Visual Information Design

Prof. James A. Landay
Computer Science Department
Stanford University

Autumn 2023
October 23, 2023

* Based on slides by Luke Vink, Scott Klemmer, and James Landay
Hall of Fame or Shame?

Palm Beach, Florida
Ballot 2000
Palm Beach, Florida
Ballot 2000

Eye drawn to the wrong holes

If only 1% error rate, can still change a close election

Hall of Shame!
# One Possible Redesign

## Design Thinking for User Experience Design, Prototyping & Evaluation

**dt+UX: Design Thinking for User Experience Design, Prototyping & Evaluation**

William Lidwell, Kritina Holden, and Jill Butler  *Universal Principles of Design*

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### OFFICIAL BALLOT, GENERAL ELECTION

**Palm Beach County, Florida**  
**November 2, 2008**

<table>
<thead>
<tr>
<th>Party</th>
<th>Candidate</th>
<th>Position</th>
<th>Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>REPUBLICAN</td>
<td>George W. Bush</td>
<td>President</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Dick Cheney</td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>DEMOCRATIC</td>
<td>Al Gore</td>
<td>President</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Joe Lieberman</td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>LIBERTARIAN</td>
<td>Harry Browne</td>
<td>President</td>
<td>5</td>
</tr>
<tr>
<td></td>
<td>Art Olivier</td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>GREEN</td>
<td>Ralph Nader</td>
<td>President</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Winona LaDuke</td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>SOCIALIST WORKERS</td>
<td>James Harris</td>
<td>President</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Margaret Trowe</td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>NATURAL LAW</td>
<td>John Hagelin</td>
<td>President</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Nat Goldhaber</td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>REFORM</td>
<td>Pat Buchanan</td>
<td>President</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Ezola Foster</td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>SOCIALIST</td>
<td>David McReynolds</td>
<td>President</td>
<td>10</td>
</tr>
<tr>
<td></td>
<td>Mary Cal Hollis</td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>CONSTITUTION</td>
<td>Howard Phillips</td>
<td>President</td>
<td>11</td>
</tr>
<tr>
<td></td>
<td>J. Curtis Frazier</td>
<td>Vice President</td>
<td></td>
</tr>
<tr>
<td>WORKERS WORLD</td>
<td>Monica Moorehead</td>
<td>President</td>
<td>12</td>
</tr>
<tr>
<td></td>
<td>Gloria La Riva</td>
<td>Vice President</td>
<td></td>
</tr>
</tbody>
</table>

**WRITE-IN CANDIDATE**

To vote for a write-in candidate, follow the directions on the long side of your ballot card.

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**TURN PAGE TO CONTINUE VOTING**

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(A vote for the candidates will actually be a vote for their electors.  
Vote for Group)
Visual Information Design

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The Model Human Processor

- Parameters
  - processors cycle time (T) \(\sim 100 \text{ ms}\)
  - memories capacity, decay time & type

- Use MHP to make predictions
  - min. frame rate (1/100ms)
  - Fitts’ Law for time to hit target
Outline

- Good Form
  - visual hierarchy, layout, proximity, small multiples & space
  - typography, grids & icons
- Team Break
- Color
- Group mood board exercise
- “Interesting Design”
Based on David McCandless
http://www.informationisbeautiful.net
The Art of Balance

Promotion & demotion of important objects

First Question for any design
➢ What are the most important things?

Information should be prioritized based on its importance to the user
Visual Hierarchy and Reading Order

**Strong visual hierarchies** guide visual & logical progression by showing what is important.

**Weak visual hierarchies** provide little or no guidance about what is important.

source: http://52weeksofux.com/post/443828775/visual-hierarchy
Watch Season 1 Now

He's the biggest hero the world has ever seen. But even Kong will need help to stop this army of high-tech beasts!

Continue Watching for Jenny
The First Read: Reading order pillars

1. size
2. color
3. layout
4. spacing
5. style

source: http://thenextweb.com/dd/2015/04/30/the-5-pillars-of-visual-hierarchy-in-web-design/#gref
Using **Proximity** to Indicate Relationships

**Gestalt Psychology in information design**

Information blocks should be **grouped together if related**, but unrelated elements should be located at some distance from each other.
Using **Proximity** to Indicate Relationships
Using **Proximity** to Indicate Relationships
Using **Proximity** to Indicate Relationships
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Using **Proximity** to Indicate Relationships
Using **Proximity** to Indicate Relationships
Small Multiples

- Economy of line
- Similarities enable us to notice differences
International Women’s Day

SMALL MULTIPLES

Echeverria, Heriberto  1971
March 8 - International Women’s Day

Diaz, Estela  1974
March 8 - International Women’s Day

Revolucion: Cuban Poster Art by Lincoln Cushing
http://www.amazon.com/Revolucion-Cuban-Poster-Lincoln-Cushing/dp/0811835820
Proximity & Small Multiples in Use

Today Weather
iOS App
Proximity & Small Multiples in Use

Today Weather
iOS App
Proximity & Small Multiples in Use

Today Weather
iOS App

Pittsburgh
30°
feels like 27°
39° / 27°
100%
3 mph
12am 4am 8am
29° 32° 31°

SUN MON TUE WED THU FRI SAT
10% 10% 40% 48% 52% 48%
31° 34° 37° 39° 28° 28°

Sunday, December 16
9am 10% 31°
10am 10% 34°
11am 10% 37°
12pm 10% 37°
1pm 10% 37°
2pm 10% 37°
3pm 10% 36°
4pm 10% 35°
Sunset 4:36pm
5pm 10% 34°
6pm 10% 31°
7pm 10°
Using Blank / White Space as an Object

- White space can be used to suggest importance or prestige
- The more space around a group, the more valuable it should be for the user
- Think of whitespace as an “element” – consider its position
A higher plain

White Space = Value
What Are The Important Things Here?
Jan Tschichold’s Revolution

Champion of Modernist Typography

*Die Neue Typographie*
Berlin, 1928

Bauhaus school
Dessau, 1925-26
Type Classifications

**Typeface** (Arial) vs **Font** (Arial Bold)

**Serifs**: Structural details in letters that (may) help the reader connect them

<table>
<thead>
<tr>
<th></th>
<th>Sans Serif</th>
<th>Serif</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Optima</td>
<td>Fenice Bold</td>
</tr>
<tr>
<td>Roman</td>
<td>answ</td>
<td>answ</td>
</tr>
<tr>
<td>Obliqued</td>
<td>answ</td>
<td>answ</td>
</tr>
<tr>
<td>True italic</td>
<td>answ</td>
<td>answ</td>
</tr>
</tbody>
</table>
How blocks used to be arranged in magazines. Schematic, thoughtless centering of blocks (= ugly).

The same blocks, correctly arranged in the same type-area. Constructive, meaningful, and economical (= beautiful).
Grid Systems

• A key pattern for implementing rationality, modernism, asymmetry
• Note that no elements are “centered”
Iconography:
Differences that Make a Difference

www.jensondesign.com/1+1=3.pdf
Administrivia

- **Web site**
  - must be on web site by studio next week or grade will be docked
  - problem getting a web site up, talk to your CA now

- **CS 194H**
  - follow-on to CS147
  - offered this Winter
Assignment Grading Buckets

- **Far exceeds expectations**: Reserved for ~ the top 1-3 submissions that can be used as examples in class. This is an A+, often a perfect or > 97% score.

- **Fulfills the expectations** in the spec and **some elements exceed expectations**. Strong engagement with the design process. Excellent presentation of the work. This is an A range grade (93 - 97%).

- **Fulfills the expectations** in the spec. Students engaged with the design process, though maybe **some small issues remain**. Presentation understandable. This is a B+/A- range grade (88 - 92%).

- **Relatively complete, but there are components of unsatisfactory quality**. Presentation may fall short (e.g., poor image resolution, too much text). This is a B range grade (83 - 87%).

- **Incomplete or multiple parts are of unsatisfactory quality**. Shows sub-par engagement with the design process. Presentation likely falls short in many ways. This is a C+/B- range grade (78 - 82%).

- **Missing substantial assignment components and/or mostly poor quality**. Does not represent engagement with the design process. This is a C range grade or lower (< 78%).
TEAM BREAK
(FINISH LOW-FI PROTOTYPE OR SLIDES)
Color
Color Definitions (digital)

- **Hue** is gradation of color (i.e., name: “yellow”)
- **Saturation** is purity of the hue (vividness)
  - how much gray is mixed in
- **Luminance** is the brightness in an image
Color: Edward Tufte – by hue

IMAGE REMOVED
Color: Edward Tufte – by luminance

IMAGE REMOVED
The Basics of the Color Wheel
Color *Harmonies*

“A pleasing arrangement of parts, whether it be music, poetry, color, or an ice cream sundae.”
Using Appropriate Color “Harmonies”

<table>
<thead>
<tr>
<th>Complementary</th>
<th>Analogous</th>
<th>Triad</th>
<th>Split Complementary</th>
<th>Rectangle (Tetrarc)</th>
<th>Square</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Complementary" /></td>
<td><img src="image2" alt="Analogous" /></td>
<td><img src="image3" alt="Triad" /></td>
<td><img src="image4" alt="Split Complementary" /></td>
<td><img src="image5" alt="Rectangle (Tetrarc)" /></td>
<td><img src="image6" alt="Square" /></td>
</tr>
</tbody>
</table>

Complementary: Colors that are opposite each other on the color wheel.
Analogous: Colors that are next to each other on the color wheel.
Triad: Colors that are evenly spaced on the color wheel.
Split Complementary: Colors that are on opposite sides of the color wheel but do not include the color in the middle.
Rectangle (Tetrarc): Colors that form a rectangle on the color wheel (not a square).
This color scheme must be managed well so it is not jarring. Bad with Text!!

Not so good for text

Christmas...maybe Everyday use...

Not so much!

Hard on the eyes
Complimentary (e.g., Children’s Bedroom)
Analogous

Always easy on the eyes, this type of color scheme always looks “natural”
Analogous (e.g., Beyond Oil)
Often a good choice for beginners, because it is difficult to mess up.
Split Complimentary
Monochromatic or Grayscale
Start with Greyscale

… then *accent* or *enhance* with color
Action + Passive Colors
Poor Use of Color

Phew! I wasn't sure I'd make it today but since I'm amazing, I did.

Made it. Proved it.

Brett & 3 others gave a bump!

Meredith Von Bell
2:34 PM Thursday, June 13th
Nice. Thought we were going to

Jessica Longname

07:32

3X/WK
7 WKS.
3 Days Off
3 Makes

Don Wilburnforce commented
I'm not sure that I'll make it tonight.
Redesigned to Use 3 Actionable Colors
Action

Immediate

Analogous
Tools that help with color selection

https://coolors.co/

http://color.adobe.com/

http://www.colourlovers.com

https://paletton.com/
I am not what happened to me. I am what I choose to become.
Mood Boards

LOREM IPSUM DOLOR SIT AMET

AN EST NIBH ILLUM CONCLUDATURQUE
Mood Boards – Team Exercise (10 min)

- Before starting your mood board, think of 3-5 adjectives giving vibe you’d like your solution to convey to users (write them down)
- From those adjectives, have each team member search online for images to convey that tone & compile them all onto a team slide
- From the images, choose the primary & secondary colors you want to use for your medium-fi

- Copy this slide deck to your team folder
Exit Ticket
Visual Design that is Interesting
[the wow factor]
Non Conventional Layouts

• Hard to get right & easy to overdo!

• Try new shapes
  – circular charts
  – hexagonal objects

• Like all techniques (color, etc) – restrict unconventional layouts to the most important information
Wilfred Castillo: Tide Prediction: http://www.wilfredcastillo.com/Tide-Prediction
Dynamic Movement / Animation

- Hard to get right & easy to overdo!

- Animation is best used to connect information & create “flow”

- Like size, color & unusual shapes, animation draws attention to the eye & suggests importance
Metaphors (using the real world to describe info)

- Hard to get right & easy to overdo!
- Very useful to provide meaning and connect information to logic
- The more direct or specific a metaphor, the more contextually relevant it is to a generation or time
The best designs **balance** the techniques you have seen

and

The **less** techniques used, the easier it is to balance them
Overwhelming Use of Different Techniques
In other words,

Keep it Focused
Based on David McCandless
http://www.informationisbeautiful.net
Form

Interestingness

Integrity

Function
Summary

- Start with **context** – what is the nature of the information? What is the most important?
- Design first in grayscale to focus on **hierarchy**
- **Small changes** help us see key differences
  - e.g., small multiples
- Avoid clutter, focus on the **essence** of your tasks
- Use color properly – **not for ordering!**
- Only use **1-2 colors at a time**, unless absolutely necessary
Further Reading

- Kevin Mullet and Darrell Sano, *Designing Visual Interfaces*
- Edward Tufte’s books and course
- Robin Williams, *The Non-Designer’s Design Book*
- Typography
  - Jan Tschichold, *The New Typography*
  - Robert Bringhurst, *The Elements of Typographic Style*
- Typography on the web
Next Time

• Wed
  – CS 147 Film Festival
    • Come watch the best videos & vote on prizes

• Studio on Friday
  – present low-fi prototype/user study results – *key things learned*
  – work on sketching out new designs

• Mon
  – Conceptual Models & Interface Metaphors
  – Read
    • "The Psychology of Everyday Things" (Ch 1) from The Design of Everyday Things by Donald Norman