Principle of Human Computer Interaction

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Introduction to HCI

Lecture 1

Outline

- **Introduction**
- **What is HCI?**
  - The HCI Challenge
  - HCI is Not about
  - HCI is about
- **The goals of HCI**
- **What is Usability?**
- **Why is usability important?**
  - Why HCI is Important in the Context of WWW?
  - It is not Simple to Make Good User Interfaces
- **Examples of good and bad design**

Introduction

- Interacting with technology has become an essential part of everyday life for the majority of people.
- The average user of a computer system is now less likely to understand the technology. Since, there are different types of technology they have to use.
- People are busy and may spend little or no time actually learning a new system.

Introduction..(cont.)

- Therefore, computer systems should be easy to use, easy to learn, and with no errors.
- To design and develop of such a system is a major concern of HCI

What is HCI?

- **Human-computer interaction (HCI):** "*is a discipline concerned with the design, evaluation and implementation of interactive systems for human use and with study of major phenomena surrounding them.*"

  (ACM SIGCHI, 1992, p. 6)

What is HCI?

- **HCI (human-computer interaction)** is the study of interaction between people (users) and computers.
- Interaction between users and computers occurs at the user interface
- The golden principle in HCI is that “people should come first”.

What ..(cont.)

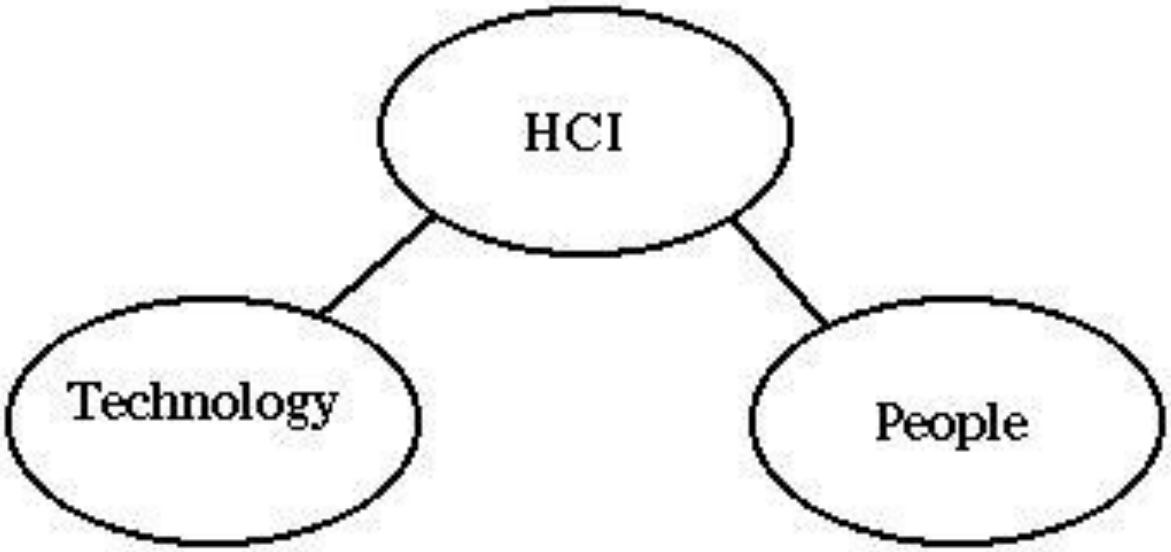
HCI consists of three parts:

- **Human**: could be an individual user or a group of users.
- **Computer**: could be any technology ranging from the general desktop computer to a large scale computer system.
- **Interaction**: any direct or indirect communication between a human and computer.

What ..(cont.)

- HCI concentrates on the study of human factors
- The study of human factors started during the Second World War by US army.
- Usability was born because of badly designed arms that caused “friendly fire” during war.

The HCI Challenge



What can it do?
How can it be built?
What are the possibilities?

What are people doing?
How would it fit it?
What would they do with the technology?

HCI is Not about

- Making the interface look pretty
- Only about desktop computers (and that goes for computing as well!)
- Something that would be nice to do but usually there's no time for it

HCI is about

- Understanding the users
- Understanding users tasks
- Understanding the surrounding environment
- GUI requirements gathering and analysis
- Design prototype
- Evaluate the system

The goals of HCI

- **The goal of HCI** *"is to develop or improve the safety, utility, effectiveness, efficiency and usability of system that include computers."*
  (Interacting with computers, 1989, p3)

The goals of HCI

- The goals of HCI are to produce usable and safe systems, as well as functional systems. In order to fulfill that, developers must attempt to:
  - Understand how people use technology
  - Building suitable systems
  - Achieve efficient, effective, and safe interaction
  - Put people first

    People needs, capabilities and preferences should come first. People should not have to change the way that they use a system. Instead, the system should be designed to match their requirements

What is Usability?

- A usable system is:
  - easy to use
  - easy to learn
  - easy to remember how to use
  - effective to use
  - efficient to use
  - safe to use
  - enjoyable to use

Why is usability important?

A Good user-interface can:

1. Earn a company billions.
2. Increase users loyalty.
3. Increase users trust.
4. Makes users happy :)

Why ..(cont.)

A Bad user-interface can:

1. be annoying, embarrassing, frustrating, and even deadly.
2. Increase mistakes in data entry and system operation.
3. Makes functions become completely inaccessible.
4. System failure because of user rejection.

Why HCI is Important in the Context of WWW?

- Competition is very close (just another link…)
- Comparison is easily possible (example – Online-Shop)
- Users who can't find the product in the shop can not buy it
- Users who are not able to fill in correctly the order form are not going to buy

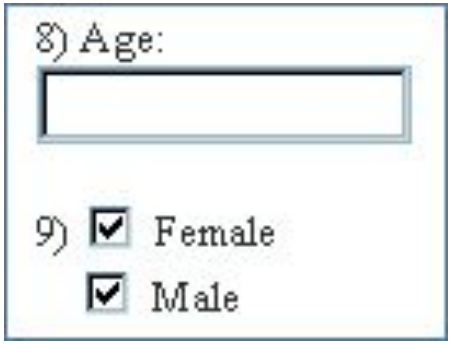
It is not Simple to Make Good User Interfaces

Basic misconceptions:

- If I (the developer) can use it, everyone can use it
- If our non-technical staff can use it, everyone can
- Good user interfaces are applied common sense
- A system is usable if all style guidelines are met

Examples of good and bad design

Examples ..(cont.)



Examples ..(cont.)

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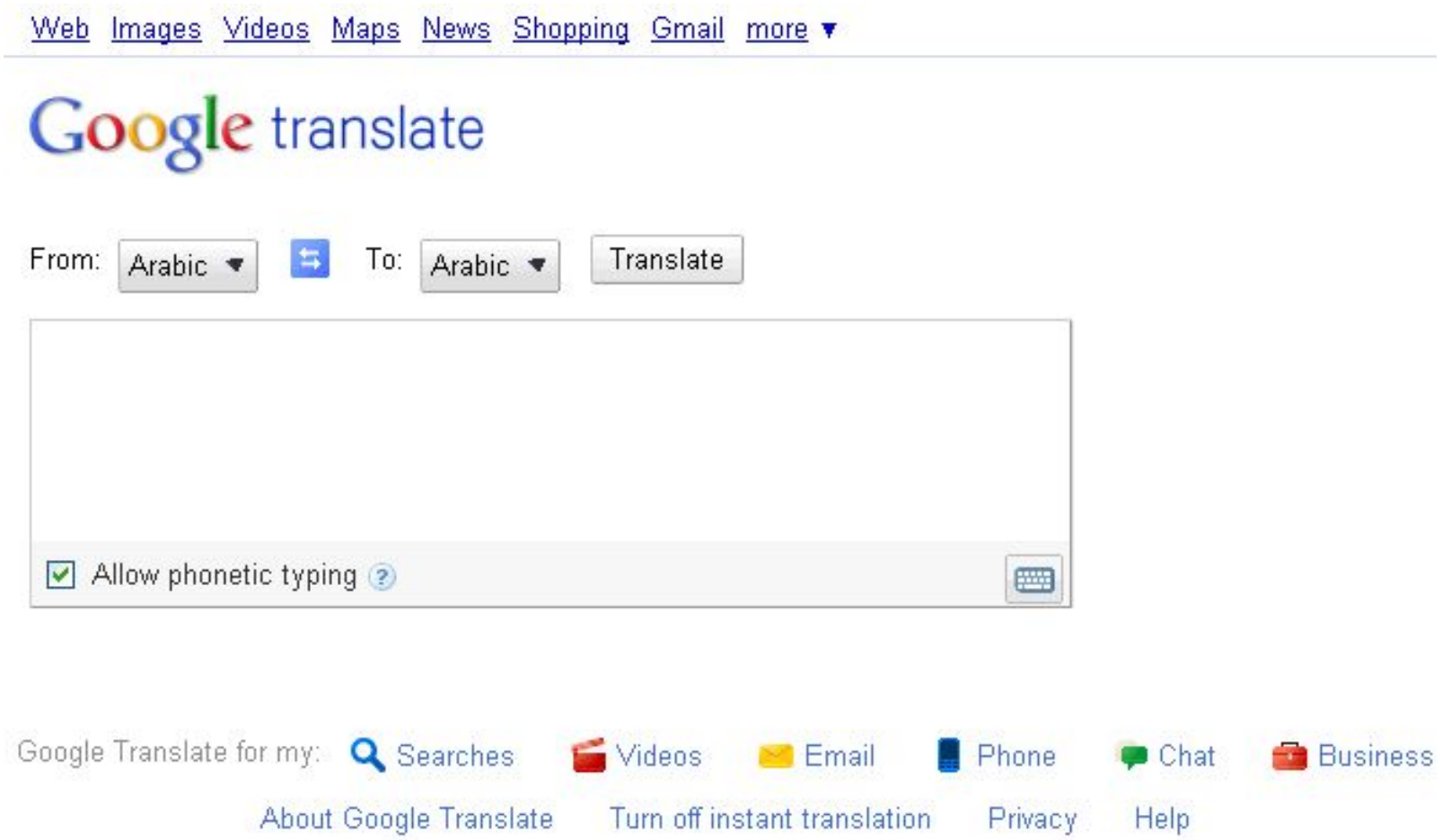
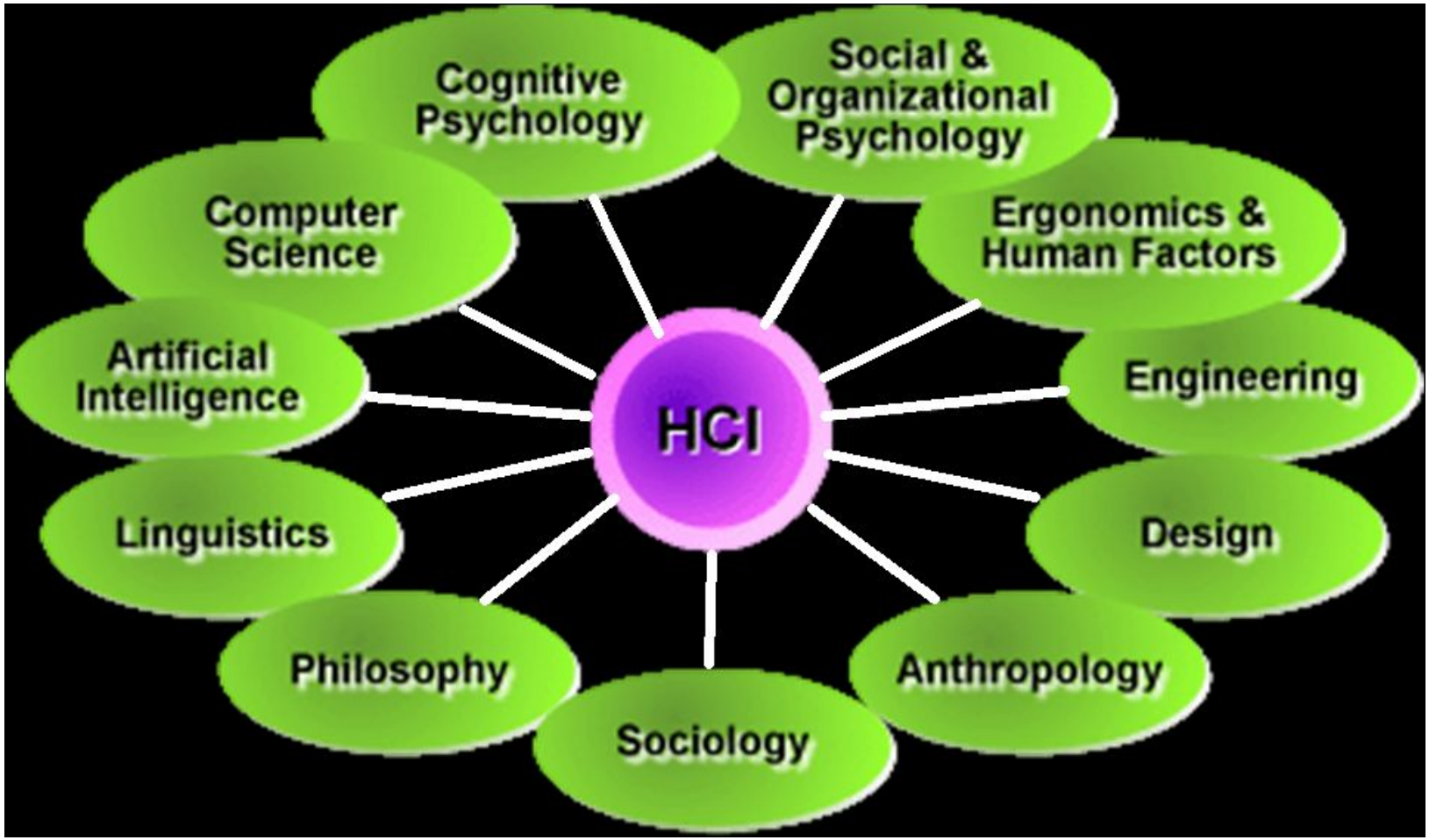


Examples ..(cont.)

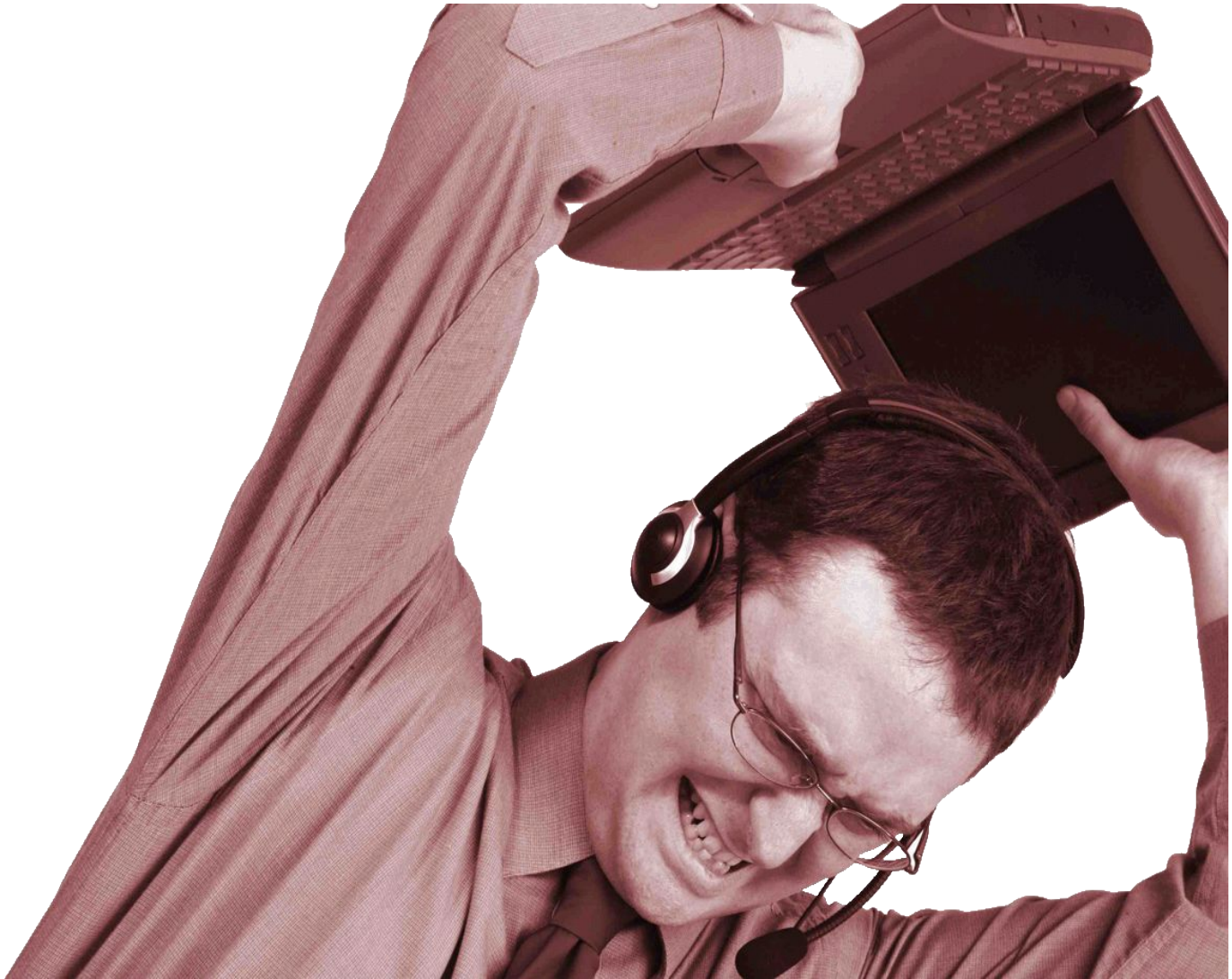
Outline

- Disciplines Contributing to Human-Computer Interaction
- Is HCI really Important?
  - A real life example
  - The importance of HCI
  - Reasons for Failures
- Traditional approach
- User-centred design
- Examples of good and bad design

Disciplines Contributing to Human-Computer Interaction



Is HCI really Important?



A real life example

Example about: Health and safety concerns

If the video doesn't record a TV program because we pressed the wrong button, we are likely to feel angry.

A real example: a pilot shuts down the wrong engine and the plane crashes (as happened near Leicestershire, in England on the M1 motorway in 1989), this is obviously more serious. **47 died**

A real ..(cont.)

Example about: direct correlation between HCI and sales

- NYNEX: a telecommunicationon company in Italy
  - Purpose: to increase the performance of helpdesk office
  - Decided to improve the usability of the helpdesk operator interface
  - Reduced the process time 1 second per call

Result: $ 3,000,000 benefit / year

The importance of HCI

1. Can Preventing accidents
2. Health and safety concerns
3. Can reduce the cost of customer training and support
4. Direct correlation between HCI and sales
5. HCI can provide you a job.

Time to Think!

- What is the percentage of software development projects that fails?
- A. 20%
- B. 35%
- C. 55%
- D. 85%

- **Fact**

- *Fletcher Buckley* *“: 85% of Software projects are either late or delivered without satisfying the specification.”*

But WHY?

Reasons for Failures

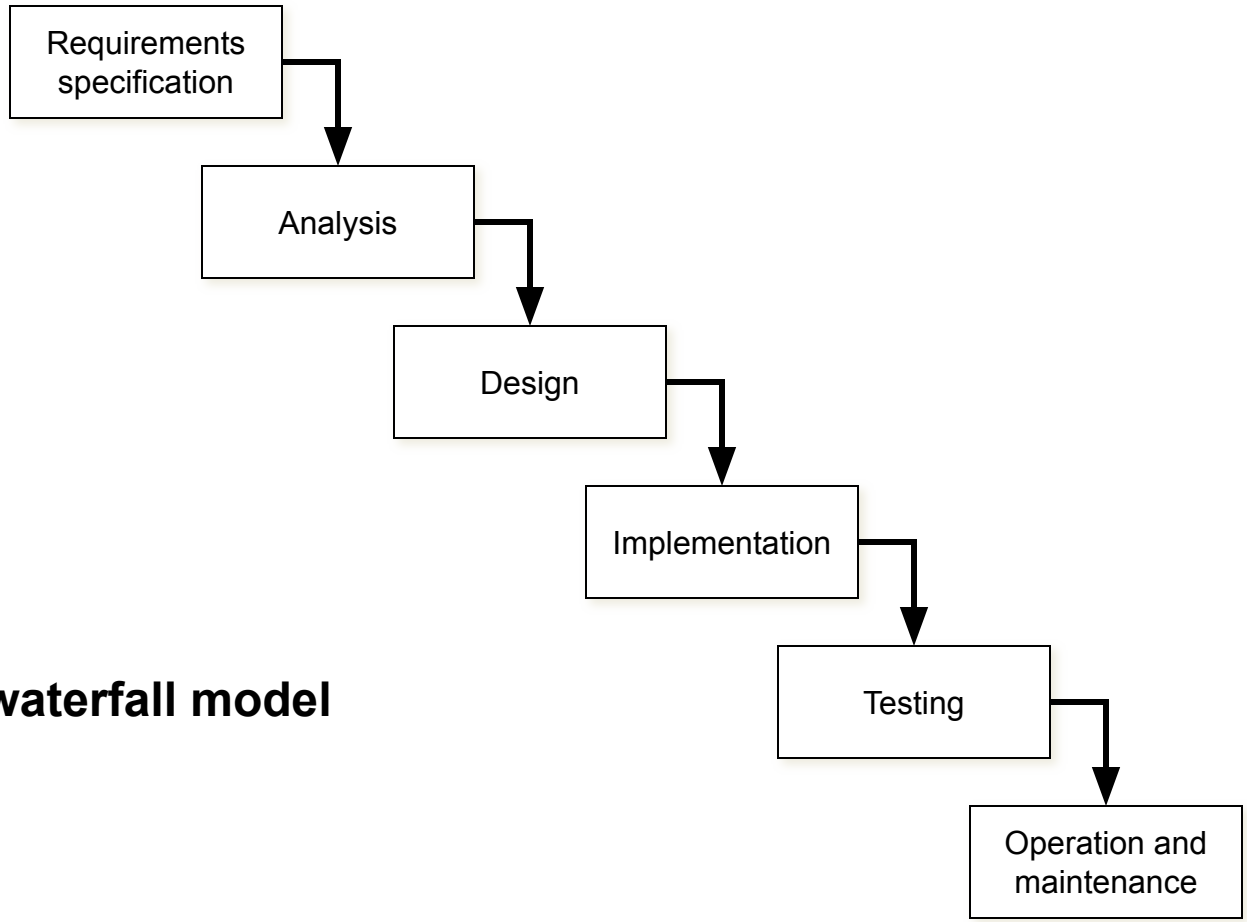
Projects in general fail for various reasons:

- lack of senior management commitment
- **lack of user involvement**
- **lack of user requirements specifications**
- poor project planning and team problems

Traditional approaches to system development

- Is concerned with producing software, software specification, maintainability, and testing
- Generally considers the interface to be just another software component.

Example of traditional approach



The waterfall model

Introduction to User Centered approach

This approach normally involves a number of key activities throughout the development of the software including:

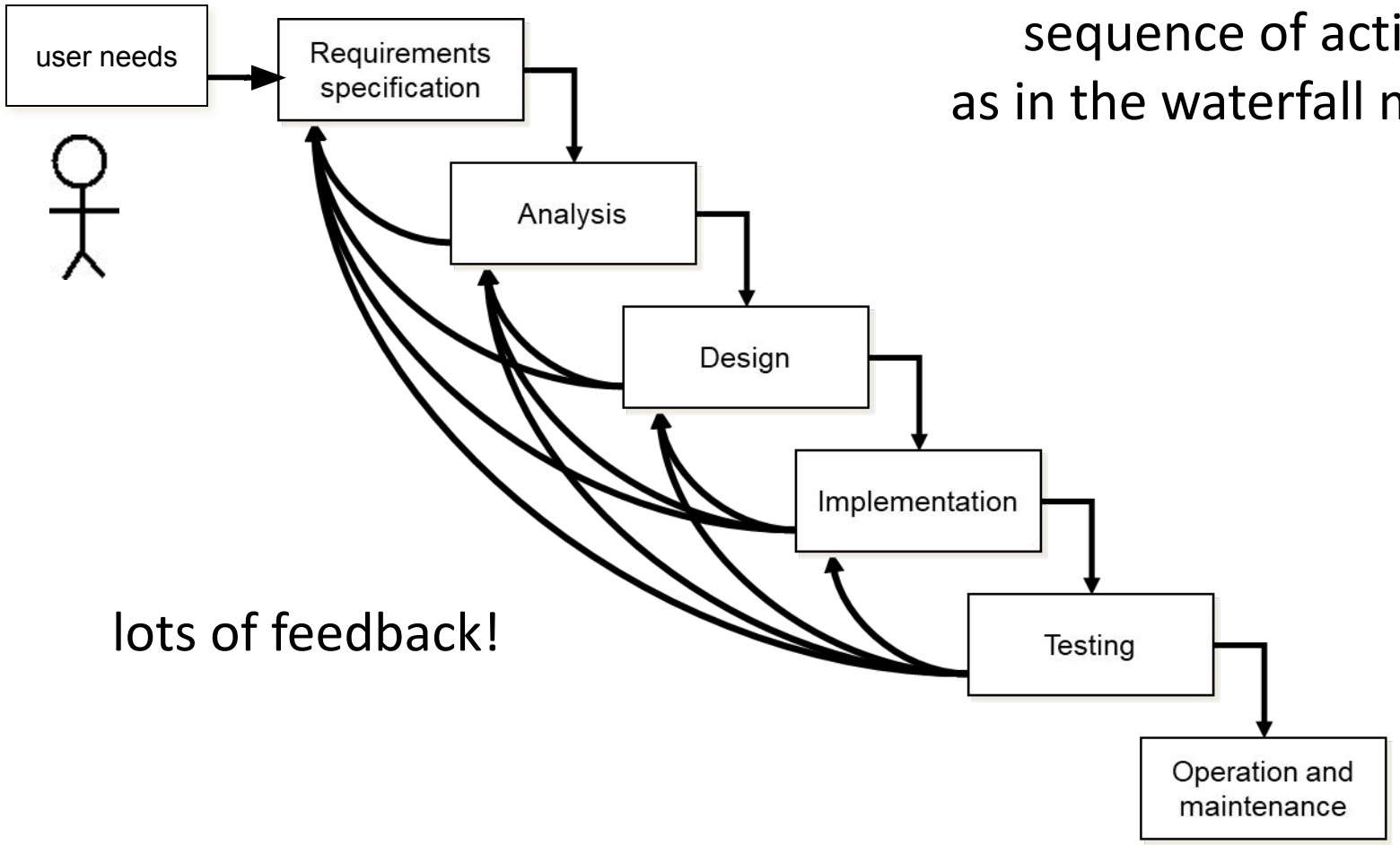
- Involving users
- Obtaining their feedback on the design
- Providing prototypes for system evaluation and re-design in light of user feedback and comments.

User Centered approach

- Real users involved at each step of the process
- Find out about the users before requirement specification
- Design and implementation
- Review (usability test) with the users

The life cycle for interactive systems

cannot assume a linear sequence of activities as in the waterfall model



lots of feedback!

User Centered Development

1. Data Collection
2. Data Analysis
3. Prototyping
4. Design
5. Evaluation

1. Data Collection

- Data recording
  - Using media
- Interviews
  - Stakeholder interviews
  - Subject Matter Expert interviews
  - User and customer interviews
- Questionnaires
  - Surveys, product reviews
- Literature review
  - Studying existing systems

2. Data Analysis

- Requirement analysis
  - Formal specifications of the system
- User analysis
  - Identifying and understanding the user
- Task analysis
  - Steps user take to accomplish this task
- Functional analysis
  - Functions that system perform to help the users carry out their task

3. Prototyping

Advantages of Prototyping:

- Users are actively involved in the development
- It provides a better system to users
- The users get a better understanding of the system being developed.
- Errors can be detected much earlier
- Quicker user feedback is available leading to better solutions

4. Design

- Goals
  - Achieving goals
- Users and systems
  - Understanding the raw materials: computer and human
- Limitations
  - Accepting limitations of humans and of design

5. Evaluation

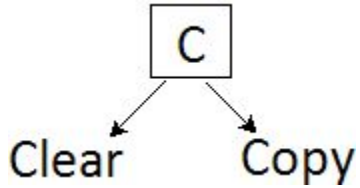
- Testing the usability, functionality and acceptability of an interactive system
- Expert evaluation
  - Evaluation by Subject Matter Experts
- User evaluation
  - Evaluation by user or customer

Designer vs. Users

Making a photocopy

- Why this photocopier does not work? What do you think!

Designer vs. Users



Designer meant by ‘C’ = Clear

People thought that ‘C’ = Copy

Examples ..(cont.)

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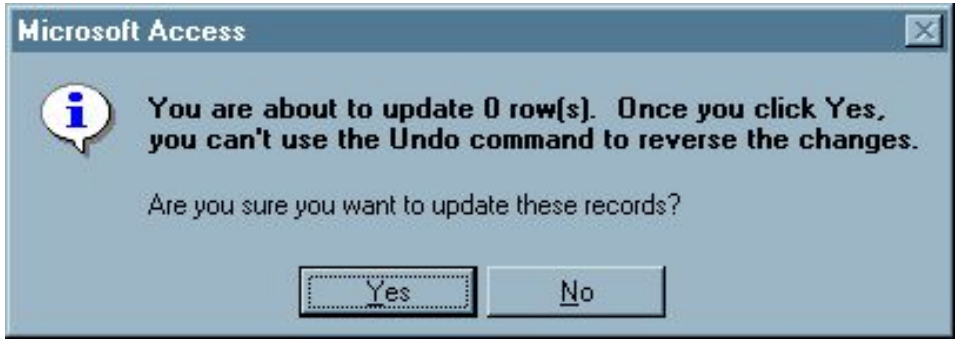

Examples ..(cont.)

Examples ..(cont.)

Examples ..(cont.)

References

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