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
- Design of Everyday Things
- Conceptual models
- Homework
- Interface metaphors

Prototyping Review

- What is a prototype?
  - “A prototype is an early sample or model built to test a concept or process or to act as a thing to be replicated or learned from.” – Wikipedia
  - a working representation of a final artifact

http://www.computerhistory.org/collections/accession/102716262
Prototyping Review

- What is a prototype?
  - “A prototype is an early sample or model built to test a concept or process or to act as a thing to be replicated or learned from.” – Wikipedia
  - a working representation of a final artifact
- Why create prototypes?
  - so we get design ideas out of our head & try them
  - lateral thinking by the designer
  - communication & feedback from stakeholders
  - faster than creating the real thing
- What are video prototypes good for?
- What is low-fi testing good for?

Design of Everyday Things

- By Don Norman (UCSD, Apple, HP, NN Group, NU)
- 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 Models

- 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?
- Interface must communicate model
  - visually (& possibly physically or using sound)
  - 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

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       |

A Common Conceptual Model

- What is your conceptual model?
- Independent controls

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

Confusion over Palm Beach County ballot

Although the Democrats are to the left, they are the third hole on the ballot.

Penning the second hole:

- Errors
- Frustration

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Car Example

Video Prototyping Assignment

• Due Thur, Feb 3

Design Guides

• Provide good conceptual model
  – customer wants to understand how UI controls impact 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!
• Compare to controls on simple car radio
  – #controls = #functions
  – controls are labeled (?) and grouped together

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

1

2

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Map Interface Controls to Customer’s Model

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

Is Consistent Always Better? NO

• PDA example: should “new appointment” & “delete appointment” be in the same place?
  “new (add) is common, but delete is not
Is Consistent Always Better? 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
  - Consistent with other apps
    - Ex. works like MS Word, uses keyboard conventions
  - 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
  - http://www.jnd.org/dn.nex/design_as_practiced.html
- Computing the Case Against User Interface Consistency, Jonathan Grudin
  - Talks about why interfaces should not always be consistent

Next Time

- In Class Activity
- Bring your video prototype materials