

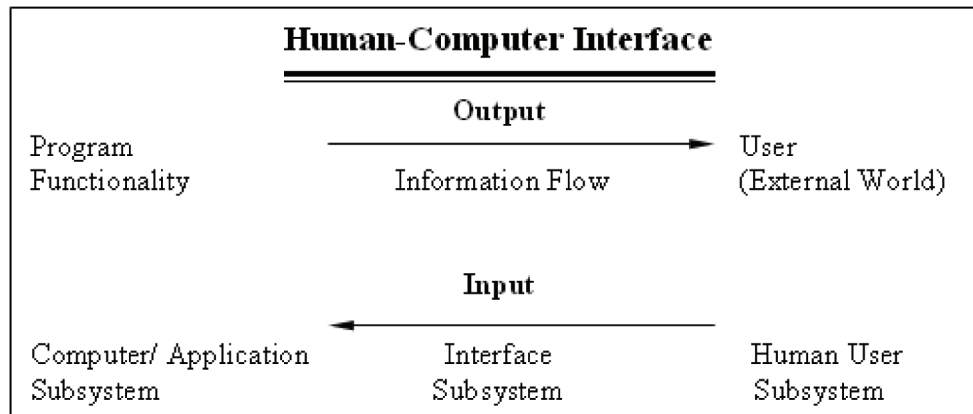
## Chapter 3

# User Interface Design Approaches in Learning Environments

### INTRODUCTION

Interface design provides the practical information for the multimedia author to develop well-designed and usable interfaces. However, the design of the user interface for any learning package involves many interacting concerns. The developer of such a package needs to consider the tasks to be achieved using the particular learning package. Although most learning package developers may use their own choices to develop the package, various approaches to user interface design has been proposed by standardization bodies (e.g. ISO, CEC/CENELEC, BSI) to provide the basic mechanisms for developing, promoting and imposing standards in the user interface in designing learning packages (Hutchins 1987; Ianella, 1992, Pangalos, 1993; Deborah, 1997; Plass, 1998; and Carter 2002). Unfortunately, many learning package developers do not use a common standard user interface design when designing a learning package. This Chapter reviews some approaches that are available to learning package developers and suggestions for user interface design.

*Figure 1. Definition of user interface (Plass, 1998)*



## USER INTERFACE DESIGN APPROACHES

A discipline that is concerned with the design, evaluation and implementation of interactive computing systems for human is termed as human computer interaction (HCI). The user interface is an interface developed to enable HCI. Using the definition of the user interface as a communication channel between the user and the functional elements of the computer (Furnes and Barfield, 1995; Marchionini, 1991 and Waterworth, 1992, Plass, 1998), human-computer interaction can be seen as a system with three components: a computer/application, an interface, and a human user subsystem as shown in Figure 1.

According to this model (Figure 1) the interface subsystem serves two functions, firstly allocates user input to internal representations of the application and secondly internal representations of the application to output that is understandable to the user. The kind of input and output modes employed by the interface subsystem determines the type of the interface. For example a text based system uses only written verbal communication mode, whereas a direct manipulation system allows the user to manipulate objects and use visual, verbal and auditory representations of the systems state (Plass *et al.*, 1998).

In general, although most components of technology assisted problem-solving (TAPS) packages can be considered part of the user-interface in one way or another, it is useful to distinguish those aspects that are clearly concerned with communication between the package and the user. This includes the actual presentation of the information, as well as the acceptance of user-input. Because the general standard communication with the student is primarily done through the natural/high level computer language i.e. English, the package must have the ability to understand the student's response and generate text of its own. There is a strong argument for user interfaces that include not only text, but also visually exciting graphics and the ability for the student to interact with this graphical environment (Swaine, 1992).

Earlier software packages were command-driven or known as text-based command-line interface. For example if the user wanted to copy a file, the command "copy" had to be typed by the user followed by pressing the enter key on the keyboard to process the task. On a Unix platform the command "dw" has to be typed to delete a word. In some cases, this structure can influence the design of the user interface because it contains design features that are influenced by the internal structure of the computer. The user has to learn certain syntax of commands, parameters, and options that are closer to the machine code of a microprocessor than to a high computer language. Such commands had to be remembered by the

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