Conceptual Models & Interface Metaphors

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CS 147
Autumn 2017
November 8, 2017

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?

- Design based on a top retailer’s site

Hall of Fame or Shame?

- M-Pesa mobile payments
- Common in Africa

Hall of 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!
Conceptual Models & Interface Metaphors

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Outline

- Design of Everyday Things
- Conceptual models
- Team break
- Interface metaphors
- UI consistency

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

Conceptual Model:

- 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
Affordances as Perceptual Clues

• Poorly-designed objects
  – no clues or misleading clues

Refrigerator

Problem: freezer too cold, but fresh food just right

Refrigerator Controls

Normal Settings
C and 5
Colder Fresh Food
C and 6-7
Coldest Fresh Food
B and 8-9
Colder Freezer
D and 7-8
Warmer Fresh Food
C and 4-1
OFF (both)
0

What is your conceptual model?
Spend 30 sec. drawing a diagram showing your model
(where the cooling units are & how controlled)
Share with your neighbor

A Common Conceptual Model

Design Model & Customer Model

Can you fix the problem?
Possible solutions
– make controls map to customer’s model
– make controls map to actual system

• 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

New Course

CS 377J. Designing Systems for Collaboration, Cooperation, and Collective Action

This project-based class focuses on the design of systems that support large groups to collaborate, cooperate, and act together. A large body of research in Human-Computer Interaction and Computer Supported Cooperative Work is devoted to the design of systems that assist large groups to come together and aggregate their efforts, whether in the form of information, code, or people power. Examples of these sociotechnical systems include Wikipedia, Facebook groups, and Change.org. Students will read papers in the HCI literature and participate in discussions that analyze the design of these systems, the various stakeholders, and how these systems are used in the real world. Prerequisites: CS 147; CS 376 recommended but not required. 3 units, Win (Salehi, N)

Assignment #5 – Lo-fi Prototype & Test

- A5 Writeup: ✓ < 0% ✓ ≥ 1% ✓+ ≥ 6% ✓+ ≥ 10%
- A5 Group Presentation: ✓ < 0% ✓ ≥ 10% ✓+ ≥ 50% ✓+ ≥ 70%
- A5 Individual Presentation: ✓ < 0% ✓ ≥ 10% ✓+ ≥ 40% ✓+ ≥ 60%

Assignment #6 – Medium-fi Prototype

- A6 Prototype: ✓ < 5% ✓ ≥ 5% ✓+ ≥ 60% ✓+ ≥ 80%
- A6 Group Presentation: ✓ < 1% ✓ ≥ 3% ✓+ ≥ 50% ✓+ ≥ 80%

- Hi-Fi Prototype Assignment posted by Thursday
  - mid-way milestone due on Thu/Fri Nov. 30/Dec. 1 (at start of studio)
  - final prototype due Thu/Fri Dec. 7-8 (at start of studio)
  - final presentations at project fair, Fri Dec. 8, d.school, 6-9:30 PM

TEAM BREAK
(15 min – restart at 12:45)
QUIZ

https://goo.gl/jAkmkE

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)?
Map Interface Controls to Customer’s Model

- Which is better for car dashboard speaker front / back control?
- Control should mirror real-world

Dashboard

Map Interface Controls to Customer’s Model

- Which is better for car dashboard speaker front / back control?
- Control should mirror real-world

Mercedes Benz Seat Control

Map Interface Controls to Customer’s Model

Problem?

Which knob controls which burner?

Map Interface Controls to Customer’s Model

Possible fixes?

Desktop 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.”
  - “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

Metaphor

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

Desktop Metaphor
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

- 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 space & leads to inconsistent look
- Argument for: helps people learn

Is Consistent Always Better?

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

NO
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
    • ex. 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

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