Slide 1

Universidade de Aveiro
Departamento de Electrónica,
Telecomunicações e Informática

Mental and conceptual models

deti departamento de electrónica telecomunicações e informática   universidade de aveiro

1

Slide 2

- What are mental models?
- How do we construct them?
- What is known about them?
- What are they used for?
- What are conceptual models?
- Guidelines to obtain good conceptual models

2

Slide 3

- Mental Model?

- Conceptual Model?

3

Slide 4

Mental and conceptual model

- A mental model (in a simple way) is the user's internal representation of the current conceptualization and understanding of the system.
  - Example: iPad ebook – User now how to read a book.

- A conceptual model is the actual model that is given to the user through the interface of the product.
  - Example: iPad ebook – Button, Screens, Events – Actual interface representing conceptual model

- Good Conceptual model?
- A conceptual model is the designer's atempt to foster good mental models through UI aspects.

4

Slide 5

Mental and conceptual model

- Difficult to ensure that the user's mental model corresponds to the designer's model since designer does not talk directly with the user.
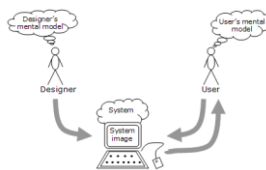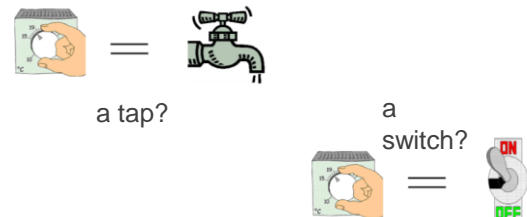

- If the product's conceptual model does not match the user's mental model:
  - user find the product hard to learn
  - might cause frustration.

5

Slide 6

Mental and conceptual model

- Room thermostat – which mental model is correct?

a tap?

a switch?

6

1

- How **users create a mental model?**

7

- How **users create a mental model?**
  - – Using the system
  - – Observing others using the system
  - – Reading documentation
  - – …

8

Mental models

- Mental models allow to
  - – Make predictions
  - – Determine causes of observed events
  - – Determine adequate actions to produce the wanted changes
  - – Understand analogous devices
  - – …

9

Mental models

- Mental models:
  - – Are incomplete
  - – Are unstable
    - • User forget, change with time, mixed up between similar systems
  - – Are not scientific
    - • Based on previous experience, superstitious behaviours
  - – don´t have specific limits
    - • User might complicate and do extra actions without planning
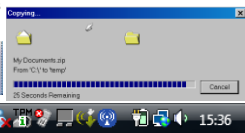
10

Main guidelines to obtain a good conceptual model

- Make visible invisible parts and processes

- Give *feedback*

- Use coherence (colors names, command syntax, dialog styles, information location on the screen, etc., etc.)

- Use a metaphor (optional)

11

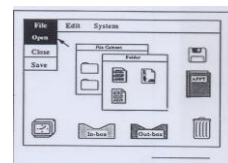## Metaphors

The Desktop metaphor:

Exploit existing mental models of the real world

Metaphors can be misleading since the "the essence of metaphor is understanding and experiencing one kind of thing in terms of another" (Lakoff and Johnson 1983)

- Which, by definition, makes a metaphor different from what it represents or points to

https://www.interaction-design.org/literature/book/the-encyclopedia-of-human-computer-interaction-2nd-ed/human-computer-interaction-brief-intro
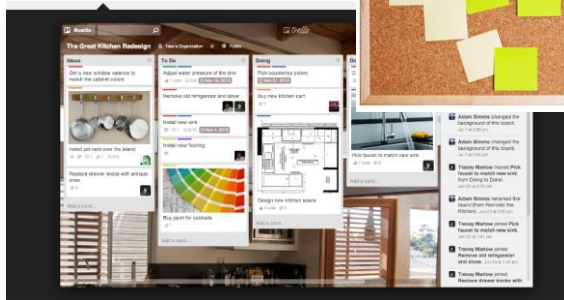
12

Metaphors

the bulletin board (Trello)

https://trello.com/tour

13

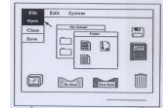## Potential problems in using metaphors

• Incomplete metaphors may confound the user

• Risk of under-utilization of the system's capacities

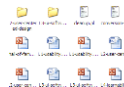• Less experienced users (e.g. children) seem to expect more literal metaphors

• Sophisticated users seem to expect more "magical" metaphors

14

Metaphors

- Advantages
  - Highly learnable when appropriate
  - Hooks into user's existing mental models very easily
- Potential problems
  - Often hard for designers to find
  - May be deceptive
  - May be constraining
  - Metaphor is usually broken somewhere

Desktop metaphor

Trashcan metaphor

15

Main bibliography

• Alan Dix, Janet Finlay, Gregory Abowd, Russell Beale, *Human-Computer Interaction*, 3rd edition, Prentice Hall, 2004

• Jenny Preece and Helen Sharp, Interaction Design – Beyond Human-Computer Interaction, 4th edition, John Wiley, 2015 (http://www.id-book.com/chapter3_teaching.php)

16