

Human Computer Interface (IT359)

Tutorial 1 Answer

1. Briefly explain what is meant by the terms perception, physiology and cognition. [3 marks]

Perception relates to the use of our five senses to detect changes in our environment. It plays a role in computer systems development because users must be able to detect and respond to changes in a display.

Physiology relates to our physical characteristics, including height, reach and weight. It plays a role in computer systems development because users must be able to physically operate both input and output devices. Problems such as RSI and Carpal Tunnel Syndrome can reduce a user's physical ability to operate some devices.

Cognition relates to the mental processes that can be used to analyze the information that we perceive in our environment. It plays a role in computer systems development because users may be able to read a warning or help message but may be unable to understand what it means.

2. Identify three different ways in which “functional ageing” can affect interface development. [6 marks]

Functional ageing relates to the way in which a user's cognitive, perceptual and physiological capabilities may degrade at a rate that is faster than might otherwise be expected for their age. This form of ageing can be a particular problem for certain industries. For example, some commercial aviation pilots suffer significant sinus problems that ultimately may lead to hearing loss. Functional ageing can affect interface development in the following ways:

- i. It can affect an entire workforce and so additional cues and prompts may be introduced for all users who suffer from this problem;
- ii. It may only affect certain individuals within a population and so studies will have to be conducted to determine whether initial assumptions about user capabilities hold for the entire group;
- iii. The rate of functional aging may vary from individual to individual and so further studies may be needed to determine the extent of the additional support that may be necessary. Ultimately, it may not be possible for some people to use the system even with significant enhancements to the interface, for example in safety-critical applications.

3. Environmental factors can impair users' ability to recall information that is necessary to operate complex, computer systems. Briefly explain how such disruptions can impair both short-term AND long-term memory. [6 marks]

Short-term memory, typically, requires concentrated effort on the part of the individual concerned. If they become distracted by environmental factors then that concentration can be broken and the content of short-term memory may be lost. For instance, even a momentary distraction can cause a user to forget the name of a file or of a password that they haven't used before.

The impact of disruptions on long-term memory is less easy to explain. Typically, it is less easy to remember information that has passed from short-term to long-term memory. In consequence, a greater source of distraction or disruption would be required to impair their memory. A, typically, example is that even expert computer users may make mistakes if they attempt to perform two familiar tasks in parallel. Both may draw upon long-term memory but there can be interference effects.

4. You have been asked to help in the development of a new computerized call centre. Customers from a national Bank will ring up if they wish to change the details of their account. For instance, they might want to open a new account, close an old account, they might want to change the address of the person who owns the account and so on. Briefly explain how you might use two different requirements elicitation techniques to identify the potential usability problems that might arise for people working with this new system. Identify the principle strengths and weaknesses of each technique. [10 marks]

There are many possible answers to this question. You could propose questionnaires, interviews, and focus groups. You could also use a summative evaluation technique, walkthroughs and usage diaries to find out the weaknesses of the existing systems. These are techniques that can be applied simply and cheaply given the details that are provided in the question. Alternatively, you could propose the use of a more process-oriented approach such as rapid prototyping and participatory design. These techniques can build on an initial requirements elicitation by trying to identify additional problems and opportunities as the development progresses. In the course we also mentioned market survey techniques, such as photo diaries. I'm not sure how these techniques might be applied to this question given that the client is already identified in some detail. However, you could propose more general; studies of the intended user population. In any event, the ideal solution should pick two complimentary techniques. For instance, questionnaires can provide a rough and ready impression of existing usability problems. These might be backed up with more detailed summative evaluations of the existing system etc.