

# Human Computer Interface (IT359)

## Tutorial 5 Answer

1. Briefly describe the differences between novices who are frequent users and experts who are infrequent users of an interactive system. [8 marks]

Novice users who frequently operate an interface will resemble experts in some respects because they will have developed relatively sophisticated models of the application. Unfortunately, those models will be fragile. In other words, they will resume the characteristics of a novice if they stray outside the familiar areas of an application or if an unusual error occurs. Infrequent expert users will be more robust. These users develop 'coping strategies' that enable them to generalize skills learnt on other application but, typically, only if the new interface is consistent with their previous systems. (First class answers might also compare the qualitative differences of the users knowledge in terms of the Rasmussen, Knowledge, Skills, Rules approach).

2. Briefly explain why the following interface was designed both to support infrequent access by experts and more frequent access by novices. [10 marks]

The short answer to this question is that the picture presents the interface to help system - expert users may be expected to access it less frequently than novices. In practical terms, the familiar indexing techniques from books etc and the use of hypertext links should support novice users to rapidly find the information that they are looking for - icons may also help with initial learning. Frequent access may result in novices learning the contents of the help facility by browsing the index. On the other hand, the interface offers direct Search facilities. These may support more focused access by experts whose less-frequent tasks may have less need of the browsing methods, mentioned above. Other answers are possible - for example, it can be argued that the indexing facilities also help infrequent experts who may not know the exact terminology for the information that they need.

3. The Johnson-Dunlop Corporation has been hired to design a form-based interface to a new system that is intended to help Bank Staff process loan applications. When one of the interface design team called on the Bank Staff they asked a long-serving employee what they liked about the existing system:

"It's really difficult to say - there are some aspects that we like and some that we don't...It all depends..."

Briefly explain why experts find it difficult to explain the strengths and weaknesses of existing systems. [12 marks]

Experts find it difficult to explain the strengths and weaknesses of their systems because the use of these applications becomes part of their everyday life. They learn to work around problems. This means that it can be difficult for designers to identify means of avoiding those pitfalls unless they understand how an expert may have organized their work to avoid the limitations of their systems.

The successes are, over time, taken for granted. This makes it difficult for experts to explain how they contribute to their tasks. It can be hard for people to imagine what life would be like without the many different features that they may hardly realise are there. One consequence of this is that interface designers will continue to maintain features on the off chance that they provide critical but unmentioned support to the users' tasks.

All of these problems are compounded by the fact that interface designers are not, typically, expert in the users domain. As a result, it can be difficult for designers to gain enough background information to interpret those comments that an expert does make about the relationship between an interface and their everyday tasks.

4. Using your answer to part (c), briefly describe how you would use scenarios and co-operative evaluation to elicit the detailed design requirements for the screen layout of the form system. [20 marks]

Scenarios involve the description of typical tasks to be accomplished using a new system. They try to anticipate both 'normal' interactions but also facilities for 'error' detection and correction. They are like scripts in that they record potential input from the user and the output from the display. They avoid assumptions about the eventual format of either input or output.

Experts provide one means of identifying scenarios. They can also provide feedback on those scenarios. Co-operative evaluation is a mechanism for achieving this feedback. Experts can act out the role of the user in the scenario. They are encouraged to 'think aloud' as they are prompted for input and read the subsequent output. Gradually, this approach can be used to progress towards more detailed interface design. At this stage, partial implementations can be checked to determine whether or not they support the full range of scenarios identified earlier in the development cycle.

The link between parts c) and d) is that the identification of scenarios provides a concrete means of avoiding some of the problems that experts find when trying to explain successful or unsuccessful aspects of their existing systems. Scenarios focus more on tasks than the interfaces that have become part of their working lives.

5. Dunlop-Johnson Communications (DJC Inc.) are considering developing a phone-in electronic mail service. Their plan is to use speech recognition software to convert the caller's voice into text which will be sent as standard internet e-mail.

- a) Describe the problems you would envisage with this system. Your answer should address problems of dictating e-mail messages to such a system and controlling the interaction in general. [12 marks]

Spoken input is error prone and, when speaker independent, as the case with this system still has a fairly small vocabulary: so some words will be misrecognised and others will not be recognizable. [6]

Controlling the interface would be very hard when the only input is spoken words which are slow and error prone and 12 keys (0..9 \* #) - spoken output is also slow for interaction [6]

- b) The Company is considering running a set of laboratory experiments to test success rates with this voice to e-mail system. Criticize the use of laboratory experiments for this evaluation and suggest an alternative evaluation strategy. [12 marks]

Basic answer: laboratory experiments are in a controlled environment and may miss important aspect of real use, e.g. high levels of background noise or varying accents. An alternative would be to recruit trial users from throughout the country to use the system and evaluate it using questionnaires and interviews. [8]

Good answers may also propose an accuracy test and carry out the evaluation as above but include checks for quality of e-mail sent and running remote experiments by getting users to enter fixed texts [4]

As part of another project Dunlop-Johnson Communications are developing a range of Web-Kiosks which will be integrated boxes housing a web browser, e-mail client, printer and payment facilities. The Web-Kiosks will be located on city and town streets in a similar manner to pay phones — customers will use either cash (£1 coins) or credit cards to pay for connection time.

- c) DJC Inc. is currently investigating different input and output devices. They have already decided on full-size, but waterproofed, QWERTY keyboards and are now considering the following pointing devices: mouse, joystick and touch-screen. Discuss the benefits and problems of each of these devices and recommend one for use in the Web-Kiosks (you may recommend one of the devices listed here or an alternative device not listed). [12 marks]

Mice require a flat surface which might be available if Kiosks are designed properly, however they are also very liable to misuse — their balls could get gunked up, their tails cut (NB: these arguments are slightly different from portables which have been discussed). Would be known to almost anyone who's ever used a computer.

Joysticks are great for tracking tasks (such as games) but are not very good as standard pointing devices. Would at least be firmly mounted and are well known to all game players and have been ruggedised for arcade use.

Touch screens are normally great for public displays but not for general pointing since the fingers are blunt and get in the way. However, when the only clicking that is required is on links and basic controls this might be feasible.

Of these three I'd go for the touch-screen, if the finger is too blunt then the next best would be a touch-pad but few non-portable users know these so this might be a problem for mass audience infrequent users.

[3 points for each mouse, joystick and touch screen and 3 for decision]

- d) For output DJC Inc. are considering laser printers or bubble jet printers: briefly explain how these printers work and state one benefit and problem of each type of printer for the Web-Kiosk. Make a recommendation. [14 marks]

Under MacOS (only OS used as an example since currently their lab's OS), applications produce QuickDraw that is sent to the print driver which converts it to PostScript and sends it to the printer. There a laser charges a photosensitive drum under the control of the PostScript engine. The drum then picks up toner powder and deposits it onto charged paper. The paper is then heated to set the toner. Fast, high quality but expensive. [6]

Bubble jets are driven directly from the computer — hence the machine finds it difficult to do anything else during printing. The QuickDraw is converted into a high-resolution bitmap that then controls a pulsing jet of liquid ink on a scanning print head. Cheap, fairly good quality but slow and ink can run. [6]

In a street fast printing would help, cost is not an issue since machine to person ratio is very low and streaking printouts would be a big problem in Glasgow where its probably raining outside the Kiosk, finally quality might be important for some tasks and users (who are paying per minute after all). So, laser printer. [2]