Conceptual Models & Interface Metaphors

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Hall of Fame or Shame?

- Design based on a top retailer’s site

Hall of Shame!

- Design based on a top retailer’s site
- Color deficiency – can’t distinguish between red & green
- In study, user could not get by this screen!
- How to fix? – redundant cues

Hall of Fame or Shame?

- M-Pesa mobile payments
- Common in Africa

Hall of Fame!

- M-Pesa mobile payments
- Common in Africa
- Simple UI, but brings banking services to the unbanked!
**Outline**

- Review visual design
- *Design of Everyday Things*
- Conceptual models
- Team break
- Interface metaphors
- UI consistency

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**Visual Design Review**

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

**Design of Everyday Things**

- By Don Norman (UCSD, Apple, HP, NN Group, NU, UCSD)
- Design of everyday objects illustrates problems faced by designers of systems
- Explains conceptual models
  - doors, washing machines, digital watches, telephones, ...
- Resulting design guides
  - Highly recommended

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**Conceptual Models & Interface Metaphors**

- Mental representation of how an artifact works & how interface controls affect it
- People may have preconceived models that are hard to change
  - (4 + 5) vs. (4 5 +)
  - dragging to trash?
    - deletes file but ejects disk
- Interface must communicate model
  - visually (& possibly physically or using sound)

**Affordances as Perceptual Clues**

- Well-designed objects have **affordances**
  - clues to their operation
  - often visual, but not always (e.g., speech)
  - What affordances do you see here?
Affordances as Perceptual Clues

- Poorly-designed objects
  - no clues or misleading clues

Refrigerator

Problem: freezer too cold, but fresh food just right

Actual Conceptual Model

Can you fix the problem?
Possible solutions
- make controls map to customer’s model
- make controls map to actual system
Design Model & Customer Model

- Customers get model from experience & usage – through system image
- What if the two models don’t match?

Conceptual Model Mismatch

- Mismatch between designer’s & customer’s conceptual models leads to...
  - slow performance
  - errors
  - frustration
  - ...

Notorious Example

Car Automatic Shifter

Administrativa

- React Native Workshop
  - w/ Quora co-founder Charlie Cheever
  - Thursday, 11/10, 6-8 PM, Bldg. 380-380F (Math Corner)
- Android Workshop
  - Thursday, 11/10, 8-10 PM, Bldg. 380-380F (Math Corner)
- Hi-Fi Prototype Assignment posted Tue
  - Mid-way milestone due on Thur/Fri Dec. 1-2 (at start of studio)
  - Final prototype due Thur/Fri Dec. 8-9 (at start of studio)
Design Guides

- Provide good conceptual model
  - customer wants to understand how controls affect object
- Make things visible
  - if object has function, interface should show it
- Map interface controls to customer’s model
  - infix vs. postfix calculator – whose model is that?
- Provide feedback
  - what you see is what you get! (WYSIWYG)

Make Things Visible

- Refrigerator (?)
  - make the A.E dial something about percentage of cooling between the two compartments?
- Controls available on watch w/ 3 buttons?
  - too many and they are not visible!

Make Things Visible

- Compare to controls on old car radio
  - #controls = #functions
  - controls are labeled (?) and grouped together
  - tradeoffs of the “glass UI” (e.g., Tesla)?

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Map Interface Controls to Customer’s Model

- Which is better for car dashboard speaker front / back control?
- Control should mirror real-world
Map Interface Controls to Customer’s Model

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Possible fixes?

Mercedes Benz Seat Control

Map Interface Controls to Customer’s Model

- Which knob controls which burner?

Metaphor

- **Definition:**
  - “The transference of the relation between one set of objects to another set for the purpose of brief explanation.”

- **Lakoff & Johnson, Metaphors We Live By**
  - “…the way we think, what we experience, and what we do every day is very much a matter of metaphor.”
  - “…in our language & thinking – “argument is war” … he attacked every weak point … criticisms right on target … if you use that strategy”

- We can use metaphor in interface design to leverage existing conceptual models

Desktop Metaphor

- Suggests a conceptual model
  - not really an attempt to simulate a real desktop
  - a way to explain why some windows seemed blocked
  - leverages existing knowledge about files, folders & trash

Example Metaphors

- **Global metaphors**
  - personal assistant, wallet, clothing, pens, cards, telephone, eyeglasses

- **Data & function**
  - rolodex, to-do list, calendar, applications, documents, find, assist

- **Collections**
  - drawers, files, books, newspapers, photo albums
How to Use Metaphor

- Develop interface metaphor tied to conceptual model
- Communicate that metaphor to the user
- Provide high-level task-oriented operations, not low-level implementation commands

Metaphor for Metaphor’s Sake

- If it doesn’t help, why have it?
- Skeuomorphism:
  - “making items resemble their real-world counterparts” or “a physical ornament or design on an object made to resemble another material or technique”
- Argument against: takes up too much space & leads to inconsistent look
- Argument for: helps people learn

Is Consistent Always Better? NO

- Palm PDA example: should “new appointment” & “delete appointment” be in the same place?
- New (add) is common, but delete is not

Ways of Being Consistent

- Interfaces should be consistent in a meaningful way
  - e.g., ubiquitous use of same keys for cut/copy/paste
- Types of consistency
  - consistent internally
    - e.g., same terminology and layout throughout app
  - consistent with other apps
    - e.g., works like MS Word, uses keyboard conventions
  - design patterns (across many apps)
  - consistent with physical world
Summary

- Conceptual models:
  - mental representation of how the object works & how interface controls effect it

- Design model should equal customer’s model:
  - mismatches lead to errors
  - use customer’s likely conceptual model to design

- Design guides:
  - make things visible
  - map interface controls to customer’s model
  - provide feedback

Further Reading

- Design of Everyday Things, Donald Norman
- Design as Practiced, Donald Norman
  - Talks about failure to make changes to Macintosh
- Computing the Case Against User Interface Consistency, Jonathan Grudin
  - Talks about why interfaces should not always be consistent
  - http://citeseerx.ist.psu.edu/viewdoc/download?doi=10.1.1.90.648

Next Time

- User Testing & Midterm Review
- BRING YOUR QUESTIONS
- Readings
  - none
- Group HE assignment in this week’s studio
  - have your individual assignment with you & easily accessible electronically
- Next team assignment
  - High-fidelity Prototype