

Interaction design theory, concepts and paradigms  
Graphical user interfaces  
Virtual reality Multimedia information systems  
Collaborative and social computing Interaction devices  
Human-centered computing Education  
Mixed / augmented reality Interaction paradigms  
**Human computer interaction (HCI)**  
HCI theory, concepts and models Touch screens  
HCI design and evaluation methods  
Empirical studies in HCI  
Haptic devices User centered design  
User studies  
Virtual reality Computer supported cooperative work

**HCI** (human-computer interaction) is the study of how people interact with computers and to what extent computers are or are not developed for successful interaction with human beings. As its name implies, HCI consists of three parts: the user, the computer itself, and the ways they work together.

## **User**

By "user", we may mean an individual user, a group of users working together. An appreciation of the way people's sensory systems (sight, hearing, touch) relay information is vital. Also, different users form different conceptions or mental models about their interactions and have different ways of learning and keeping knowledge and. In addition, cultural and national differences play a part.

## **Computer**

When we talk about the computer, we're referring to any technology ranging from desktop computers, to large scale computer systems. For example, if we were discussing the design of a Website, then the Website itself would be referred to as "the computer". Devices such as mobile phones or VCRs can also be considered to be "computers".

## Interaction

There are obvious differences between humans and machines. In spite of these, HCI attempts to ensure that they both get on with each other and interact successfully. In order to achieve a usable system, you need to apply what you know about humans and computers, and consult with likely users throughout the design process. In real systems, the schedule and the budget are important, and it is vital to find a balance between what would be ideal for the users and what is feasible in reality.

## **The Goals of HCI**

The goals of HCI are to produce usable and safe systems, as well as functional systems. In order to produce computer systems with good usability, developers must attempt to:

- understand the factors that determine how people use technology
- develop tools and techniques to enable building suitable systems
- achieve efficient, effective, and safe interaction
- put people first

## **Factors in HCI**

There are a large number of factors which should be considered in the analysis and design of a system using HCI principles. Many of these factors interact with each other, making the analysis even more complex. The main factors are listed in the table below:

### **Organisation Factors**

Training, job design, politics, roles, workorganisation

### **Environmental Factors**

Noise, heating, lighting, ventilation

Health and Safety Factors

### **The User**

Cognitive processes and capabilities

Motivation, enjoyment, satisfaction, personality, experience

## **Comfort Factors**

Seating, equipment, layout.

## **User Interface**

Input devices, output devices, dialogue structures, use of colour, icons, commands, navigation, graphics, natural language, user support, multimedia,

## **Task Factors**

Easy, complex, novel, task allocation, monitoring, skills

## **Constraints**

Cost, timescales, budgets, staff, equipment, buildings

## **System Functionality**

Hardware, software, application

## **Productivity Factors**

Increase output, increase quality, decrease costs, decrease errors, increase innovation



## **Disciplines contributing to HCI**

The field of HCI covers a wide range of topics, and its development has relied on contributions from many disciplines. Some of the main disciplines which have contributed to HCI are:

### **Computer Science**

- o technology
- o software design, development & maintenance
- o User Interface Management Systems (UIMS) & User Interface Development Environments (UIDE)
- o prototyping tools
- o graphics

### **Cognitive Psychology**

- o information processing
- o capabilities
- o limitations
- o cooperative working
- o performance prediction

## **Social Psychology**

- o social & organizational structures

## **Ergonomics/Human Factors**

- o hardware design
- o display readability

## **Linguistics**

- o natural language interfaces

## **Artificial Intelligence**

- o intelligent software

## **Philosophy, Sociology & Anthropology**

- o Computer supported cooperative work (CSCW)

## **Engineering & Design**

- o graphic design
- o engineering principles