Conceptual Models & Interface Metaphors

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Interface Hall of Fame or Shame?

• Tabbed dialog for setting options in MS Web Studio
  • more tabs than space to display them
  • Clicking on the right arrow once gives

Outline

• Review – more Engelbart videos
• Design of Everyday Things
• Conceptual models
• Interface metaphors

Review

• Computers do not need to be the way we see them today
• Predict the future by inventing it
• What were some of the things Engelbart invented?
Design of Everyday Things

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

Highly recommend this book

Conceptual Models

- Mental representation of how object works & how interface controls affect it
- People may have preconceived models that are hard to change
  - $(4 + 5)$ vs. $(4 \times 5)$
  - dragging to trash?
    - deletes file but ejects disk
- Interface must communicate model
  - visually
  - online help and documentation can help, but shouldn't be necessary

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

French artist Jacques Carelman
Crazy design for a screw punch!

Refrigerator

Problem: freezer too cold, but fresh food just right

French artist Jacques Carelman
Crazy design for a screw punch!
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?

A Common Conceptual Model

Actual Conceptual Model

• Now can you fix the problem?
• Possible solutions
  – make controls map to user’s model
  – make controls map to actual system

Design Model & User Model

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

Conceptual Model Mismatch

• Mismatch between designer’s & user’s conceptual models leads to...
  – Slow performance
  – Errors
  – Frustration
  – ...

Notorious Example

Confusion over Palm Beach County ballot

Although the Democrats are listed second in the column on the left, they are the third hole on the ballot.

Punching the second hole could be a prize for the Reform Party.

James Landay
Design Guides

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

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!
- Compare to controls on simple car radio
  - #controls = #functions
  - controls are labeled (?) and grouped together

Map Interface Controls

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

Map Interface Controls

- Stove controls

James Landay
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*:
  - In our language & thinking -- "argument is war"
    - he attacked every weak point
    - criticisms right on target
    - if you use that strategy

- We can use metaphors to leverage existing conceptual models

Desktop Metaphor

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

Example Metaphors

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

- Data & function
  - rolodex, to-do list, calendar, applications

- Collections
  - drawers, files, books, newspapers, photo albums

Is Consistent Always Better?

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

- Interfaces should be consistent in a meaningful way
  - eating knives, cutting knives, Swiss army

- Some types of consistency
  - consistent internally
    - e.g., same terminology and layout throughout
  - consistent with other apps
    - ex. works like MSWord, uses keyboard conventions
    - design patterns
    - consistent with physical world
Summary

- Conceptual models
  - mental representation of how the object works & how interface controls effect it
- Design model should equal user model
  - mismatches lead to errors
  - know the user's likely conceptual model
- Design guides
  - make things visible
  - map interface controls to user'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://www1.ics.uci.edu/~grudin/Papers/CACM89/CACM89.html](http://www1.ics.uci.edu/~grudin/Papers/CACM89/CACM89.html)

Next Time

- Breaking up into teams
- Design Discovery
- Read
  - Chapter 3 of *Contextual Design* (handout)
  - Chapter 3 of *The Design of Sites* (online)