CMSC 434
Intro to Human-Computer Interaction

Conceptual Models II
Monday, March 5th, 2012
Instructor: Jon Froehlich
TA: Kotaro Hara
#inspiration
#inspiration

[http://youtu.be/NTgrMJRQ77Q]
#inspiration

Fame/Shame
Fame/Shame

[Hall of Fame/Shame Submission by CMSC434 Student Stephen McCarthy]
Demo of IDEO Whole Foods shopping cart scanner prototype
July 13, 1999
Demo of Microsoft/Chaotic Moon Whole Foods shopping cart scanner prototype
February 27, 2012

### SafePath Peer Review

**Reading Response**

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### Don Norman

*“Design of Everyday Things” p9-29*

**Reading Response**

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**Reading Responses**

*This document contains a table with dates representing reading responses for different assignments.*
SafePath

Abstract:

Crime in College Park, both on campus and off, is a serious problem. It harms students and the prestige of the university. Current solutions, like the blue public emergency telephones (PERT), M-urgency, and other smartphone applications are purely reactive. Our app, SafePath, will have the ability to guide the user through safe routes as well as contact campus police if an emergency does occur. Its effectiveness will be judged by changes the app can make in the number of attacks committed against pedestrians as measured by the campus police. The app will be available to faculty, staff, or anyone who needs to walk around the campus or its surroundings and will provide them with the information they need to take the safest route.

Introduction

The University of Maryland - College Park has long been recognized as an elite research institution. Ranked nationally as 17th among public universities by U.S. News and World Report...
THE DESIGN OF EVERYDAY THINGS

Previously published as THE PSYCHOLOGY OF EVERYDAY THINGS

DONALD A. NORMAN

AUTHOR OF EMOTIONAL DESIGN
Yo, professor, this stuff is so intuitive.
Conceptual Model

Design Model
Designer

User's Model
User

System
System Image

The system image results from the physical structure that has been built (including documentation, instructions, and labels).

The user’s model is the mental model developed through interaction with the system (and past experiences).

The design model is the designer’s conceptual model.

“Every act of communication is an act of translation”

- From “If This Be Treason” by Gregory Rabassa
Interfaces must communicate model

Online help and documentation is useful but shouldn’t be necessary

[Slide derived from Prof. Bjoern Hartmann]
People are explanatory creatures, they can’t help to build mental models to help form explanations of things—even when these explanations are wrong.

Mental Model: Physics

Which path does the ball take as it falls to the ground: A, B, or C?

When asked of sixth graders, only 3 percent answered C, the right answer.

When asked of high school students who had studied six weeks of Newtonian mechanics, only 20 percent answered C.

[Example from The Design of Everyday Things by Don Norman; Original study White & Horwitz, 1987]
Mental Model: Thermostats

[Example from The Design of Everyday Things by Don Norman; Original study Kempton, 1986]
Two Theories of Home Heat Control*

Willett Kempton
Michigan State University

People routinely develop their own theories to explain the world around them. These theories can be useful even when they contradict conventional technical wisdom. Based on in-depth interviews about home heating and thermostat setting behavior, the present study presents two theories people use to understand and adjust their thermostats. The two theories are here called the feedback theory and the valve theory. The valve theory is inconsistent with engineering knowledge, but is estimated to be held by 25% to 50% of Americans. Predictions of each of the theories are compared with the operations normally performed in home heat control. This comparison suggests that the valve theory may be highly functional in normal day-to-day use. Further data is needed on the ways this theory guides behavior in natural environments.

* This paper will also appear as a chapter in Cultural Model in Language and Thought, N. Quinn and D. Holland (Eds.), Cambridge University Press, 1985. Copyright for this paper is held by Cambridge University Press.

For comments on this paper, I am grateful to Dan Bobrow, Roy D’Andrade, Gautam Dutt, Peter Gladhart, Dedre Gentner, Dorothy Holland, Charlotte Linde, Ann Millard, Bonnie Morrison, William Rittenberg, Jeff Wehl, and an anonymous reviewer for Cognitive Science.
Some Design Principles

1. **Visibility**: Can I see what to use?
2. **Affordance**: How do I use it?
3. **Feedback**: What is it doing now?
4. **Mapping**: How does it relate?
5. **Constraint**: I can do this, but I can’t do that.
6. **Consistency**: Have I seen this before?

[Example from The Design of Everyday Things by Don Norman]
Visibility
Visibility
Visibility
Visibility
Visibility
Visibility
Which door do I **push**?
Which door do I **pull**?
Affordance refers to the perceived & actual properties of a thing that determine just how that thing could possibly be used.
On which side of the door should you push?

[Example from The Design of Everyday Things by Don Norman]
On which side of the door should you push?

[Example from The Design of Everyday Things by Don Norman]
Mapping
Mapping is a “technical” term meaning the relationship between two things: between the controls, their movements, and the results in the world.

Don Norman
Cognitive Scientist / Author / Hipster

[The Design of Everyday Things by Don Norman]
A “natural” mapping takes advantage of physical analogies and cultural norms, leading to an “immediate” understanding
Mapping

Poor mapping is evident when a control does not relate visually or symbolically with the object it affects.

Poor mapping requires the user to stop and think about the relationship, breaking flow.

Poor mapping of controls to functions increases the cognitive load for users and can result in potentially serious user errors.

[The Design of Everyday Things by Don Norman and About Face 2.0 by Cooper and Reimann]
Mapping

The *result* of using the control is reasonably clear: A burner will heat up when you turn a knob.

However, the *target* of the control—which burner will get warm—is unclear. Does twisting the left-most knob turn on the left-front burner, or does it turn on the left-rear burner?

Users must find out by trial and error or by referring to the tiny icons next to the knobs. The unnaturalness of the mapping compels users to figure this relationship out anew every time they use the stove.

[The Design of Everyday Things by Don Norman and About Face 2.0 by Cooper and Reimann]
Mapping

[The Design of Everyday Things by Don Norman and About Face 2.0 by Cooper and Reimann]
Mapping
Mapping

- **Scroll direction: natural**
  - Content tracks finger movement

- **Zoom in or out**
  - Pinch with two fingers

- **Smart zoom**
  - Double-tap with two fingers

- **Rotate**
  - Rotate with two fingers

[http://youtu.be/Gpa9_Fo0muM]
How to Change or Reverse Scroll Direction in Mac OS X 10.7 Lion

Mac OS X Lion is out, and one of the most obvious changes new users are experiencing is a reversal in the direction their mouse scrolls. Up is down,

Top Comments
People that don’t like OS X Lion’s scrolling don’t get it, it’s not reversed. The old way was reversed.
Its now like your webpage is a piece of paper, if you push the paper up, you continue to read further down the page.

MacManLtd 7 months ago 17
How to Change or Reverse Scroll Direction in Mac OS X 10.7 Lion

Mac OS X Lion is out, and one of the most obvious changes new users are experiencing is a reversal in the direction their mouse scrolls. Up is down, and down is up.

Top Comments

People that don’t like OS X Lion’s scrolling don’t get it, it’s not reversed. The old way was reversed.

It's now like your webpage is a piece of paper, if you push the paper up, you continue to read further down the page.

MacManLl 7 months ago 17
Feedback—sending back to the user information about what action has actually been done & what result has been accomplished—is a well known concept in the science of control and information theory.

Don Norman
Cognitive Scientist / Author

[The Design of Everyday Things by Don Norman]
Feedback
Effect improves when immediate and synchronized with user action
Feedback

PUSH BUTTON TO CROSS

REBOOT UNIVERSE

Traffic Light

Man in Suit

Mixed Signal Costume

by Nate | November 04, 2010 | 16 comments

Skill Level: Intermediate

Mixed Signal Costume
Feedback