Types of Visualizations (Beyond Numeric/Statistical)
Maps

John Keyser

Taxonomies

- Taxonomies help us understand the range of options, and which visualizations might be appropriate
- There are many different ways to categorize types of visualizations
  - Including the sort-of categorization I presented
- To give some sense, I will list three here
  - Pulled from three books
  - But there are many more possible

Data Visualisation: A Handbook for Data Driven Design

Andy Kirk

Chart Purpose

- Analytical purpose of chart: What is it trying to show?
- Five Categories of Charts
  - Categorical
  - Hierarchical
  - Relational
  - Temporal
  - Spatial

CHRTS

- Categorical
  - Comparing categories and distributions of quantitative values
- Hierarchical
- Relational
- Temporal
- Spatial

Categorical

- Bar Chart
- Clustered Bar Chart
- Dot Plot
- Pictogram
- Radar Chart
- Polar Chart
- Box-and-Whisker Chart
- Scatter Plot
- Histogram

CHRTS

- Categorical
- Hierarchical
  - Charting part-to-whole relationships and hierarchies
- Relational
- Temporal
- Spatial

Hierarchical

- Pie Chart
- Waffle Chart
- Stacked Bar Chart
- Treemap
- Venn Diagram
- Dendrogram
- Sunburst Chart

CHRTS

- Categorical
- Hierarchical
- Relational
  - Graphing relationships to explore correlations and connections
- Temporal
- Spatial

Relational

- Scatter Plot
- Bubble Plot
- Parallel Coordinates
- Heat Map
- Node-Link Diagram
- Chord Diagram
- Sankey Diagram

CHRTS

- Categorical
- Hierarchical
- Relational
- Temporal
  - Showing trends and activities over time
- Spatial

Temporal

- Line Chart
- Bump Chart
- Slope Graph
- Stream Graph

CHRTS

- Categorical
- Hierarchical
- Relational
- Temporal
- Spatial
  - Mapping spatial patterns through overlays and distortions

Spatial

- Choropleth Map
- Isarithmic Map
- Proportional Symbol Map
- Prism Map
- Dot Map
- Flow Map
- Area Cartogram
- Dorling Cartogram
- Grid Map

Now You See It
Stephen Few

Variation and Relationships

- Categorize based on types of variables and what you want to do with them
- Two basic types of visualzaitons
  - Variations
  - Relationships
- Two main types of variables
  - Categorical
  - Quantitative

Variation and Relationships

- Variation within Categorical Variables
- Variation within Quantitative Variables
- Variation across Space
- Variation through Time
- Relationships Among Quantitative Variables
- Relationships Among Categorical Variables
- Relationships Among Multiple Variables and Perspectives

Variation within Categorical Variables

- How a value measured across different categories compares

- Bar Chart
- Line Graph
- Slope Chart
- Treemap

Variation and Relationships

- Variation within Categorical Variables
- Variation within Quantitative Variables
- Variation across Space
- Variation through Time
- Relationships Among Quantitative Variables
- Relationships Among Categorical Variables
- Relationships Among Multiple Variables and Perspectives

Variation within Quantitative Variables

- How numerical data is distributed

- Strip Plot
- Box-and-Whisker Plot
- Histograms

Variation and Relationships

- Variation within Categorical Variables
- Variation within Quantitative Variables
- Variation across Space
- Variation through Time
- Relationships Among Quantitative Variables
- Relationships Among Categorical Variables
- Relationships Among Multiple Variables and Perspectives

Variation Across Space

- How data varies across a geographic domain
  - Or, later, across 3D space

- All the Maps
- Much of scientific visualization

Variation and Relationships

- Variation within Categorical Variables
- Variation within Quantitative Variables
- Variation across Space
- Variation through Time
- Relationships Among Quantitative Variables
- Relationships Among Categorical Variables
- Relationships Among Multiple Variables and Perspectives

Variation through time

- Show variation over time
  - Typically one axis is time

- Line Charts
- Multiple Box Plots
- Dot plots (for irregular samples)
- Heat Maps

Variation and Relationships

- Variation within Categorical Variables
- Variation within Quantitative Variables
- Variation across Space
- Variation through Time
- Relationships Among Quantitative Variables
- Relationships Among Categorical Variables
- Relationships Among Multiple Variables and Perspectives

Relationship Among Quantitative Variables

- Co-relationships

- Scatter Plots
- Heat Maps
- Bubble Charts
- Parallel Coordinates

Variation and Relationships

- Variation within Categorical Variables
- Variation within Quantitative Variables
- Variation across Space
- Variation through Time
- Relationships Among Quantitative Variables
- Relationships Among Categorical Variables
- Relationships Among Multiple Variables and Perspectives

Relationships Among Categorical Variables

- How values from different categories compare to each other

- Multiple/Clustered Bar Chart
- Scatter Plot Matrix
- Heat Map
- Radar Chart

Variation and Relationships

- Variation within Categorical Variables
- Variation within Quantitative Variables
- Variation across Space
- Variation through Time
- Relationships Among Quantitative Variables
- Relationships Among Categorical Variables
- Relationships Among Multiple Variables and Perspectives

Relationships Among Multiple Values and Perspectives

- Combining multiple chart types to give an overall view

Communicating with Data Visualisation

Adam Frost, Jim Kynvin, Tobias Sturt, Sergio Fernandez Gallardo

Story

- Focus of taxonomy is the type of story you want to tell
  - What is it you're trying to communicate
  - Multiple example chart types could be appropriate for each story
  - Any one chart type can usually be used for multiple types of stories

What Type of Story?

- Change Over Time
- Comparison
- Composition
- Distribution
- Correlation
- Geospatial
- Others
- Chart Combinations

Change Over Time

- One data series, 2 years
- One data series, several years
- One data series, with annotations
- Several data series, 2 years
- Several data series, several years
- Several data series against an average
- Ranking
- Margin of error
- Projections
- Off-the-Chart (excessively large values)
- Too much data

Comparison

- Five items or fewer
- Five items or fewer, percentage
- 10-20 datapoints
- 10-20 datapoints, percentage
- Many categories, two variables
- Many categories, many variables
- Many countries, many variables
- Margin of error
- Off-the-charts
- Too many datapoints

Composition

- Percentage, small dataset, one point in time
- Percentage, comparing against others
- Nested categories
- Too many datapoints

Distribution

- A single distribution
- Comparing two distributions
- Comparing many distributions

Correlation

- Comparing countries or categories
- Change over time

Geospatial

- 10 datapoints or fewer
- One country or area, all regions
- Global data, single point in time

Others

- Targets and deviation
- Timelines
- Movement and flow
- Overlap

Chart Combinations

- A change for the better
- A change for the worse
- A neutral or historical change
- Comparison – an outlier or exception
- Comparison – a mixed picture
- Comparison – two key categories or one category agains ta target/average