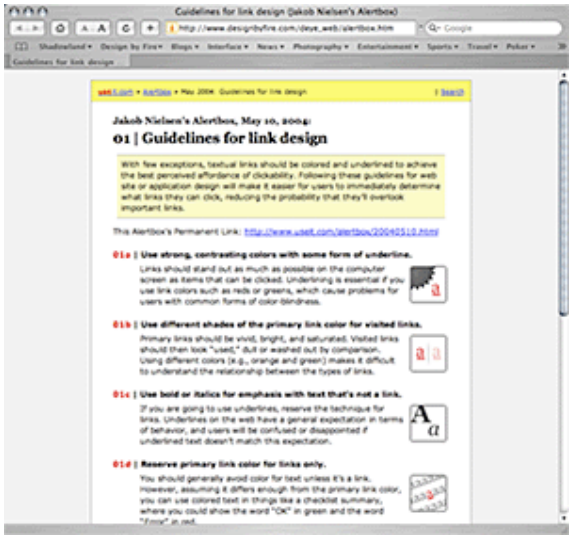
Don Norman &
The Design of Everyday Things

Useit.com Redesign

Article: Design Eye for the Usability Guy

http://www.designbyfire.com/000094.html

Redesign of useit.com site example



Rewrite text, redesign page layout, quick card and flash version

What did we discover about www.ca.gov?

1. Visibility of system status
2. Match between system and real world
3. User control and freedom
4. Consistency and standards
5. Error Prevention
6. Recognition rather than recall
7. Flexibility and efficiency of use
8. Aesthetic and minimalist design
9. Help users recognize, diagnose, and recover from errors
10. Help and Documentation

Today's Topics

1. Don Norman
2. How People "Do Things"
3. Memory
4. Affordances
5. Constraints
6. Cognitive Principles
7. Design Principles
8. Don Norman's Usability Guidelines

Don Norman &
The Design of Everyday Things

How can we design things to be more usable?

Who is Don Norman, Ph.D?

- Newsweek: The Guru of Workable Technology
- Author of “The Design of Everyday Things”
- Professor of Computer Science at Northwestern University
- Professor emeritus at the University of California, San Diego
- Co-founder & principal of the Nielsen Norman group
- Apple Fellow & Vice President of the Advanced Technology Group at Apple Computer

How People Do Things:
The Seven Stages of Action

From “The Design of Everyday Things” by Don Norman

Forming a goal
example**: I want more light so I can see better.**

Forming the intention
example**: I will turn on some lights.**

Specifying an action
example**: I will walk to the wall, and move the light switch up.**

Executing the action
example**: Attempting to do the action.**

Perceiving the state of the world
example**: I look around.**

Interpreting the state of the world
example**: Can I see better?**

Evaluating the outcome
example**: If I can see better, I have succeeded!**

Sample run through

Forming a goal**: What do I want?**

Forming the intention**: What would satisfy this goal?**

Specifying an action**: What do I have to do to achieve the intention?**

Executing the action**: Do the steps I have specified.**

Perceiving the state of the world**: Use my senses to gather information about the world and/or system I am working with.**

Interpreting the state of the world**: Figure out what, if anything, has changed.**

Evaluating the outcome**: Did I achieve my goal?**

In groups of 2, choose and describe a task using

The Seven Stages of Action

Forming a goal**: What do I want?**

Forming the intention**: What would satisfy this goal?**

Specifying an action**: What do I have to do to achieve the intention?**

Executing the action**: Do the steps I have specified.**

Perceiving the state of the world**: Use my senses to gather information about the world and/or system I am working with.**

Interpreting the state of the world**: Figure out what, if anything, has changed.**

Evaluating the outcome**: Did I achieve my goal?**

Memory

How do we remember?

Short Term Memory (STM)

How many numbers can you remember?

- Break into pairs and see how many digits you can remember
- Read a string of numbers from *your* handout
- Other partner repeats them back
- Repeat, but use the next longer string
- Keep going until you make a mistake
- Switch roles, using the other person's handout, and try again

Short Term Memory (STM)

Humans can usually handle about 7 items of information (±2, or 5–9) at once.

This doesn't mean that 10 links is too many. It just means that having more choices imposes a greater burden on the user's ability to process information.

We recall things from STM effortlessly.

Long Term Memory (LTM)

Need volunteer from audience…

Long Term Memory (LTM)

- Harder to get to the information
- Takes more time and effort
- It is our interpretation of the past, not an exact recording
- How we interpret things effects how we can recall them
- It is easier to remember things that have meaningful relationships
- Good mental models also help memory
- Bad ones cause problem

Affordances

What we interact with in a system

Affordances

- **Affordances are parts of a system that allow (or afford) us to interact with the system.**

- **Buttons, scrollbars, the mouse, the keyboard, other widgets, etc.**

- **Anything we can interact with is an affordance**

Google's and Yahoo's affordances

- **Name as many affordances as you can at Google**
- **Now at Yahoo**
- **What are the tradeoffs involved with having lots of affordances vs. fewer affordances?**

Remote controls

What are the affordances on these remote controls?

Can you tell just by looking at them what the buttons do?

What device does each unit control?

Shower controls

What are the affordances in this shower?

Which handle is hot?

Which is cold?

Which direction do you turn the handles?

Stove controls

What are the affordances on this stove?

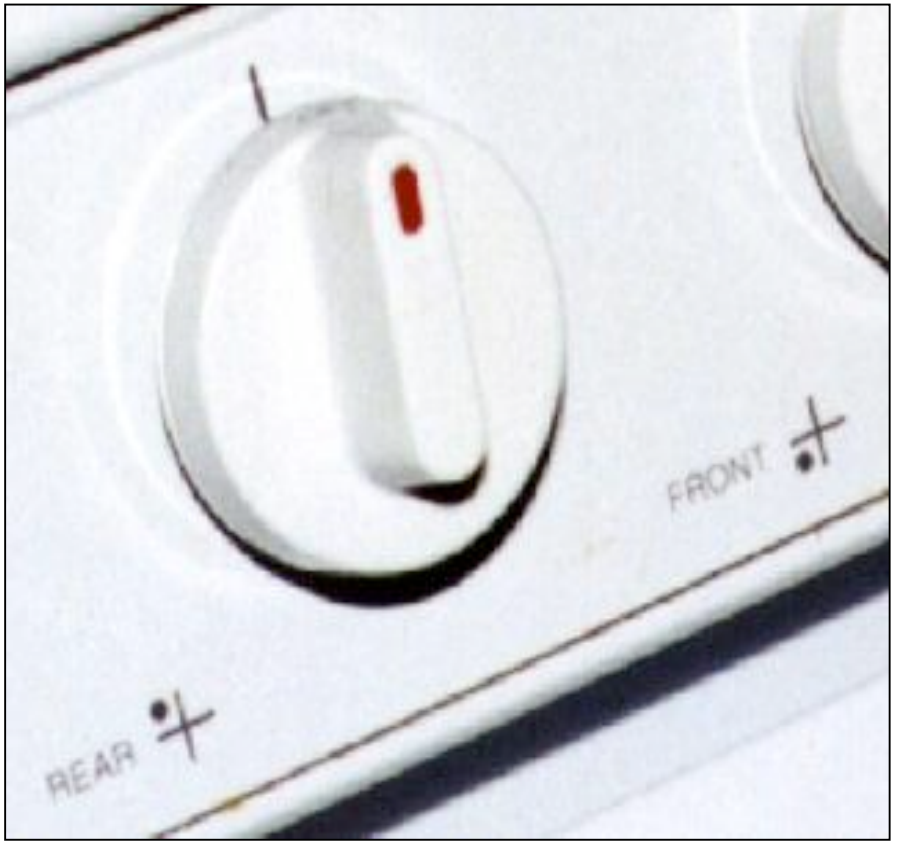
Which knob controls which burner?

Stove controls detail

Why are there instructions?

Which set of instructions applies to which knob?

Is there a better way to lay out a stove?



Door and Lock

What are the affordances on this lock?

Why did someone draw an arrow on the door?

Modern doors

What are the affordances on these doors?

Why do they need so many instructions?

Classic desk telephone

What are the affordances on this telephone?

Is this "old-fashioned" telephone easier or harder to use than other, more recent telephones?

Facts about this style of telephone:

- There are two ways to put it on "hold".
- A **forcing function** keeps it from hanging up even when dropped onto its head.
- A **blocking function** means you can't use the wall cord in the handset or the handset cord in the wall jack (the modular plugs are of different sizes).
- The numbering on the keypad runs opposite to a calculator's, because telephone equipment in the 1970s was too slow to keep up with skilled 10-key operators.

Two watches

What are the affordances on these watches

What tradeoffs did the designers make in each case?

Constraints

Physical constraints

Physical limitations that constrain possible actions

Examples:

- Why are manhole covers round?
- Cars that can't start unless in park or neutral

Can we think of more?

Semantic constraints

When the meaning of a situation controls the possible actions

Examples:

- Why are you sitting where you are?
- Why are you facing forward?

What happens if the user doesn't understand the meaning/purpose of the system/situation?

Cultural constraints

Relies on accepted cultural conventions

What does red mean?

- stop, danger, alert

What does yellow mean?

- warning, slow, caution

Why might cultural constraints fail?

Why use them at all?

- Because a particular culture shares the same knowledge and experience

Can you think of examples?

Logical constraints

Using logic to constrain actions

Natural mappings

- left-right, up-down

Sequence

- doing things in an obvious order (1,2,3 a,b,c)

Completeness

- using all the parts, filling in all the fields, etc.

Cognitive Principles

Cognitive principles: Automatic vs. effortful processes

- Automatic processes occur without conscious "thinking."
- Automatic processes don't interfere with each other or with effortful processes.
- Effortful processes occupy limited cognitive resources.
- Effortful processes require conscious "thinking."
- Effortful processes interfere with one another.
- Doing more than one effortful process means doing all of them less well.

Cognitive principles: Guidelines

- ***See and recognize*** **is easier than *remember and type* or *remember and hunt*.**
- **People can remember the locations of *distinctive* objects better than the locations of words (but labels help)**
- **People remember locations of objects through automatic processing**
- **People don't remember the locations of colors through automatic processing, so it's effortful**

Design Principles

Design principles: Assisting you users in evaluation

- Put knowledge in the world and give feedback about the state of the system
- Exploit knowledge commonly in your users' heads
- Provide explanations of your display, if it is very complex
- Give your users a mental model of your site; tell them what they can do there
- Remind users of where they are
- Set expectations

Design principles: Assisting your users in execution

- Put knowledge in the world (affordances)
- Exploit automatic cognitive processes
- Use iconographic/pictorial widgets, but label them with words
- Use large widgets (within constraints)
- Keep widgets on the screen
- Keep widgets in consistent physical locations
- Keep widgets near the mouse pointer
- Avoid scrolling
- Avoid the using a combination of both keyboard & mouse for a single user task

Don Norman's Usability Guidelines

4 steps to better usability

Don Norman's Usability Guidelines

Visibility

Make the relevant parts visible. By looking the user should be able to tell the state of the device and the alternatives for action (affordances)

A good conceptual model

Help the user by visually communicating a good mental model of how the system works.

Good mappings

Help the user determine the relationship between actions and results, controls and effects, by using natural mappings.

Feedback

The give immediate feedback to the user about the results of their actions and the state of the system.

Reading

Human-Centered Design Considered Harmful, Don Norman

http://www.jnd.org/dn.mss/humancentered_desig.html

Activity-Centered Design:

Why I like my Harmony Remote Control, Don Norman

http://www.jnd.org/dn.mss/activitycentere.html

Homework: Create online resume

- Build a small interactive on-line resume
- Should have at least 3 sections
- Should have navigation
- Should use good usability design
- Use real information
- Use web design process
- Due before start of class next week