

Lecture-4

Introduction to Human Computer Interaction

4.1 Goals of HCI

The term Human Computer Interaction (HCI) was adopted in the mid-1980s as a means of describing this new field of study. This term acknowledged that the focus of interest was broader than just the design of the interface and was concerned with all those aspects that relate to the interaction between users and computers.

The goals of HCI are to produce usable and safe systems, as well as functional systems. These goals can be summarized as 'to develop or improve the safety, utility, effectiveness, efficiency and usability of systems that include computers. In this context the term 'system' derives from systems theory and it refers not just to the hardware and software but to the entire environment---be it organization of people at work at, home or engaged in leisure pursuits---that uses or is affected by the computer technology in question. Utility refers to the functionality of a system or, in other words, the things it can do. **Usability**, a key concept in HCI, is concerned with making systems easy to learn and easy to use. Poorly designed computer system can be extremely annoying to users.

Usability goals

To recap, usability is generally regarded as ensuring that interactive products are easy to learn, effective to use, and enjoyable from user perspective.

It involves optimizing the interactions people have with interactive product to enable them to carry out their activities at work, school, and in their everyday life. More specifically, **usability is broken down into the following goals:**

- Effective to use (effectiveness)
- Efficient to use (efficiency)
- Safe to use(safety)
- Have good utility (utility)
- Easy to learn (learnability)
- Easy to remember how to use

Effectiveness

It is a very general goal and refers to how good a system at doing what it is supposed to do.

Efficiency

It refers to the way a system supports users in carrying out their tasks.

Safety

It involves protecting the users from dangerous conditions and undesirable situations. In relation to the comfort design aspect, it refers to the external conditions where people work. For example, where there are hazardous conditions---like x-rays

machines or chemical plants---operators should be able to interact with and control computer-based system remotely. The second aspect refers to helping any kind of user in any kind of situation avoid the danger of carrying out unwanted action accidentally. It also refers to the perceived fears users might have of the consequences of making errors and how this effects their behavior to make computer-based system safer in this sense involves:

- Preventing the user from making serious error by reducing the risk of wrong keys/buttons being mistakenly activated (an example is not placing the quit or delete-file command right next to the save command on a menu.) and
- Providing users with various means of recovery should they make errors. Save interactive systems should engender confidence and allow the users the opportunity to explore the interface to carry out new operations.

Other safety mechanism includes undo facilities and confirmatory dialog boxes that give users another chance to consider their intentions (a well-known used in email application.

is the appearance of a dialog box after the user has highlighted the messages to be deleted, saying: “are you sure you want to delete all these messages?”)

Utility

It refers to the extent to which the system provides the right kind of functionality so that user can do what they need or want to do. An example of a system with high utility is an accounting software package providing a powerful computational tool that accountants can use to work out tax returns. An example of a system with low utility is a software drawing tool that does not allow users to draw free hand but forces them to use a mouse to create their drawings.

Learnability

It refers to how easy a system is to learn to use. It is well known that people do not like spending a long time learning how to use a system. They want to get started straight away and become competent at carrying out tasks without too much effort. This is especially so for interactive products intended for everyday use (for example interactive TV, email) and those used only infrequently (for example, video conferencing) to certain extent, people are prepared to spend longer learning more complex system that provide a wider range of functionality (for example web authoring tools, word processors) in these situations, CD ROM and online tutorials can help by providing interactive step by step material with hands-on exercises.

Memorability

It refers to how easy a system is to remember how to use, once learned. This is especially important for interactive systems that are used infrequently. If users haven't used a system or an operation for a few months or longer, they should be able to remember or at least rapidly be reminded how to use it. Users shouldn't have to keep relearning how to carry out tasks. Unfortunately, this tends to happen when the operation required to be learning are obscure, illogical, or poorly sequenced. Users need to be helped to remember how to do tasks. There are many ways of designing the interaction to support this. For example, users can be helped to remember the

sequence of operations at different stages of a task through meaningful icons, command names, and menu options. Also, structuring options and icons so they are placed in relevant categories of options (for example, placing all the drawing tools in the same place on the screen) can help the user remember where to look to find a particular tool at a given stage of a task.

User experience goals

The realization that new technologies are offering increasing opportunity for supporting people in their everyday lives has led researchers and practitioners to consider further goals. The emergence of technologies (for example, virtual reality, the web, mobile computing) in diversity of application areas (e.g., entertainment, education, home, public areas) has brought about a much wider set of concerns. As well as focusing primarily on improving efficiency and productivity at work, interaction design is increasingly concerning itself with creating systems that are:

- Satisfying
- Enjoyable
- Fun
- Entertaining
- Helpful
- Motivating
- Aesthetically pleasing
- Supportive of creativity
- Rewarding
- Emotionally fulfilling

The goals of designing interactive products to be fun, enjoyable, pleasurable, aesthetically pleasing and so on are concerned primarily with the user experience. By this we mean what the interaction with the system feels like to the users. This involves, explicating the nature of the user experience in subjective terms. For example, a new software package for children to create their own music may be designed with the primary objectives of being fun and entertaining.

4.2 Evolution of HCI

All HCI takes place within a social and organizational context. Different kinds of applications are required for different purposes and care is needed to divide tasks between humans and machines, making sure that those activities and routine are allocated to machines.

Knowledge of human psychological and physiological abilities and, more important still their limitations is important.

Tools and techniques are needed to realize systems. Evolution also plays an important role in this process by enabling designers to check that their ideas really are what users want.

Two systems that provide landmarks along this evolutionary path are the Dynabook, and the Apple Lisa, predecessor of today's Apple Macintosh machines. They were also easy to learn, and provided a visual interface whereby, in general, objects could be directly manipulated, while the system gave immediate feedback.

Dynabook

Alan Kay designed the first object-oriented programming language in the 1970s. Called Smalltalk, the programs were the basis for what is now known as windows technology— the ability to open more than one program at a time on a personal computer. However, when he first developed the idea, personal computers were only a concept. In fact, the idea of personal computers and laptops also belongs to Kay. He envisioned the Dynabook—a notebook-sized computer, with a keyboard on the bottom and a high- resolution screen at the top.

Lisa by Apple

The GUI (Graphical User Interface) that started it all. If you are sitting in front of a computer with a mouse and pull-down menus you owe it to this machine. Windows proponents will tell you that Xerox PARC (Xerox PARC is a research and development company) developed GUIs and Apple stole it from them, therefore what Mr. Gates has done is okay. Xerox had the core idea.

The first Apple Lisa was equipped with dual 5.25 inch floppy drives in addition to a huge external hard drive (shown here). The Apple Lisa moved the hard drive inside the case.

