Lecture Notes:|

How We Learn

Freda Salatino

“Anne!”

Anne was seated on the springboard; she turned her head. Jubal called out, “That new house on the far hilltop -- can you see what color they’ve painted it?”

Anne looked in the direction in which Jubal was pointing and answered, “It’s white on this side.”

Jubal went on in normal tones, “You see? … it [wouldn’t] even occur to her to infer that the other side is probably white, too, unless she herself went around to the other side and looked. And even then she wouldn’t assume that it stayed whatever color it might be after she left …“

Robert Heinlein, Stranger In A Strange Land

How People Learn About Their World

All learning is the product of experience.

When objects behave the same way from interaction to interaction, people come to expect that behavior from them all the time -- and generalize those expectations to other objects like them.

When object behavior conforms to expectations, users can draw on their past experience and use the object successfully.

What Happens When The Model Breaks?

When an object behaves differently than expected (same cues, different functionality), users are not immediately discouraged.

If the variation in behavior still falls within the parameters of what has historically been "normal" for that object, they'll try alternate solutions -- until they lose patience.

When the model breaks:

- First we blame ourselves
- THEN we blame the object

> *Before conducting product usability tests, human factors and usability testing professionals always instruct people that the product is being tested, not the user, and that there is nothing they can do that can harm the computer. And, no matter how many times you tell them you are not testing them, it rarely works. They still blame themselves!*
>
> Theo Mandel, The Elements of User Interface Design

Side Trip: Breaking the Model on Purpose

Advertisers, playwrights, and storytellers break the model of what the user expects, all the time.

The dissonance between expectation and reality, when viewed from the outside, creates comedy.

However, this is less than useful in The Real World.

Interface cues should give users an idea of the object's form and function, and should allow them to determine their appropriate behavior.

Objects that provide deliberate misdirection (two sets of conflicting clues) cause users to hesitate before proceeding.

A "comedy of errors" amuses the spectator -- rarely the participant!

Mental Models and the Acquisition of Knowledge

Your mental model is an internal representation of how you understand and interact with a system. It includes all connections you make -- intellectually, emotionally, and socially -- between your actions and your results.

Your model is based on your experiences, and your assumptions. It is your attempt to simplify your world.

Users employ models...

- To predict future events (or infer invisible events)
- To determine causes for observed events
- To determine appropriate actions to cause desired changes
- To serve as mnemonic devices for remembering relations and events
- As a means of understanding a similar device or event
- To overcome information processing limitations

Limitations of Human Cognition

(from Deborah Mayhew)

Human Strengths:	**Computer Strengths:**
• Pattern recognition • Selective attention • Capacity learn • Infinite-capacity LTM • Rich, multikeyed LTM	• High-capacity memory • Permanent memory • Fast processing • Reliable memory access
Human Weaknesses:	**Computer Weaknesses:**
• Low-capacity STM • Fast-decaying STM • Slow processing • Error prone • Unreliable access to LTM	• Simple template matching • Limited learning capacity • Limited capacity LTM • Limited data integration

Too Much Information?

> *We are surrounded by large numbers of manufactured items, most intended to make our lives easier and more pleasant. … All these wonderful devices are supposed to help us save time and produce faster, superior results.*
>
> *But … if these new devices are so wonderful, why do we need special dedicated staff members ("power users" or "key operators") to make them work? Why do we need manuals or special instructions to use the typical business telephone? Why do so many features go unused?*
>
> *And why do these devices add to the stresses of life rather than reduce them?*
>
> Donald Norman, The Psychology Of Everyday Things

> *Consciousness is a peculiar phenomenon. It is riddled with deceit and self-deception … the conscious **I** is happy to lie up hill and down dale to achieve a rational explanation for what the body is up to.*
>
> *Sensual perception is the result of a devious relocation of sensory input in time; when the consciousness thinks it determines to act, the brain is already working on it.*
>
> *There appears to be more than one version of consciousness present in the brain; our conscious awareness contains almost no information but is perceived as if it were vastly rich in information. Consciousness is peculiar.*
>
> Tor Norretranders, The User Illusion

Learning and Exploration

- **Children** -- who still have years of knowledge acquisition ahead of them -- are motivated by the need to explore their world in great detail.
- **Teens** are more interested in learning about the world by exploring their peers, and learning appropriate behavior.
- **Adults** -- who are already grappling with more information than they know what to do with -- want to continue to succeed by leveraging that which they already know.

How Does This Play Out In Real Life?

Children's discovery sites:

- Children's Discovery Museum http://www.cdm.org/
- Monterey Bay Aquarium http://www.mbayaq.org/lc/
- Bay Federal Credit Union http://googolplex.cuna.org/
- Nickelodeon http://www.nick.com

Teen discovery sites:

- Tech Museum of Innovation http://www.thetech.org/
- Monterey Bay Aquarium http://www.mbayaq.org/lc/
- Bay Federal Credit Union http://googolplex.cuna.org/
- MTV http://www.mtv.com

Adult discovery sites:

- Tech Museum of Innovation http://www.thetech.org/
- Bay Federal Credit Union http://www.bayfed.com
- IMDB http://www.imdb.com
- UC Berkeley Extension http://www.unex.berkeley.edu/

It also plays out hugely in the creation of product user assistance, which is primarily oriented toward the adult purchaser.