INTRODUCTION TO HUMAN COMPUTER INTERACTION (HCI)

ICT 241-2 Human Computer Interaction

Lecture 1

What is Human Computer Interaction (HCI?)

User definition:

HCI, also known as man-machine interaction, is a discipline that organizes interaction between man and computing devices to make it more successful.

Developer Definition:

Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them.

HCI?

- Organizes interaction between man and computing devices to *make it more successful*

Multidisciplinary

- Involves:

  - *Psychology and cognitive science*

  - Ergonomics

  - Sociology

  - Computer Science and Engineering

  - Business/Management

Arts

  - *Writing*

What is Human Computer Interaction (HCI?)

Organizes interaction between man and computing devices to make it more successful

Multidisciplinary

Involves:

•**Psychology and cognitive science**

to give someone knowledge of the user's perceptual, Cognitive and problem-solving skill

What is Human Computer Interaction (HCI?)

- **Ergonomics**

for the user's physical capabilities

- **Sociology**

help to understand wider context of the interaction

- **Computer Science and Engineering**

to be able to build the necessary technology

What is Human Computer Interaction (HCI?)

•**Business/Management**

to be able to market it

•**Arts**

Graphic designer's to produce effective interaction

•**Writing**

Technical writing to produce the manuals

Why Multidisciplinary?

A beautifully designed graphic display may be unstable if it ignores dialogue constraints or the psychological limitations of the user

Do you agree?
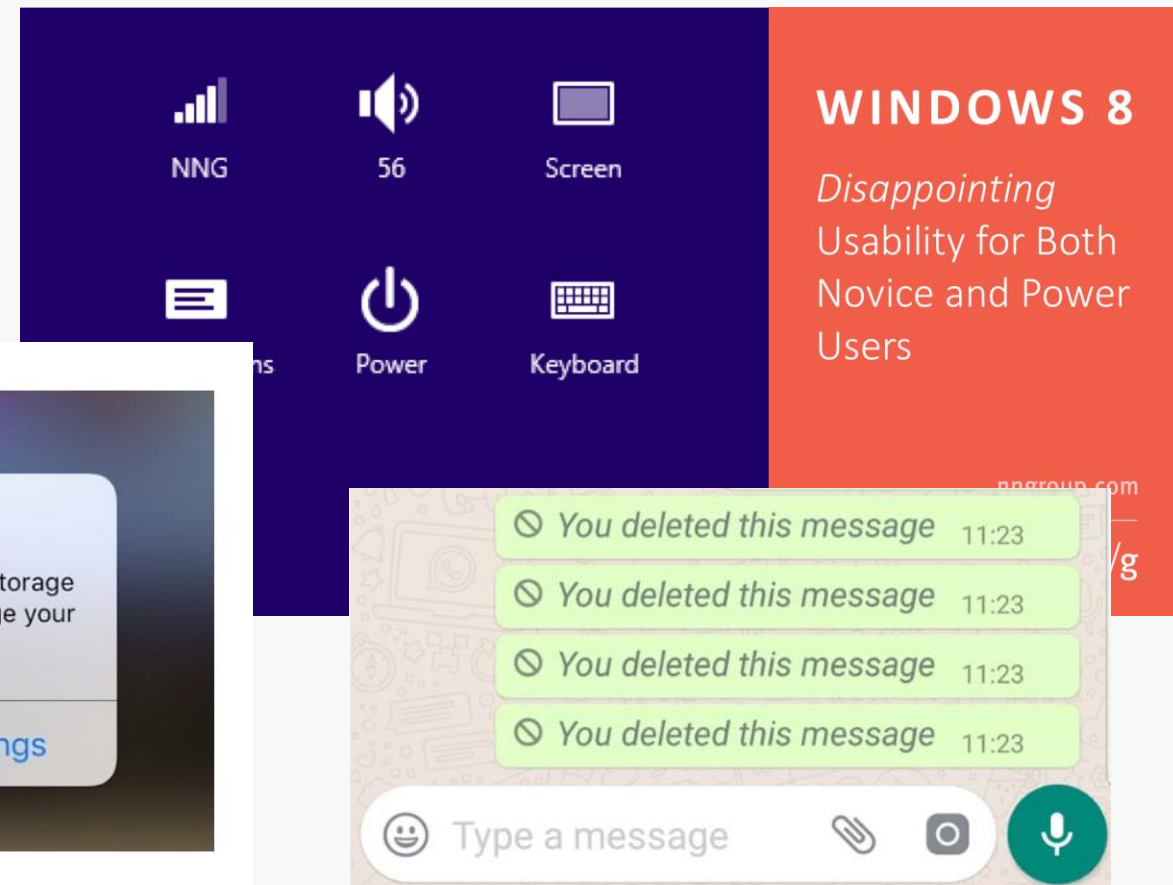
What are your experiences?

Design fails?

Why HCI?

- We are complex beings in complex settings!

- Inadequate attention to users and task → bad user interfaces → System failure

Is HCI a Science or a Craft?

Theoretically, it is a marriage of art and science

- But it is not always true,

[a beautiful woman + a wise man] ->

handsome and intelligent child

Is HCI a Science or a Craft?

- Beautiful and/or novel interfaces are artistically pleasing and motivate fulfilling the tasks required

- Scientific view/reasoning: why certain things are successful whilst others are not? Then, allow creative nature to feed off this information

HCI is required to be both a craft and a science in order to be successful

Role of HCI – develops the relationship

- Some users not only cannot work but also cannot live without their computers in everyday life ☺
- E.g. emails, Facebook, …

What are type of tasks for which people could use computers?

Role of HCI – develops the relationship

Computers now affect every person in society

ICT literacy – fundamental right in a society

"*Product success may depend on ease of use, not necessarily power of machine*" – find reasons to justify this

- **Assignment 1: (group activity, 4 members) Submit before 8:00pm on 15th May 2023.**

Challenge of developing products for everyone

HCI takes advantage of our everyday knowledge of the world to make software and devices more understandable and usable for everyone.

e.g. Desktop Computers – Consider introducing a computer for very beginner

Challenge of developing products for everyone

Designing **interactive systems** is concerned with many different aspects of a product.

e.g. ask a question from visiting foreigner in your village

aspects : language, understanding, interpretation, finding answer(solution), ...

Components of HCI

Human   Interaction   Computer

The user is interacting with the computer in order to accomplish something (he has a goal !)

Describe Human Users

An Individual

Group of users working together

A sequence of users in an organization (each dealing with some parts of task)

How to classify or understand human users?

- **Physical abilities**
- **Personality differences**
- **Skill differences**
- **Cultural diversity**
- **Motivation**
- **Special needs**

Computer(s)

- **Desktop/Laptop**

- **Mobile phones/tablet computers**

- **Tabletops**

- **Virtual Reality (VR)**

- **Large scale computer systems**

- **Process control system**
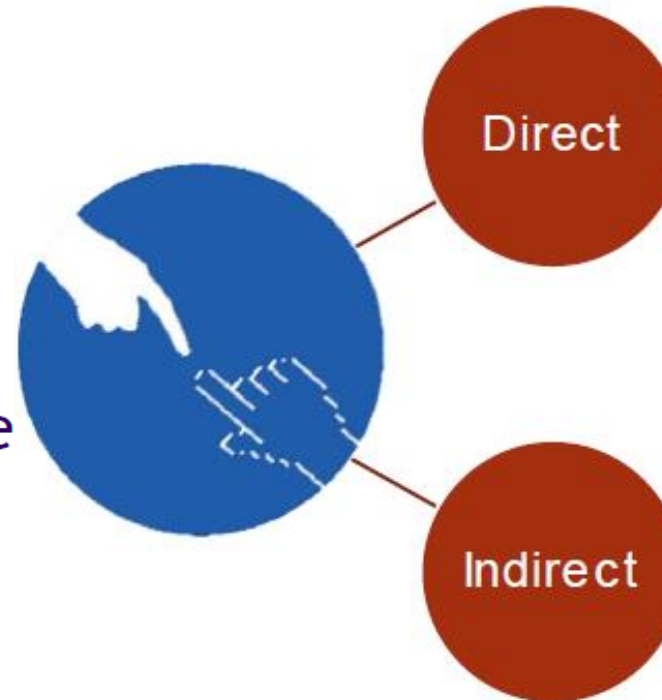
- **Embedded system**

What is Interaction?

A communication between a user and computer be it direct and indirect

Two types of interaction:

Direct: a dialog with feedback and control throughout the performance of the task

Indirect: Batch processing or intelligent sensors controlling the environment

Direct

Indirect

Goals of interaction design

Allow users to carry out tasks
- Safely
- Effectively
- Efficiently
- Enjoyably

Two types of interaction design

User-centered design

- In order to optimize the system functionality and resources, human user is considered main stakeholders that need to be satisfied

Task-centered design

- "Tasks are what the user is carrying out in a way he/she wants.

What is Interface (User Interface/UI)?

Interaction happens through the interface

Interface facilitates the communication between the user and system

How?

The interface needs to provide some mechanisms for

- people to provide instructions and enter data into the system: 'input'.
- the system to tell people what is happening: 'feedback'
- the system to display the content (i.e. information, pictures, movies, animations) : 'output'.

Interactive Interfaces

The interface of an interactive system is all those parts of the system with which people come into contact,

- physically, (by pressing buttons or moving controls)

- Perceptually (by displaying things on a screen, or making noises)

- Conceptually (by providing messages and other displays)

Ways to extend the interface of a device

- The device can be handled in different ways to do the same (**multiple ways**)

- Use the devices to increase the productivity (**simplify** the **interface**)

- Single device to multiple tasks (**multitasking**)

- Change the device to use it easily to do the task (**Customization**)

- Some people like to do in a specific way (**personalized**)

Good and bad interfaces

Poor user interfaces

- can cripple a system that is outstanding in all other respects
- can be very irritating for the user
- Can be hard to learn or remember
- Can loose productivity
- could literally become a life or death situation

Good user interfaces (User Friendly ...)

- Find features of good user interfaces
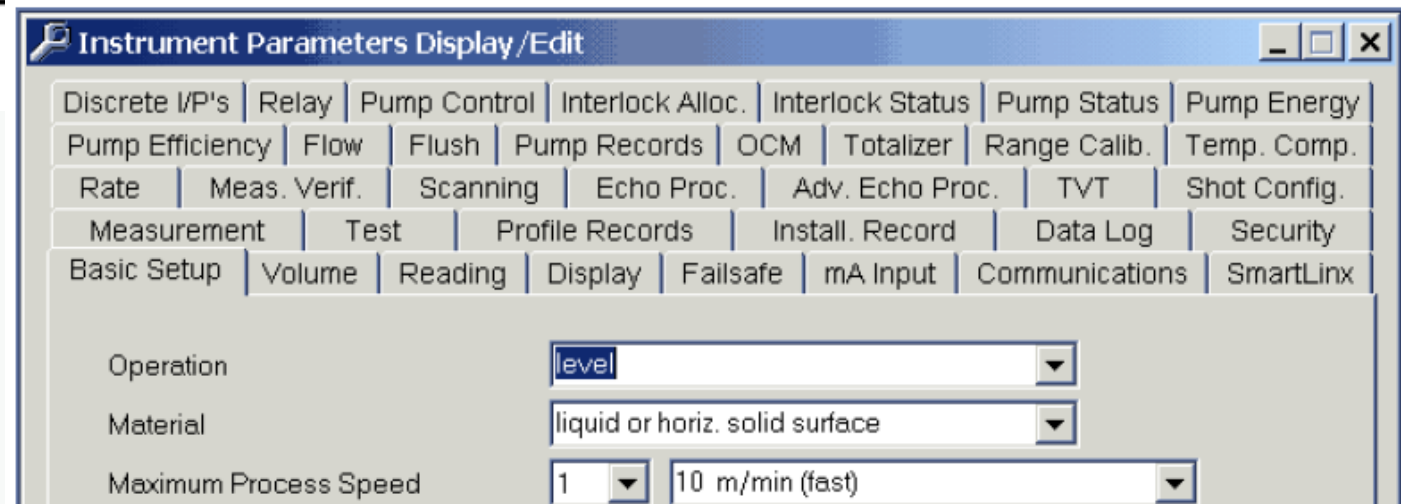- Find examples of good user interfaces

15 min task

Examples of bad interfaces
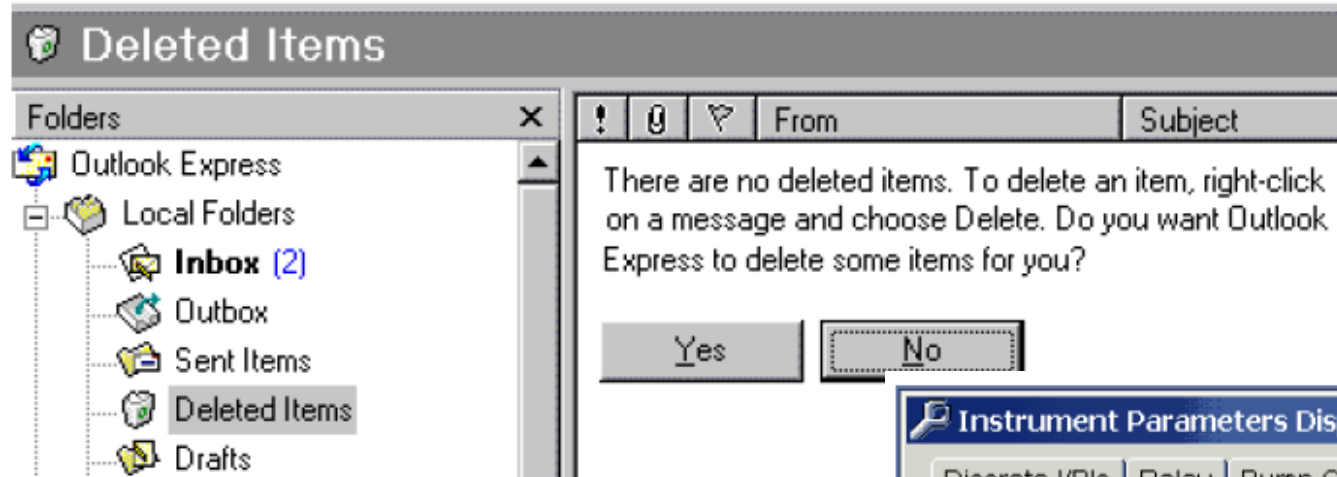
Strange message ???

Too many tabs ???

Developing Interactions/ Interfaces

When developing interactions in a system, the designer should

- understand the human capacities of the user

- understand the consequences of using information technology as a tool for solving work related tasks

- develop and evaluate the system by putting the user at the center of the design process.

Why designing is so difficult?

- I am not you!
- Designers design things that will be used by others
- Solutions
    - Closing the gap
    - Design by yourself – DIY design

Developing interfaces for good interaction

Interface is not the last thing to do

- Should be developed integrally with the rest of the system
- Iterative work that goes with evaluation

Good interfaces

- Suitable for the task
- Easy to use (appropriate, adaptable to the user's knowledge and experience)
- Feedback on performance
- Display information useful for the user
- Confirms to the "Principles of Software Ergonomics"
- People need to have a proper 'say'

- *Software ergonomics includes the determination of user needs, interface design, user support and usability testing*

References for reading

Human-computer interaction (HCI) is an area of research and practice that emerged in the early 1980s, initially as a specialty area in computer science embracing cognitive science and human factors engineering …….

Human Computer Interaction - brief intro | The Encyclopedia of Human-Computer Interaction, 2nd Ed. (interaction-design.org)

~END~