

User Interface Design

Lecture 1: Introduction to Interaction Design and Human-Computer Interaction

Dr. Obead Alhadreti



Outline

- ▶ Course Overview
- ▶ Interaction Design
- ▶ Human-Computer Interaction
- ▶ Usability and User Experience

Course Overview

▶ **Course Description:**

- The main purpose of this course is to introduce students to the field of Human-Computer Interaction (HCI), Interaction Design and Usability.
- It will provide students with a foundational understanding and practical experience on designing and evaluating usable interactive user interfaces.

Course Overview

▶ **Course Learning Outcomes (selected):**

1. Identify user needs and their user-interface implications.
2. Apply user-centered design methods and techniques to design usable and useful interfaces.
3. Develop personas and use case scenarios for a set of user requirements and a targeted technology.

Course Overview

4. Understand the concept of usability and design principles, and apply them to assess the usability of software user interfaces and other products.
5. Design and refine low/high fidelity prototypes with the ability to justify every design decision.
6. Evaluate user-interfaces with and without users.

Course Overview

► Course Elements



1. Lectures

Can be downloaded from your the portal of 'learning'

2. Lab Exercises

3. Project

Apply your knowledge in concrete use case

Course Overview

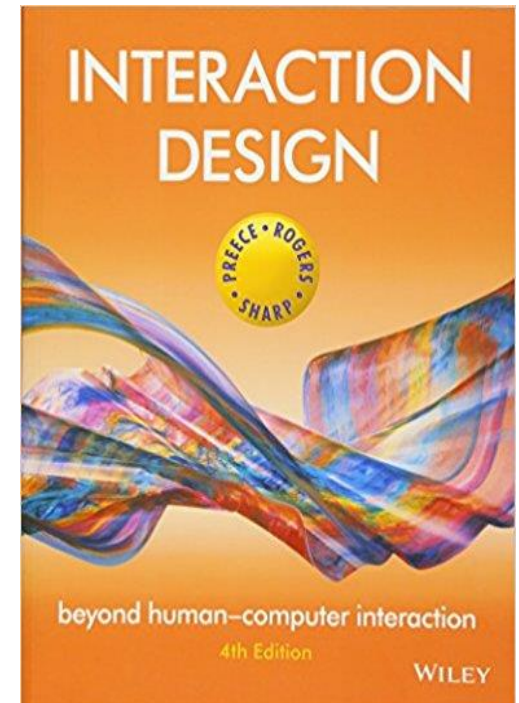
Topics to be covered:

1. Introduction to Human Computer Interaction, Interaction Design and Usability
2. User Requirements Analysis
3. Conceptual and Physical design, Design principles, Interaction Styles, Design patterns
4. Prototyping
5. Evaluation Techniques with/without users
6. HCI Models and Theories: GOMS, MHP, Fitts' Law
7. Human Reliability and Error
8. Universal and Inclusive Design
9. Multimodal Interfaces and Ubiquitous Computing
10. Gestural Interaction and Tangible User Interfaces

Course Overview

▶ **Required Textbook:**

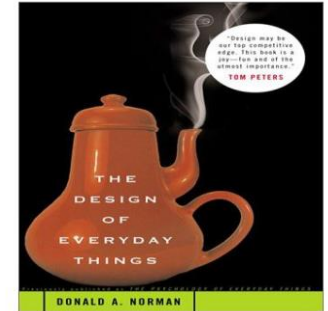
- Interaction Design: Beyond Human-Computer Interaction. 4th Edition. Yvonne Rogers, Helen Sharp, Jenny Preece. 2015
- Parts available @ [Google Books](#)



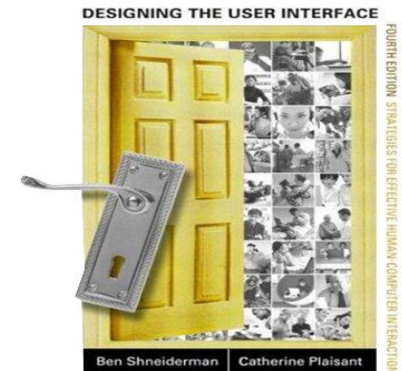
Course Overview

▶ **Additional Resources:**

- The Design of Everyday things. Norman D. (1984).



- Designing the User Interface: Strategies for Effective Human-Computer Interaction. Ben Shneiderman Catherine Plaisant. 2009.



- [Interaction Design Foundation](#)

Course Overview

▶ Assessment Methods:



- Final Exam (50%)
- Mid-term Exam (20%)
- A Group Project (30%)
Work in groups of five

Learning Objectives

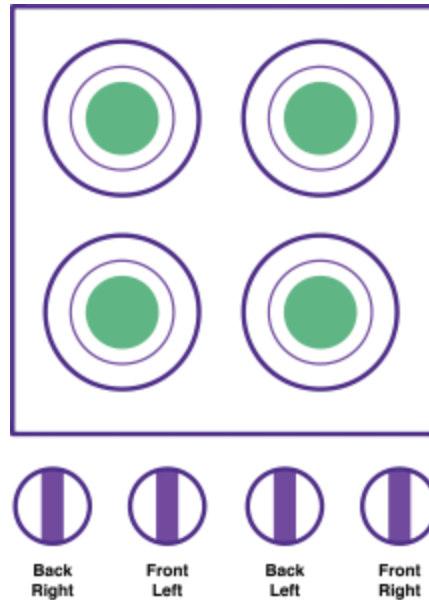
- ✓ Describe what interaction design is and how it relates to human–computer interaction and other fields.
- ✓ Describe what human–computer interaction is and why it is important.
- ✓ Explain the relationship between the user experience and usability.

What is Interaction Design?

- ▶ **Interaction design (ID)**, also known as human interaction design, means
 - “the practice of *designing **interactive products** to support the way people communicate and interact in their everyday and working lives.*” (Yvonne, Helen, Jenny, 2015)
- ▶ Product might be digital or non-digital.
- ▶ **Interactive products** normally refers to products and services on digital computer-based systems which respond to the user's actions by presenting content.

Why to Study Interaction Design?

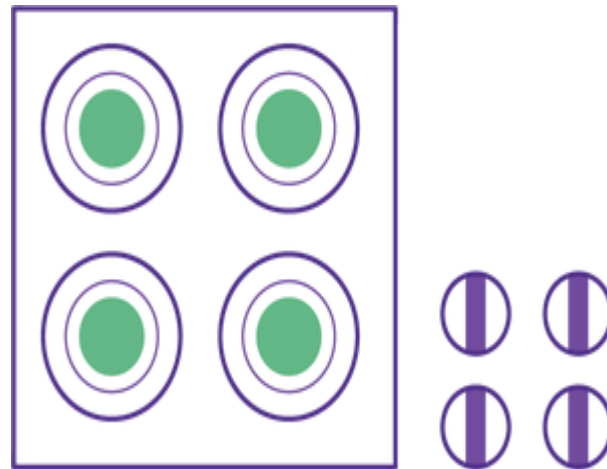
- ▶ Let us use a real world example to answer this question.
- ▶ Check out this stove below.



- ▶ It is difficult to figure out which knob is used for which burner, you might end up using the labels often to operate a stove like this one.

Why to Study Interaction Design?

- ▶ But, using the principles of human interaction design, say the stove instead looked like this:

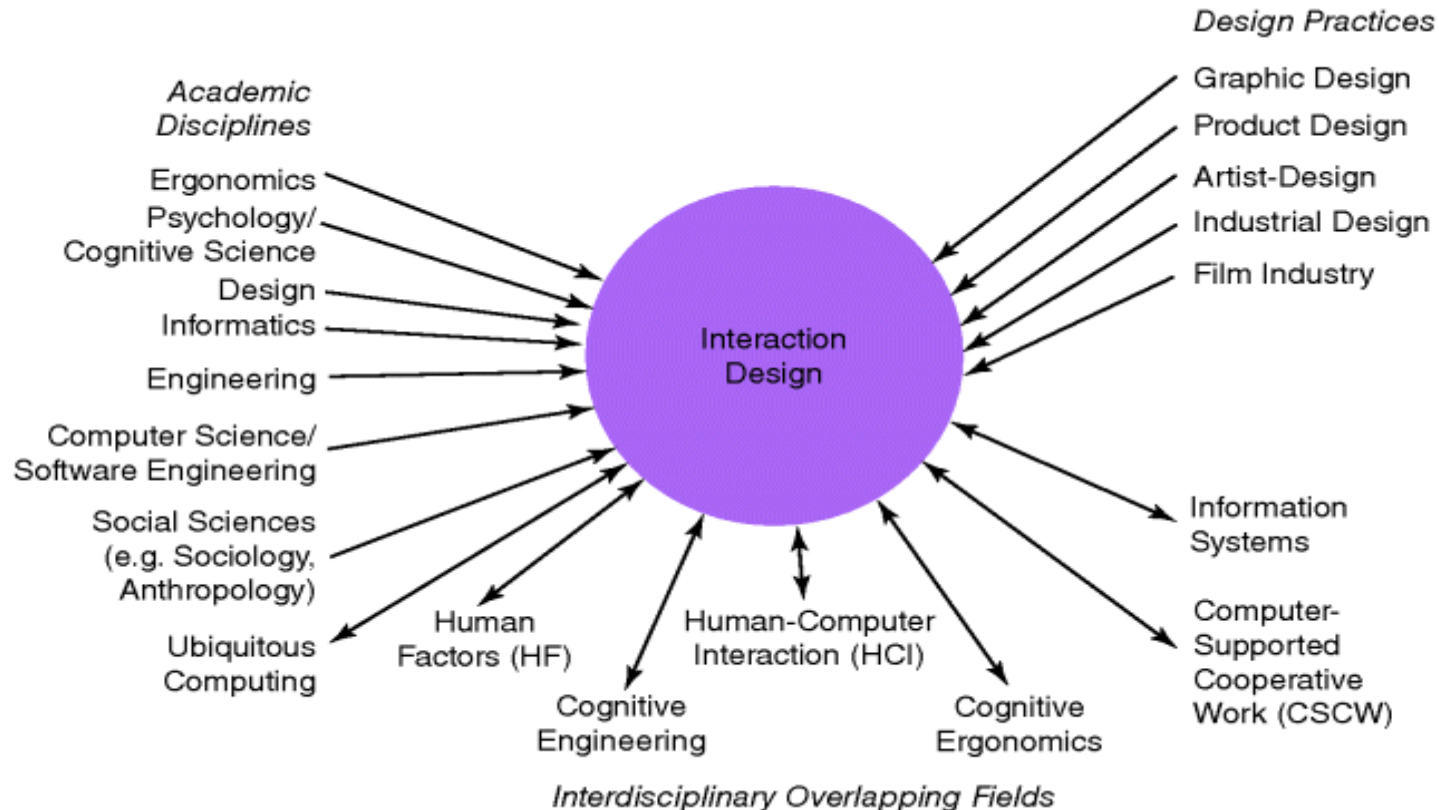


- ▶ This is intuitively far easier to understand because the layout of the knobs is directly related in its placement to the layout of the burners.

Why to Study Interaction Design?

- ▶ Design principles can be universal and you could be taking design inputs from physical things and applying them to software and be even more effective with your software design decisions.
- ▶ Thus, studying interaction design is fundamental to all disciplines, fields, and approaches that are concerned with researching and designing computer-based systems for people.

The Components of Interaction Design

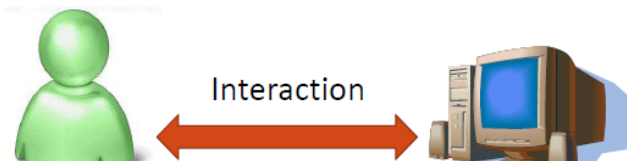


What is Human-Computer Interaction?

- ▶ Human-Computer Interaction (HCI) is a “*discipline concerned with the design, evaluation and implementation of **interactive computer systems** for human use, and with the study of the major phenomena surrounding them*”.

(ACM SIGCHI 92)

- ▶ HCI is then a specialization within Interaction Design.
- ▶ There are three entities in human-computer interaction:



What is Human-Computer Interaction?

- ▶ Interaction is a “dialogue” between humans and computers, with an aim of exchanging information.
- ▶ The interaction between user(s) and application(s) is achieved via an interface – **user interface (UI)**
- ▶ The user interface is the space where interactions between humans and machines occur.

Types of User Interface

4. Form based

The image displays a variety of standard web form controls:

- Input:** Text, Number, Date (with a calendar icon), Password (with a visibility toggle icon).
- Label:** A simple text label "ANOTHER LABEL" with a red error message "Yet another label".
- Combo suggest:** A dropdown menu with "Finland" and "France" as options.
- Code/label:** Two text input fields, one labeled "code lib" and one labeled "code", both with visibility toggle icons.
- Button:** Two buttons labeled "Rechercher" and "Clickable button".
- Form Elements:** A section containing a "checkbox2" (checked) and a "checkbox3" (unchecked).
- TEXTAREA:** A large rectangular text area.
- Radio:** Two radio buttons labeled "Drag and drop frames" (selected) and "Fixe frames".

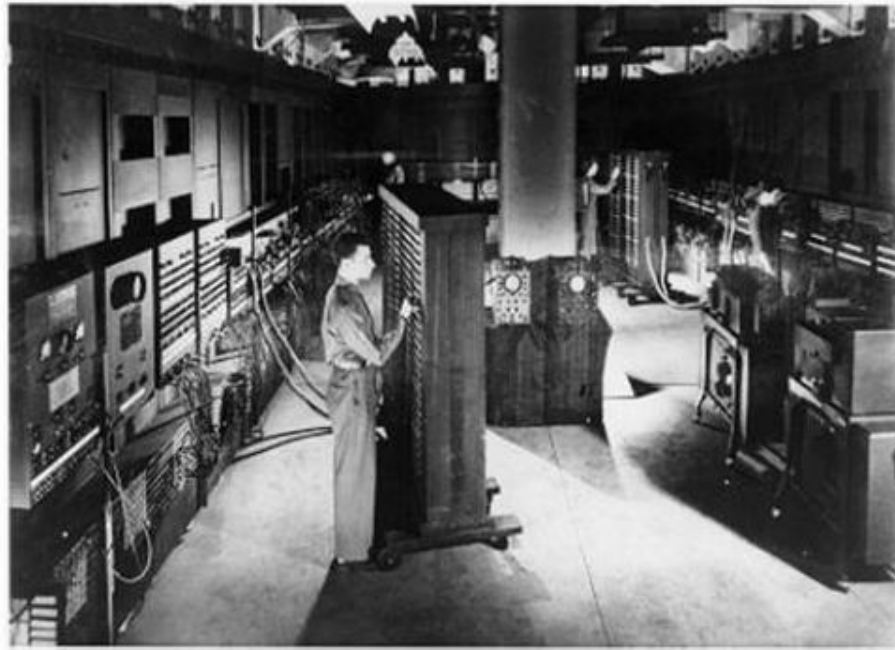
5. Natural language

Disciplines Contributing to HCI



Early Human Computer Interaction

▶ ENIAC - 1943



ENIAC (1943) - the first electronic numerical integrator and computer in the US

Early Human Computer Interaction

▶ Mark I - 1945

- ▣ ASCC: IBM Automatic Sequence Controlled Calculator (aka Mark 1)

55 feet long, 8 feet high, 5 tons



Human Computer Interaction in 1980

▶ Xerox Star - 1981

- 1st commercial PC (flop)
 - \$15k cost
 - closed architecture
 - lacking key functionality (spreadsheet)



Human Computer Interaction in 1980

▶ Apple Macintosh - 1984

- Aggressive pricing - \$2500
- Not trailblazer, smart copier
- Good interface guidelines
- 3rd party applications
- High quality graphics and laser printer



Human Computer Interaction in 2000



Human Computer Interaction Today



Human Computer Interaction Today

► Ubiquitous Computing

- Person is no longer user of single device but occupant of computationally-rich environment
- Many computers to one person
- Can no longer neglect macro-social aspects
- Off the desktop to the laptop, PDAs, cell phones, ...



Why is HCI important?

- 1. User interfaces are a major component of many computer systems**
 - Up to 50% of all code is user interface code
- 2. Ever-increasing number of applications**
 - Users' expectations are getting higher
 - People are not willing anymore to spend long times on learning how to use an application
 - If people don't like your application, they dump it

Why is HCI important?

3. HCI help development teams to avoid typical frustrations of users



<https://www.youtube.com/watch?v=GzhH900EjgE>

Can't figure out how to do simple things

Many hidden functions



<http://www.youtube.com/watch?v=keMmM3P4BRM>

Operations *outcome not visible*

Can't remember combinations of digits * #

how do we know whether it worked

how can we remember that this option is ON

Why is HCI important?

4. **HCI help development teams to avoid fatal errors**



A bad design led to a deadly aircraft accident in Leicestershire in 1989.

Why is HCI important?

5. HCI high return on investment

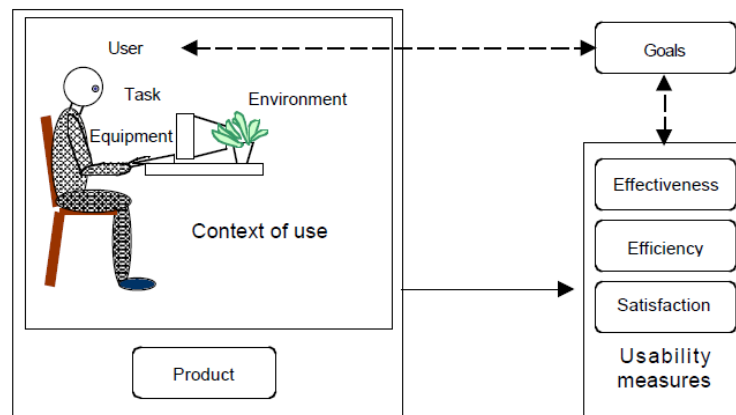
- “For every dollar spent acquiring a customer, you will spend \$100 dollars reacquiring them after they leave because of bad customer service.” (Mauro New Media 2002)
- “Every \$1 spent on advertising produced \$5 in revenue, while \$1 spent on customer experience improvements yielded more than \$60” (Creative Good, 1999)

Usability

- ▶ The International Standard ISO 9241-11 defines usability as *“the extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use”*
- ▶ **“Effectiveness”** here refers to the accuracy and completeness with which users achieve specified goals.
- ▶ **“Efficiency”** means the amount of resources expended in relation to the product’s effectiveness.

Usability

- ▶ **“Satisfaction”** means that users can complete their tasks without discomfort, and that they feel positive about using the product.
- ▶ The term **“context”** includes the users, their goals, the nature of the task(s), and the particular equipment, as well as the physical and social environments in which the product is used.



The User Experience (UX)

- ▶ The International Organization for Standardization defines user experience as
 - “person’s perceptions and responses resulting from the use and or anticipated use of a product, system or service.”*
- ▶ It's important to distinguish the total user experience from the usability of user interface. As an example, consider a website with movie reviews. Even if the UI for finding a film is perfect, the UX will be poor for a user who wants information about a small independent release if the underlying database only contains movies from the major studios. The user experience is a broader concept.

The User Experience (UX)



Peter Morville's UX Honeycomb