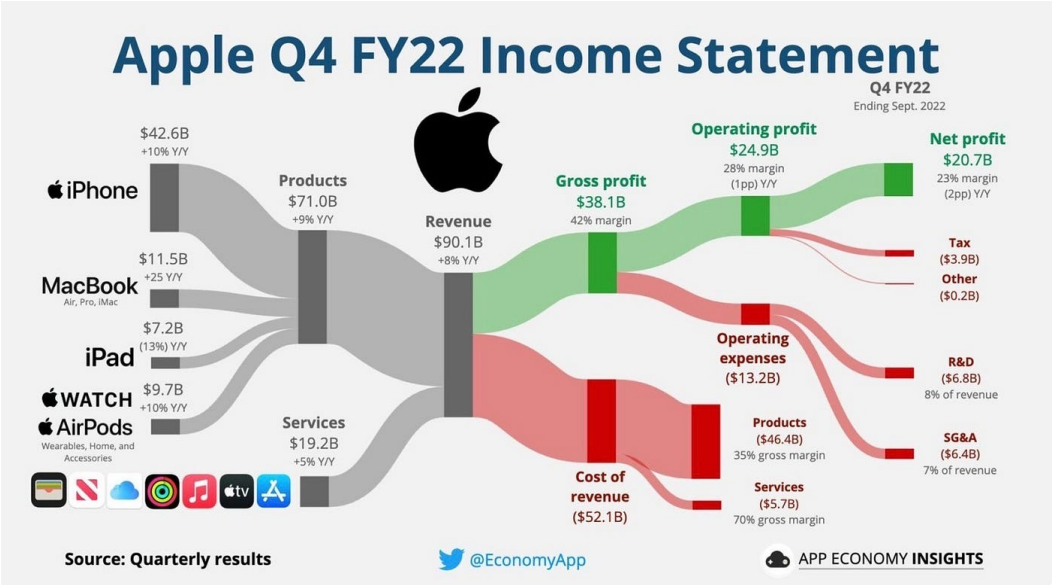
Source: https://www.oldstreetsolutions.com/good-and-bad-data-visualization

Examples of (good) Visualizations (1)

The 50 Most Visited Websites in the World

Source: https://www.visualcapitalist.com/the-50-most-visited-websites-in-the-world/

Apple Income Statement



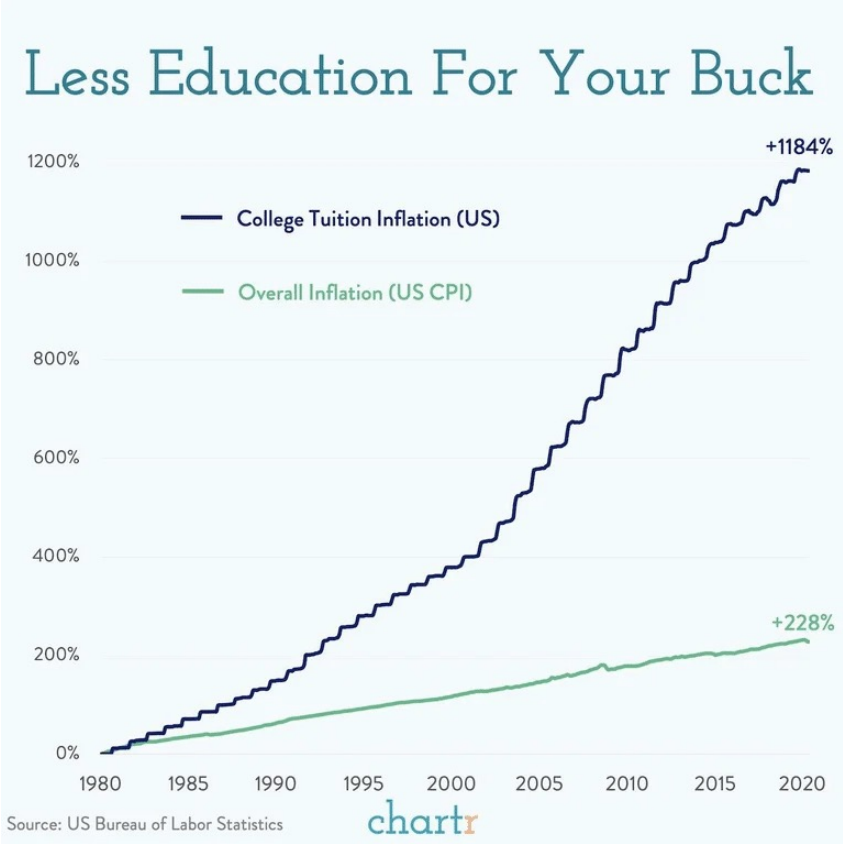
Source: https://medium.com/geekculture/top-10-data-visualizations-of-2022-worth-looking-at-eec641e3fe84

Examples of (good) Visualizations (2)

YouTube Channels Then & Now

Source: https://www.cyfe.com/blog/best-data-visualizations-of-2020/

Overall Inflation vs. College Tuition Inflation



Source: https://www.cyfe.com/blog/best-data-visualizations-of-2020/

Goals and Benefits of (good) Data Visualization?

- Simplify complex data
  - Make it easier to identify trends, patterns, and outliers
- Improve comprehension
  - Enhance the ability to grasp difficult concepts and identify new patterns
- Facilitate communication
  - Help to convey findings to others efficiently and clearly
- Supports decision-making
  - Provide a visual context that can aid in making informed decisions

➔ Make data-driven insights more comprehensible and actionable

What is Interactive Data Visualization?

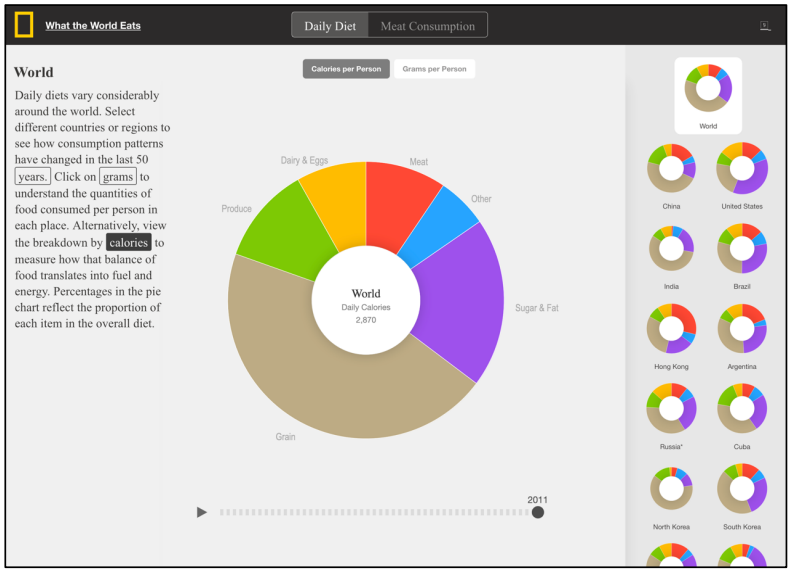
- **Interactive data visualization** = use dynamic and responsive graphical representations of data that allow users to interact with the visual elements.
  - ➔ enable users to explore data by manipulating the visual elements to uncover deeper insights

- Possible User Interaction
  - Clicking: highlight or isolate specific data points
  - Hovering: display detailed information or tooltips
  - Zooming and Panning: explore data at different levels of detail
  - Filtering and Slicing: focus on specific subsets of data
  - Drill-down: access more detailed data by clicking on summary levels

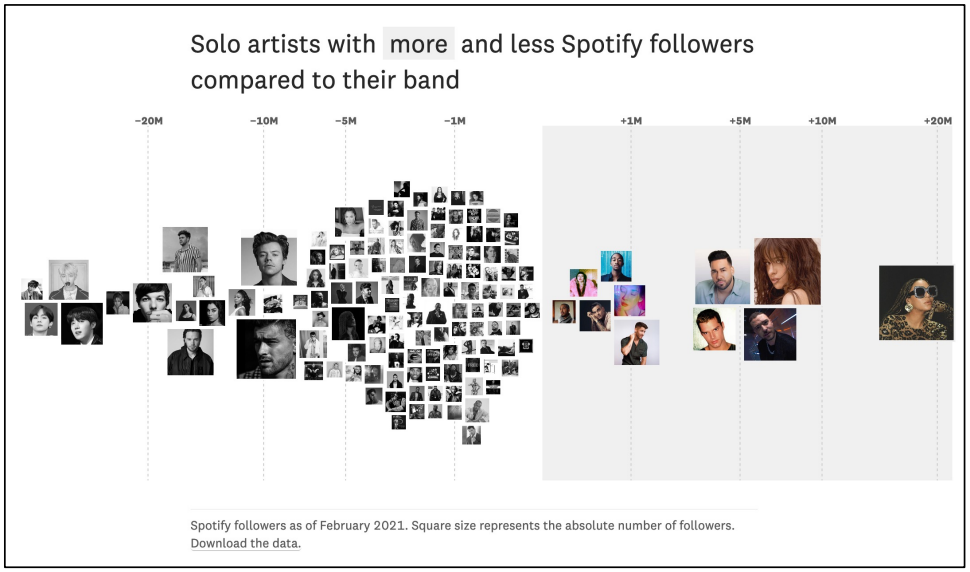
- Examples
  - Dashboards: Interactive panels displaying KPIs that update in real-time
  - Geographical Maps: zoom in on specific regions and see detailed data
  - Scatter Plots and Bubble Charts: allow users to filter data points based on different variables

Examples of (good) Interactive Visualizations

National Geographic –
What the World Eats



How many artists overshadow
their band after going solo?



Goals and Benefits of (good) Interactive Data Visualization?

- Enhanced Exploration
  - Users can explore data in a non-linear fashion, uncovering insights that might not be visible in static visualizations.
- Customization
  - Users can customize the view to their specific needs, improving the relevance & usability of the data.
- Engagement
  - Interactive elements can make data more engaging and easier to understand.
- Real-time Analysis
  - Support real-time data updates and dynamic analysis (crucial for time-sensitive decision-making)

➔ Interactive data visualization leverages technology to create more engaging, user-friendly, and insightful ways to understand & analyze data, enhancing the decision-making process.

Introduction & Vis Design Process

1. Good Vis, Bad Vis: Interactive Data Visualizations
2.  Great Vis: Storytelling with Interactive Data Visualizations
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What is Storytelling?

Storytelling = the art of conveying a narrative through a structured and engaging format

➔ has been an essential part of human culture & communication for millennia

- Key Elements of Storytelling
  - Characters
  - Plot
  - Setting
  - Theme
  - Conflict
  - Narrative Arc

- Importance of Storytelling
  - Cultural Preservation
  - Education
  - Entertainment
  - Communication
  - Connection

- Benefits of Storytelling
  - Engagement
  - Memory Retention
  - Empathy
  - Inspiration

➔ powerful tool across various fields, due to its ability to connect with audiences on a deep emotional level

What is Storytelling with Interactive Data Visualizations? (1)

Storytelling with interactive data visualization refers to the practice of conveying data insights through a narrative that is supported by interactive and dynamic visual elements. This approach combines the traditional elements of storytelling with the power of data visualization to engage and inform the audience effectively.

Key Elements of Storytelling with Interactive Data Visualization

1. Narrative Structure
   - **Introduction**: Sets the context and introduces the main topic or question.
   - **Body**: Explores the data, highlighting key insights, trends, and findings.
   - **Conclusion**: Summarizes the insights and suggests potential actions or implications.

2. Visual Elements:
   - **Charts and Graphs**: Bar charts, line graphs, scatter plots, and other visual tools to represent data.
   - **Annotations**: Text and labels that provide explanations and highlight important points.
   - **Transitions and Animations**: Smooth transitions that guide the user through different parts of the story, making the data exploration process more engaging.

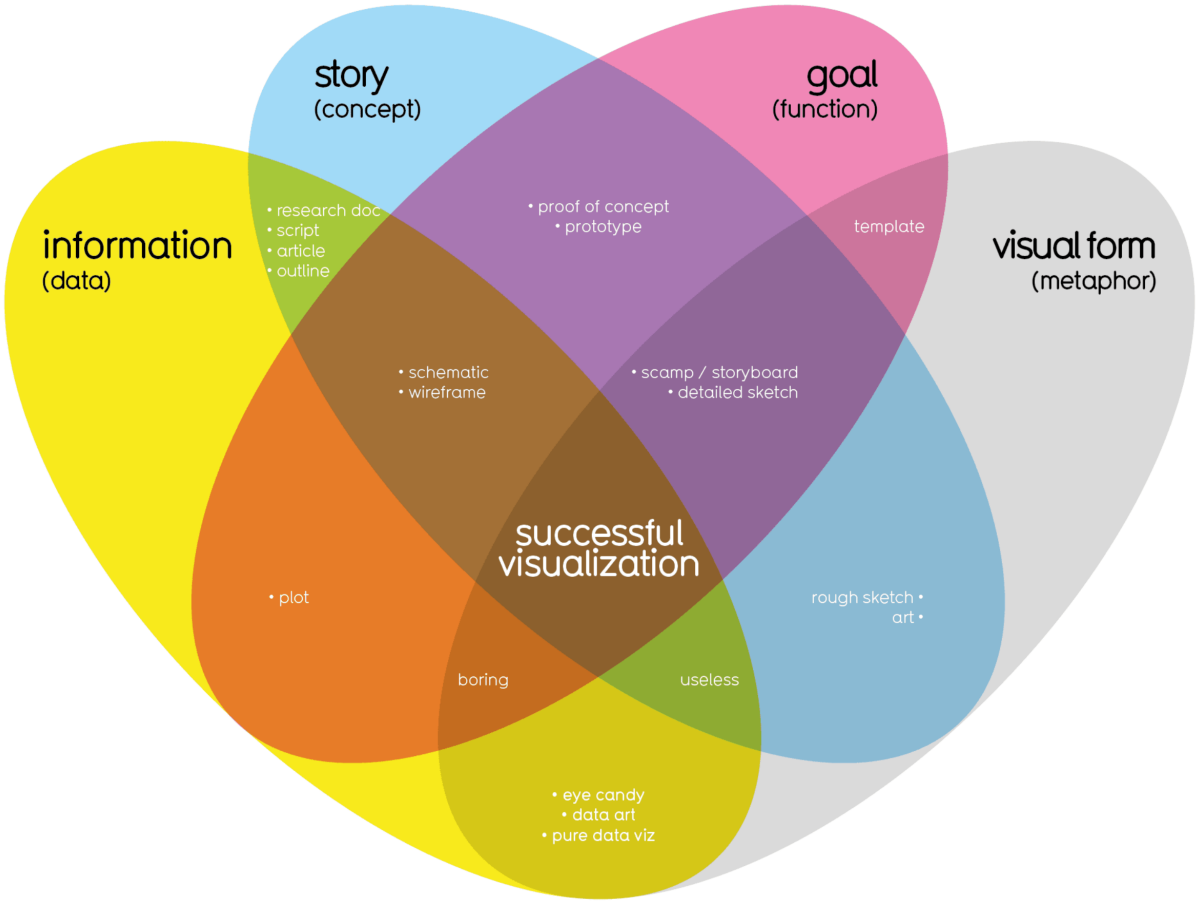
3. User Interaction
   - Allow users to engage with the data by clicking, hovering, zooming, and filtering.
   - Provide a more personalized experience where users can explore specific aspects of the data that interest them.

What is Storytelling with Interactive Data Visualizations? (2)

- Benefits of Interactive Data Storytelling
  - **Enhanced Understanding**: Helps users grasp complex data through a coherent narrative.
  - **Increased Engagement**: Interactive elements keep engaged and make the data exploration process enjoyable.
  - **Improved Decision-Making**: Provides a clear and compelling narrative that can inform and influence decisions.
  - **Personalization**: Users can interact with the data to focus on areas relevant to them, making the story more impactful.

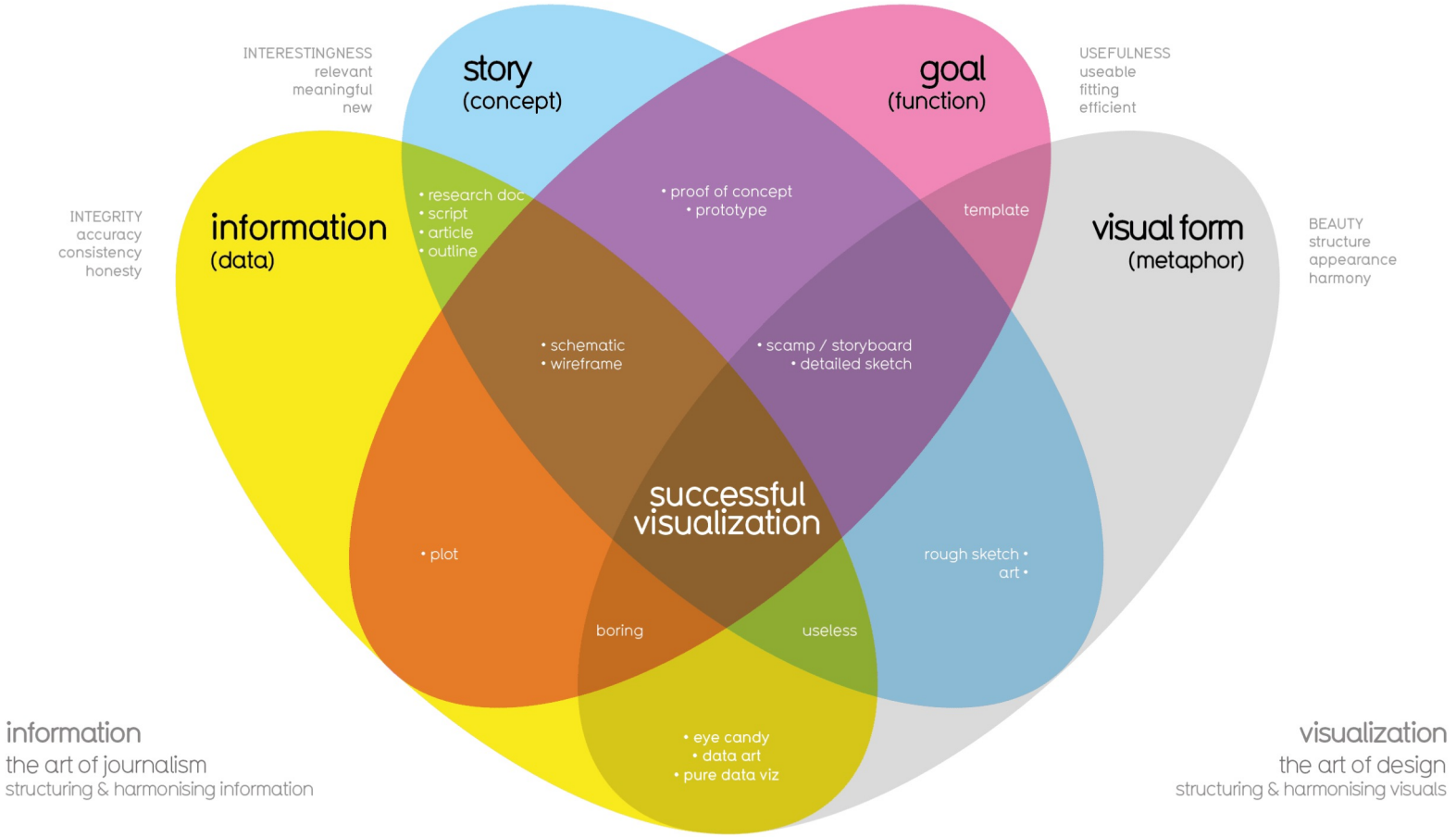
- Applications
  - **Business Reports**: Dashboards that tell the story of company performance, market trends, and financial metrics.
    - Example: illustrate the quarterly performance with interactive charts.
  - **Scientific Research**: Narratives that guide users through research findings and experimental results.
    - Example: a data-driven article explaining the opioid health crisis.
  - **Journalism**: Interactive articles using data visualizations to explain news stories.
    - Example: a news article, that uses maps to tell the story of an election.
  - **Education**: Learning modules that use interactive visualizations to teach complex concepts.
    - Example: a platform visualizing a historical event

What makes a Great Visualization?



Source: David McCandless, from Book: Knowledge ist Beautiful, https://informationisbeautiful.net/visualizations/what-makes-a-good-data-visualization/

What makes a Great Visualization?



Source: David McCandless, from Book: Knowledge ist Beautiful, https://informationisbeautiful.net/visualizations/what-makes-a-good-data-visualization/

Wine & Math

Source: https://pudding.cool/2021/03/wine-model/

The Stories Behind a Line

Source: http://www.storiesbehindaline.com

Your Turn !

Exercise 1

Analysis and Critique of Interactive Data Stories

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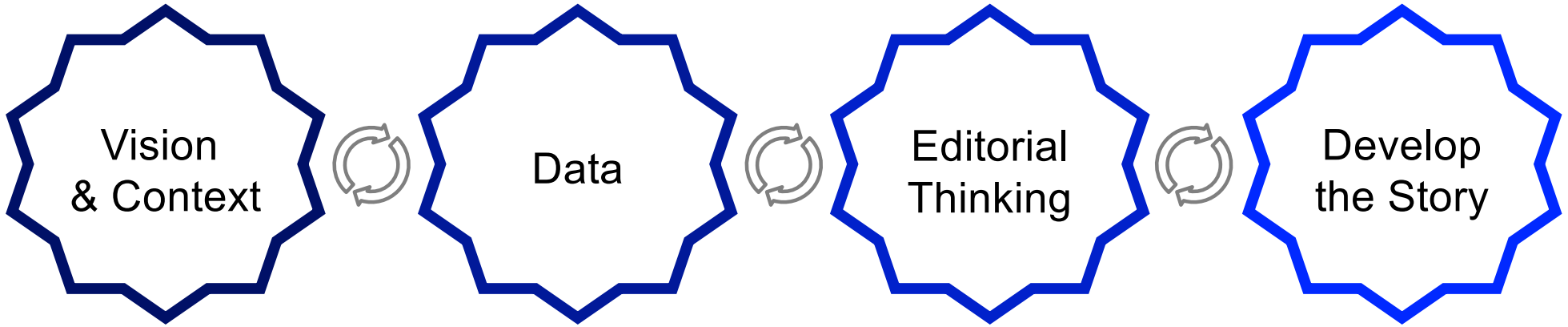
Why follow a vis design process at all?

Advantages of following a defined process:

- Reduce randomness of approach
  - Shapes entry and closing points; allows time-boxing
- Adapt to accommodate changing requirements and circumstances
  - Each project is different, but should follow the same sequence of thinking
- Protect value of experimentation
  - by documenting findings
- Encourages iteration
  - Each stage of the process: first time to undertake the activity, not the last

The Vis Design Process (which we will be using in this class!)



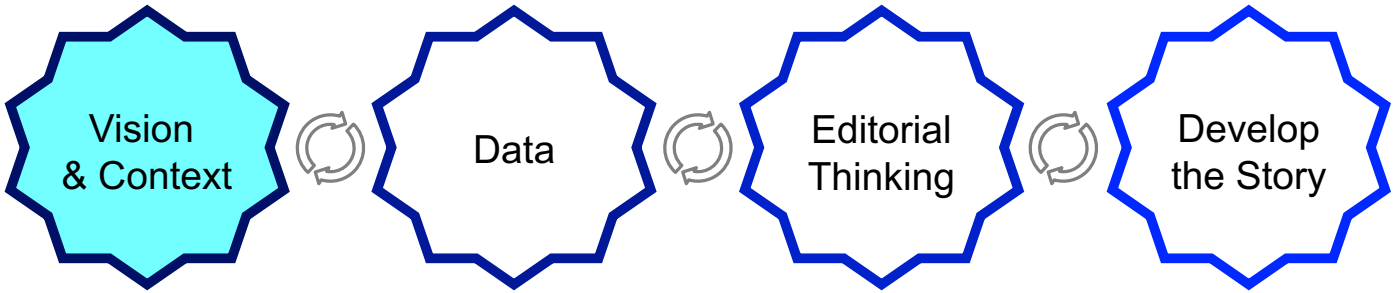
- Purpose and Vision
- Audience
- Constraints

- Data Acquisition
- Data Examination
- Data Transformation
- Data Exploration

- Angle
- Framing
- Focus

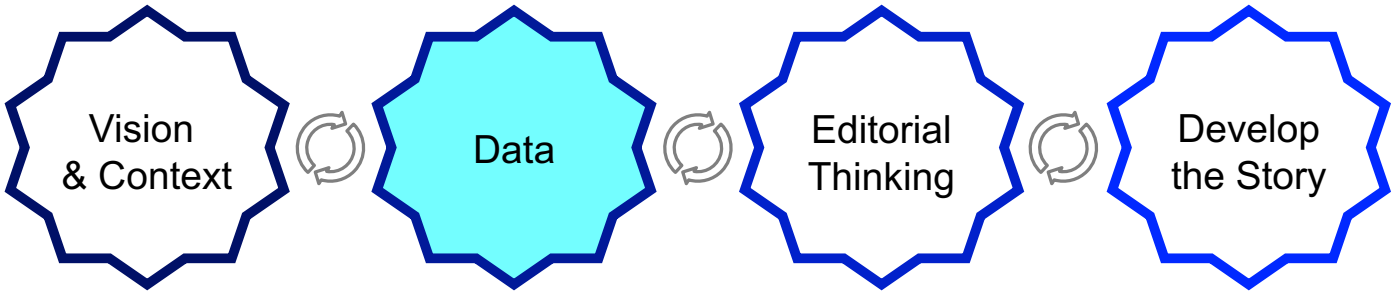
- Visual Encoding & Charts
- Rules of Thumb
- Interactivity & Storytelling
- Composition, Annotations & Colour

Vision & Context



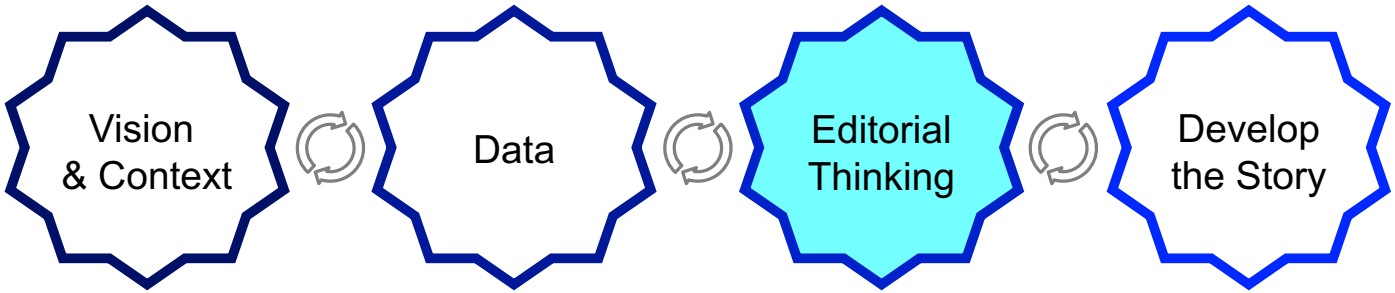
- Purpose, Vision, Mission
  - Why are you producing the Vis (what is your “motivating curiosity”)?
  - What are you trying to accomplish? What is your intended effect?
  - Function of the Vis? Tone of the Vis?
  - 3-minute Story and Big Idea?
- Audience
  - Whom are you making the Vis for?
- Constraints
  - Timescale, Budget, Technology, …

Data



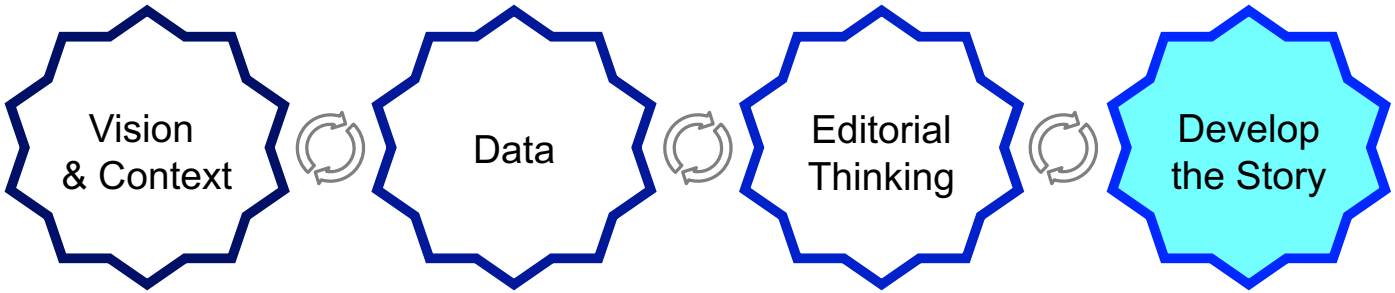
- Data Acquisition: Source the data to visualize
- Data Examination: Look at the data
- Data Transformation: Cleaning, Creating, Consolidating
- Data Exploration: See the data, broaden the viewpoint via EDA

Editorial Thinking



- Angle
  - What questions should your eventually chosen charts answer?
- Framing
  - What data items and values to include and exclude?
- Focus
  - What to emphasize? What is your message?

Develop the Story



- Visual Encoding and Charts
- Rules of Thumb
- Interactivity and Storytelling
- Composition, Annotations and Colour

Key Takeaways

- What are the key aspects of
  - Data Visualizations?
  - Interactive Data Visualizations?
  - Storytelling with Interactive Data Visualizations?

- Vis Design Process

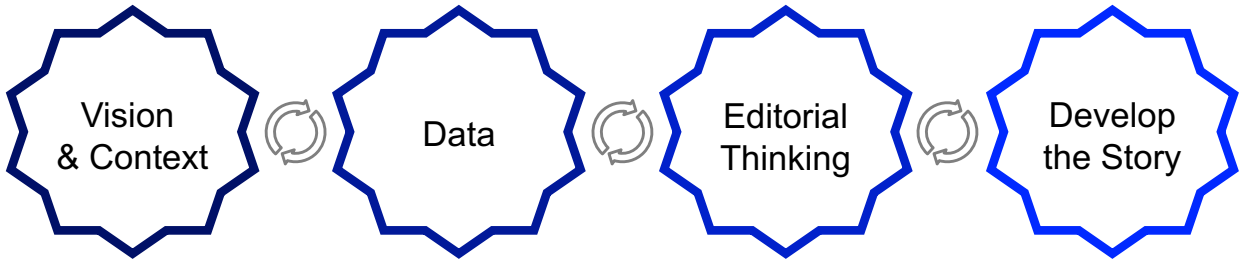


Photo by Dragonfly Ave on Unsplash