Design Thinking for Data Visualization

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Voices on the Webinar

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Webinar Reminders

1. Everyone is MUTED.

2. Remember to chat in questions!

3. Webinar is being recorded and will be posted and sent out via email
Common need & timing alignment for data visualization!
# Webinar Participants

**SNAP-LA**

1. Eisner Pediatric & Family Medical Center
2. JWCH Institute, Inc.
3. KHEIR Center
4. Los Angeles LGBT Center
5. South Central Family Health Center
6. The Achievable Foundation
7. UMMA Community Clinic
8. Westside Family Health Center

**CP3**

1. Asian Health Services
2. Community Health Partnership
3. Gardner Family HealthCare
4. La Clinica de La Raza, Inc.
5. LifeLong Medical Care
6. Monterey County Clinics
7. Northeast Valley Health Corporation
8. Operation Samahan
9. Ravenswood Family Health Center
10. San Joaquin General Hospital
11. Venice Family Clinic
12. Vista Community Clinic
Setting the Context

What data visualization tools or techniques does your organization use?

What challenges has your organization encountered when displaying or presenting data?

"Our stakeholders want more data and at different levels. Finding the right tool to handle such requests is our current priority."

"Ability for staff to manipulate and drill down to explore the data further."

"Keeping it simple enough to understand for everyone."
Design Thinking for Data Visualization

Andrew Frueh
Director of User Experience

HealthCatalyst
Ignite outcomes improvement
New Language & Necessary Craft
It’s Everywhere

Data visualization has seeped into every aspect of our daily lives
Traffic Maps
So what?
So What?

**First:** Dataviz is everywhere and comes in a wide spectrum of sophistication and quality.
Why Visualization?

Big Data:

• The sheer volume and velocity of data coming at us is staggering

• Demands a new way of communicating that abstracts, simplifies, and helps us cope
Boeing Osprey

• Takes off an lands like a helicopter
• Sensors produce a terabyte of data on each takeoff and landing
• Ten flights produce as much data as the entire print collection of Library of Congress
• Scouring that data in any raw format would be absurd
So What?

First: Dataviz is everywhere and comes in a wide spectrum of sophistication and quality.

Second: The volume of data available to us is greater now than at any time in human history, we need visualization to help us cope.
How High is the Bar?
So What?

**First**: Dataviz is everywhere and comes in a wide spectrum of sophistication and quality.

**Second**: The volume of data available to us is greater now than at any time in human history, we *need* visualization to help us cope.

**Third**: The exposure to dataviz has an effect on the expectations of our clients and the consumers of our viz.
Learning Objectives

You will be able to turn your data into effective visualizations that convey actionable stories.

- Understand how our brains perceive and **consume** data visualizations.
- Understand and apply **design** guidelines for well-executed, beautiful charts.
- Understand how to establish context and how to use context to **design** and **create** the most effective dataviz for your audience.
- **Create** effective dataviz for a real-world scenario within healthcare analytics.
- Explain your design decisions to others.
When a Chart Hits our Eyes
If something is hard to perceive, people not only struggle to find the right meaning, but judge it less favorably. It's not the chart that they'll judge harshly if the meaning is hard to find; it's the *information* itself. They'll consider it less credible.
Activity
Eye Map

Instructions:

Look visualization on next slide:
• Map how your eyes travel across the visualization.
• Number each “stop” your eyes make.
NON-MORTGAGE DEBT OUTSTANDING

BILLIONS OF $US

$1,000 -

800 -

600 -

400 -

200 -

0 -

2004 05 06 07 08 09 10 11 12 13

Student loans

Auto

Credit card

Home equity

Other

SOURCE: FEDERAL RESERVE BANK OF NEW YORK
How Do We Read Text?

1. Here's a breakdown synopsis of data visualization’s development from simple communicating visualizations through a long period of stagnation to burgeoning interdisciplinary science. It provides context for when we begin to evaluate and learn to think visually. Specifically it helps us understand three key points:

   1. Arguments about good and bad charts have gone on for 100 years, and even clever new chart types probably aren’t as clever as you think.
   2. Most rules about data visualization design principles, tradition, taste, and the constraints of the medium used to publish them, not on scientific evidence.
   3. Scientific evidence supporting rules for choosing chart types and techniques, while developing rapidly and with some exciting finds, is in its very early stages.

2. Antecedents

   The first data visualization was probably drawn in the dirt with a stick, when one hunter-gatherer drew a map for another hunter-gatherer to show where they could find food, or maybe treasure. Here is a new one.

   This can’t be fact checked, but I’m confident saying it. If data is information about the world…
How Do We Read Charts?

3. Difference in Hourly Wages for Those With College Degree vs. Other Groups
   (Those with grad degrees aren’t counted)

4. $20 - 16 - 12 - 8 - 4 -
   1973  81  93  97  01  05  13

2. College vs. less than high school

1. College vs. high school

6. College vs. some college
How Do We Read Charts?

1. We don’t go in order
Activity
Heat Map

Instructions: Review your eye tracking to see where your eyes went *first* on the chart.
What Stands Out?

- High Contrast (colors or brightness)
- Distinct Colors
- Story or Trend in the Data (an intersection between lines, etc)
- Big Numbers
- Human Faces
How We Read Charts

1. We don’t go in order
2. We see first what stands out
TEAM PERFORMANCE

BLUE TEAM PERFORMANCE

RATING

Jan.  June

High  Low

SOURCE: COMPANY RESEARCH

TEAM PERFORMANCE
HIGHLIGHTING INDIVIDUALS

RATING
High
Low

Steve
Alice
Joe
Bob
Jane

Jan.
June

SOURCE: COMPANY RESEARCH
How We Read Charts

1. We don’t go in order
2. We see first what stands out
3. We see only a few things at once
WHERE PEOPLE LIVE

PERCENTAGE OF WORLD POPULATION LIVING IN URBAN AND RURAL AREAS

100%

Rural

Urban


SOURCE: UNITED NATIONS, DEPARTMENT OF ECONOMIC AND SOCIAL AFFAIRS, POPULATION DIVISION (2014)
DECLINING CALL CENTER PERFORMANCE

CUSTOMER SERVICE PERFORMANCE RATING

Outage

Service restored

WEEK 1

WEEK 2

SOURCE: COMPANY RESEARCH
CUSTOMER SERVICE CALLS VS. PERFORMANCE

CUSTOMER SERVICE PERFORMANCE RATING

NUMBER OF CUSTOMER SERVICE CALLS

OUTAGE

WEEK 1

WEEK 2

SOURCE: COMPANY RESEARCH

#HASUMMIT17
SOURCE: COMPANY RESEARCH

How We Read Charts

1. We don’t go in order
2. We see first what stands out
3. We see only a few things at once
4. We seek meaning and make connections
How We Read Charts

1. We don’t go in order
2. We see first what stands out
3. We see only a few things at once
4. We seek meaning and make connections
5. We rely on conventions and metaphors
The Feeling Behind our Eyes
Design Principles

1. Structure & Hierarchy
# Consistent Structure

<table>
<thead>
<tr>
<th>Title</th>
<th>12%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subtitle</td>
<td>8%</td>
</tr>
<tr>
<td><strong>Field</strong></td>
<td>75%</td>
</tr>
<tr>
<td><strong>Timestamp</strong></td>
<td>5%</td>
</tr>
</tbody>
</table>

Consistent Alignment

Limit Eye Travel

HAS16 Example
How would you best characterize your organization?

- Accountable Care Organization: 1674
- Integrated Delivery Network: 1410
- Healthcare Association: 789
- Academic Medical Center: 512
- Other: 402
Design Principles

1. Structure & Hierarchy
2. Clarity
Seriously?

Design Principles

1. Structure & Hierarchy
2. Clarity
3. Simplicity

"The ability to simplify means to eliminate the unnecessary so the necessary can speak."

Hans Hofman
A REP’S PAST PERFORMANCE DOESN’T PREDICT FUTURE PROFITS

By looking not just at the revenue reps have generated but at their future profitability, you may find that your top performers are even more valuable than you thought—and your low performers even more costly.

For both high—and low—performing sales reps in a B2B company, revenue generated was not a good indicator of expected future profitability, calculated using a special formula.

A REPS’ DECILE RANKING WITHIN SALES FORCE

SALES REPS’ AVERAGE ANNUAL REVENUE (IN THOUSANDS)

*CALCULATED USING A PROPRIETARY FORMULA.
SOURCE: RESULTS FROM A STUDY OF ONE B2B COMPANY
BY V. KUMAR, SARANG SUNDER, AND ROBERT P. LEONE

SOURCE: V. KUMAR, SARANG SUNDER, AND ROBERT P. LEONE
Building Better Charts
Design Process

1. Listen to the Client
What is the Context?

“In the absence of context, a chart is neither good nor bad. It’s only well built or poorly built.”
What is the Context?

• Who will see this?
• What do they want?
• What do they need?

• What idea do I want to convey?
• What could I show?
• What am I trying to prove/learn?
Customer is Always Right?

TYPICAL APPLE PRODUCT...

A GOOGLE PRODUCT...

YOUR COMPANY’S APP...

STUFFTHATHAPPENS.COM BY ERIC BURKE
Chicken or the Egg?
Design Process

1. Listen to the Client
2. Listen to the Data
The Story in the Data

Listen to the Client and the Data

What story does the client want me to tell?
What story can the data tell?
What story is the data telling?
Design Process

1. Listen to the Client
2. Listen to the Data
3. Sketch
Sketch Examples

LIFECYCLE VS DEMAND FOR TECHNOLOGY PRODUCTS

> 2000

APP DEVELOPERS

CLIENTS

HEALTH CATALYST

EVIDENCE

HEALTHY CATALYST FABRIC

MESAURES BUILDER LIBRARY (MBL)

PRECISE REGISTRY BUILDER

HEALTH CROWD ARTS

THIRD PARTY ARTS

CUSTOM ARTS

DEVELOPMENT

INNOVATION

GROWTH

MATURITY

DECLINE

EXIT

YOU ARE HERE

WITH OPEN APIs AND DOS

WITHOUT OPEN APIs AND DOS

TIME

EHR EXPECTATIONS

DESIGNER

HAS17

#HASUMMIT17
Design Process

1. Listen to the Client
2. Listen to the Data
3. Sketch
4. Prototype
Thank You!
SNAP-LA To Do’s Summary

- **Webinars**: Attend upcoming webinar on August 10: Tableau in Action.

- **Coach Check-in**: Attend coach check-in between July 15-31.

- **Consultation Support**: Email Megan (mobrien@careinnovations.org) if you have requests for Jerry, Boris, or Loretta.
CP3 Low-Intensity Track: 4 Part Data for Pop. Health Series

Part 1: Building a Data-Driven Culture for Pop. Health Management
- July 19, 2017 @12-1pm
- Faculty: SA Kushinka, CCI & Jerry Lassa, Data Matt3rs

Part 2: Design Thinking for Data Visualization
- July 27, 2017 @ 12-1pm
- Faculty: Andrew Frueh, Health Catalyst

Part 3: Tableau in Action
- August 10, 2017 @ 2-3pm
- Faculty: Dr. Jason Cunningham, West County Health Centers

Part 4: From Data to Action: Key Steps and Strategies for Using Data to Improve Care
- August 17, 2017 @ 12-1pm
- Faculty: Boris Kalikstein, Pivotal Moment Consulting
For questions, please contact:

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