When Less *Really* is More: Putting Data Visualization Best Practices to Work

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Intended Results

• Reflect on your current data audience(s) and stakeholders
• Build a shared understanding of data viz best practices
• Reflect on your own work and action plan
Limiting Assumptions

• Data are of good quality

• Data are actionable

• Data viz authors had good intentions
Shout-outs

Ann K. Emery
http://depictdatastudio.com

Stephanie Evergreen
http://stephanieevergreen.com
Good data visualization . . .

• is an *accessible* story-telling tool

• supports equitable communication among stakeholders

• supports better data use for decision-making
"When you package up your insights as a data story, you build a bridge for your data to the influential, emotional side of the brain."
Equitable Data Communication

The right to use social science tools – such as surveys – to package their knowledge into data to convey to decision-makers and other audiences.

The right to research

The right to access information beyond their reach, whether that knowledge is inaccessible due to cost, technical jargon, or other barriers.

The right to be heard

The right to know

decolonize data

The right to the tools through which groups or individuals can systematically increase that stock of knowledge which they consider most vital to their survival.
Data Use for Decision-Making

Active Implementation

Effective Practices $\times$ Effective Implementation $\times$ Enabling Context $\Rightarrow$ Improved Outcomes

Teams

Data & Communication
1. Know Your Audience
Whose instincts are we considering?
Think – Pair – Share

Think about your audience:
• What level of technical detail do they need?
• What do they want to do with the data?
• What do you want them to do with the data?
• What are some gaps in the way you currently communicate data?

Pair up with someone. Discuss your reflections.

Share with the larger group – if you wish.
2. Apply Data Visualization Best Practices
Text

• Titles are descriptive

• Subtitles/annotations provide additional information

• Text size is hierarchical

• Text is horizontal

• Data are labeled directly

• Labels are used sparingly
Demographic data on ABC Organization individuals served 10/1/10 – 9/30/11
The ABC Organization served a total of 713 individuals between 10/1/10 and 9/30/11.

Our cultural diversity

- Latino: 380 youth
- African American: 250
- African Descent: 40
- Multiracial: 25
- Other: 22
- Native American: 11
- Asian: 7
- Unknown: 4
- Arab Descent: 4
- Caucasian: 3

84% are Latino or African American
Arrangement

• Proportions are accurate
• Data are intentionally ordered
• Axis intervals are equidistant
• Graph is 2-dimensional
• Display is free from decoration
Demographic data on ABC Organization individuals served 10/1/10 – 9/30/11
The ABC Organization served a total of 713 individuals between 10/1/10 and 9/30/11.

Our cultural diversity

<table>
<thead>
<tr>
<th>Race/ethnicity</th>
<th>Number of individuals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Latino</td>
<td>380 youth</td>
</tr>
<tr>
<td>African American</td>
<td>250</td>
</tr>
<tr>
<td>African Descent</td>
<td>40</td>
</tr>
<tr>
<td>Multiracial</td>
<td>25</td>
</tr>
<tr>
<td>Other</td>
<td>22</td>
</tr>
<tr>
<td>Native American</td>
<td>11</td>
</tr>
<tr>
<td>Asian</td>
<td>7</td>
</tr>
<tr>
<td>Unknown</td>
<td>4</td>
</tr>
<tr>
<td>Arab Descent</td>
<td>4</td>
</tr>
<tr>
<td>Caucasian</td>
<td>3</td>
</tr>
</tbody>
</table>

84% are Latino or African American
Color

• Color scheme is intentional

• Color is used to highlight key patterns

• Color is legible when printed in black and white

• Color is legible for people with colorblindness

• Text sufficiently contrasts with background
China has the highest first quarter sales.
Lines

• Gridlines, if present, are muted
• No border lines
• No tick marks, axis lines
• One horizontal, one vertical axis
When he got to the bottom, Jabari remembered something. “I forgot to do my stretches!” he said to his dad.

“Stretching is very important,” said his dad.
General Considerations

• Highlight significant findings or conclusions
• Graph type is appropriate for data
• Graph has appropriate level of precision
• Chart elements work together to create meaning
Perfection is achieved not when there is nothing more to add, but when there is nothing left to take away.

– Antoine de Saint-Exupery
Remove to improve (the data-ink ratio)
3. Case Studies
Exhibit A.
The Disaster
The Reboot Agenda

1. Don’t bury the lead

2. Limit to one page (front and back)

3. No blocks of narrative text

4. Use color for emphasis
Exhibit B. The Improvement

### XYZ County
**FY2017 Adolescent Pregnancy Prevention Program Evaluation Report**

<table>
<thead>
<tr>
<th>Outcome Objective</th>
<th>Target</th>
<th>Actual</th>
<th>Achieved?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Increase in knowledge that supports the prevention of pregnancy and/or STIs</td>
<td>50%</td>
<td>95%</td>
<td>✔️</td>
</tr>
<tr>
<td>Increase in attitudes and beliefs that support the delay of sexual activity for the prevention of pregnancy and/or STIs</td>
<td>35%</td>
<td>75%</td>
<td>✔️</td>
</tr>
<tr>
<td>Increase in attitudes and beliefs that support the use of condoms for the prevention of pregnancy and/or STIs</td>
<td>55%</td>
<td>90%</td>
<td>✔️</td>
</tr>
</tbody>
</table>

95% of youth demonstrated a statistically significant increase in sexual knowledge.

Statistically significant increase in mean sexual knowledge score:
- **PRE**: 5.8
- **POST**: 9.5

75% of abstinent youth demonstrated an increase in attitudes supporting abstinence.

74% of youth surveyed reported being abstinent at pre- and post-test.

<table>
<thead>
<tr>
<th>Youth Served</th>
<th>African American</th>
<th>Other</th>
<th>Latino</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>71%</td>
<td>23%</td>
<td>12%</td>
<td>8%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Youth Surveyed</th>
<th>African American</th>
<th>White</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>70%</td>
<td>12%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Age</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;15</td>
</tr>
<tr>
<td>15-17</td>
</tr>
<tr>
<td>&gt;17</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Gender</th>
</tr>
</thead>
<tbody>
<tr>
<td>Female</td>
</tr>
<tr>
<td>Male</td>
</tr>
</tbody>
</table>

84 days between pre-and post-test.
Figure 1. Percent of Respondents Who Correctly Answered Questions on Sexual Knowledge

95% of youth demonstrated a statistically significant increase in sexual knowledge.

Statistically significant increase in mean sexual knowledge score

<table>
<thead>
<tr>
<th>PRE</th>
<th>POST</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.8</td>
<td>9.2</td>
</tr>
</tbody>
</table>

Statistically significant increase in the number of youth who know where to access contraceptives

<table>
<thead>
<tr>
<th></th>
<th>71%</th>
<th>100%</th>
</tr>
</thead>
</table>

75% of abstinent youth demonstrated an increase in attitudes supporting abstinence.

Increase in the number of youth who agree they abstain because they don’t want to get an STI

<table>
<thead>
<tr>
<th></th>
<th>97%</th>
<th>100%</th>
</tr>
</thead>
</table>

Increase in the number of youth who agree that they abstain because they don’t want to get pregnant or get their partner pregnant

<table>
<thead>
<tr>
<th></th>
<th>62%</th>
<th>100%</th>
</tr>
</thead>
</table>

90% of youth demonstrated a significant increase in attitudes supporting condom use.

Increase in the number of youth who agree that condoms are good at preventing pregnancy

<table>
<thead>
<tr>
<th></th>
<th>74%</th>
<th>100%</th>
</tr>
</thead>
</table>

Statistically significant increase in the number of youth who agree that condoms are good at preventing STIs/HIV

|   | 73% | 93%  |
Exhibit C. The Unnecessarily Dense Approach
The Reboot Agenda

1. Refocus visuals to highlight key take-aways
2. Remove superfluous data
3. Simplify color scheme
Exhibit D. The Simplification

Generalist Results – May 2019
Student Overview and Benchmarks
This section of the report overviews student statuses, benchmark results, and change from the 2018 Generalist Outcome Assessment.

113 First-Year Students

<table>
<thead>
<tr>
<th></th>
<th>Total 92.9%</th>
<th>1 (Ethics) 92.0%</th>
<th>2 (Diversity) 91.2%</th>
<th>3 (Social Justice) 94.7%</th>
<th>4 (Research/Practice) 86.0%</th>
<th>5 (Policy) 78.8%</th>
<th>6 (Engagement) 88.5%</th>
<th>7 (Assessment) 83.4%</th>
<th>8 (Intervention) 87.6%</th>
<th>9 (Evaluation) 87.6%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>63%</td>
<td>22%</td>
<td>15%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
<td>0%</td>
</tr>
</tbody>
</table>

Average Scores by Competency
This section of the report shows average scores for each competency across all first-year students (possible scores range from 0 to 5). Average scores are sorted from largest to smallest.

- 3 (Social Justice) 4.62
- 2 (Diversity) 4.53
- 1 (Ethics) 4.50
- 6 (Engagement) 4.49
- 9 (Evaluation) 4.39
- 8 (Intervention) 4.35
- 4 (Research/Practice) 4.35
- 7 (Assessment) 4.28
- 5 (Policy) 4.11
### Average Scores by Student Status

This section of the report shows averages scores for each competency, and in total, by student status.

<table>
<thead>
<tr>
<th>Competency</th>
<th>Full-Time</th>
<th>DE - Triangle</th>
<th>DE - Winston Salem</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Total</strong></td>
<td>40.35</td>
<td>39.36</td>
<td>38.88</td>
</tr>
<tr>
<td>1 (Ethics)</td>
<td>4.48</td>
<td>4.56</td>
<td>4.53</td>
</tr>
<tr>
<td>2 (Diversity)</td>
<td>4.63</td>
<td>4.40</td>
<td>4.29</td>
</tr>
<tr>
<td>3 (Social Justice)</td>
<td>4.58</td>
<td>4.80</td>
<td>4.53</td>
</tr>
<tr>
<td>4 (Research/Practice)</td>
<td>4.35</td>
<td>4.40</td>
<td>4.29</td>
</tr>
<tr>
<td>5 (Policy)</td>
<td>4.17</td>
<td>3.92</td>
<td>4.12</td>
</tr>
<tr>
<td>6 (Engagement)</td>
<td>4.48</td>
<td>4.52</td>
<td>4.47</td>
</tr>
<tr>
<td>7 (Assessment)</td>
<td>4.45</td>
<td>3.96</td>
<td>4.06</td>
</tr>
<tr>
<td>8 (Intervention)</td>
<td>4.39</td>
<td>4.28</td>
<td>4.29</td>
</tr>
<tr>
<td>9 (Evaluation)</td>
<td>4.48</td>
<td>4.40</td>
<td>4.00</td>
</tr>
</tbody>
</table>
Data Gallery

Visit each data visualization flipchart. Using the Data Viz Checklist note:

- Strengths
- Opportunities for improvement
- Questions you may have
United Kingdom 2016-17 Government Expenditure

- **Social Protection**: £240bn
- **Health**: £145bn
- **Education**: £102bn
- **Defence**: £46bn
- **Government Debt Interest**: £39bn
- **Public Order and Safety**: £34bn
- **Personal Social Services**: £30bn
- **Housing and Environment**: £34bn
- **Transport**: £29bn
- **Industry, agriculture and employment**: £24bn
- **Other (includes EU contributions)**: £49bn

Total 2016-17 Government Expenditure: **£772 billion**

Expenditure figures taken from page 5, Budget 2016. 16 March 2016, HM Govt.
Anatomy of a Winning TED Talk

1% Sophisticated Visual Aids
We're not sure who puts the D in TED—most of the best presentations favor tepid PowerPoint slide shows (sorry, Brans Brown), Pictionary-quality drawings (really, Simon Sinek?), or no props at all.

5% Opening Joke
Remember the one about the shoe salesmen who went to Africa in the 1900s? That's how Benjamin Zender opened his talk—which turned out to be about classical music.

5% Spontaneous Moment
Don't overprepare. Tease the guy in the front row ("You could light up a village with this guy's hair"). Comment the stagehand who handles the human brain you brought.

5% Statement of Utter Certainty
People come for answers—give 'em what they want, as Shawn Achor did: "By training your brain ... we can reverse the formula for happiness and success."

12% Snappy Refrain
The TED equivalent of "I have a dream." Example: "People don't buy what you do; they buy why you do it." Repeat 7x.

23% Personal Failure
Be relatable. We want to know about that nervous breakdown. Or at least the time you didn't fit in at summer camp.

49% Contrarian Thesis
Wait a sec—we should be playing more videogames? The more choices we have, the worse off we are? TED is where conventional wisdom goes to die.
LANGUAGES

This chart shows you the primary languages of your community, useful when deciding which language to Tweet in.

- English: ~42107 (57.1%)
- Spanish: ~22987 (31.2%)
- Portuguese: ~1798 (2.4%)
- German: ~1362 (1.8%)
- French: ~1355 (1.8%)
- Dutch: ~1070 (1.5%)
- Italian: ~745 (1%)
- Catalan: ~528 (0.7%)
- Turkish: ~369 (0.5%)
- Indonesian: ~271 (0.4%)
- English UK: ~256 (0.3%)
- Russian: ~207 (0.3%)
- Other: ~661 (0.9%)
Figure 4. Advanced medical imaging among noninjury emergency department visits for persons aged 18 years and over: United States, 1999–2008

Trend is significant ($p < 0.05$).
NOTE: Figures are based on 2-year averages.
Figure 6: Student Results by Skills Area

- System & Fundamentals: 2009 State Average = 2.9, 2010 State Average = 2.6, Possible Items Correct = 3.2
- Social & Ethical: 2009 State Average = 4.1, 2010 State Average = 2.7, Possible Items Correct = 2.7
- Word Processing: 2009 State Average = 2.7, 2010 State Average = 2.7, Possible Items Correct = 2.8
- Spreadsheets: 2009 State Average = 2.3, 2010 State Average = 2.3, Possible Items Correct = 2.3
- Multimedia/Presentation: 2009 State Average = 3.5, 2010 State Average = 3.1, Possible Items Correct = 3.1
- Telecommunications/Internet: 2009 State Average = 2.1, 2010 State Average = 2.8, Possible Items Correct = 2.8
- Database: 2009 State Average = 6, 2010 State Average = 6, Possible Items Correct = 6
Action Planning

Where do you have discretion and freedom to act?

What can you do without more resources or authority?
Questions?

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