Presenting Your Results

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creating community through the arts

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Objectives

At the end of this workshop, you will possess:

• An understanding of basic statistical concepts to support your impact reporting
• Several approaches for presenting and displaying your impact data
• A brief glimpse into the world of data visualization
Agenda

• Primer of Basic Statistics
• Overview of Graphic Display
• Introduction of Data Visualization
• Next Steps
Introduction

**data**, dātä,, n.pl. facts given, from which others may be inferred:—sing. da'tum(q.v.)
Types of Data

- Primary – data you collect yourself
- Secondary – secondhand data
- Qualitative – descriptive
- Quantitative – numerical
- Discrete – limited values
- Continuous – any value

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Levels of Measurement

- **Nominal** – No order or ranking can be imposed on the data
- **Ordinal** – Has an order, but the intervals between measurements are not meaningful
- **Interval** – Precise differences between units of measure, but no true zero point
- **Ratio** – highest level of measurement
Socio-Economic Status: Different Levels of Measurement

- **Nominal** – Profession
- **Ordinal** – Household income categories
- **Interval** – Rating scale
- **Ratio** – Annual household income
Numerical Summaries

• Average - mean, median, mode
• Range
• Skew
Organizing Data

• Database
• Spreadsheet
• Tables
General Principles of Graphic Display

• Present meaningful data
• Define the data unambiguously
• Present the data efficiently
• Do not distort the data
Components of Charts

• Title
• X-Axis
• Y-Axis
• Legend
• Source
• Data
Types of Charts

- Pie charts
- Bar charts
- Line graph
- Scatterplots
Pie Chart

- Distribution of categorical data
- Not especially interesting
- Never make three-dimensional

Figure 1. Student and faculty response to the poll 'Should Avenue High School adopt student uniforms?'

- Yes: 10%
- No: 90%
3-D Pie Chart: Nuclear Power Stations
Bar Chart

- Display relationship between categorical variables and quantitative variables
- Can be vertical or horizontal
- Never make three-dimensional

Figure 1. Number of police officers in Crimeville, 1993 to 2001

Figure 3. Number of students at Diversity College who are immigrants, by last country of permanent residence

<table>
<thead>
<tr>
<th>Country</th>
<th>Number of Immigrants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Australia</td>
<td>80</td>
</tr>
<tr>
<td>Brazil</td>
<td>120</td>
</tr>
<tr>
<td>China</td>
<td>120</td>
</tr>
<tr>
<td>France</td>
<td>240</td>
</tr>
<tr>
<td>Korea</td>
<td>80</td>
</tr>
<tr>
<td>United States</td>
<td>160</td>
</tr>
</tbody>
</table>
Figure 2. Internet use at Redwood Secondary School, by sex, 1995 to 2002

Figure 4. Drug use by 15-year-old students in Jamie's school, by gender
A Really Bad Bar Chart
The Corrected Chart


source: Illinois Board of Higher Education, Data Block 2004

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Other Types of Bar Charts

Stacked Bar Charts

Dot Graph

Pictograph

Histogram

Source: OECD Education at a Glance: 1996
Line Graph

• Reveal trends and relationships between data
• Also called a time series chart
• Beware of scaling effects

Figure 2. Average number of dollars donated at Evergreen High School, by age of donor
Example of Scaling Effect

Stock prices of two companies: Hypothetical data

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Correcting Scaling Effect

George W. Bush: Job Approval and Unemployment Rates

unemployment: Bureau of Labor Statistics

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**Scatterplot**

- Data points are plotted, but not joined
- Pattern reveals relationships between variables
- Can be used to inspect data before doing additional analyses
Data Correlation

Figure 2. Strong linear relationship of variables

Figure 3. Positive or direct relationships between variables

Figure 4. Negative or inverse relationships

Figure 5. Scattered data points
Outliers

Figure 9. Outliers
“Words and numbers are of equal value, for in the cloak of knowledge, one is the warp and the other is the woof. It is no more important to count the sands than it is to name the stars.”

Data Visualization

• Visual representation of data
• Combination of aesthetic form and function
• Provides insight into complex data by presenting it an intuitive way
Summary

• Present fewer numbers
• Contextualize
• Round up or down as much as you can
• Use charts, but try to vary the type
• Add a little of your own personality
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