Human Computer Interaction

THE PSYCHOLOGY OF USABLE THINGS

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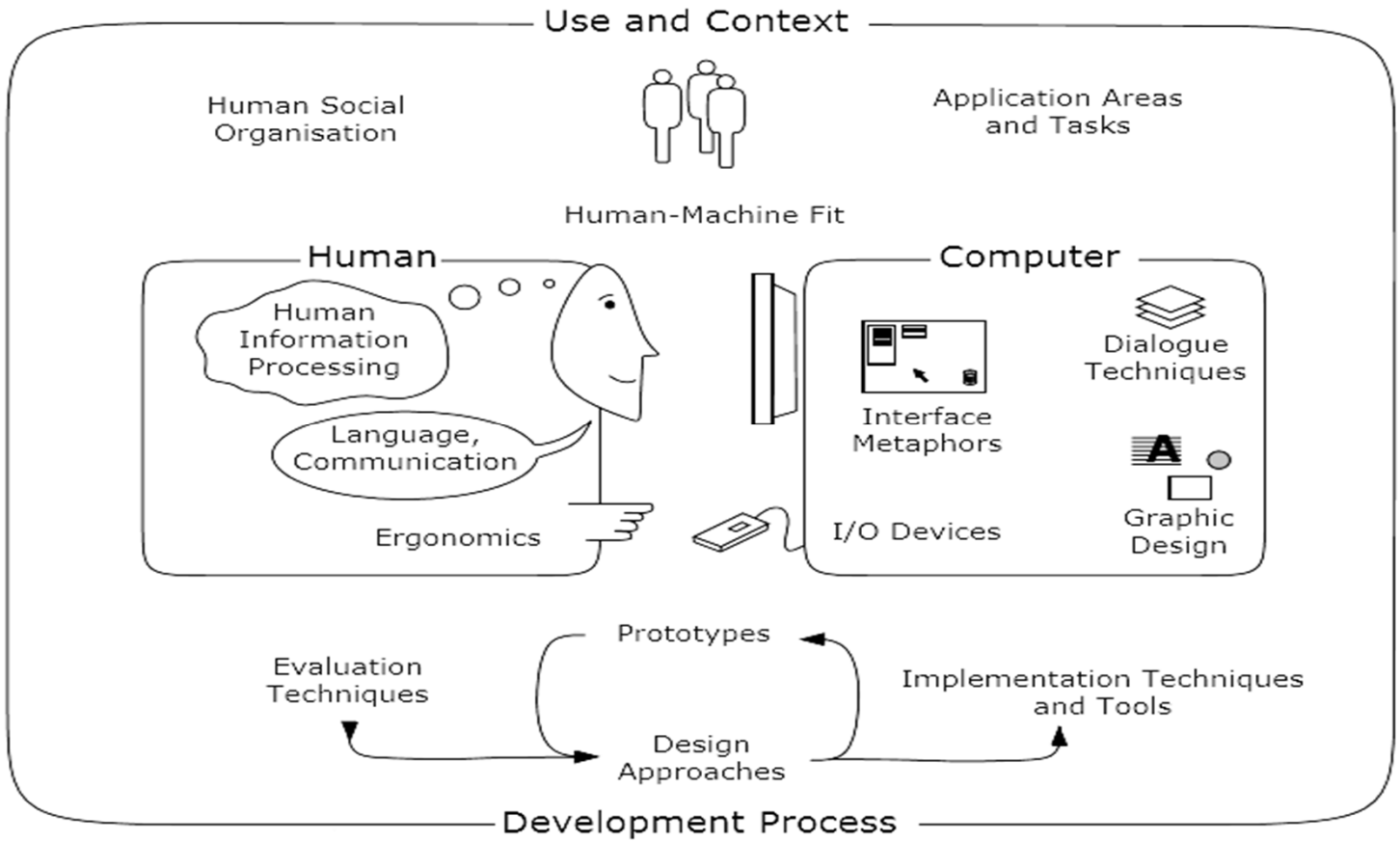
Content



The nature of Human-Computer Interaction. Adapted from the ACM SIGCHI Curricula for Human-Computer Interaction [Hewett et al., 2002]

Agenda

- Psychopathology of Everyday Things
- Psychology of Everyday Things
- Psychopathology of Computers

The Psychopathology of Everyday Things

Shower Control

http://baddesigns.coml

- Shower control: water either goes into the bath out of the faucet or comes out of the shower
- Sticker with instructions on the faucet.
- How do you make the water come out of the shower instead of the faucet?
- You have to reach under the faucet and pull the knob down!

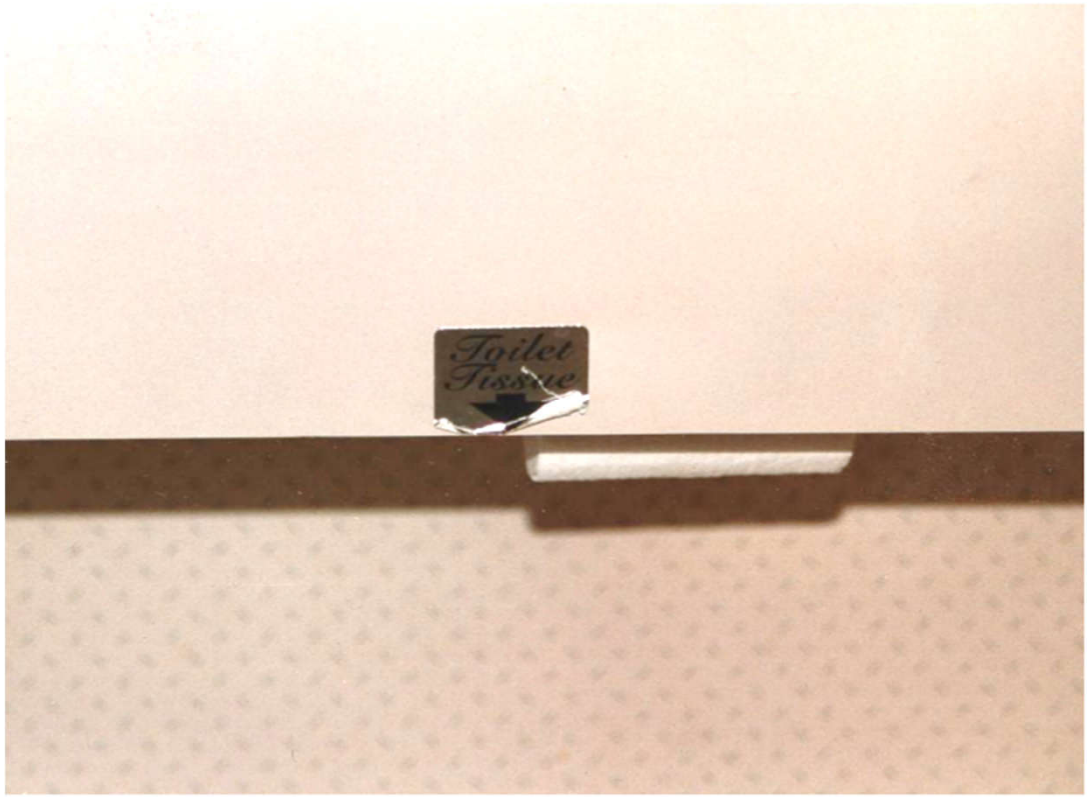
What's in the bottle?

http://baddesigns.com/shampoo.html

Where is the Toilet Paper?

Can you see where the toilet paper is in this hotel bathroom?

Ah, there it is! Well-hidden



Conclusion

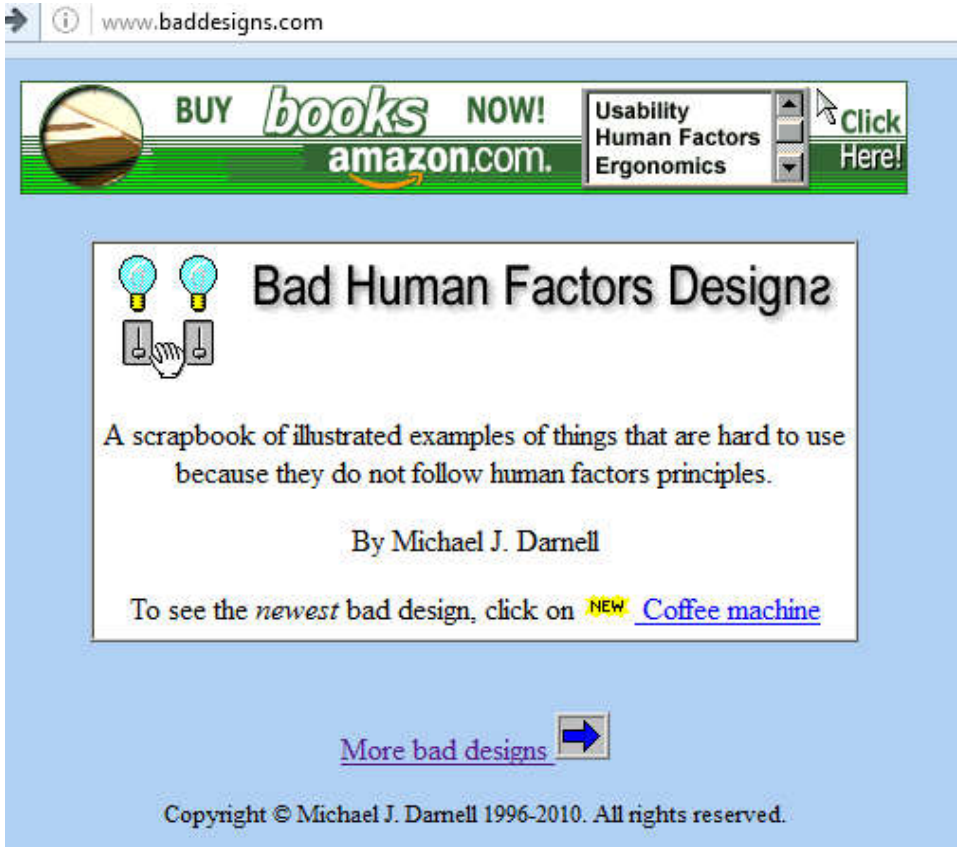
Things that are hard to use because they do not follow human factors principles

Bad Design

- “ When simple things need pictures, labels, or instructions, the design has failed. ”
- “Poorly designed objects are not that easy to understand. They doesn't contain visible clues to their operation.”

  - [Don Norman, The Design of Everday Things, 1988 [Norman, 1992, page 9]]

BadDesign.com



The Psychology of Everyday Things

- Perceived and Real Affordances
- Real World Affordances
- GUI Affordances
- Labels
- Mappings
- Constraints
- Conventions
- The Principle of Causality

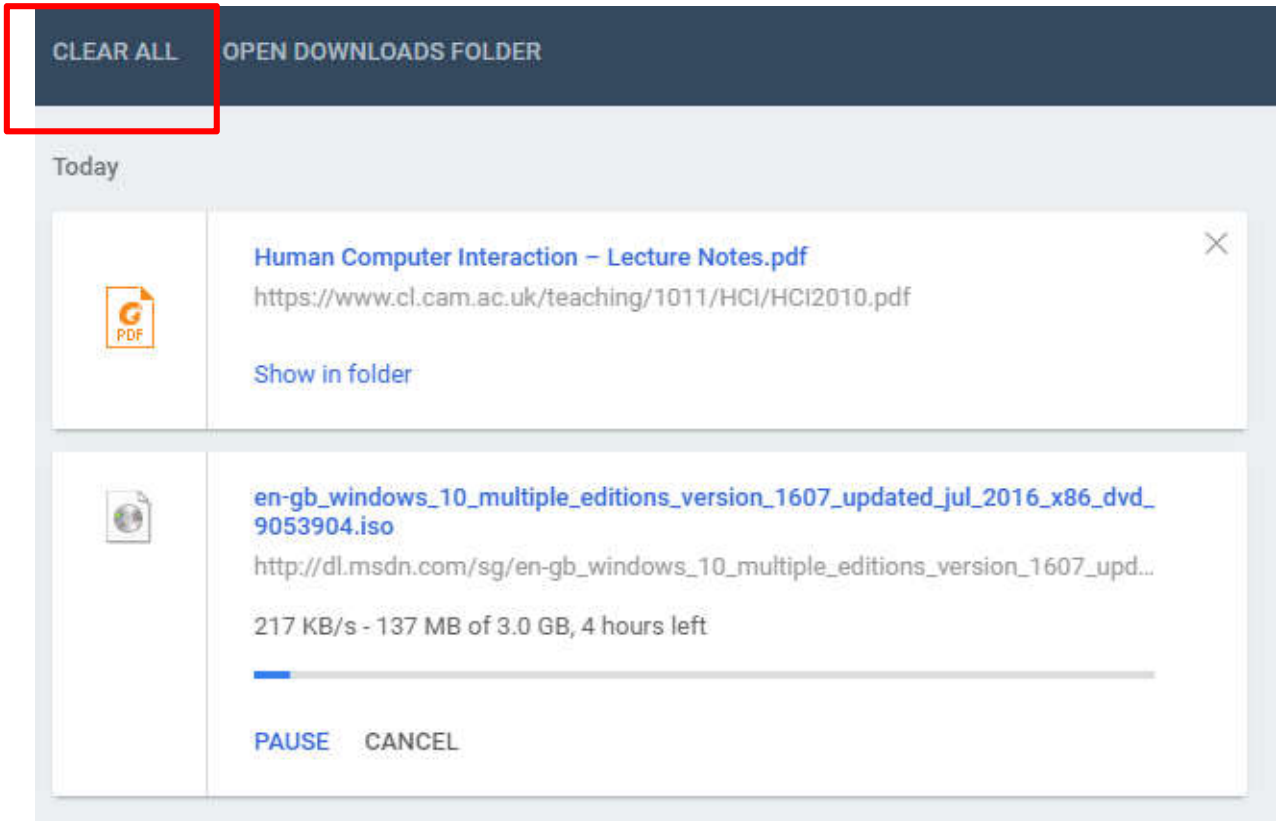
Perceived and Real Affordances

- **A ordances** are the range of possible (physical) actions by a user on an artefact:
  - **Perceived A ordances** are the actions a user perceives to be possible.
  - **Real A ordances** are the actions which are actually possible.
  - **Perceived affordances** are what we *think* it can do, which may be correct or incorrect
  - The way to make sure the *affordances* are clear (that is, the *perceived affordances* match the *real affordances*) is to use *signifiers*, which are signs indicating what you can do

Perceived and Real Affordances

http://johnnyholland.org

Perceived and Real Affordances

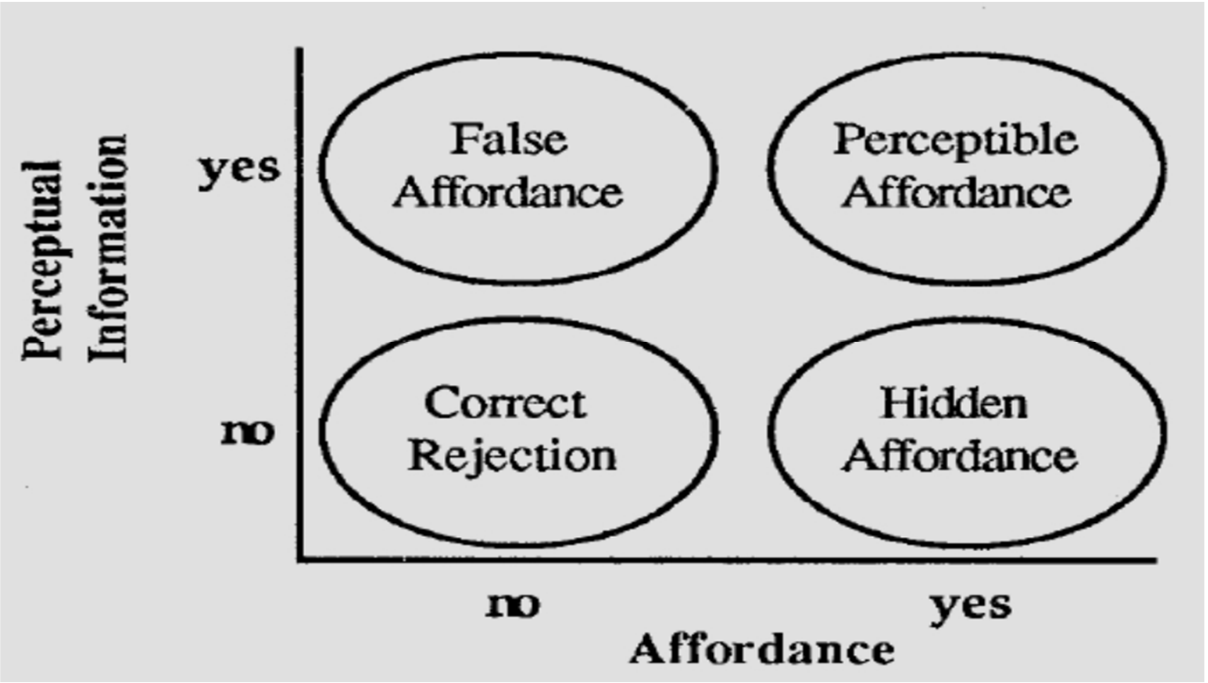


http://johnnyholland.org

Less Helpful Affordance

The on/off slider button on the iPhone was changed when iOS4 was launched and the new design continues to confuse.

Perceived A ordances



Affordance Example

The handles on a tea set provide an obvious affordance for holding.

Strong Affordances

A lot of basic engineering elements have strong affordances.

For example:

- when you see a button, you want to push it.
- when you see a switch, you want to flip it.
- when you see a crank, you want to turn it (although usually you can't tell if it affords being turned clockwise or counter-clockwise)

Real World Affordances

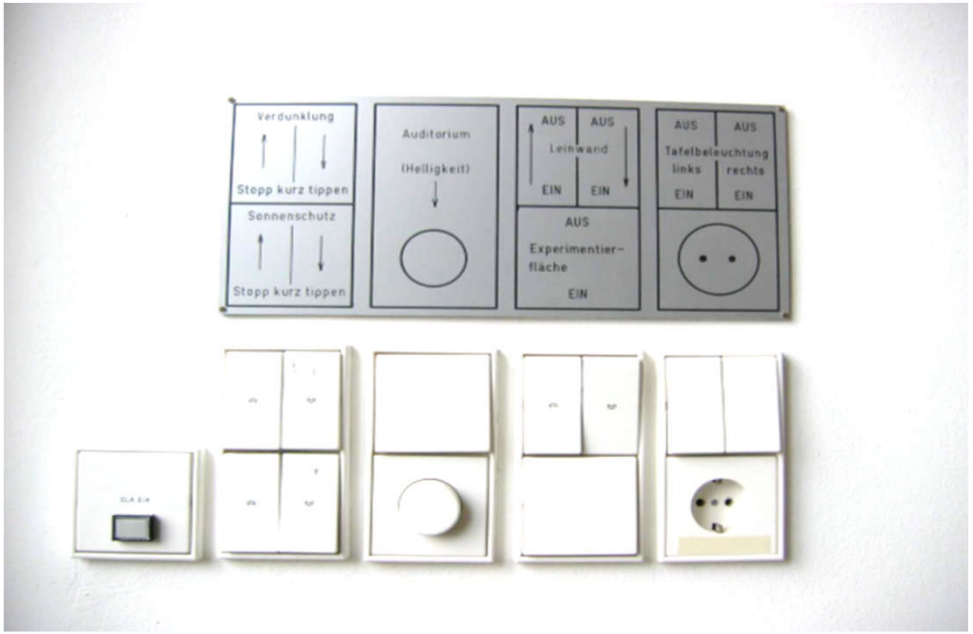
- For physical objects,there can be both real and perceived a ordances(and the two sets are not necessarily the same).
- Appearance indicates how to use something:
  - A chair a ords (suggests) sitting.
  - Knobs are for turning.
  - Slots are for inserting things.
  - A button a ords pushing.
- When perceived a ordances are taken advantage of, the user knows what to do just by looking.

GUI Affordances

- For screen-based interfaces, the computer hardware already has built-in physical a ordances:
  - Screen a ords touching.
  - Mouse a ords pointing.
  - Mouse buttons a ord clicking.
  - Keyboard a ords typing.
- Changing the shape of the cursor to indicate a clickable link is not an a ordance (you can still click anywhere), but visual feedback.
- Physically locking the mouse button on non-clickable areas is a real a ordance.

Labels

- “When simple things need pictures, labels, or instructions, the design has failed!” Norman [1992, page 9]



Mappings

- Mappings are the relationships between controls and their e ects on a system. Natural mappings take advantage of physical analogies and cultural standards.
- Examples:
  - Turn steering wheel clockwise to turn a car right. Actually, there are two mappings here:
    - which control a ects steering,
    - which direction to turn it.
- Move a control up to move an object up.
- Use a louder sound to mean a greater amount.

Constraints

- The di culty of dealing with a novel situation is directly related to the number of possibilities. Constraints are physical, semantic, cultural, and logical limits on the number of possibilities.
- Physical constraints such as pegs and holes limit possible operations.
- Semantic constraints rely upon our knowledge of the situation and of the world.
- Cultural constraints rely upon accepted cultural conventions.
- Logical constraints exploit logical relationships. For example a natural mapping between the spatial layout of components and their controls.
- Where a ordances suggest the range of possibilities, constraints limit the number of alternatives.

Conventions

- Conventions are cultural constraints. They are initially arbitrary, but evolve and become accepted over time. They can however still vary enormously across di erent cultures, for example:
- Light switches: America down is o , Britain down is on
- Water taps: America anti-clockwise is on, Britain anti-clockwise is o
- The colour red: America danger, Egypt death India life, China happiness

The Principle of Causality

- Causality is the relation between two events, cause and e ect, where the second occurs as a consequence of the rst.
- Apparent causality is when something which happens immediately after an action, appears to have been caused by that action. We associate the e ect with the apparent cause.

False Causality

Coincidental e ects lead to superstition:

- Touchacomputerterminaljustbeforeitfails,andyouareapttobelieveyou causedthefailure.
- Start an unfamiliar application, just before the computer crashes.
- Invisible e ects lead to confusion:
- When an action has no apparent result, you may conclude it was ine ective (and repeat it). For example, repeatedly clicking the “Stop” button when the system is unresponsive.
- →There is a need for **feedback**!

Psychopathology of Computers

Beware Unix Commands

- Intend to type: rm *~ to remove Emacs backup les.
- Actually type: rm * ~ which removes everything!
- And there is no undo ...

The Terminal is Dead

When GUI Dead?