Tentamen HCI – Human-Computer Interaction

(MMI, MCI or Cognitive Ergonomics)
vakcode 400312

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Friday 14 January 2005, 13.30-16.30 Q105/Q112

notes:

- the people who already have a pass for the HIP (Human Information Processing) can skip questions nr. 8 and 22, if they indicate this.
- the people who already have a pass for the GTA (Groupware Task Analysis) can skip questions nr. 11 and 13, if they indicate this.
- no books or other aids are allowed to be used during the exam.

Please fill in:

Naam: Studentnummer: Studierichting / jaar:

Please write clearly, in English or Dutch, in the space provided on the exam paper. In the case of Multiple Choice questions, choose **one** answer which you think is most correct, by placing a circle around the a), b), c) or d).

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1. HCI is a multidisciplinary research field, and relatively new. Mention at least five of the (more established or older) scientific, engineering or design disciplines that inform HCI. Describe two of these examples in mode detail, illustrate how they inform HCI and how they are incorporated.

2. What are *affordances*? Give three examples of things and their affordances (bonus point for the most original example!).

3. How many Degrees of Freedom (DoF's) has the average computer mouse? Describe them.

4. How many Degrees of Freedom (DoF's) does the whole human hand have?

a) a whole three of them!
b) maximum twelve
c) around 25
d) about 300

5. Which one of the following statements is true?

a) People can do only one thing at the time
b) Computers can do only one thing at the time
c) With the mouse on the computer you can point at only one thing at the time
d) With two mouses[1] on the computer you can point at two things at the same time

[1] preferably, the plural of the computer mouse is *not* 'mice', as is the case with the little animal....

6. Which one of the following statements is true?

a) An input device is used for presenting information and consists of actuators
b) An example of a sensor is an LED (Light Emitting Diode)
c) A display consists of actuators and enables the computer to present output
d) An example of an actuator is the right mouse button

7. Ergonomics as a discipline was established around 1945. But of course people have been studying the properties of artefacts and tools they produced for much longer. Who would have been one of the first ergonomists, and why?

8. What is a, according to the theory of Human Information Processing (and applied in Cognitive Ergonomics) *Short Term Sensory Storage* (STSS) or sensory memory? Give an example, and relate it to user interface design.

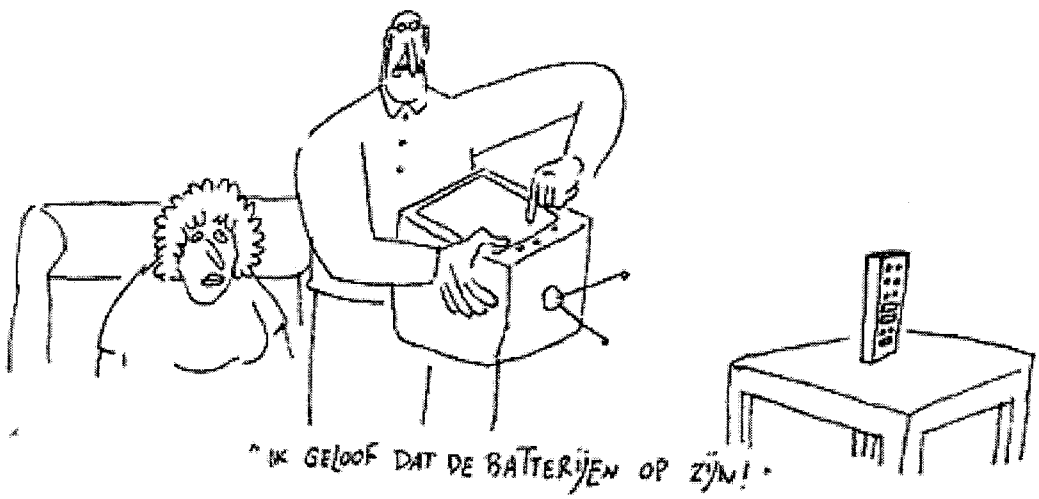
9. The classical categorisation in five senses (seeing, hearing, smelling, tasting and feeling) is insufficient for the field of study of HCI. Name three more senses or sub-senses, and indicate how these modalities can be applied in the design of human interfaces.

10. What is, in ethnographic terms, *implicit group knowledge*? Give an example.

11. What is the main function of Task Model 2 (TM2) in the GTA design method?

a) to envision the future
b) to ensure a consistent design style
c) to describe the current situation
d) to create a "To Do list", an overview of tasks to perform today

12. In the picture below (a cartoon from Kamagurka) we can see a 'user' struggling with technology, apparently because he has the wrong mental model of how the system works. As a result, his conclusion ("I think the batteries have run out") is wrong.



What is a good definition of a mental model? Give an example.

13. Why do we describe *roles* rather than *persons* in Task Model 1 (TM1) of GTA?

14. What does Donald Norman mean with the Gulf of Execution?

15. In user interface design processes sometimes the QOC (Question, Options and Criteria) method is applied. Make an analysis of an everyday situation using the QOC method.

16. HCI doesn't have many formulas, the most well known one is Fitts' law. Which of the following statements about Fitts' Law is true?

a) It still holds when feed-forward is applied
b) If the target size is increased the movement time decreases
c) If the movement angle is increased, movement time increases
d) Movement time decreases when the target distance increases

17. The interaction between human and computer can often be described in various layers (up to seven), for instance to do with the goals, or the actual actions carried out. Give the names and description of at least two of such layers.

18. What sort of things can one measure *qualitatively* rather than quantitatively in a usability test, and how would one go about?

19. Metaphors are often used in the computer interface, for instance the 'desktop' and a 'wastebasket' ('Trash' in US English). The idea is that it helps the user to understand the functionality. Using metaphors in the design of the user interface has limitations and disadvantages too. Give an example.

20. Metaphors don't have to be just visually. Give an example of other modalities used in a metaphorical way.

21. *Scenario based design* is a method particularly well suited for:
a) improvement of existing interactive systems
b) to envision potential usage of not yet existing functionality
c) making a film about user interface design
d) the development of style guides

22. In the interaction between people (and technology) several *modalities* can play a role. Which of the examples below have to do with the haptic, symbolic modality?
a) Braille language
b) a hand shake
c) a gesture with the middle finger
d) a computer game with force-feedback