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Human-Computer Interaction: 1A. HCI Introduction

6 & 7th October 2025

HCI Introduction

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- Module introduction
- What is HCI?
- Why is it important?

Learning Objectives: be able to …

- Navigate the course and understand how you will be assessed
- Outline what HCI is concerned with
- Discuss what user interfaces are and how they affect us
- Explain relevance of usability and user experience

Module Learning Outcomes

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Be able to …

- Recognise the significance of HCI for the development of systems that people can use successfully, efficiently and safely
- Employ knowledge of human abilities and behaviour to analyse user interface problems and motivate user interface designs
- Apply HCI principles and guidelines in the design and implementation of interactive systems
- Evaluate the usability and user experience of interactive systems using appropriate methods and metrics

Module Overview

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- Lectures – 2h every week
- Exercises – worksheet for revision at home, light extra reading
- Seminar – 1h, starting this week
- Coursework
  - Exercise sheets: Get bonus points for effort
  - Two group assignments that build up to one submission
  - In class test in week 5

Module Overview – Content

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- Weeks 1-4: Understanding the human
  - perception, movement, memory, attention
- Weeks 5/6: Interaction and design
  - interaction models, design principles, prototyping
- Weeks 7/8: Evaluation
  - measuring user performance and experience
- Weeks 9/10: User interface technology
  - input devices, contemporary HCI issues and research

Group Coursework

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- Groups of six: will be formed in your seminar this week
- Practical assignments on which you work successively
  - Week 2-4: Reaction Time Experiment
  - Week 6-9: Usability study
- Single submission as coursework presentation in week 10
- Each group member rates the the contribution of their peers
  - Ratings given must be justified
  - Engage with you group: Turn up, contribute to discussions, do your tasks to a good standard, respond to messages, be kind and respectful to each other.
    - Don’t make agreements about ratings you’ll give each other…

Javascript Tutorial

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- Groupwork 1 is based on JavaScript.
- Take the tutorial in week 1 to be ready for remaining labs
- Contains all the elements you need to be familiar with
- After the tutorial, take a moodle quiz
- Complete by WK2 Monday 5pm (multiple attempts allowed)

Seminar format

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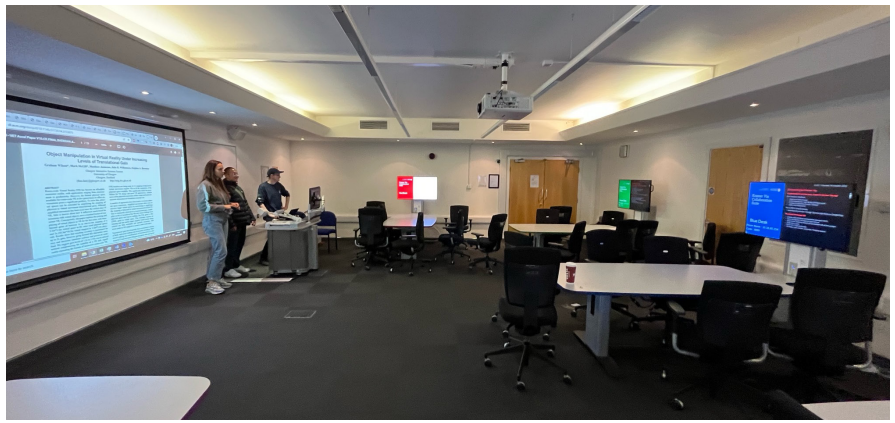
- Bring completed exercise sheets to get a mark
- Participate in discussions – we may use a spinny wheel to get you talking
- Mini-tutorials on practical skills for your coursework
- Introduction and progress review of group coursework



Assessment

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- 70% Exam / 30% Coursework
- Weekly exercises
  - Javascript tutorial + Exercise sheets E1-E4, E6-E9
  - Bonus points only awarded if exercises completed before next seminar
- 30% for coursework
  - Groupwork assessed for quality
  - Individual marks factoring in contribution
  - Week 5 in-class test

Moodle

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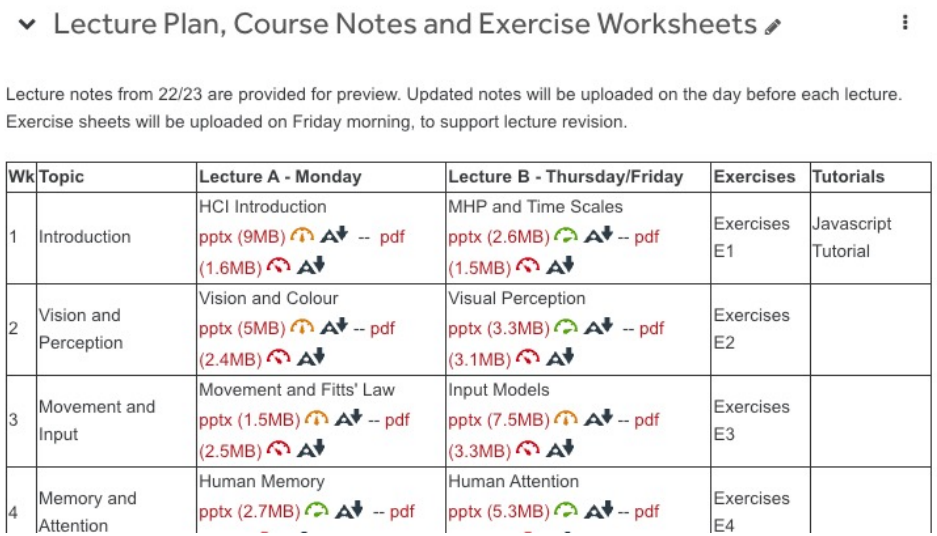
- Lecture notes in ppt/pdf, before lecture
- Panopto recordings added later
- Exercise worksheets added after Thursday lecture
- Coursework details



Lecture Plan, Course Notes and Exercise Worksheets

Lecture notes from 22/23 are provided for preview. Updated notes will be uploaded on the day before each lecture. Exercise sheets will be uploaded on Friday morning, to support lecture revision.

Wk	Topic	Lecture A - Monday	Lecture B - Thursday/Friday	Exercises	Tutorials
1	Introduction	HCI Introduction pptx (9MB) -- pdf (1.6MB)	MHP and Time Scales pptx (2.6MB) -- pdf (1.5MB)	Exercises E1	Javascript Tutorial
2	Vision and Perception	Vision and Colour pptx (5MB) -- pdf (2.4MB)	Visual Perception pptx (3.3MB) -- pdf (3.1MB)	Exercises E2	
3	Movement and Input	Movement and Fitts' Law pptx (1.5MB) -- pdf (2.5MB)	Input Models pptx (7.5MB) -- pdf (3.3MB)	Exercises E3	
4	Memory and Attention	Human Memory pptx (2.7MB) -- pdf	Human Attention pptx (5.3MB) -- pdf	Exercises E4	

Instructors and TAs

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- If anything is not quite right, come and talk to us.
- If you struggle for whatever reason, speak to us.
- We are there to help.

- Issues to do with course material or groupwork – TAs in your lab session
- Timetabling, extensions, wellbeing, grades – Teaching office
- Anything else – Dan/Hans (ideally speak to us after your lecture)

HCI Introduction

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- Course introduction
- **What is HCI?**
- Why is it important?

HCI is concerned with Interactive Systems and User interfaces

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- Most computing systems are interactive and have people in the loop.
- ISO 9241-210 “Ergonomics of Human-System Interaction” definitions:
- **Interactive System**: “combination of hardware and/or software and/or services and/or people that users interact with in order to achieve specific goals”
- **User Interface**: “all components of an interactive system (software or hardware) that provide information and controls for the user to accomplish specific tasks with the interactive system”
  - The part of an interactive system through which people can interact

Interactive Systems

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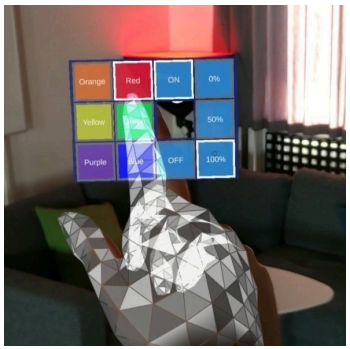
- An Interactive System is a computational system that allows users to interact in real-time.
- Interactions receive instant feedback visible to the user.
- “Real-time” refers to system responses that users perceive as instant – typically in the order of 100ms.
- Examples
  - Desktop OS, e.g. Windows 11 or MacOS
  - Mobile devices, e.g. Android or iPhone
  - Augmented Reality, e.g. MS Hololens
  - Ticket vending machines
  - Command line interfaces, text editors



User interfaces

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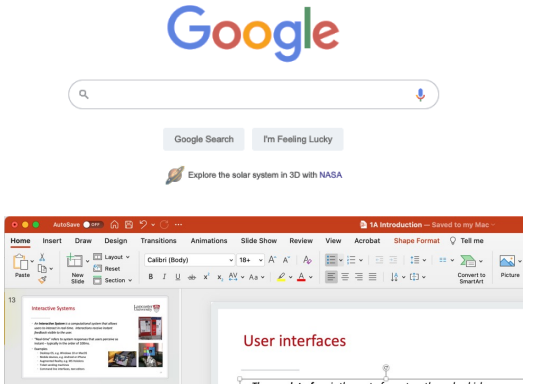
- The user interface is the part of a system through which a user can interact, composed of software and/or hardware that supports input, output or both.
- Not restricted to digital and interactive systems.
- Examples:
  - Graphical user interface (GUI) of any app or system, e.g. of search engine, or powerpoint
  - Voice user interface in a smart speaker (e.g. Alexa)
  - Buttons, switches, wheels and levers in a cockpit
  - Control panel of everyday devices, e.g. microwave oven, alarm clock, …



Human-Computer Interaction

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- *"Human-computer interaction is a discipline concerned with the design, evaluation and implementation of interactive computing systems for human use and with the study of major phenomena surrounding them"*
  (definition in the ACM SIGCHI Curricula for HCI, 1992)

- As computer scientists, we develop interactive systems
  - that people should be able to use successfully
  - that enable the joint performance of tasks by humans and machines

People and Machines

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View	People are	Machines are
Machine-centred	Vague Disorganized Distractable Emotional Illogical	Precise Organized Undistractable Unemotional Logical
People-centred	Creative Compliant Attentive to change Resourceful Able to make flexible decisions based on context	Dumb Rigid Insensitive to change Unimiginative Constrained to make consistent decisions

HCI Introduction

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- Course introduction
- What is HCI?
- **Why is it important?**

Reflecting on UIs

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- When was the last time a UI annoyed you?
- Think about what exactly happened
- What went wrong?
- Why?

How do user interfaces impact us?

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The design of the user interface and of the interaction determines how we use products and services

- What we can do with a product, service, or app
- How easy or hard it is to work with a piece of software
- How quickly we learn to use a system
- How safe a product or system is to use

How do user interfaces impact us? #2

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- **The user interface is the part of a system that we actually experience**
- It determines our performance with the system
- It determines how we feel about the system

Utility, Usability, User Experience

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- **Utility:** What a system (device, product, app,…) enables the user to do.
  - The tasks they can complete in interaction with a system
  - For a given goal, utility is an essential quality.
- **Usability:** How well a user can use a system to achieve their goals
  - How easy or difficult is the system to learn and use? How efficient and effective is the user interface? Have safe is the operation of the system?
- **User experience (UX):** The actual experience of using a system
  - How it behaves and what it feels like when we use it
  - Utility and usability are fundamental for a good user experience
  - But the use experience also depends on social and emotional factors

Economic relevance of HCI

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- Products that are easy to use are good for business
- Improving the user experience can
  - Increase productivity of users – completing tasks more efficiently
  - Reduce costs – less training and less support needed
  - Increase sales/revenue – online shopping
  - Enhance customer loyalty – dissatisfied user will not come back
- Usability is often considered a sign of quality
- Usability can provide a competitive advantage

Usability as discriminating factor

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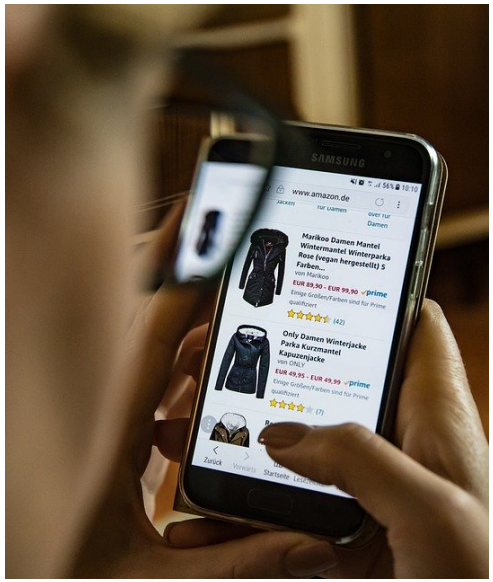
- Traditionally, we discriminate products by functionality and price
- With new media, there are many products that offer the similar functionality at similar price
  - Messaging services, paid by advertising
  - Online shops, that sell similar products
- The user interface becomes the discriminating factor
  - Is your service or app easier to use?
  - Can users get their tasks done faster?
  - Do they have a better experience during the interaction?



“Bad Usability is a Leaky Pipe"

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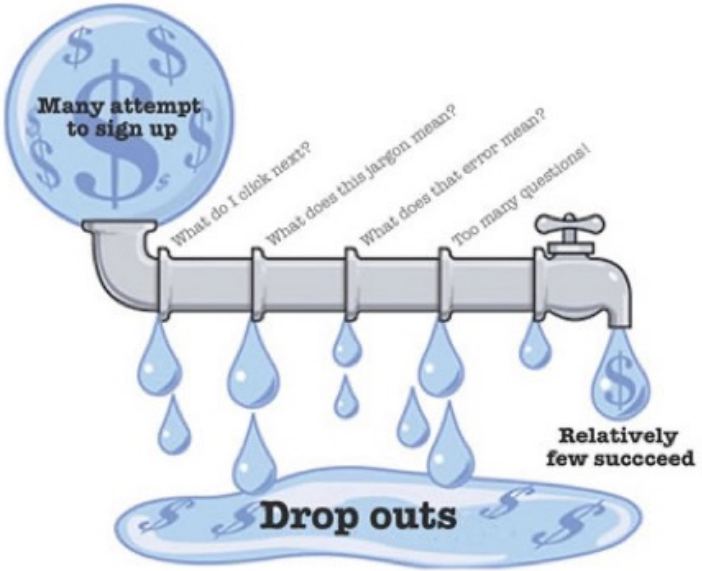
- On the Internet or App Store, the competition is never far away
  - Just one click away
  - Comparison is easily possible
  - If users have a poor experience, they can easily go to another site/app
- ”Bad Usability is a Leaky Pipe”
  - ~~https://90percentofeverything.com/2006/11/13/bad-usability-is-like-a-leaky-pipe/index.html~~ RIP
  - Can’t easily find what I want …
  - Not sure why I have to fill this in …
  - What does this jargon mean ...



HCI Introduction – Key points

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- HCI is about what humans and machines can accomplish together, through interaction
- Interactive systems support the joint performance of tasks through interaction in “real-time”
- User interfaces are the visible part of an interactive system, and determining what we can do and how well
- Usability is a quality of interactive systems: How easy is it to learn and use? How efficient? How satisfying?

Remember …

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- Complete the Javascript tutorial by next Monday, to claim bonus point

Next Lecture

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- “The Model Human Processor”
- A model of humans as information processors
- How much time do people need to process information and act on it?

Lecture Revision

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- Are all systems that have a user interface interactive systems?
- How can the design of user interface impact us? Give examples.
- What is the difference between utility and usability?
- What is the difference between usability and user experience?
- Does the usability only depend on the user interface, or can it also depend on other parts of an interactive system?
- How is a leaky pipe a metaphor for bad usability?
- Why is usability good for business?