ÉCOLE POLYTECHNIQUE
FÉDÉRALE DE LAUSANNE

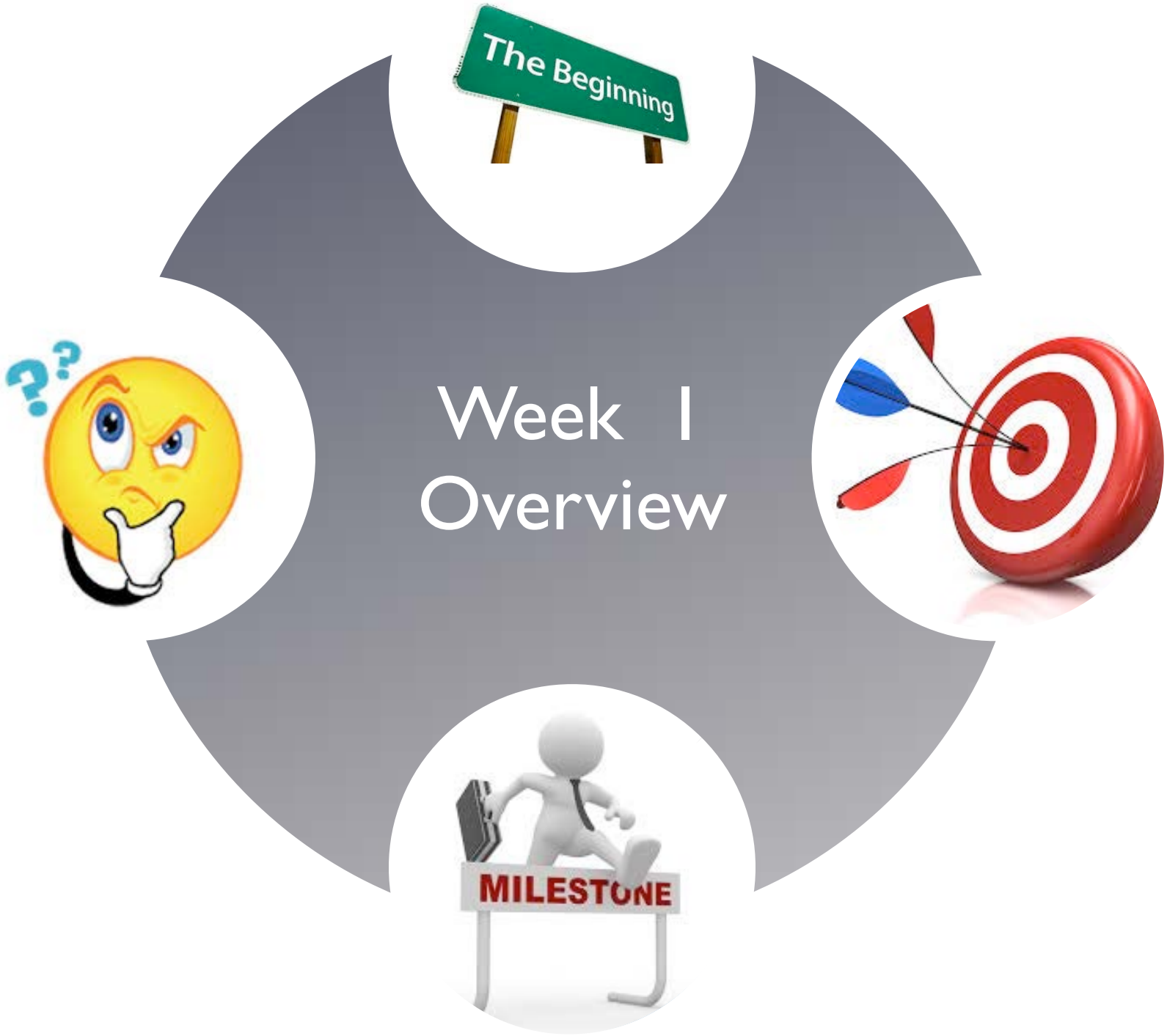
HUMAN COMPUTER INTERACTION GROUP

Human Computer Interaction

School of Computer and Communication Sciences

EPFL

Pearl Pu


The Beginning
Week 1
Overview
MILESTONE

Introduction

DEFINITIONS

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

The method we use

- Design thinking
  - Goal-directed design

- Many other methods (may use them as extras)
  - Stanford d School
  - IBM design thinking

Design method: goal-directed method

- Goal-directed method comprises of qualitative research, user modeling, requirentment 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)

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 HCI?

Why HCI matters?

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

HCI IS HARD

- 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

Figure 1-2 Thanks for sharing. Why didn't the program notify the library? What did it want to notify the library about? Why is it telling us? And what are we OKing, anyway? It is not OK that the program failed!

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

HCI IS A CAREER OPTION

UX quantitative Researcher **Facebook** Palo Alto, CA

Every day, Facebook is altering the way people communicate and share information. Over 175 million people spend 3 billion minutes daily on Facebook to share and connect with people they care about.

As a Facebook researcher, you can **fundamentally affect** people's lives in a real and meaningful way.

The goal of the User Experience team (UEX) is to improve the user experience by incorporating research, insights and content strategy into the product cycle. Our current research menu is focused on qualitative methods: **discount usability methods, user tests, interviews studies and observation**.

You will not only influence specific product decisions, but will also help guide the focus of the UEX team's efforts. Finally, as part of the User Experience team, the Quantitative Researcher must have enthusiasm for the **design process**, a desire to address the **needs of the user**, and a deep respect for the variety of methods one can use to get at user experience issues, qualitative and quantitative

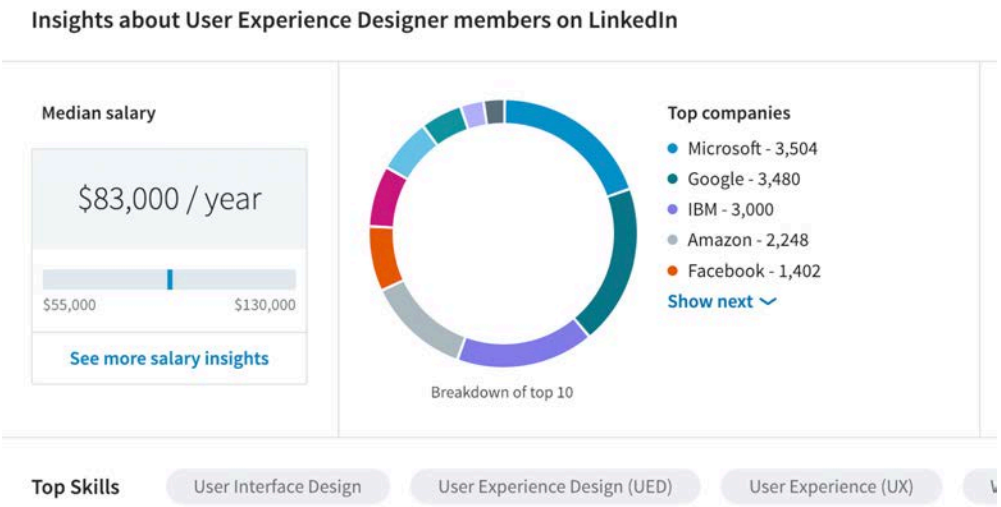
JOB ADS

Swissquote

Project Management · 1 job

UI/UX Product Designer

Gland, Switzerland



HCI IS IMPORTANT IN SOFTWARE INDUSTRY?

- 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

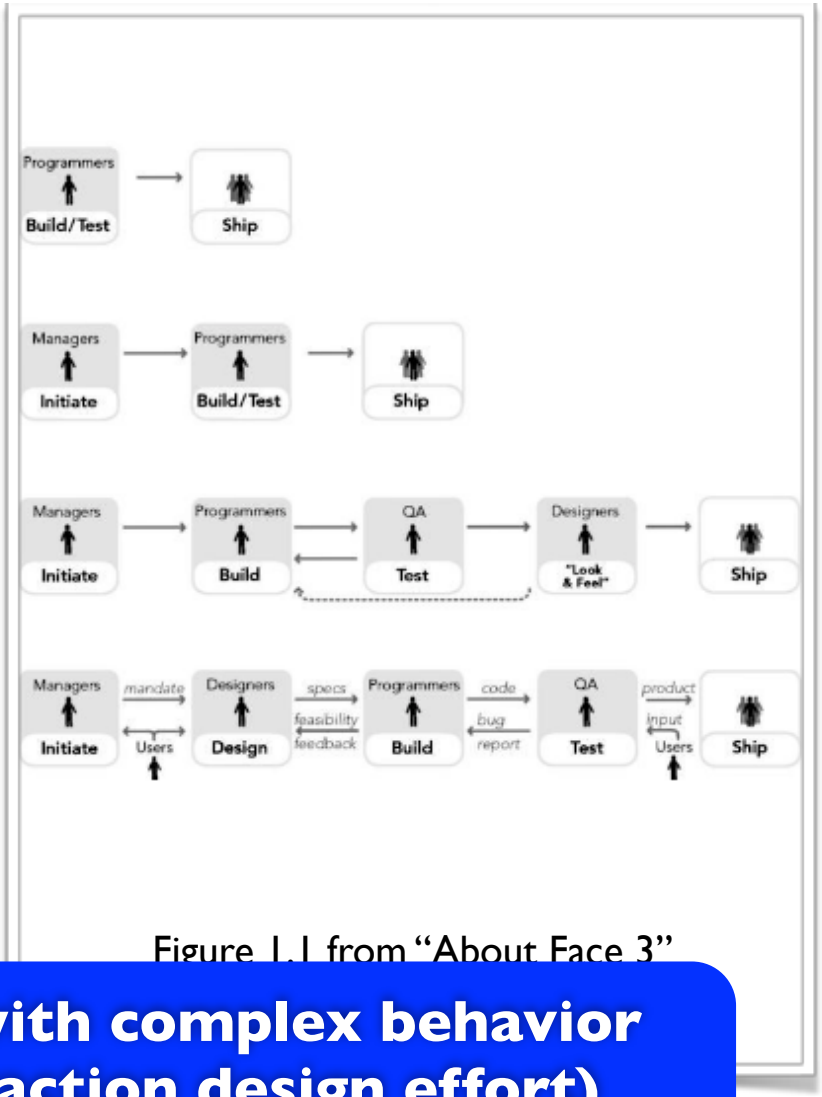


Figure 1.1 from "About Face 3"

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

HCI (IxD and UxD) is valuable training

- Besides learning methods and knowledge, students also learn “design thinking”
- Design thinking is the synthesis (as opposed to analytical thinking) based on Gestalt theory - for some problems, we have to come up with a unified solution in a relationship with its surroundings.
- Design thinking is increasingly valuable to not only online and IT companies but also to the entire business world

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.

Conclusion

- 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

- The terms HCI, User Experience Design (UX), and Interaction Design (IxD) are often used interchangeably
- But IxD and UX are different
  - when a true design succeeds, user experience dominates while behavior or form may disappear
  - less is more
- Our main focus is on UX, which means we will focus more on design thinking, and less on tinkering new gadgetry.

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

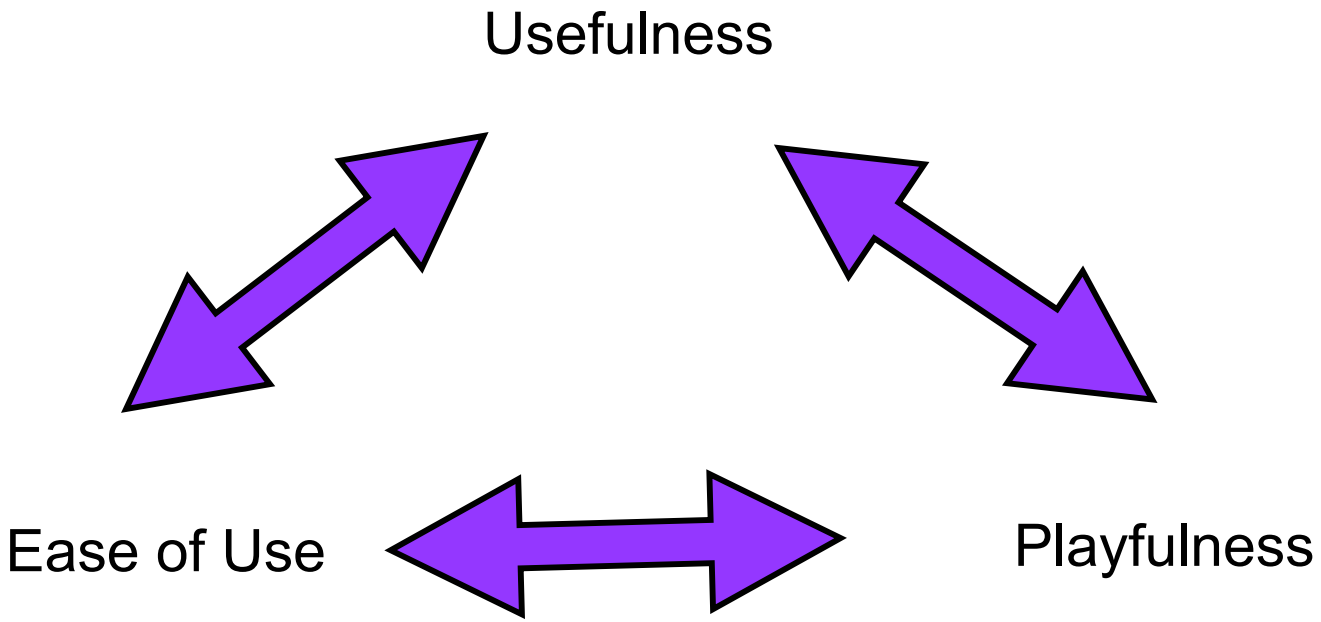
Which one do you prefer?

Usefulness and ease of use enough?

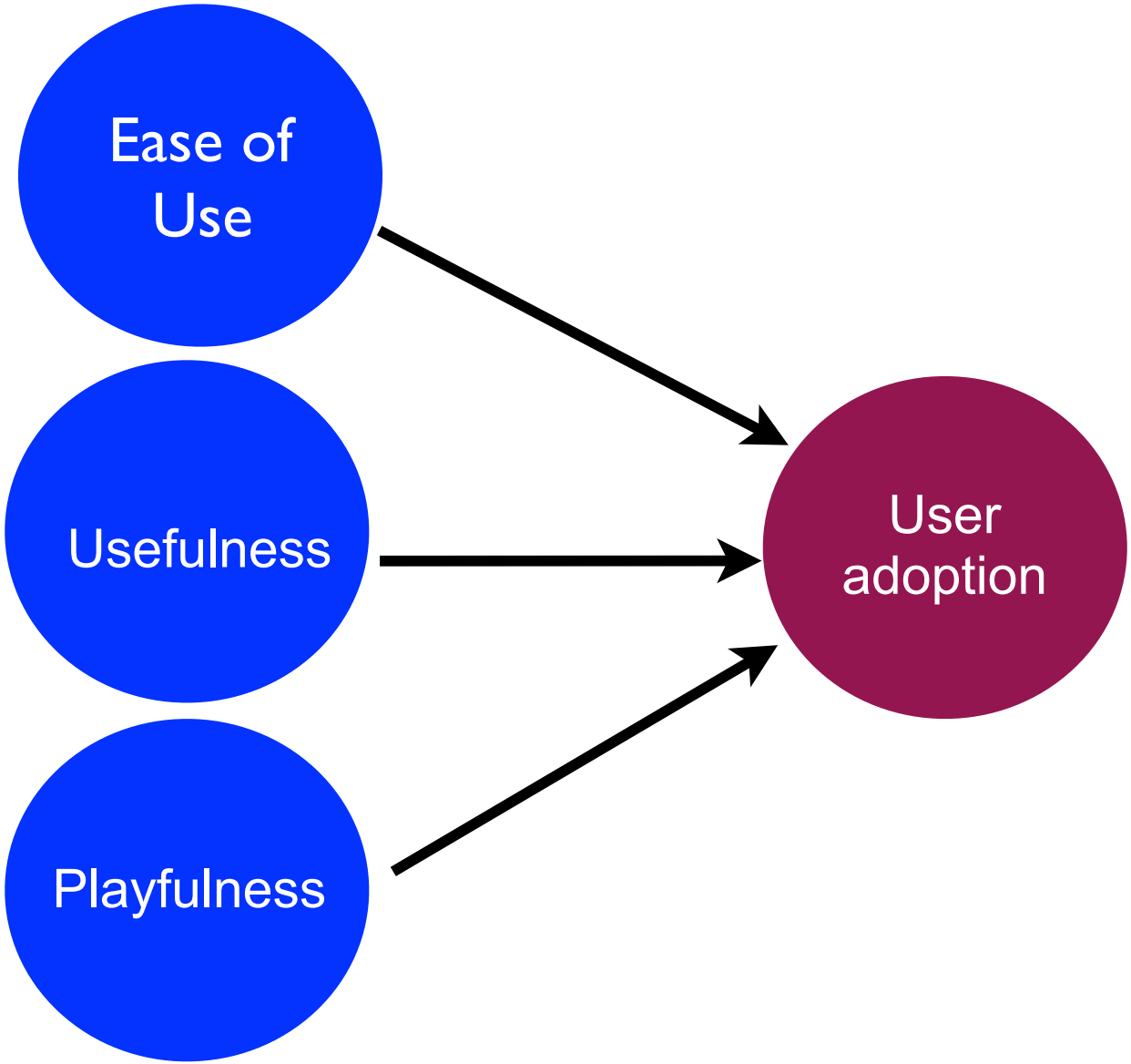
No! design must consider playfulness

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

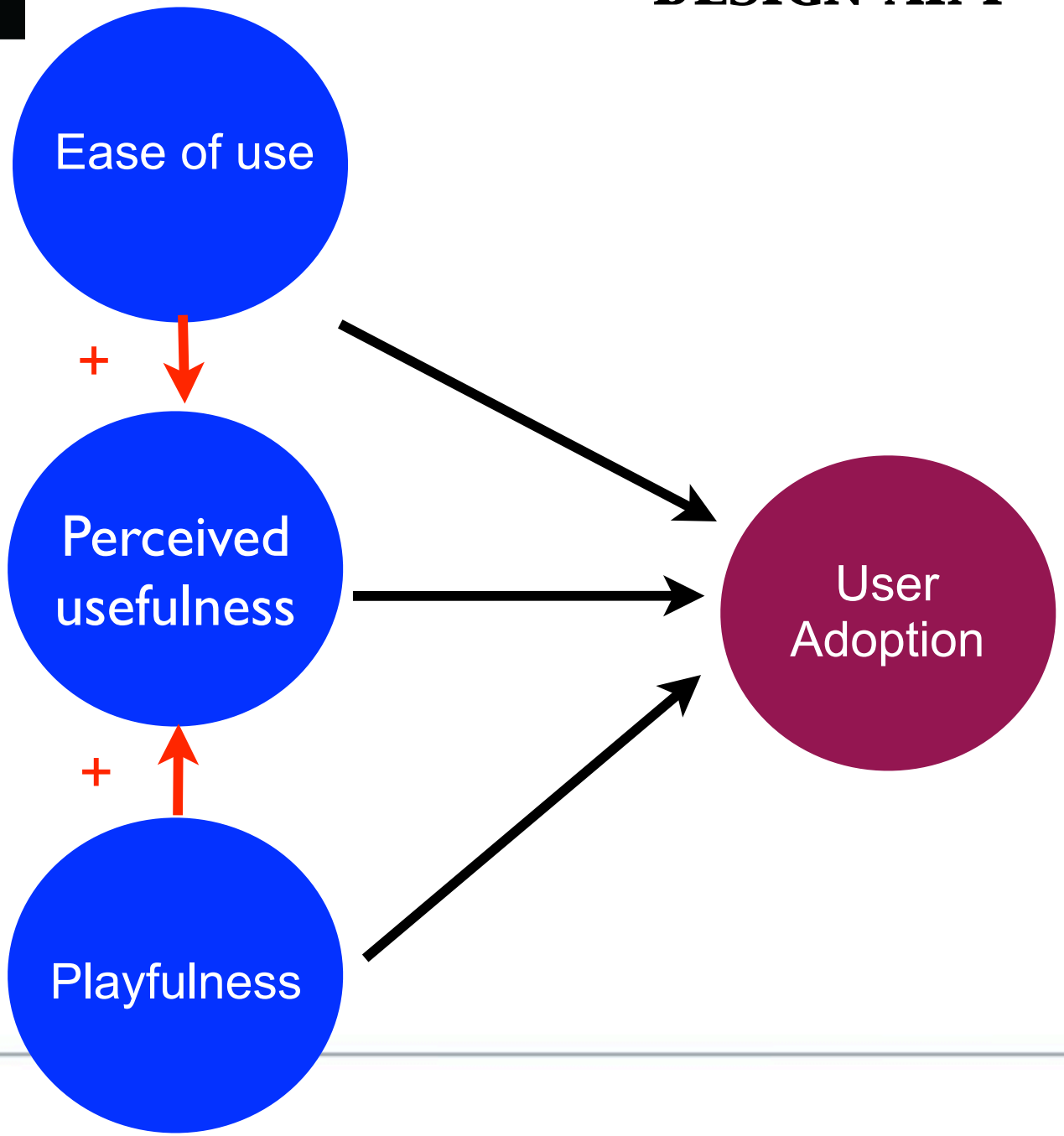
Success criteria for UX design



How these criteria relate?



Design aim – adoption



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: easy of use and playfulness are amplifiers of adoption - they increase the likelihood of user adoption, giving the same usefulness***

As an HCI student

Foundations of Design

- 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 - it is to ***imagine*** what the product might be, rather than what it is

What you will be able to do at the end?

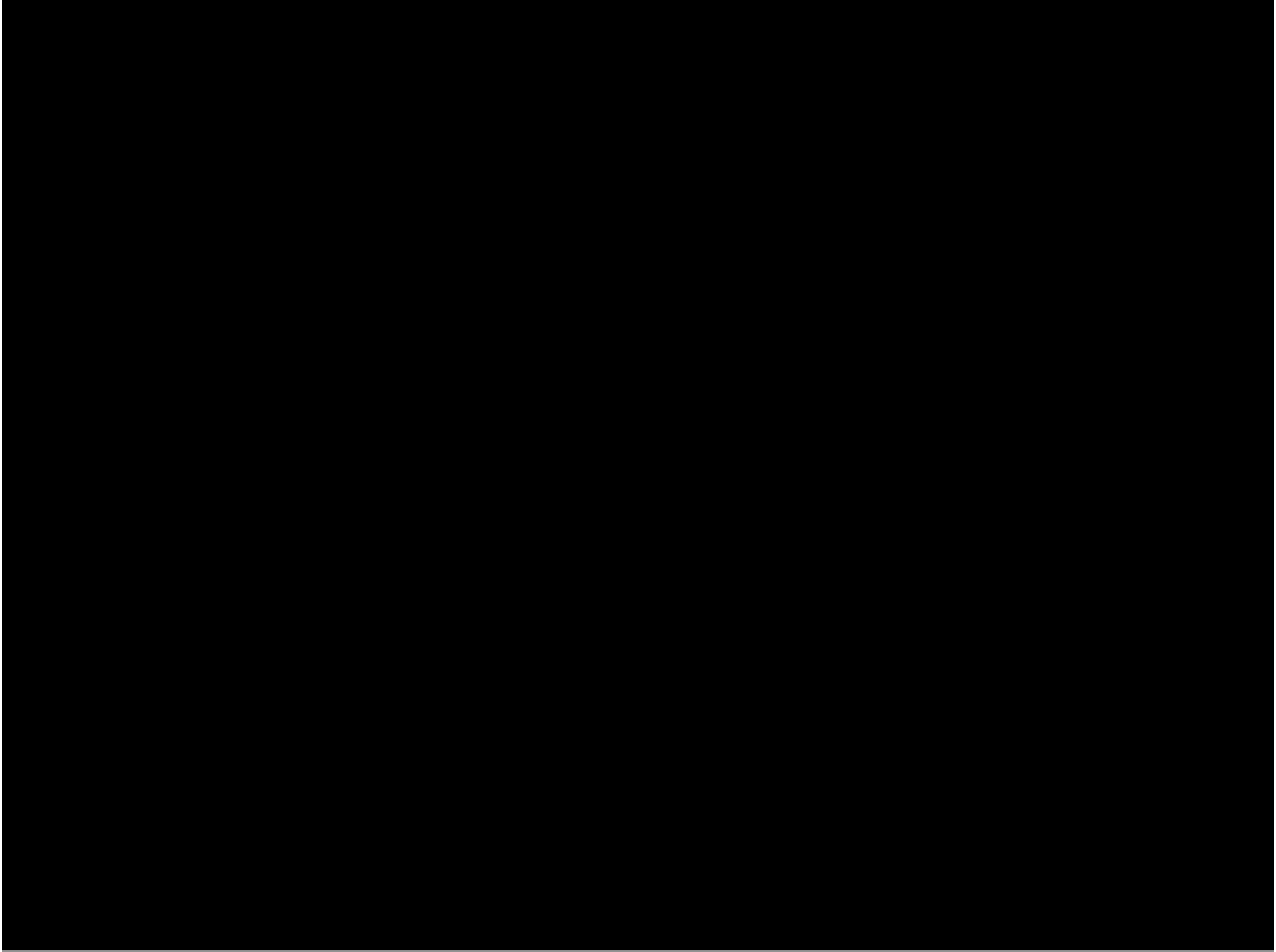
- Design any user-facing software and hardware products
  - convey your design vision; imagine what it might be
- Practice “design thinking”
- Prototype interaction and visual design & evaluate
- Given two interface designs, you can give ‘expert’ opinions of which one is better and why
- Make simple but crucial changes to increase usability
- Predict users’ reactions to designs without user studies

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

Aimersoft

Knowledge Navigator



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

COMMON MISCONCEPTIONS

- I am a user interface user; I am natural with HCI - ***wrong***. You may know how to evaluate food. This doesn't mean you can product a good meal
- HCI is subjective - ***wrong***. Teachers and assistants grade with strict guidelines and principles.

READING

- The Cooper book is required - a free electronic version exists
- Reading before classes meet! - a 20 minute reading will save you a lot of time

PLAGIARISM

- Copying solutions from your peer groups
- Asking someone else to do your work
- Copying text from the internet word for word
- Re-purpose projects from other courses

- EPFL has strict guidelines for treating these cases

FAQ (frequently asked questions)

- Can I take the VR and Database course at the same time?
  - No.
- Can I be absent more than 5 times?
  - No. If you have problems with that, please send email to me.
- If I don’t have programming background, can I take this course?
  - No/Yes, you should find a partner who does.

Some useful things you'll learn

- Users recognise much faster than recall
  - When asking them to enter a date, give them a calendar
- An airplane crashed into a mountain because of UI problems

DESIGN PRINCIPLES

Users don't understand Boolean logic.

This "lamp" icon appears throughout the book; look for them and memorize them!

Course Syllabus

Administrative Details

- **Course Title: CS 486**
- **Number of credits: 4**
- **Time allocated: 120 hours**
- **Lecture Time:** Monday 8:15h – 10h (BC 01)
- **Exercise Hour (TP):** Mon 10:15h – 11h (BC 07 & 08)
- **Project Hour**: Mon 11:15-12h (BC 01, 07, 08)
- **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)

How is it taught?

- This course is taught in three ways
  - Lectures
  - SAQ (self-assessment questions)
  - A team project with several phases
    - you will receive a design brief for each phase

MILESTONES

	100%
Re-frame the design challenge, perform domain and competitive product analysis (due on Friday 4th week) By domain, we mean the subject area where your product operates. Important: a domain expert is more than a	20%
Interview users (due on Friday 6th week) What is your persona hypothesis? whom and how many users did you interview (at least 10)? Can you describe the setting where you interviewed them? What questions did you ask (what is your IO guide)? What happened	20%
User modeling (due on Friday 8th weeks) User modeling & persona construction	20%
Scenarios and requirements (due on Friday 10th week, 2 weeks total) Creating problem and vision statement, brainstorming, identify persona expectations, draw the empathy diagram to capture user expectations and requirements	15%
Interaction and visual framework (due on Friday 13th weeks, 3 weeks total) What is framework design? It's defining the interaction framework and visual framework. However we will be only producing paper prototypes to show our framework solutions. This is why it's also called the lofi	25%
User testing and Video prototyping (due on Friday 15th weeks) Perform heuristic evaluation and update your design solutions. Choose one key scenario to make a short video (4 min)	20%

Design Challenge

4 AREAS

- How can we help people become physically more active?
- How can we help people reduce their stress?
- How can AI explain itself?
- How can we provide more entertainment?

DESIGN CHALLENGE

- Design challenge sets the direction for the project
- You need to
  - Choose partners
  - Frame the design challenge into something suitable for HCI course, useful, innovative, and feasible

INITIALLY…

- Design challenge
  - Vague and abstract - you need to frame it
  - Overwhelming - only the interaction and visual part matter

- What's not a good HCI design challenge?

Design brief 1 - re-frame a Design Challenge

How to re-frame a design challenge

- Reframe is carefully re-phrase
- Initial: how can we provide more entertainment?
- Re-framed design challenge
  - How can we provide more AR entertainment in smart homes
  - How can we provide more AR entertainment in smart homes while helping people stay physically active
- Domain analysis
- Competitive product analysis

Working iteratively

How to integrate results

- Iterating on these three steps should give you a POV (point of view) statement

  - A POV is your reframing of the design challenge into an actionable problem statement that will launch you and your group into ideation of your solution.

  - Three important elements of POV: the user, their needs, an insight

  - A POV should not discuss specific solutions

POV

Example (can you tell where the solution starts?):

Physical inactiveness is the new smoking. Scientists predict that it will kill millions of people. How can we use technology to help people change their current habits and become physically more active?

Most apps use social and peer group as incentives, but self-efficacy is a less explored area.

Using gamification principles, this app makes users think about themselves in 30 year's time if they didn't regularly exercise. The app provides training as well as specific missions that require both exercise and social interaction. The goal is to make users' aware of the benefit of fitness and focus on their intrinsic motivation rather than focusing on techniques such as persuasion or competition.

CREATING WITH CONSTRAINTS

- Design is overwhelming - search for a solution among millions
- Design thinking is key
- Being uncomfortable is part of the process!!

- Look for constraints - from users, technology, stake holders (domain experts)

What is domain analysis?

- Researching the domain where your product operates (internet, books, scientific facts)
- Consider the following examples:
  - How can we help people become physically more active?

First iteration

- Google the challenge
  - Keep a record - why you want to exercise, set some goals
  - Put it in your calendar
  - Make it fun
  - Find a friend
  - Figure it out
  - If you drop the ball, pick it up
  - Reward yourself

SECOND ITERATION

- Why it's harmful if we don't regularly exercise
  - Risk of disease (purpose of the product)
- Theories on goal setting
- Theories on making it fun (gamification)
- Theories on persuasion with social influence
- Theories on rewards (badges)

COMPETITIVE ANALYSIS

- Survey existing products
- Avoid re-inventing the wheel
- What's your value proposition (unique selling point)
- Important: try to use one or two competitive products yourself
- Final step: build a competitive analysis map.

Getting to know competitive products

- Fitbit Coach
- MyFitness Pal
- Runkeeper
- Zombies, Run!
- Charity Miles

Example

Physical inactiveness is the new smoking. Scientists predict that it will kill millions of people. How can we use technology to help people change their current habits and become physically more active?

Most apps use social and peer group as incentives, but self-efficacy is a less explored area.

Only after user interview and user modeling, you can do the following:

Using gamification principles, this app makes users think about themselves in 30 year's time if they didn't regularly exercise. The app provides training as well as specific missions that require both exercise and social interaction. The goal is to make users' aware of the benefit of fitness and focus on their intrinsic motivation rather than focusing on techniques such as persuasion or

THE END