Notes for Class 2: Conceptual Models and Interface Metaphors

Objectives
By the end of the class, you will be able to...
• Define conceptual model.
• Identify instances where the user’s model, system image, and design model do not match. Explain why this match is important for easy interaction.
• Describe several design guidelines. Apply these design guidelines to critique interface designs and suggest better alternatives.
• Explain the concept of an interface metaphor and choose an appropriate metaphor for a given product.

Agenda for Class
• Discuss examples of objects & interfaces, identifying when Norman’s principles have been violated. Write Norman’s principles on the overhead.
• Discuss some everyday objects.
• Interface metaphors
• Design activity.

Reading Assignment
The Psychopathology of Everyday Things by Donald A. Norman.
Available on the course website.

Notes:

Definitions:
• Affordance - Perceived and actual properties of an object that determine how the object could be used.
• Principle of Visibility - the controls must be visible and they must convey the correct message.
• Principle of Mapping – design controls to create a natural relationship between the control and its function. Take advantage of physical analogies and cultural standards.
• Principle of Feedback – provide the user with information to indicate which action has been done
• Conceptual model – a person’s understanding of how a device operates.
• Design model – the designer’s conceptual model of how a system operates
• User’s model – the user’s conceptual model of how a system operates
• System image – the system’s interface + documentation. This is the only way the design model is conveyed to the user. If there is a poor system image, the user’s model may not match the designer’s model, leading to usability problems.
Affordances and Norman’s Principles

1. **Give an example of an interface with poor visibility.**
   - Examples: doors without handles & visible hinges, slide projector where you push the button quickly for forward and longer for reverse, phone without visible “hold” button.

2. **Find a small everyday object in your home and examine it carefully. Are its operating parts visible? Would its operation be immediately apparent to someone who had never used it? Do the operating parts easily map to the functions?**

3. **Think of an example where your conceptual model of a device did not match the actual operation.**
   - Norman’s fridge & thermostat
   - Child’s Winnie the Pooh phone book – if you are too slow it resets itself with no visual indication (see image in ppt slides)

4. **Take a look at your stove. Do the burner & oven controls provide a natural mapping to their function? Why or why not?**
   - A good mapping will place the burner control knobs in the same spatial arrangement as the burners themselves, so that the controls match the real world things that they control.

5. **Think of a time when a device or system you used provided inadequate feedback. How could the feedback have been improved?**
   - My son launches his video games multiple times because the computer doesn’t make it clear that the software is loading. Show a splash screen while loading.

6. **Norman claims that when the number functions exceeds the number of controls the interface will be more difficult to use. Why? Is this always the case?**
   - 1 control / function makes it easy to label and makes the function clear. Otherwise mappings are often arbitrary
   - But there may be reasons to put more than one function / control (e.g., ease of reaching controls when there are many)

Interface Metaphors

1. **What do you think is meant by the term “interface metaphor” in software design?**
   - Interface designed to be similar to a physical entity (with some variation).
   - Idea is to exploit users’ prior knowledge.

2. **Give an example of an interface metaphor used in a software product. Does it improve usability? Why or why not?**
   - There are some examples of poor metaphors in the powerpoint slides
e.g. RealPhone (for more details see http://homepage.mac.com/bradster/iarchitect/phone.htm)

i. no matter how much it looks like a phone it will never operate the same
ii. E.g. a normal phone – you pick up receiver, then dial #, but on this one, you dial #, then click on receiver to place call
iii. Receiver is a control but doesn’t look like one
iv. Pressing a speed dial button automatically dials (without having to pick up the receiver first)
v. Removing menus removed much of our understanding of how computer programs operate - plus our ability to learn shortcut keys.

Metaphors are never the same as using the real device, so skills will not necessarily transfer.
Metaphors that are too literal can be a burden rather than a help

**Key Concepts for Today:**
1. Make controls visible and make their operation clear.
2. Convey a good conceptual model by providing natural mappings between controls and their functions.
3. Provide meaningful feedback so the user knows what action has been performed.
4. Appropriate metaphors can be helpful, but skills do not always transfer.

**Sample Test Questions to Help You Study**
1. Find an everyday object in your home. Critique its design using Norman’s principles of visibility, mapping, and feedback.
2. Look at Norman’s figure 1.15. Design a better interface to the multifunction radio.
3. Critique your design from today’s design activity.