

# Human Computer Interaction

## Course Wrapup

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# Overview

- In this lecture I want to do a wrapup of the course.
- I want to summarize the **theme** of HCI, and emphasize some of the **modern factors** that make it important.
- Then, I will give a brief overview of the **major themes** covered in detail in the course.
- You can think of this as a concise list of topics to familiarize yourselves with when preparing for the **exam**.
- In fact, after completing this course you should be comfortable having an **intelligent** conversation about these topics.
- HCI is a **practice**, like an **art**, thus one of the **main objectives** of the course to to prepare you for this.
- I will also make some final comments on **projects** and HCI in general.

# What is HCI?

- Human-computer interaction (HCI) began to **emerge** as a discipline *per se* in the 1980s.
- Initially it was specialization of computer science that embraced **cognitive science** and **human factors** engineering.
- It has expanded rapidly for three decades, and now attracts professionals from **many other disciplines**.
- We can think of HCI as **human-centered informatics**, if we wish.
- HCI is concerned with how **humans interact** with computers, and how **computers interact** with humans.

- **1950s-1960s: Getting data in, getting data out.** Concentration on improving low-level HCI.
- **1970s: The rise of the Personal Computer.** The broad project of cognitive science, which incorporated cognitive psychology, artificial intelligence, linguistics, cognitive anthropology, and the philosophy of mind, had formed at the end of the 1970s.
- **1980s: Graphical User Interface (GUI).** Interfaces designed for easier understanding of computers. Before GUI, there was a command prompt by which command was given to the computers. GUI started the graphical interface which is easy to use, understand, visualize, and it improved the working environment.
- **1990s The Internet and Collaborative works.** Communication among people and computers became easier, and computers and their interfaces became highly decentralized.
- **2000s: Mobile Computing.** Mobile and Smart Phones offer a wide range of services that blur the divisions between computers and between people and groups.
- **2010s: The Social Computer.** Social networks and social applications radically distribute interactions and puts computers in role as *mediators* of interaction between other agents.
- **Today: accelerating change.** Wearable computing devices, ubiquitous computing, the Internet of Things, natural interaction, surface-based computing, learning.

# HCI is highly multidisciplinary

- HCI is an inherently multidisciplinary field.
- Many factors and areas of expertise combine to ensure usability.





# But what is HCI?



## HCI is an academic discipline.

- Academic HCI studies people interacting with technology.
- This is (usually) studied at an abstract level.

## HCI is a design discipline.

- A large part of HCI is about designing interactions and interventions involving people and technology.
- Note that I don't talk about designing interfaces.

## HCI is an engineering discipline.

- A well-thought and well-designed human-computer interface must eventually be built.
- HCI also encompasses all of the engineering paradigms and practices for implementing human-computer interfaces.
- There is significant overlap with software engineering in this aspect.

- HCI is **extremely difficult** to define precisely.
- Nonetheless, its **academic**, **applied**, and **design** aspects have continued to expand and **infiltrate**.
- HCI is finally starting to **leave its roots behind** and establish itself on its own.
- This is similar to how **Computer Science** did the same in the 1980s.
- **Bottom line**: as the consumer technology continues to grow and expand at breakneck pace, **HCI will only continue to increase in scope**.

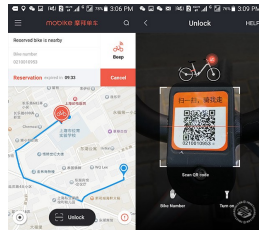
## On the importance of HCI

# Why is HCI important?

- Who cares?
- Independently of personal tastes and interests, HCI is an **extremely important discipline** in the modern world.
- Let's look at some of the reasons. . .

## Daily life

- Computers permeate every aspect of our daily lives.
- Even when not “using” a computer, our life is affected in some way by computing.
- ATMs, ticket vending machines, drink/food dispensing machines, etc.
- HCI is an important factor when designing any (and all) of these because it **affects our daily quality of life.**

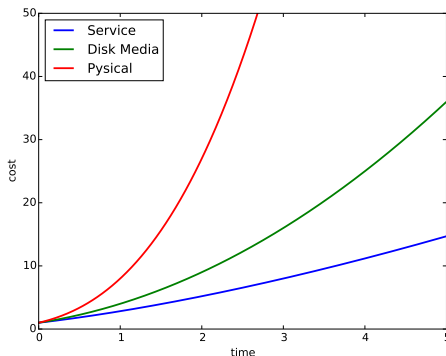


## Untrained users

- Today, the vast (**vast**) majority of users are decidedly non-expert computer users.
- Contrast this with the early days of computers (even 20 years ago).
- Users **expect** to understand the main functionality of an average program within **a few minutes**.
- Interfaces *must* be effective, obvious, easy to use, and most importantly they **must not require training**.
- This is why developing **scenarios** and **personas** for HCI is essential.

## Why is HCI important for you

- HCI principles are not only important for the end user, but also for **software development companies**.
- Anyone who goes to work as a software developer **must** know something about Human Computer Interaction.
- And hopefully this course has demonstrated that **a little HCI** goes a long way.

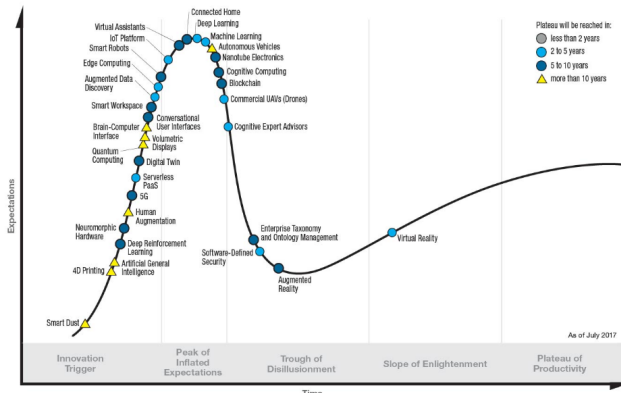




# HCI will be a dominant theme

- Like **network programming** and **design patterns** for my generation, Human Computer Interaction will **dominate** the early-to-middle stages of most of your careers.

Gartner **Hype Cycle** for Emerging Technologies, 2017



# Course Content

- In the first part of the course, we had a general discussion about concepts introduced to the field design by **Don Norman**.
- You should be comfortable with the concepts of **affordances**, **signifiers** and **mapping**.
- Going a bit deeper, we also looked at the **psychology of action**.
- You should know about the **gulfs of execution and interpretation** and what they mean for HCI.
- **Importantly**: you should understand the relationship between affordances, signifiers and mapping and the psychology of action.

- We also had a (mostly theoretical) discussion about **visual organization** and its importance to HCI.
- You should be familiar with the most important elements of the **Gestalt Theory of Visual Organization**.
- On a (somewhat) more practical level, we also looked at how **color vision and peripheral vision** limit us.
- These can be difficult to apply in practice, but you should be able to **diagnose** problems and hopefully **ameliorate** their affect.

- You should all be familiar with that **basic components of GUI** toolkits.
- This means: widgets in general, container widgets, layout widgets, buttons, labels, etc.
- You should also be familiar with how **events** are used to communicate **asynchronously** between UI components.
- And you should be aware of the **complications** this can cause.
- And, of course, you should be able to discuss how to manage this complexity using paradigms like **separation of concerns** and **MVC**.
- Again, HCI is very much about **practice**, so take any opportunity you can to put these concepts into play when you are working.

- You should be familiar with the concept of **needfinding** and the purposes it serves in the design process.
- From identified needs, you should understand how we use personas to **categorize** classes of users.
- And, finally, how these personas are used to populate **scenarios** used to articulate specific UI requirements.
- You should understand the **limitations of metaphors**, and finally the techniques used to test **usability** of design elements.
- You should also understand the basics of **usability testing** and know how to design a usability test to probe your designs for **critical usability problems**.

- I normally **do not** expect you to discuss any of the papers covered in class specifically during the exam.
- You should be able to express an **informed opinion** about HCI theory and practice after this course, however.
- **Suggestion**: have a look at the **Best of CHI 2016 page** for an **excellent** panorama of the state-of-the-art.

# Final Projects and Programming Assignments



- I must emphasize: the majority of the final exam is based on the **final project**.
- The **interrogation** about course topics is more of a discussion about HCI that lets me ensure that everyone leaving the course has a satisfactory understanding of HCI fundamentals.
- **Remember**: you should also be prepared to discuss at least **one** recent paper on HCI during the exam (Latest and Greatest style).
- Some considerations about the final project:
  - Start thinking **now** about a project.
  - Please don't wait until you have a **fully-formed plan** for a project.
  - Come to me **early** and we can work **together** to define your projects.

- Final grades are based on: a selected **programming assignment** (more on this later), a **project**, and **questions** about the course material.

## 9 CFU:

Project:	80%
Programming assignment:	15%
Questions on course material:	5%

## 6 CFU:

Project (reduced scope):	90%
Questions on course material:	10%

- Projects will be evaluated based on how well the methodologies in the course are followed in developing an interface from idea, through needfinding and prototyping.
- The project consists of: an **implementation**, a **written report** (10-15 pages), and a **presentation** (15-20 slides).
- Factors contributing to final grade:
  - **Innovation**: ambitious projects are more risky, and this will be valued in the final evaluation.
  - **Independence**: if you take charge of the decision making and execute the project with minimal guidance (**advice** is not **guidance**).
  - **Technical solidity**: the quality of your code counts. This doesn't mean **bug-free**, but rather good adherence to **MVC**, **separation of concerns**, and **good coding practices**.
  - **Presentation quality**: how well you **present** your work also counts.
- **Remember**: your goal in this project is to **design**, **implement**, and **evaluate** an idea related to HCI.

## Programming assignment (9 CFU only)

- A part of the final grade (15%) will be based on the implementation of a **programming assignment**.
- This assignment will be a small **graphical user interface** that you will implement **individually**.
- Your implementation will be evaluated on the basis of how well you **apply** the **patterns**, **paradigms**, and **best practices** learned during the course.
- About halfway through the course I will announce the possible programming assignments.
- You must **choose** one of the assignments from the list.
- **IMPORTANT**: If you work on a **team project**, the team members **MUST** choose different **programming assignments**.
- The Three available projects for this year have been **published on the course Moodle**.

## Exam Procedures

- Some things to remember about registering for the exam:
  - You **must** submit your **programming assignment** (9 CFU only, Github/Gitlab repository preferably) by the **exam registration deadline**.
  - You **must also** submit the **written report** for your project by the exam registration deadline.
  - I cannot stress the above points enough: *if you do not submit the programming assignment at least one week before the exam, you will have to wait for the next appello.*

## Final Words on HCI

- As we have seen, HCI is a big **mish-mash of subjects and disciplines**.
- There is no body of seminal papers to point at and say: “this is HCI.”
- This is evident in light of the **final** Latest and Greatest paper discussed last time.
- This is also clearly reflected in the mix of topics covered in this course.
- It is unclear if, when and how HCI will become a unified **discipline on its own**.
- Until then, it will remain firmly **interdisciplinary** in nature.



- In the end, we are sort of left with our original trichotomy:

HCI is an **academic discipline**.

- Academic HCI studies **people** interacting with **technology**.
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HCI is a **design discipline**.

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HCI is an **engineering discipline**.

- HCI also encompasses all of the engineering paradigms and practices for **implementing** human-computer interfaces.
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