

# Fundamentals of Human–Computer Interaction (HCI) for e-Learning

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**Abstract:** Good Usability of complex learning objects (e.g. simulations, animations, interactions etc.) is vital for the acceptance of e-Learning material. However, the basis for the preparation, design and the understanding of e-Learning material requires at least some basic knowledge and insights into the results of research in Human–Computer Interaction (HCI) and Usability Engineering (UE). One possible approach in design is a User centered design (UCD) which can be expanded to the so called learner centered design (LCD). The primary goal of this half-day tutorial is to apply some concepts and principles of HCI to the design and development of e-Learning material.

*"HCI draws on many disciplines, but it is in computer science that it must be accepted as a central concern." Alan Dix (2004)*

## 1. Introduction

In the context of Human-Computer Interaction it is important to consider a perspective that recognizes, respects, values and attempts to accommodate a wide range of human abilities, skills, requirements and preferences in the design of learning material. This automatically reduces the need for a lot of special features whilst at the same time fostering individualization, consequently high quality of interaction and, ultimately, end-user acceptability [11], [3], [2]. In short: the focus should be always on the human [10].

## 2. Design for everyone?

In contradiction to Vanderheiden & Henry (2003), a design for all cannot be achieved by designing for everyone, but only by designing for specific end-user groups [7], [5], [6]. Consequently there is a methodology, which is of increasing popularity: the User Centered Design (UCD) approach [9], [1].

UCD is an approach to creating software that is usable by the end-users to the greatest extent possible [8].

Whereas System Centered Design addresses questions including: What can be built on this platform? What can I create from the tools available? What do I as a developer find interesting to work on?

User Centered Design is totally based upon the end-user's abilities and needs, context, work and tasks. UCD methods include understanding the end-users and analyzing their tasks, setting measurable goals, and involving the end-users from the project's beginning [4]. The normative perspective of UCD is that there is **no average end-user** and, consequently, design should be targeted towards specific end-user groups.

### 3. The Tutorial

In this tutorial participants will become familiar with selected fundamentals of Human-Computer Interaction & Usability Engineering with the aim of design and development of e-Learning material.

The participants will learn practical principles of HCI research which are immediately useful during design of learning material.

Finally, the participant should understand the principles of a User-Centered Design (UCD) approach and expand their knowledge to a Learner Centered Design (LCD).

### 4. Topics

- Basics of Learner Analysis: Specification and understanding of learner demographics and environments, learner modeling, task analysis;
- Importance of Metaphors: Easy recognition of fundamental concepts conveyed through appropriate wording, signs, symbols and images;
- Fundamentals of mental models: Appropriate organization of information, tasks and roles;
- Navigational aspects: Efficient movement within the mental model via e.g. windows, menus, dialogue boxes, control panels etc.;
- Basics of Appearance: visual and acoustical characteristics;
- Fundamentals of Interaction: Effective input and output;
- Information Visualization and basic visual design issues;
- Basics of User-Centered Design (UCD) expanded to Learner-Centered Design (LCD).

## 5. About the Lecturer

Andreas Holzinger is Associate Professor of Information Processing and currently works, teaches and researches at the Medical University Graz in Information-Systems with emphasis on Human-Computer Interaction and Usability Engineering. He holds a CEng in electronics, a BEng in communication engineering, a MSc in Physics, a MPh in Media Science and a PhD in Cognitive Science. He is member of the ACM, IEEE, AACE, the German Society for Informatics (GI), the German Society for Psychology (DGP), and board Member of the Austrian Computer Society (OCG). He is national expert in the E.U., IFIP WG 13.2 member and member of the ERCIM WG "User Interfaces for All".

More details see: [www.basiswissen-multimedia.at](http://www.basiswissen-multimedia.at)

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