

Human Computer Interface (IT359)

Tutorial 4 Answer

1. Briefly describe the differences between physiology and perception. [6 marks]

Perception relates to the physical senses. The term is used to describe the way in which information is received from external stimuli in the environment. Physiology refers to the physical profile of the user's body. Average height, weight, reach are all-important physiological characteristics.

2. What is RSI and why is it an increasing problem for computer users? [10 marks]

RSI or repetitive stress injury is an increasing problem for computer users because it is the result of sustained stress on the human body. VDU use places considerable stress upon individual users. The human body has not been adapted to sustain these pressures over prolonged periods. For example, neck and back pains can result from prolonged periods spent at a monitor. Wrist pains, carpal tunnel syndrome, can result from prolonged keyboard use. These problems have increased because many users are ignorant of the preventative measures that can be taken, such as regular breaks and good posture. These problems have also increased because more and more people are spending more of their working lives behind a keyboard.

3. Briefly describe the links between high staff turnover, poor working conditions, Health and Safety legislation and problems such as Carpal Tunnel Syndrome. [10 marks]

Current scientific evidence, and the HSE guidelines, suggests that Carpal Tunnel Syndrome does exist and should be taken seriously by employers. Poor working environments can lead to high levels of staff turnover. One of the symptoms of poor working conditions is ignorance about health and safety legislation. If this legislation is not followed then staff may be lost through problems such as Carpal Tunnel Syndrome. Good employment practices, as advocated by bodies such as the HSE, include education in the measures that can be taken against RSI and Carpal Tunnel Syndrome. In any event, one side effect of not providing this advice may be the considerable financial penalties that can be incurred when key staff suffers from either of these problems. EC legislation in the form of the 'six pack' of health and safety regulations also requires employers to actively inform their staff about the dangers of VDU use.

4. The Johnson Corporation have been asked to perform what is called a 'human reliability assessment' of a well-known company's IT department. As a result of this study they have decided to produce a leaflet that can be given to employees to show them what a good typing posture should look like. Your task is to draw up a first version of this leaflet. Marks will be awarded for diagrams indicating both good and bad posture. [24 marks]

The key things that I'll be looking for will include support for the back. The legs should be given ample room and a footrest may be used. The thighs must clear the desk. The position of the monitor should ideally be 15 degrees below the horizontal but should certainly not place undue pressure upon the user's neck. Wrists should be held above the keyboard and a wrist 'rest' might be provided - although this should not be used as a 'rest'. Document holders might also be shown to indicate support for secondary tasks.

5. Define Fitt's Law and explain what is meant by fields, context and control when used in forms interface design. [15 marks]

Fitt's law states that the time taken to carry out a mouse operation is proportional to the distance to the object and inversely proportional to the size of that object. [4]

In particular $T = 1.03 + 0.96 \log_2 (D/S + 0.5)$ [4]

Fields, context and control are different types of screen element: fields are the elements that a user fills in, control is information and/or on-screen controls for how to drive the interface, and context gives information as to why this form exists and why the information is needed. As a general rule, a good form should contain all three elements, clearly separate them, and group all control information together and all context information together. [7]

6. The following interface has been designed for a parts ordering company. The parts department will complete this form in response to telephone orders from various sites, each person ordering has a unique client code. Two pull down menus at the top of the screen allow the user to enter the part type and the destination. An order will be sent on pressing the "Send" button.

Criticise the design and suggest ways to improve it. Your answer should include 4 criticisms and a suggestion of how to improve each. [20 marks]

The interface is titled "Car Parts Ordering System". It features a central area with a "Client code" input field and a numeric keypad (0-9). Below this is a "Send" button. At the top, there are two pull-down menus labeled "Parts" and "Destinations". At the bottom, there are two more pull-down menus labeled "Parts" and "Destinations", and two empty text input fields. On the left side, there is a list of parts: Alternator, Brake, Clutch, Diode, Electric Window, Fan Belt, Grommet, Hand Brake, and Indicator. On the right side, there is a list of destinations: Auchterarder, Birmingham, Carlisle, Doncaster, Edinburgh, Forfar, Glasgow, Hatfield, and Inverness. Lines connect the pull-down menus to their respective lists.

Many possible answers along the lines of...

There is no little control information. There is plenty of on screen space to give the control information so some "help" should be provided, this could be as simple as "Enter the client's code followed by a part name and destination then click Send. To correct an error... to cancel the order..."

The active areas of the screen are fairly small and distributed throughout the screen, as mentioned above Fitt's law predicts this will be slow to manipulate. Make active areas closer together — larger may feel clunky.

The control, context and fields are all mixed, appear randomly laid out on the screen and are not connected (e.g. parts menu and feedback are separated by the whole screen height). Bring control and fields together by using pop up menus at the feedback location and order them according to the normal order in a phone call.

No indication of how to change an error or cancel an order — provide a "clear form" button or tell the user how to clear an individual field. The menus should be better as pop-ups with tick-marks, these are normally changable.

7. Given an implementation of the original system and the system revised according to your suggestions, explain how you would plan an evaluation to show that your system is more usable. Your answer should include a definition of what you mean by usable. [20 marks]

The most appropriate way to evaluate this system would be to use a large-scale experiment.

A large set of users would be given a set of tasks to complete. The group would be split in two with half the group getting each interface, but with the same tasks and setting. Usability could then be measured by time to complete the tasks and the number of errors made. The tasks should be similar to those tasks that the users will perform but the environment should be constrained so that it does not affect the performance between the two groups. If the redesign is quicker to use and leads to fewer errors in the experimental setting it is likely that this will translate to the system in location, but this should be checked with limited on-site tests.

By usable I mean a combination of time to complete task and error rate.