Human-Computer Interaction

L.EIC - FEUP - 2025

Teachers

Rui Rodrigues

rui.rodrigues@fe.up.pt

Daniel Mendes

danielmendes@fe.up.pt

Teresa Galvão

tgalvao@fe.up.pt

Bruno Cunha

bruno.cunha@fc.up.pt

Vítor Carvalho

vitor@fe.up.pt

Sofia Teixeira

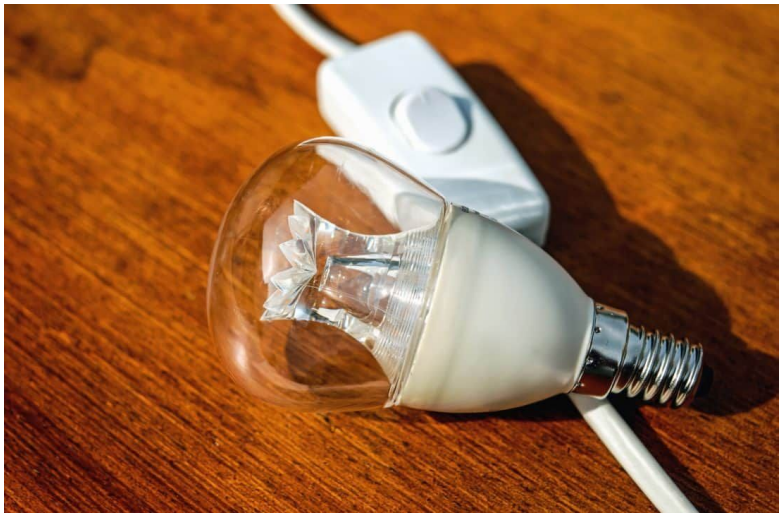
up201806466@fe.up.pt

João Duarte

j.duarte@fc.up.pt

What were the first "devices" you used today?

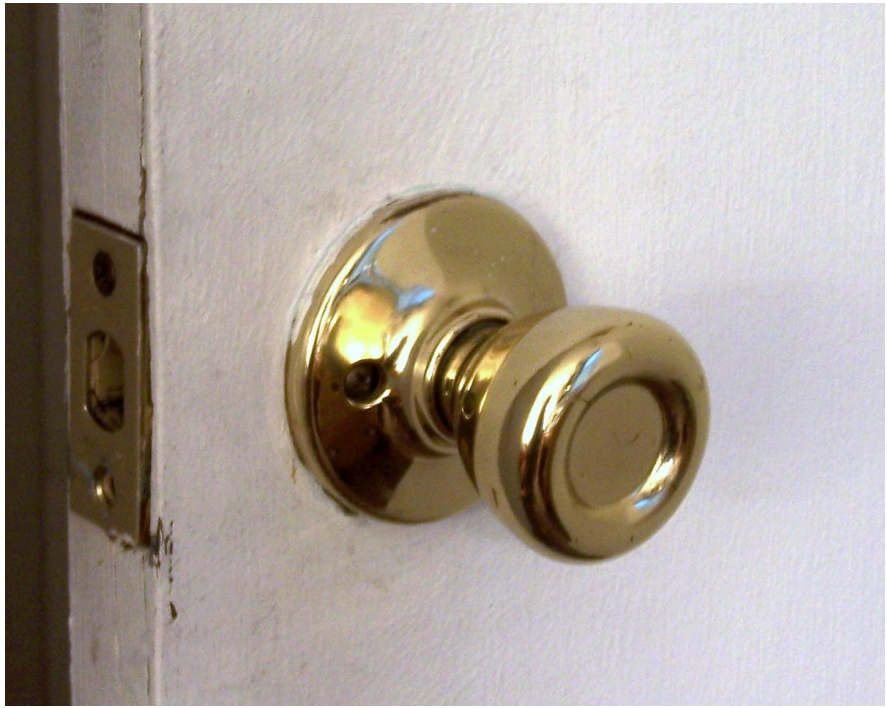
Light switch?



Watch?

Phone?

Door Handle?



Faucet?

Coffee machine?

Remote Control?

Some questions...

- What do they have in **common**?
- Why are there **different solutions** for **similar purposes**?
- Are they all (any?) **good solutions**?
- How did someone **come up with such solutions**?

Goals for today

- What is **Human-Computer Interaction**
- Main differences between **User Interface (UI)** and **User Experience (UX)**
- HCI **Design philosophy**
- Some HCI “**Mantras**”
- Course structure and next steps

Human-Computer Interaction

Human-Computer Interaction

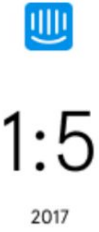
- What does it study?
- What is the goal?
- What are interfaces?

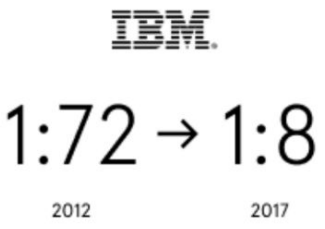
Look around...

- (Almost) Everything is (should be) **designed to be used**
- Technology is a **commodity**
- User Experience is now a **differentiating factor**

UX Job Market Growth

Ratio Designer/Developer





Multidisciplinary

- **Human**: User, others, social context
  - **Behavioral Sciences**
- **Computer** (Machine): Hardware/Software
  - **Computer science/engineering**
- **Interaction**: Relation/communication Human-Machine
  - **Design**
- And more...

User Interface - UI

- “Visible” (**human-stimulating**) part of the system
  - May include sound, haptics…
- Enables the users to
  - **Interact** with the system
  - **Perform** their tasks
  - Get **feedback/information** from the system
- The User operates/interacts **over/through** the Interface

HCI Definition

Human-computer interaction (HCI) is a **multidisciplinary** field of study focusing on **the design of computer technology** and, in particular, **the interaction** between humans and computers.

https://www.interaction-design.org/literature/topics/human-computer-interaction

User Experience (UX)

- What is it?
- How does it relate to UI?
- How is it different from Usability?

User Experience (UX)

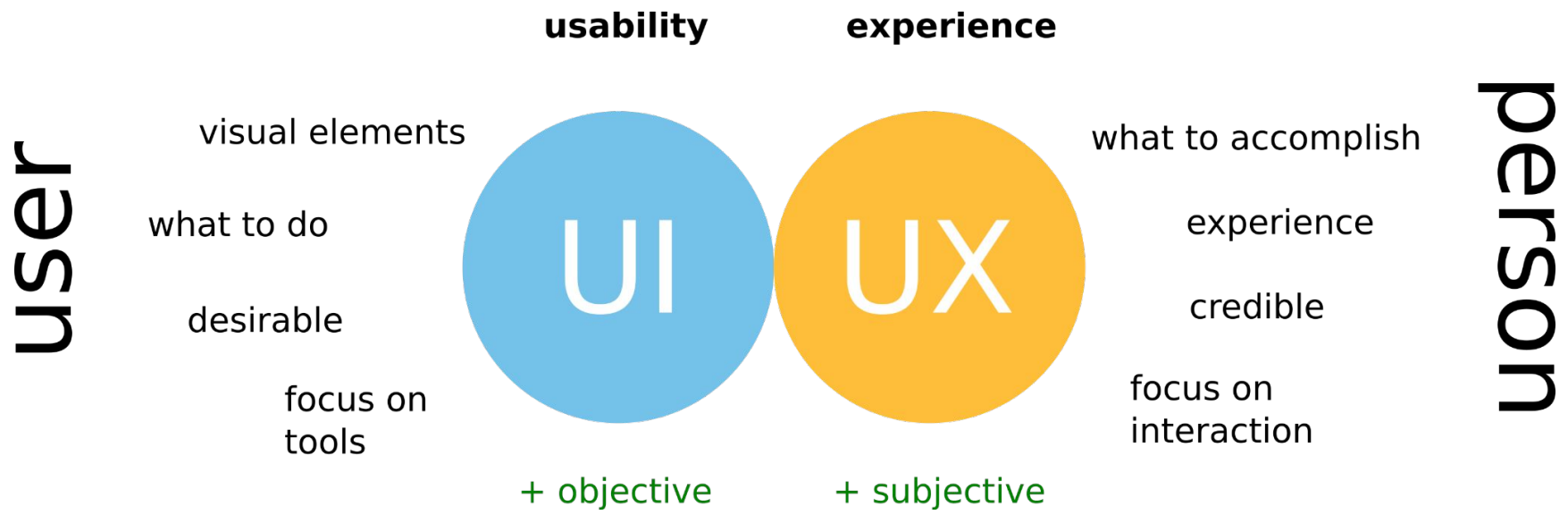
- The **whole experience** with a system, technology, device
- Not only the direct interaction with the artefact, but the **overall context**
    - Some include marketing, store display, unboxing, aesthetics, support (Customer Experience, CX)

User Experience (UX)

- Involves **affective component**
  - **Emotions** while using

- One does not *design the* user experience, but **DESIGNS FOR** an user experience

UI vs UX


usability
experience
user
person
visual elements
what to do
desirable
focus on tools
UI
UX
what to accomplish
experience
credible
focus on interaction
+ objective
+ subjective

Some Design Myths

- “Good design means good graphics”
- “Marketing dept. knows the users”
- “Good design is common sense”
- “The interface can be designed in the end”

~~"Good design means good graphics"~~

- Visuals are **important** to communicate,
  - but **not enough** for good interaction
- The user's perspective has to be considered in different aspects:
  - **Goals**
  - **Expectations**
  - **Tasks...**

~~"Marketing dept. knows the users"~~

- Marketing is (for the most part) focused on demographics
  - Not on the **human behaviour** while using
- What the users report is often different of what they do and feel
  - **User studies** and **observation** are key

~~"Good design is common sense"~~

- If it is that simple, why are there **so many bad web sites** and apps?
- **Common** sense is **not necessarily right** (and not so common ;)
- It takes **experts and work** for good design

~~"The interface is designed in the end"~~

"... The **needs of the users** should **dominate** the design of **the interface**, and the needs of the interface should **dominate** the design of **the rest of the system.**"

[Don Norman]

- **User needs** -> **Interface Design** -> **Functionality**
- Design flaws detected at the end **cost a lot** of time and money

User-Centered Design (UCD)

"... an **iterative** design process in which designers **focus on the users and their needs** in each phase of the design process.

... designers use a mixture of **investigative methods and tools** (e.g., surveys and interviews) and **generative** ones (e.g., brainstorming) to develop an **understanding of user needs**.

https://www.interaction-design.org/literature/topics/user-centered-design

HCI Mantras

- Know your users
  - Physical, cognitive, sensorial abilities
  - Social context, background, etc.
  - User research will be part of this course

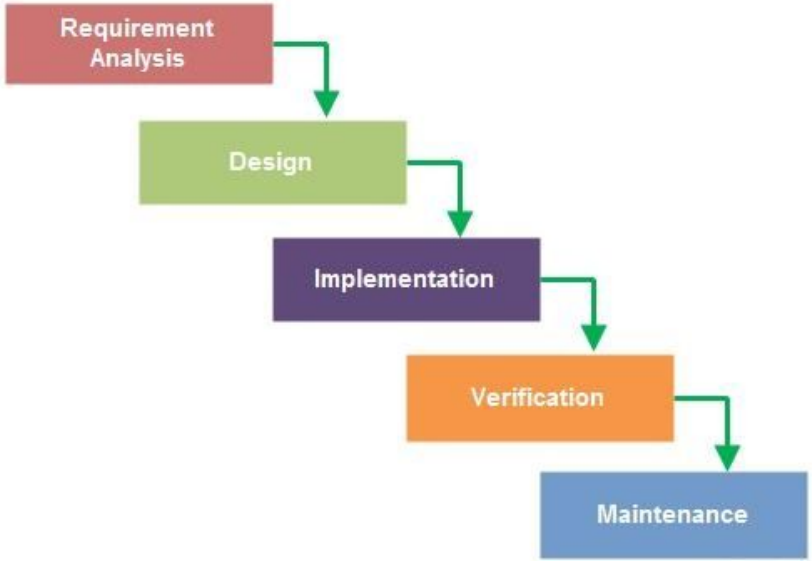
HCI Mantras

- “The user is not like me”
  - To think the opposite is the most common mistake
  - You (we) are not typical users
  - You (we) adapt to bad interfaces and think they are ok

Design Process

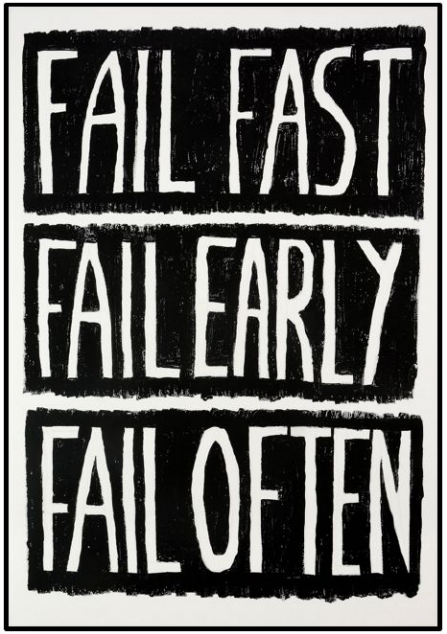
~~Waterfall model?~~

Problems: Assumes all is completely known and specified very early on, only tests functionally after implementation



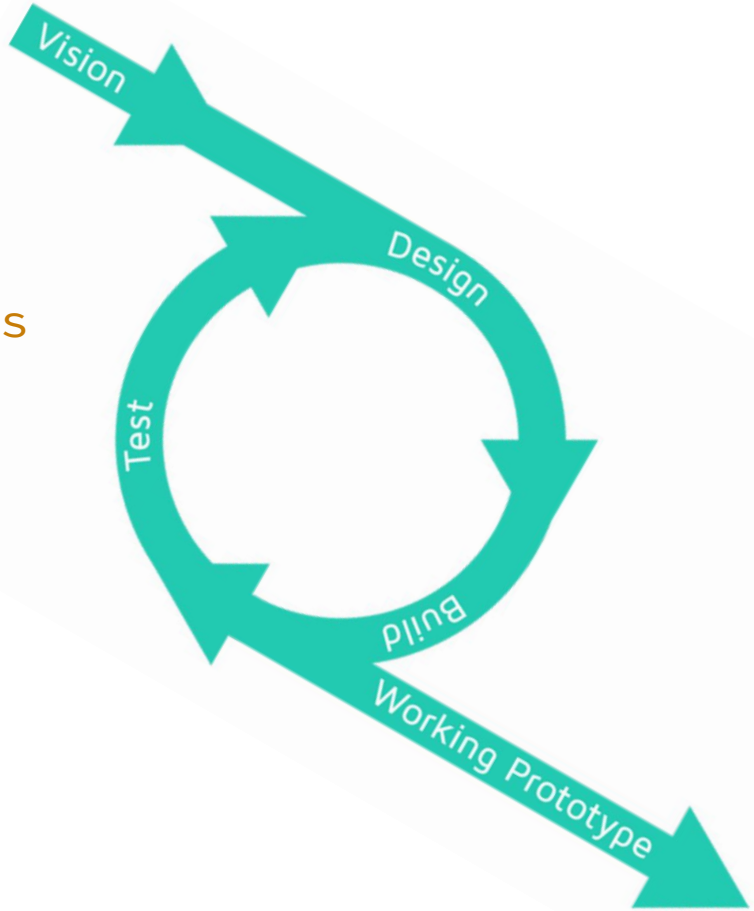
Fail Fast Philosophy

- Fail:
  - fast
  - early
  - often

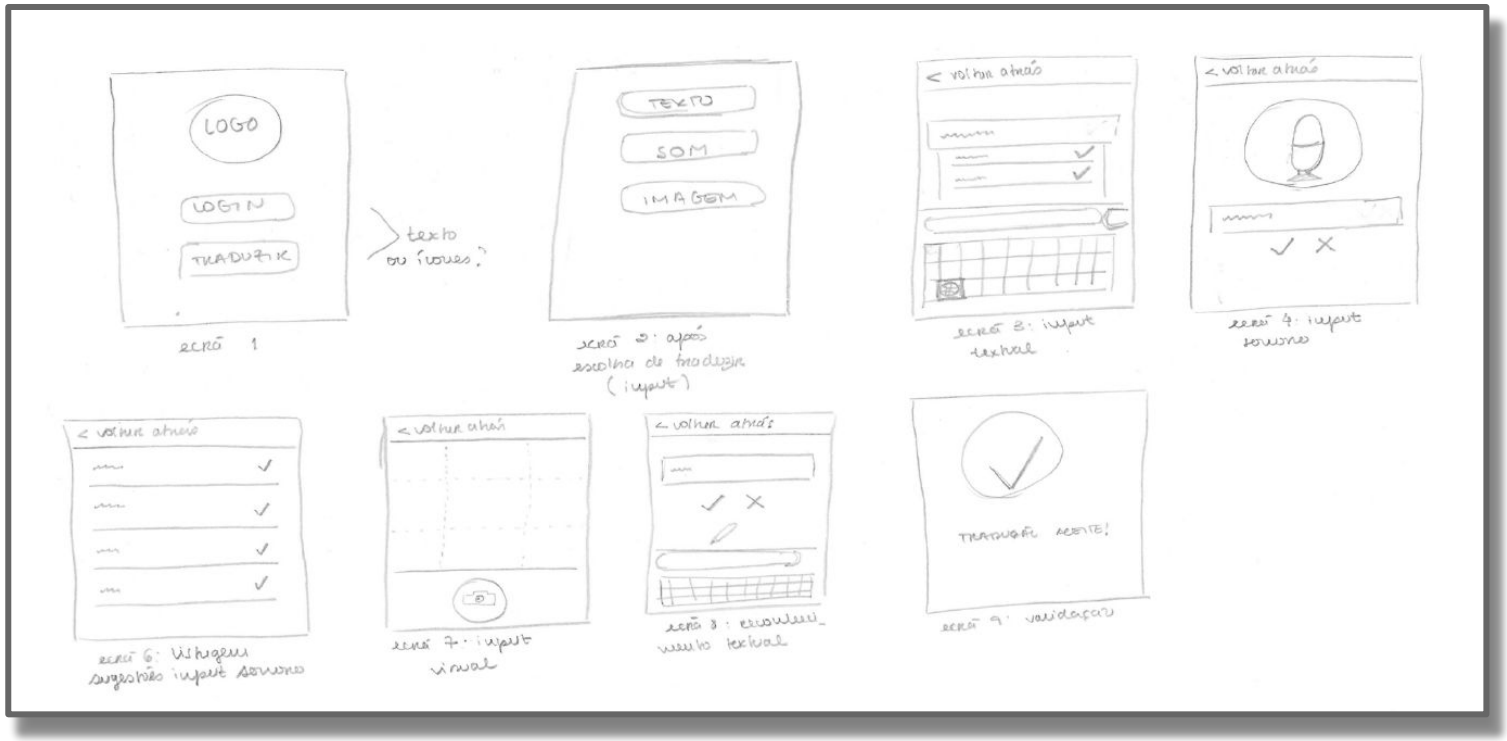


Iterative Design Process

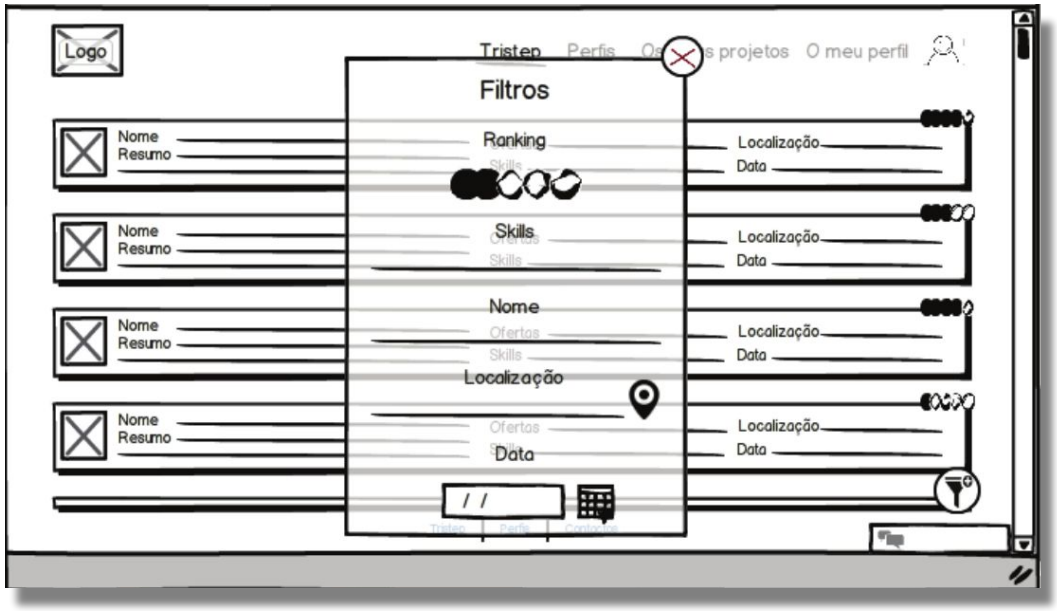
- Iterate over low-cost prototypes
  - Ideate/design
  - Prototype
  - Test/evaluate
  - Repeat



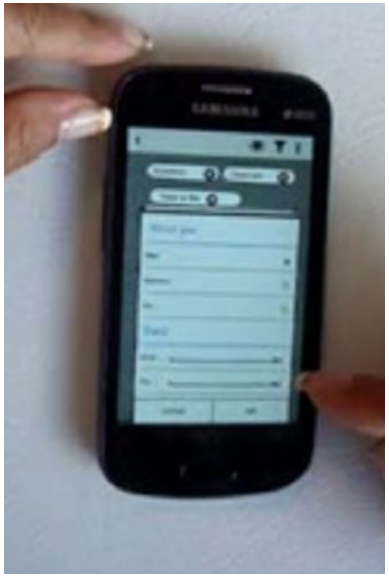
Prototyping



Prototyping



Prototyping



Course Structure

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- **Lectures**
  - 1.5h / week
  - **Discussion** about HCI topics, approaches and techniques
  - **Material** made available in advance in Moodle for preparing
  - **Micro-activities** to help reduce work off-class
  - Two **Mini-Tests**

- **Practical classes**
  - 1.5h / week
  - **One project** developed in **three phases**
  - **Groups of four** students of the **same class**
  - Classes start next week, but **work starts today...**

Project

Main Goal

Design of a novel user interface (UI) for a mobile / web app
or other if better suited (propose and let's discuss!)

Groups

4 students from same class

Three Phases

1. User and Task Analysis (4 weeks)
2. First Iteration (4 weeks)
3. Second Iteration (4 weeks)

Topic

Broad topic to be presented next week

Course Evaluation

- Project Grade
  - PG = F1 * 30% + F2 * 30% + F3 * 30% + FR * 10%
    - F1, F2, F3 - Project Phases
    - FR - Final Report
- Final Grade
  - FG = PG * 80% + MT1 * 10% + MT2 * 10%
    - PG - Project grade
    - MT1, MT2 - Mini-Tests

Presentations and Reports

- Presentations
  - 5 minutes
  - Submitted the day before the presentation
- Reports
  - After the presentation
  - Can (should!) be refined according to feedback
- Focus on the process!

Questions?

Question!

Bad Design ?

1. Think of **an object/device** - "artifact" - that you think it is somehow **"badly designed"**
   (not an app/site - sorry, SIGARRA fans)
2. **Take one or two pictures** of it.
3. Go to the **“Bad Design?” forum in Moodle** and post the picture(s) with your comments according to the instructions there.
4. **Keep It Simple, Fast and Polite.**
5. Do it until **next monday.**

(feel free to comment constructively on other posts)

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Slides by Rui Rodrigues
Partly based on Hugo Nicolau's slides (IST)