Best Practices
Building and Designing Data Visualizations

Gianthomas Volpe
Agenda

• The Need for Data Visualization
• Types and Functions of Data Visualization
• The Data You Have
• Getting to Know the Visualizations
• Color and Formatting
• Shapes and Labels
• Building a Dashboard
• Next Steps
• Questions and Answers
The Need for Data Visualization

Why do we visualize data?

“The purpose of data visualization – any data visualization - is to illuminate data. To show patterns and relationships that are otherwise hidden in an impenetrable mass of numbers”

-Robert Simmon, OpenVis Conference 2014
The Need for Data Visualization

Data Visualization makes hidden trends and patterns in the data easily visible

How many times does the number 89 appear?

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Why We Visualize

Good Visualizations Should Make Data Actionable
Agenda

• The Need for Data Visualization
• **Types and Functions of Data Visualization**
• The Data You Have
• Getting to Know the Visualizations
• Color and Formatting
• Shapes and Labels
• Building a Dashboard
• Next Steps
• Questions and Answers
Types and Functions of Data Visualization

Tables vs. Graphs

- Tables – Interact primarily with verbal system.
- Graphs – Interact primarily with visual system.

3 Factors to consider:

**Audience**
- Who is your audience?
- What are they expecting?
- How will they interact with the data?

**Data**
- How much data do you have?
- What kind of data?

**Goals**
- What is the purpose of your visualization?
- What kind of insight are you sharing?
Types and Functions of Data Visualization

What is the purpose of your visualization?

- Exploratory
- Explanatory
- Interactive
- Static
Agenda

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Understand Your Data

Know your data to visualize it correctly

Data Types

Qualitative (Attributes)

Nominal Data
• Defines, Describes or Identifies

Ordinal Data
• Indicates Position or Order

Quantitative (Metrics)

Cardinal Data
• Quantifies, Counts or Measures
Understand Your Data

Qualitative Data Types - Attributes

Ordinal Data

Data that can be counted and ordered, but not aggregated

Examples

- **Date** – 1/1/2015, 1/2/2015, 1/3/2015
- **Rank** – Like, Neutral, Dislike
- **Grade** – C, C+, B-, B, B+, A-, A, A+
Nominal Data

Data that be counted, but not ordered or aggregated.

Examples

- **Product** – Books, Movies, Magazines
- **Gender** – Male, Female
- **City** – Los Angeles, New York, Arlington
Understand Your Data

Quantitative Data Types - Metrics

Cardinal Data

Data that can be counted, ordered, and aggregated.

Examples

- **KPIs** – Revenue, Cost, Profit
- **Counts** – Number of Employees, Number of Units
- **Measures** – Distance, Time, Temperature
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Getting to Know The Visualizations

Selecting a Visualization

Comparisons

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Distribution

Part-to-whole

Relationships

Time

Geospatial
Getting to Know The Visualizations

Comparison Visualizations

Comparisons

Few Categories

Few Items

Clustered Bar Chart

Many Categories

Many Items

Bar Chart

Bar Chart Matrix
Getting to Know The Visualizations

Comparison Visualizations – To Avoid

Avoid Using

Line Charts
Implies Continuity between points.
Getting to Know The Visualizations

Distribution Visualizations

Distribution

Single Variable

Few Items

Many Items

Two Variables

Column Histogram

Line Histogram

Scatter Plot
Getting to Know The Visualizations

Geospatial Visualizations

Geography

Few Data Points

Many Data Points

Bubble Map

Marker Map

Area Map

Density Map
Getting to Know The Visualizations

Part-to-whole Visualizations

Part-to-whole

Few Categories

Many Categories

Parts of Categories

Pie Chart

Heat Map

100% Stacked Bar
Getting to Know The Visualizations

Relationship Visualizations

- **Relationship**
  - Two Variables
  - Three Variables
  - Related Elements

- **Scatter Plot**
- **Bubble Chart**
- **Network Graph**
Getting to Know The Visualizations

Time Visualizations

- Time
  - Few Periods
    - Single of Few Categories
      - Clustered Bar Chart
  - Many Periods
    - Many Categories
      - Line Graph
      - Line Graph
Getting to Know The Visualizations

Time Visualizations

Avoid Using

Pie Chart
Removes Ordinality
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Color and Formatting

Using color and size to enhance your visualization

Formatting your visualization with colors and sizing can help you communicate the insights in your data and improve user experience.

Hue

Saturation
Hues - Using color bands

Hues can be used to create bands of contrasting colors. Apply the banding on attributes to visualize trends and insights for attribute elements.

Use opposing colors to increase contrast between attributes elements.
Saturation can be used to visualize additional quantitative data (metrics). Use the metrics to color visualization elements by an additional measure.

Use less saturation for lower values, and more saturation for higher values.
Color and Formatting

Using the right number of colors

Use Fewer Than 6 Colors
Color and Formatting

Using colors to emphasize and contrast

Use Opposing Colors for Comparisons
Color and Formatting

Using colors to emphasize and contrast

Use Opposing Cool Colors for Backgrounds, Warm Colors for Data
Color and Formatting

Color Blindness Affects 10-18% of the Male Population
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Shapes and Labels

The right shapes for your insights

- Circle
- Ring
- Tick
- Square
- Bar
- Pie
Shapes and Labels

Labels add fundamental context

Context is important - always label your axes
Label data points if more context is needed and you don't too many
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Building a Dashboard

Guiding the dashboard consumer

Reading Gravity

Primary Optical Area

Weak Fallow Area

Strong Fallow Area

Terminal Area
Building a Dashboard

Guiding the dashboard consumer

Reading Gravity

Primary Optical Area

Strong Fallow Area

Weak Fallow Area

Terminal Area
Building a Dashboard

Guiding the dashboard consumer

Present Information Hierarchically
Building a Dashboard

Guiding the dashboard consumer

Present Information Hierarchically
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5 Rules for Successful Data Visualization

1. Don’t present too much information
2. Avoid using too many colors
3. Don’t distort the data
4. Organize the visualizations
5. Provide Context and Label Correctly
Questions and Answers
MicroStrategy World 2015
Enterprise Data Discovery Hands-On Workshop

Track 13

**Intro to Enterprise Data Discovery**
- Access Any Data and Prepare for Analysis
- Analyze Your Data and Visualize the Insights
- Share Your Dashboard and Collaborate

**Advanced Enterprise Data Discovery**
- Connect to Advanced Data Sources
- Scrape data from web pages
- Create Advanced Metrics & Integrate D3 library
- Connect to Server for Governed Data Discovery

**Integrating R into Enterprise Data Discovery**
- Build Metrics using 300+ inbuilt Analytical Functions
- Set up and use R Advanced Analytics Functions
- Visualize Advanced Analytics with D3 Visualizations
Early Adopter Program

MicroStrategy 10 Self-Service Capabilities

- MicroStrategy Modeled Data
- Personal/Departmental
- Cloud
- Databases
- Big Data

Data Wrangling

BRAND NEW HTML 5 UX FOR FASTER EXPERIENCE
Visualization Challenge

Exhibit Hall
MicroStrategy 9s

Free recommended Security upgrade

Contact us to find out what programs we have for you.