Designing the User Interface

9

Revision Objectives

After you have studied this chapter, you should be able to:

- discuss the importance of good interface design
- discuss human computer interaction (HCI) design issues such as the use of colour, layout, and content
- identify the required characteristics of a user interface with respect to information, type of interface, type of user, type of application, physical location and current technology.

9.1 The importance of good interface design

In Chapter 2 we gave as one of the definitions of the operating system 'the interface between the user and the hardware'. This definition implies that the interface is designed to make the hardware usable. The interface will consist of several screens shown to the user which may then require a response from the user.

How the user reacts to information presented to them is a complex issue and will draw upon research in the field of psychology.

The HCI is the space between the computer system and the user and its aim is to facilitate the successful use of the computer system.

The interface will be crucial for all aspects of the application – input (for user data entry), processing (where the user may be required to confirm certain results) and the output (where the user interprets the results and responds accordingly).

Operating a piece of machinery – such as driving a car – requires the user to be familiar with certain basic controls, i.e. the steering wheel, accelerator, brake and clutch pedals etc. This way a competent driver would be expected to be able to drive a car with which they have no previous experience. This idea of 'transferability' also applies to be use of computer systems and applications software. A user looking for the 'Save' option would expect to find this either as separate button or on the left hand side of a ***menu bar***.

The effectiveness of a human computer interface is determined by:

- ✓ the graphical, textual and auditory information presented to the user
- ✓ control sequences – such as keystrokes and mouse clicks required
- ✓ selections the user makes to ***navigate*** through the software.

9.2 Human Computer Interaction (HCI) design issues

Before considering each of these design features, think about what information is being presented to the user at any time.

At the start of a word processing session the user will make a menu selection to (for example) load an existing document. The implication is that the user will be expected to know where to find this menu selection.

Keying in of text

The implication is that the user will be aware of software features which are relevant, for example, highlighting text, deletion and movement of text.

Help features

The user will do a keyword search, for example, the user needs to edit a footnote and has forgotten how to do it. This is a transferable skill which has already been used with other software.

These are very different components of the task and the user interface will reflect this.

Consistency

For the two issues of ***colour*** and ***layout*** a key consideration is consistency. That means both consistency within the same piece of software and existing software with which the user is familiar.

Intuitive

When students produce documentation for their coursework report they often set as an objective in the requirements specification that the software is 'user friendly'. When queried they will agree that this is a meaningless phrase to use. What is meaningful is a statement that the software should be intuitive to use. The user should – at any point in the use of the software – be clear what options are possible and what response is required from them. There is no worse feeling when using a program than sat there asking yourself "What do I do next?".

Colour

This is best illustrated with simple examples.

- ✓ On a web form the labels for the various controls could be a different colour to explanatory text
- ✓ Text which gives a warning message could be red to attract the immediate attention of the user.

The use of 'loud' colours is generally to be avoided.

Modern generic software – such as Microsoft Office PowerPoint – has pre-defined colour combinations – called themes – which can be selected by the user (Figure 9.1).

There may be an outside influence on the choice of colours. For example, web site pages may need to use corporate colours which have been adopted by the company in all its materials and so colours must be carefully chosen.

Colour blind users may be unable to distinguish between green and red or other colour combinations.

Progress Check 9.1

Name some of the content of a screen for which you would consider carefully the colours used.

Layout and Content

The design needs to be consistent, for example, different fonts and font sizes will be consistently used for headings, warning text, explanatory text, labels for controls and for any data entered.

There is a limit to the amount of information a user can process from a single screen – and this is where research from psychology is relevant.

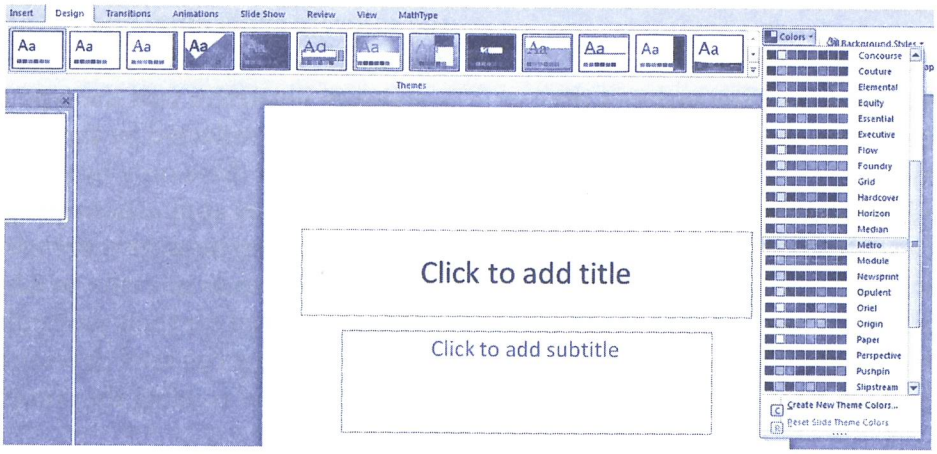

Figure 9.1 Microsoft Office PowerPoint themes

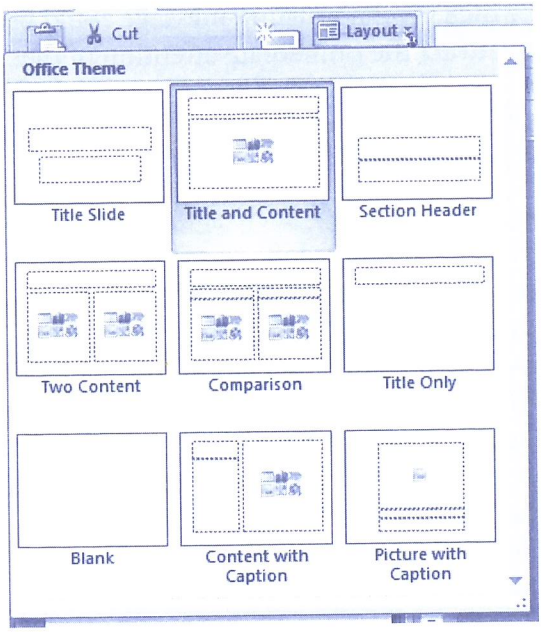

Figure 9.2 MS PowerPoint pre-defined templates

A data entry screen may require the information to be either:

- ✓ split across several inputs screens – a good example of this would be a web form for ordering goods where the data entry is organised as a sequence of screens for the input of the goods data, then the customer data, followed by the delivery data and finally the payment data
- ✓ or presented using a vertical scroll bar.

Software such as PowerPoint has a number of pre-defined templates for the layout of page content (Figure 9.2).

Data entry may be done by copying the information from a paper form. The order of the fields on the computer form should match the order on the paper document.

As a general rule English users would expect to scan the content of a screen from the top left to the bottom right corner of the screen. Content should therefore reflect this. Initial instructions would be at the top of the screen and a 'Save' or 'Next screen' button positioned bottom right of the screen.

Progress Check 9.2

What do you understand by a screen design which is described as 'intuitive' to use?

9.3 The required characteristics of a user interface

We have already introduced the different types of interface in widespread use:

- ✓ ***Command driven***
- ✓ ***Graphical User Interface (GUI).***

Look Back

To Chapter 2 for different types of interface.

Characteristics of a user interface

The categories of interface are only two:

- ✓ Graphical User Interface
- ✓ Command driven

However, a GUI may take a number of styles as these include: forms-based, menu-driven and natural language.

These style are not mutually exclusive and It is common, for example, for a forms-based interface to be menu-driven. Also, a forms-based interface would be a GUI.

The suitability of the style will depend upon the software application and the anticipated end-user.

History illustrates well the type of interface needed will be reflected by the application. Early computing was done only by systems programmers and then later by applications programmers. Application then became more widespread and avilable to the end-user who would be using software as a tool for their particular application area. Computing has now developed to the point where 'everyone' is using the computer as

a tool – with the possible exception of the computing profession developers who are creating the tools for others.

Matching interfaces types to application areas is almost impossible to do. Whereas previously a programmer would require access only to a simple text editor and a compiler which could both be simple menu-driven interfaces, modern Integrated Development Environment (IDE) now has a wealth of features and such an interface is complex.

The move towards even increasing web applications supporting applications such on-line transaction processing has with it developed styles of interface to support this need.

Progress Check 9.3

The tailoring of the appearance of the screen used with a command driven interface will be limited.

What features could be changed?

Later

We shall consider the actual design of an interface in Section 2. This discussion will be highly relevant for your coursework for Section 4. The design of your application will include the design of the various interface screens used by the application.

Exam-style Questions

1. A building firm has expanded rapidly. A systems analyst is employed to plan the introduction of a computer system which will store customer records and details of stock and also keep the firm's accounts.

   Communication between the computer system and the administration staff employed by the firm is to be through a Human Computer Interface (HCI).

   Discuss the importance of:

   (a) colour,

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   (b) layout,

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   (c) content,

   in the design of the HCI.

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2. An interactive computer system in a shopping mall is intended to give information to customers.

   Discuss how the use of colour, layout and content will influence the design of the Human Computer Interface (HCI).

   (a) colour .....

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(b) layout .....

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(c) content .....

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3. A navigation system is designed to be mounted in a car in order to show the driver how to reach the destination. Describe the characteristics of the user interface and why they are appropriate to the application.

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4. A bank has a customer file containing the transactions made by its customers.

The file is used to

- produce a bank statement for each customer once a month
- answer customer queries when the customer telephones the bank.

Explain why the telephone operator uses a forms-based interface when taking details of the query from the customer.

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