

# Interaction Design

**School of Computer and  
Communication Sciences**

**EPFL**

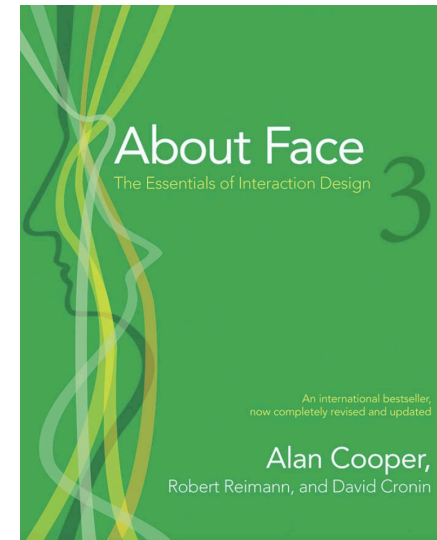
Pearl Pu



## ADMINISTRATIVE DETAILS

- **Course Title: CS 486**
- **Number of credits: 6**
- **Time allocated: 120 hours**
- **Lecture Time:** Monday 8:15h – 10h (BC 01)
  - **Exercise Hour (TP):** Mon 10:15h – 11h (BC 01, 07)
- **Project Hour:** Mon 11:15-12h (BC 01, 07)
- **Format of Control:** continuous
- ***Textbooks:***
  - ***Required*** : About Face 3 by Alan Cooper et al.
  - 100 Things Every Designer Needs to Know About People by Susan Weinschenk (Kindle edition and e-book)

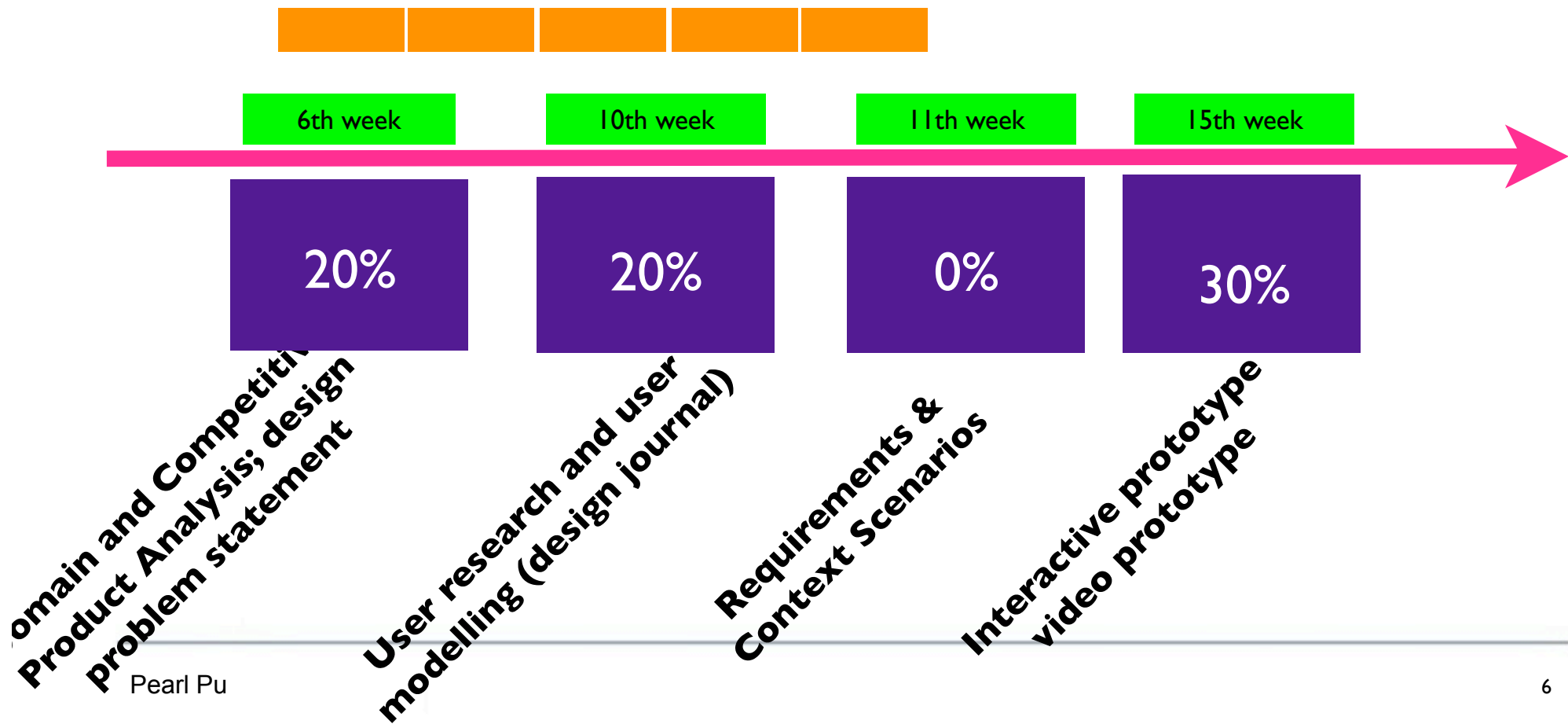
- Two major sources
  - Cooper book
  - Lecture notes in slides



- 5 Graded assignments (30% of grade)
  - 3 will be actually graded
- Capstone project in two phases (50% of grade)
  - group performance (group of three students)
- Design journal (20% of grade)
  - user research
  - individual performance

- Before the lectures on Monday
  - Reading material for each week is assigned (see Moodle page)
  - Students complete readings at home before Monday's lecture time
- Classroom teaching (Monday 8:15h -10h)
  - Additional slides to review the material and to give more in-depth explanations
  - Focus on practical aspects
- Exercises (Monday 10:15h-11h)
  - Graded assignments
- Project hour (Monday 11:15h - 12noon)
  - Sessions dedicated to the project

## 5 Graded Assignments (30%)



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## HUMAN COMPUTER INTERACTION?







## OUTLINE OF THIS SLIDE DECK

1. Cooper book: history, what, how
2. Lecture notes: why HCI
3. Design aims
4. Recapitulation



## **Cooper Book**

**Forward: The Postindustrial World**

**Introduction**

**Chapter 1: Goal-Directed Design**



# HCI IS A RESPONSE TO A BIG CHANGE

- Industrial Age vs. Information Age
  - assembly workers vs. information architects and programmers
  - transport goods vs. transport bits
  - construct software once and use it many times
  - no need to reduce the cost of software construction; optimize it
- Users in industrial age vs. in information age
  - users interact with software much more often and in more ways (how you operate a car, a microwave in the old days vs. nowadays)
  - you buy a car today -> you are really buying a navigation system
- HCI emerged as a topic due to the pervasive impact of information technology on users and our society

**Making most desirable software is the main goal, rather than saving manufacturing cost**



## COMPANIES STRUGGLE WITH SOFTWARE

- Some executives are still thinking using industrial age mind set - optimizing manufacturing
- New Way: adopt **interaction design** as the primary tool for designing and managing software construction

**Interaction design determines what behaviour will succeed**



## A BRIEF HISTORY OF INTERACTION DESIGN

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- IxD design follows the history of personal computers
  - Xerox Parc
  - Apple Computer
  - WYSIWYG interface (what you see is what you get)
- The emergence of the Web made IxD popular overnight
- End users want technology to provide a compelling and effective user experience



## DESIGN HAS BEEN IGNORED UNTIL RECENTLY

- Mechanical devices have a dozen of visible states; they are carefully designed for ease of use
- A piece of software can easily have 1 mio lines of code, and be in one of thousands of states, their interaction behavior often has been poorly designed

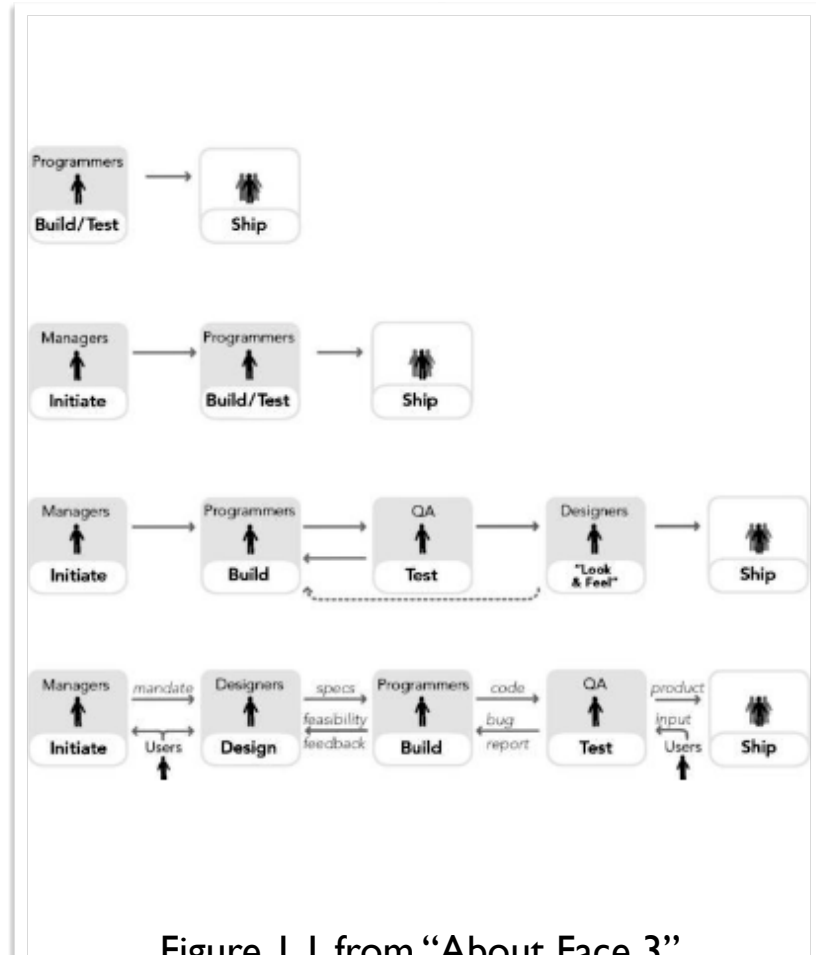


Figure 1.1 from "About Face 3"

**The emergence of software with complex behavior requires design effort (interaction design effort)**



## 4 GREAT ARGUMENTS

- Digital products
  - are rude
  - require people to think like computers
  - exhibit poor behavior (10 year old)
  - Require humans to do the heavy lifting



## WHY SO BAD?

- Ignorance about users
- Conflicting interests - ease of coding vs ease of use
- Lack of process





## NEED A NEW METHOD

- Repeatable
- Predictable
- Analytical
- To transform an understanding of users into products that both meet their needs and excite their imaginations
- Furthermore, it's a design method

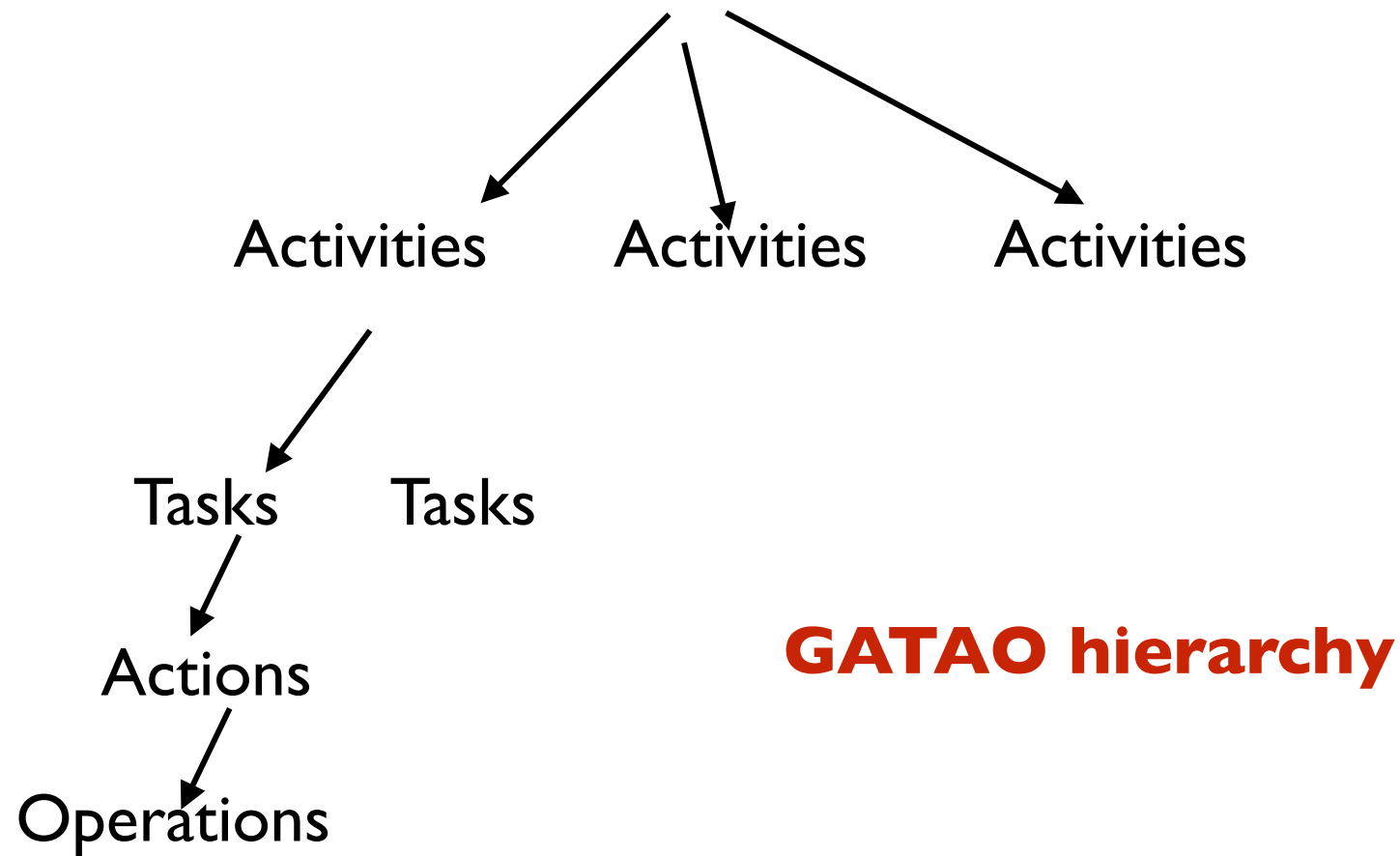


## DESIGN METHOD: GOAL-DIRECTED METHOD

- Goal-directed method comprises of qualitative research, user modeling, requirement analysis, prototyping, and evaluation
- Design principles to optimize design process
- Cognitive and behavior psychology theories to help understand users' goals, motivations, and limitations

**Goal-directed Design Method (GDD)**

Goal - expectation of an end condition





## WHY FOCUSING ON GOALS?

- Goals motivate people to perform activities
- Understanding goals allow you to understand the expectations and aspirations of your users
- This understanding translates to deciding which activities are truly relevant to your design

## GOAL-DIRECTED DESIGN PROCESS (GDD)

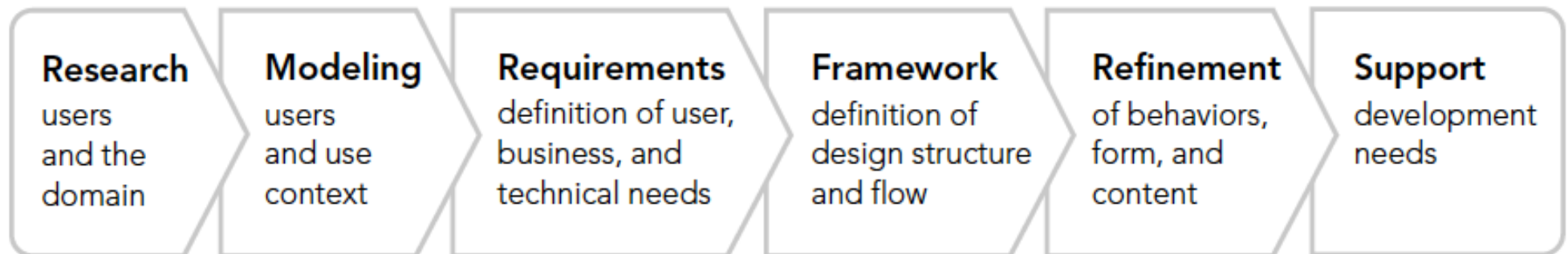


Figure 1-5 The Goal-Directed Design process.

## 2

### **Lecture notes - Why HCI**

Human computer interaction is concerned with the *Design*, *Implementation* and *Evaluation* of digital products, environments, systems, and services for the purpose of offering compelling user experience



## WHAT ARE WE DESIGNING?

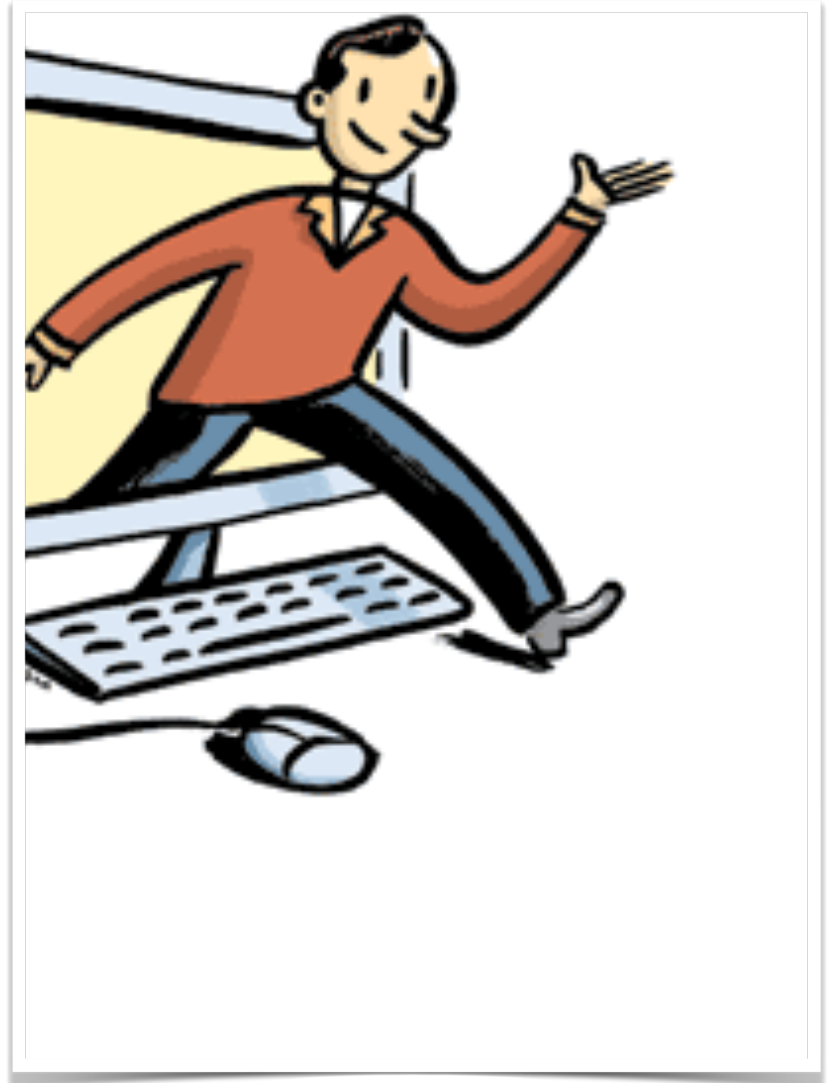
- Three main entities
  - Behavior (interaction)
  - Form (interface)
  - Content (information)
- When a true design succeeds, user experience dominates while behavior, form, and content may even disappear (less is more)



Why study HCl?

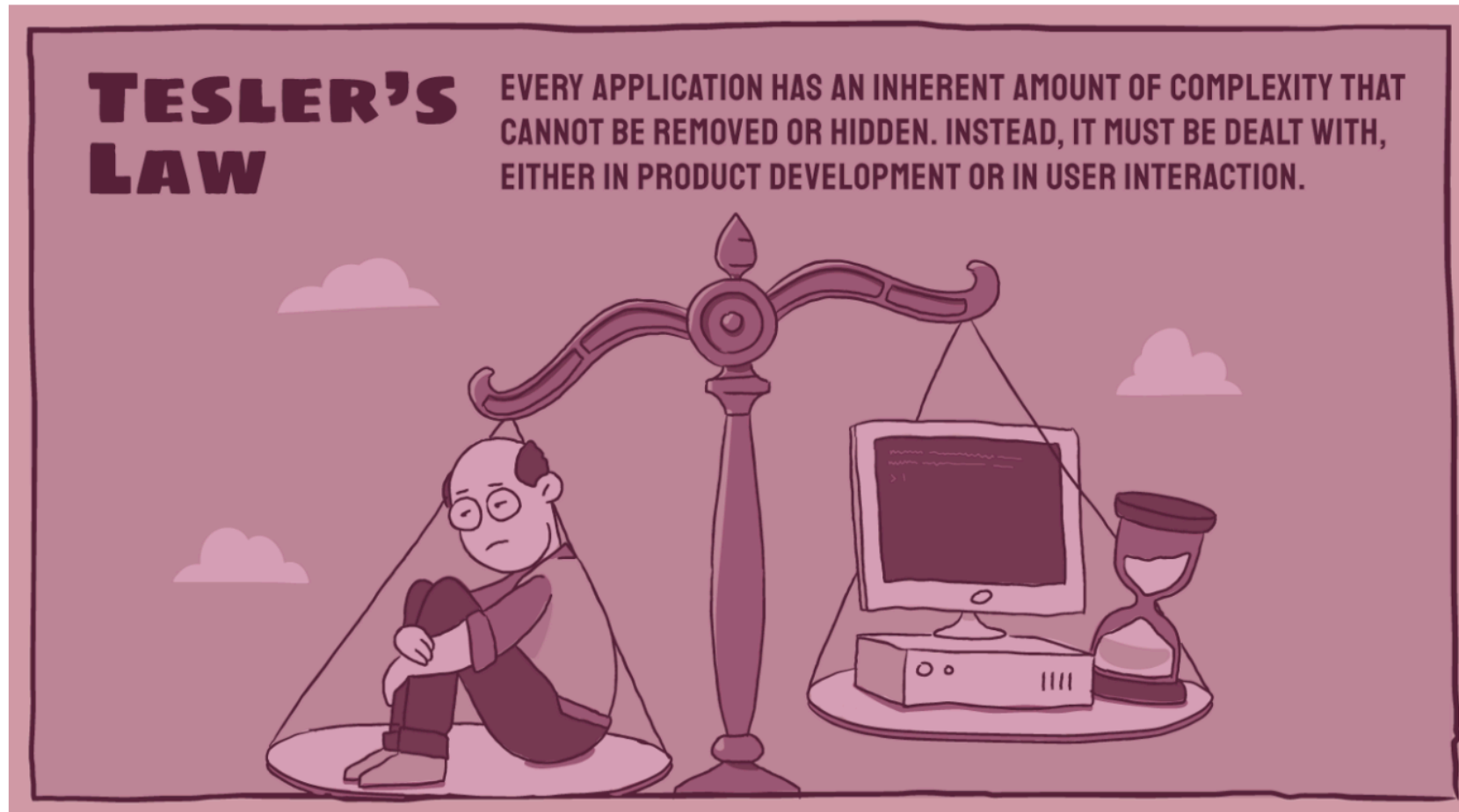
Why HCl matters?

- Design is hard
  - Who are users? what do they want?
  - What are their goals?
  - How do they do things? how to model them? how will they adapt to new software
- Lack of traditional methods (it's a young field)
- Inherit conflict: ease of coding vs. ease of use



Developers step out and examine IT products  
from users' point of view

# LAW OF CONSERVATION OF COMPLEXITY





## HCI IS A CAREER OPTION

- The second reason for studying HCI is that it is a viable career option. There are more and more jobs, such as user experience designers, product designers, that require skills and training provided by this course.



## HCI IS A CAREER OPTION

- Apple: industrial design team, human interface design team
- Amazon: User experience researcher
- Google: UX team, qualitative user experience researcher
- Facebook: UX quantitative researcher
- Logitech: UX designer
- Swissquote: UI/UX product designer from product management team
- Frontend designer, frontend engineer, etc.



## HCI SAVES MONEY

- ✓ **IBM**, along with several other companies, states that for every \$1 invested in usability testing on software, the payback is between \$10 and \$100.
- ✓ The single largest predictor of call center volume is your web site's usability. Calls cost an average \$22-\$30 per call.
- ✓ For every dollar spent acquiring a customer, you will spend \$100 dollars reacquiring them after they leave because of poor user experience.
- ✓ For every \$10 spent defining and solving critical usability problems early in development using professional usability research, you will save about \$100 in development costs.

- HCI is not guess work
- HCI requires professional training.



# MISCONCEPTIONS ABOUT HCI

- **HCI is about GUI**
  - but GUI is just one piece of the puzzle.
- **HCI is about technology**
  - but HCI is not limited to the confines of the computer; it doesn't even need a screen.
- **HCI is about usability**
  - while ease of use is important, HCI also promotes designing products to offer compelling user experience.
- **HCI is just about Users**
  - while HCI adopts a user-centric approach to design technology, users are also the bottleneck; users don't decide what's good, but designers do; designers have to integrate as many goals and needs as possible for the business and users.
  - Henry Ford said: "if i asked my consumers, they would have wanted a faster horse."





## WHAT IS THE DIFFERENCE

- User Experience Design (UX), and Interaction Design (IxD) are often used interchangeably
- UX - behavior, content, form
- IxD - behavior
- How are IxD and UX related?
  - IxD addresses a subset of concerns of UX
- Our main focus is on both IxD (behavior) and UX (all three items)

# Class Discussion “Inspiring Design”



- Find a partner
- Take turns to name a digital product whose interaction design has inspired you and discuss why
- As a team, discuss the important criteria of a successful interaction design
- Be prepared to present these criteria



**What are the design aims?**

## WHAT IS A SUCCESSFUL DESIGN?

What makes people want your products?

- Digital products must be useful
  - provide functions and features to help users perform his tasks
    - word processing
    - printing
    - online purchase
    - communication
    - online entertainment



**Usefulness of a product is primordial**

## USEFUL BUT UNUSABLE OBJECT



## IS USEFULNESS ALONE ENOUGH?

No! design must consider ease of use

- What do we mean by ease of use?
  - Minimize learning time
  - Minimize interaction time
  - Minimize error rate



## USEFUL AND EASY TO USE, BUT....



unattractive, even  
embarrassing



**WHICH ONE DO YOU PREFER?**







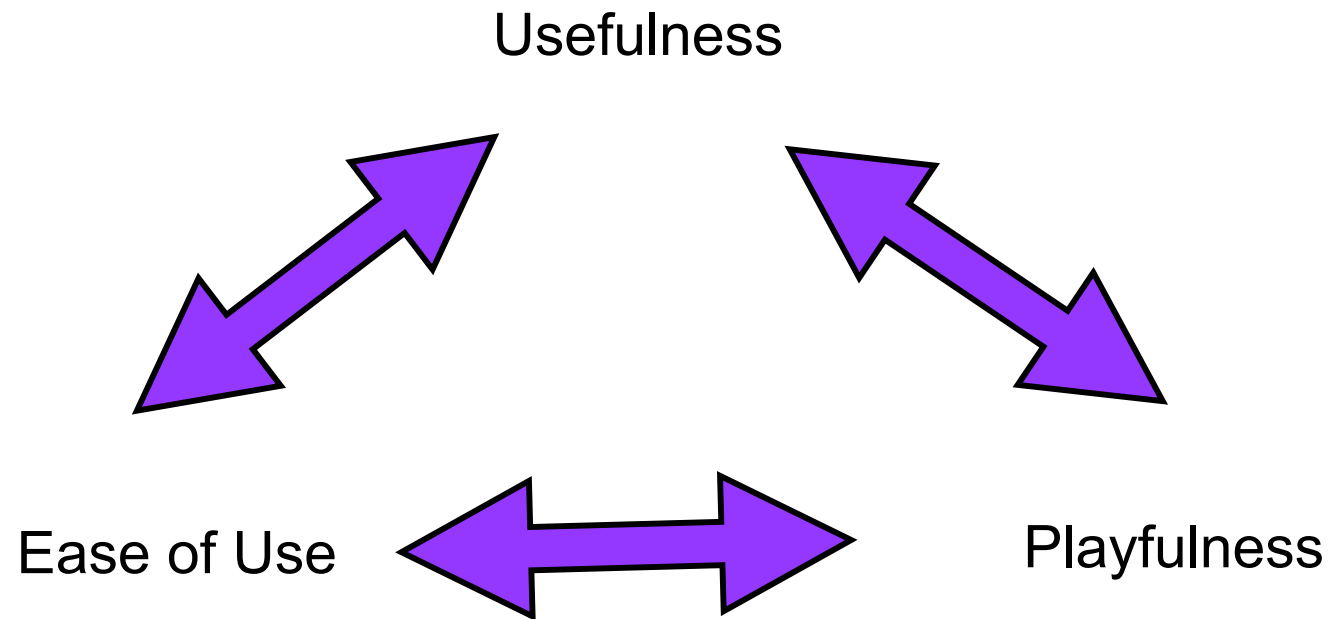
## USEFULNESS AND EASE OF USE ENOUGH?

No! design must consider playfulness

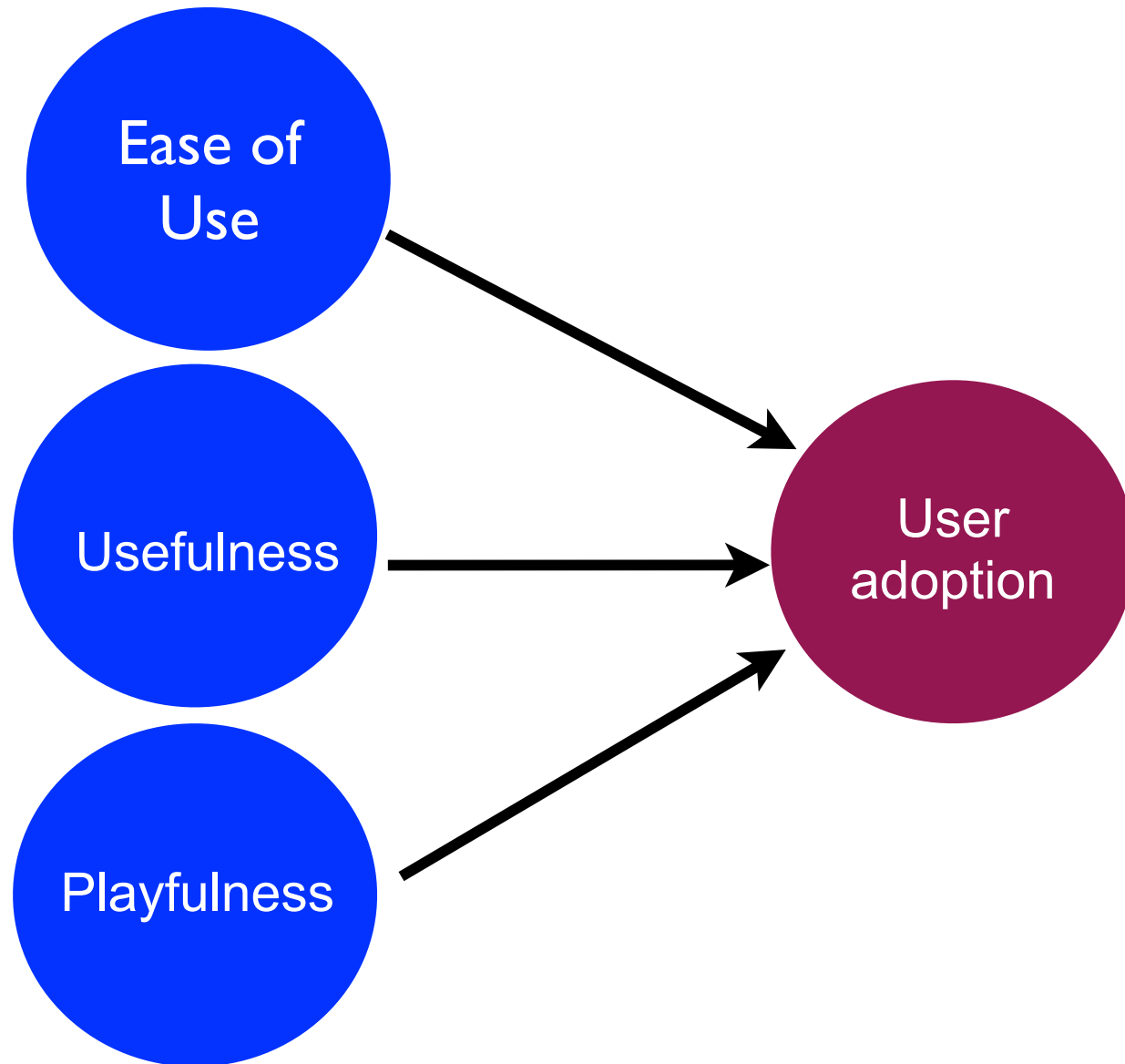
- What do we mean by playfulness?
  - Do users forget the lapse of time?

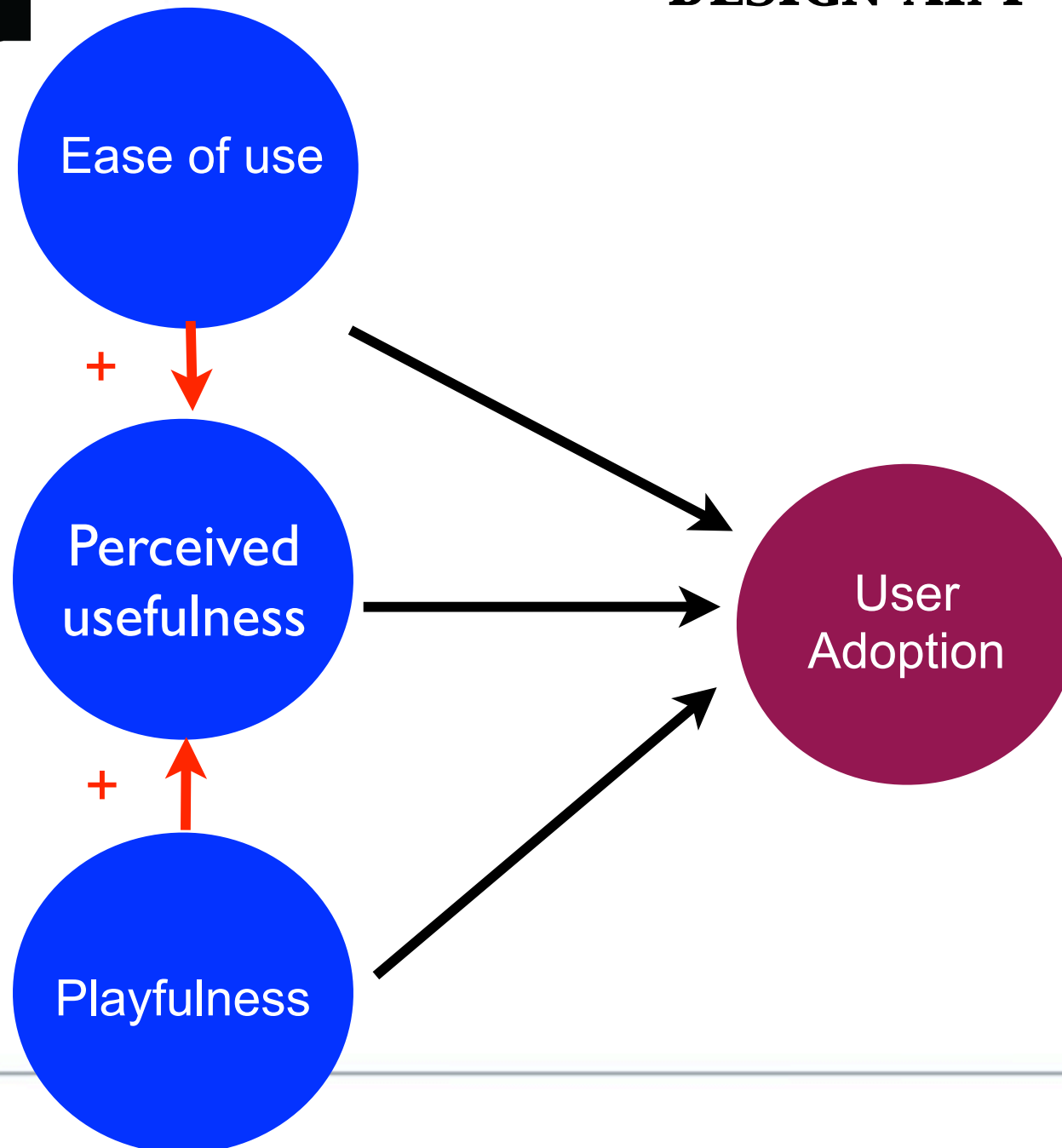


## SUCCESS CRITERIA FOR UX DESIGN



## HOW THESE CRITERIA RELATE?







## THE RELATIONS OF THESE THREE CRITERIA

- The three criteria do not interact with each other equally
- Users perceive products that are easy to use more useful
- Users perceive products that are more playful more useful
- Users do not perceive more useful products (more features) easier to use
- Users do not perceive more useful products more playful
- ***Conclusion: ease of use and playfulness are amplifiers of adoption - they increase the likelihood of user adoption, giving the same usefulness***

## 4

# Goal-directed Design Process



- Most traditional methods don't provide a means of translating research results into design solutions
- How does GDD bridge the gap?
  - Design as product definition - we will learn how to identify user requirements and define a detailed plan for the behavior and appearance of products
  - Design as researchers - we will learn how to find design drivers in domain research, user research



## BETWEEN RESEARCH AND DESIGN

- Models
  - We will learn how to model users as personas
- Requirements
  - We will learn how to identify design requirements
- Frameworks
  - We will learn how to develop interaction frameworks



# Class Discussion

## “Interview Users”



- Find another partner
- Together develop the GATAO hierarchy for the case where the user interacts with a ATM machine
- Her goal “take out 50 CHF from her bank account”
- You may replace the ATM machine by a bus ticket machine where the user goal is to buy a ticket from “Morges to Lausanne”.



## Recapitulation

- UX design uses theories and methods from many disciplines: design science, usability, and traditional sciences (cognitive and psychology) and engineering disciplines
- UX is more than the sum of its parts: user experience design is an extension beyond the traditional sciences



## COURSE OBJECTIVE

- Design thinking vs. analytical thinking
- Goal-directed design process including users goals/needs finding, prototyping, evaluation, re-design
- Design principles derived from psychology and cognitive science - mental models, how people learn, memorize, focus, perceive, etc.
- Via a hands-on project, learn to become an user experience designer



## HOW DOES THIS COURSE ADDRESS YOUR NEEDS?

- I'd like to design cool and attractive software/websites/games/gadgets, but i don't know how.
  - design thinking (training you to think differently)
  - give you a method (GDD in Cooper's book)
  - teach you design principles that work
- I see so many poorly designed software/websites/games/gadgets. I don't know how to explain why the design didn't work.
  - critique poor design
  - suggest improvement
- I want to do a start-up; I need to develop user-facing software



## WHAT THIS COURSE DOES NOT COVER?

- How to use flash, proEngineer, or any other particular software package
- How to make an attractive webpage
- How to design an interface hardware
- How to program

