Lecture-5

Discipline of Human Computer Interaction

5.1 Quality

Let us firstly look at a general definition of quality.

According to the American Heritage Dictionary “characteristic or attribute of something.” As an attribute of an item, quality refers to measurable characteristics---things we are able to compare to know standards such as length, color, electrical properties and so on.

In my point of view or with respect to HCI, quality is something beyond meeting the specifications, requirements or customer expectations. For example, consider a scenario, as you know, there is always a quality assurance department in any software house which checks the final products with reference to their specification or requirements. The products that do not fulfill their specifications or requirements they are considered bugged. In my scenario, what will be the matter if the specifications or requirements, which are being used to measure quality, are not complete? That’s why, I think, quality is beyond the conformance to specifications or requirements or even the customer expectations.

I think quality cannot be measured just by the requirements or specifications described by the customer rather you should approach to that end user who will use this product. The expectations or needs of the end user can be the measure of quality. So, we can say, as much as the product will be useable for end user as much higher will be its quality.
To understand the relationship of quality and usability in a software reference, look at the definition of software quality. “The extent to which a software product exhibits these characteristics”

- Functionality
- Reliability
- Usability
- Efficiency
- Maintainability
- Portability

5.2 Interdisciplinary nature of HCI

<table>
<tr><td colspan="2">Organizational Factors
Training, job design, politics, roles Work organization</td><td>Environmental Factors
Noise, heating, ventilation, lighting</td></tr>
<tr><td>Health and Safety
Stress, headaches, Muscular-skeleton, disorders</td><td>Cognitive processes and capabilities
The User
Motivation, Enjoyment, Satisfaction, Personality Experience level</td><td>Comfort Level
Seating Equipment layout</td></tr>
<tr><td colspan="3">User Interface
Input devices, output displays, dialogue structures, User of colour, icons, commands, graphics, natural language</td></tr>
<tr><td colspan="3">Task Factors
Easy, complex, novel, Task allocation, repetitive, Monitoring, skills, multi-media</td></tr>
<tr><td colspan="3"></td></tr>
<tr><td colspan="3">Constraints</td></tr>
<tr><td colspan="3">System Functionality
Hardware, software, application</td></tr>
<tr><td colspan="3">Productivity Factors
Increase output, increase quality, decrease costs, decrease errors, decrease labour requirements, and decrease production time, Increase creative and innovative ideas leading to new products</td></tr>
</table>

The main factors that should be taken in account in HCI design are shown in above figure. Primarily, these relate directly to users, such as comfort and health, or are concerned with users' work, the work environment or the technology being used. What makes the analysis even more complex is that many factors inevitably interact with each other. For example, if changes are made to improve productivity, this may have undesirable effects on users' motivations and levels of satisfaction because issues relating to job design and work organization are ignored.

Case Study – Ticketing System

A small travel agency with a number of shops distributed throughout the country decides that, in order to survive in the travel industry, it needs to install an efficient ticketing system. Current practice involves sales staff in a lengthy procedure for issuing tickets to customers. First, they have to call an airline to check if there are any vacant seats for the time when the customer wishes to fly. Then they have to check with the customer which of the available seats is suitable before making a reservation with the airline. The ticket is then written out by hand. In addition, the customer needs a receipt and an itinerary, which are also written by hand. One of the biggest problems with this practice is getting a telephone connection to the airline. This means that customers often have to wait while a frustrated sales assistant keeps trying in vain. To overcome this problem, it is common practice to ask the customers to come back later in the hope that the sales staff will manage to get through to the airline in the meantime. Another time-consuming job is accounting for each ticket that has been issued, and the sales staff has to do this by hand every two weeks.

Before deciding to get new system, the branch manager does some background research into how the agency really functions. She starts by visiting branches in a sister company that is using a computerized ticketing system. After talking to the staff for just a short time she discovers that there are problems. The sales staff complains that the computer is always going wrong and that they don't trust it. Furthermore, they can't understand some of the messages that it produces when they make errors. In fact, they wish they could go back to the old un-computerized way of working. Sales figures since the new system was installed are also disappointing and a large number of staff have left the office. Not surprisingly, the manager is consultants examine the users' needs and how they currently go about their work in detail and also find out exactly what the goals of the company are. They then recommend a system with the following characteristics:

- Immediate ticket booking via a computer connection (alleviating the problem of engaged phone line),
- Automatic print-out of tickets, itineraries and receipts (eliminating the need to write these by hand and thereby reducing the possibility of errors and illegibility while speeding up the process),
- Direct connection between the booking system and accounting (speeding up the process of accounting),
- Elimination of booking forms (reducing overheads as less paper and time are used).

The consultants are optimistic that customer satisfaction will improve because customer will get their tickets on the spot. They point out to the manager, however, that in order to get the most out of the new system the layout of the agency needs to be changed to make it comfortable for the sales staff to operate the compute, while still providing scope for direct contact with customers. Staff will also need training, and some careful changes to existing jobs are needed too—job design. In particular, technology means that they will need support during the period of change. Staff will also need to know how to cope when an airline's computer malfunctions. Changes in employment conditions must also be examined. For instance, if staff is expected to carry out more transactions in less time, are they going to be rewarded for this extra activity? Staff relations with other staff in the company who will not be using the computerized system must also be taken into account.

HCI understands the Complex Relationship between Human and Computers, which are two distinct 'Species'. Successful Integration is dependent upon a better understanding of both Species.

Human

- Cognitive Psychology
- Social Organizational Psychology
- Ergonomics and Human Factors

Machine

- Computer Science
- Artificial Intelligence
- Design

Cognitive Psychology

Psychology is concerned primarily with understanding human behavior and the mental processes that underlie it. To account for human behavior, cognitive psychology has adopted the notion of information processing. Everything we see, feel, touch, taste, smell and do is couched in terms of information processing.

Social and Organizational psychology

Social psychology is concerned with studying the nature and causes of human behavior in a social context. Four core concerns of social psychology as:

- The influence of one individual on another person's attitudes and behavior
- The impact of a group on its members' attitude and behavior
- The impact of a member on a group's activities and structure
- The relationship between the structure and activities of different groups.

Ergonomics or human factor

Ergonomics, or human factor, developed from the interests of a number of different disciplines. Its purpose is to define and design tools and various artifacts for different work, leisure and domestic environments to suit the capabilities and capacities of users.

Artificial Intelligence

Artificial Intelligence (AI) is concerned with the design of intelligent computer programs which simulate different aspects of intelligent human behavior. The relationship of AI to HCI is mainly concerned with user's needs when interacting with an intelligent interface. These include, for example, the use of natural language and speech as a way of communicating with a system.

Computer Science

One of the main contributions of computer science to HCI is to provide knowledge about the capabilities of technology. In addition, computer scientists have been concerned about developing various kinds of techniques to support software design, development and maintenance.

Design

Design contributes creative skills and knowledge to this process. In many respects the greatest influence of engineering on HCI and subsequently on interface.