

Submission to workshop on “Teaching HCI for AI: Co-design of a Syllabus” organized by SIGCHI Italy, July 7<sup>th</sup>, 2020

## Teaching Human-Technology Interaction students to design AI applications in a multidisciplinary context

Kaisa Väänänen and Thomas Olsson

Unit of Computing, Faculty of Information Technology and Communication Sciences,  
Tampere University, Finland

[kaisa.vaananen@tuni.fi](mailto:kaisa.vaananen@tuni.fi), [thomas.olsson@tuni.fi](mailto:thomas.olsson@tuni.fi)

**Abstract:** *Human-Centered AI (HCAI) design is an essential development approach to make AI applications successful. HCAI is collaborative, explainable, responsible and desirable to its users [1-4]. We as HCI professionals should provide students the ways to work along this approach. The following describes our vision of the planned syllabus for HCAI. We first define the target audience and learning goals, then outline a draft syllabus with relevant study modules and overall structure, and finally explain two modules in more detail.*

**Need for this education:** AI and HCI are often taught in different study programmes, and hence the students do not necessarily get to communicate and work together on creating successful AI applications. To enable a human-centered design approach to AI, cooperation between professionals representing these viewpoints is needed. Additionally, we advocate analytical and reflective approaches to design in order to educate holistic design thinking skills for interdisciplinary work.

**Target audience:** MSc students, especially in Human-Technology Interaction (HTI) students but also from other related disciplines, representing both human and technical sciences (psychology, sociology, software engineering, media research, machine learning, data science, etc.)

### Learning goals:

- To create **basis for interdisciplinary collaboration on design and development of AI applications** and systems that take into account the human stakeholders' needs
- To provide **skills on using concrete methods and tools for the design and development of AI apps** that provide **positive user experience** and follow **ethical principles**
- To bridge the gap between HTI/design thinking and the more technical skills & knowledge

**Breadth of the teaching:** The students could take either just the introductory course (Basics of Human-Centered AI) or they can take a subset or the whole set of the courses up to 25 cu.

Below, we present a sketch of a HCAI study programme, consisting of courses and study modules. This is followed by a description of two of the study modules in a bit more detail. These are not full descriptions of the contents, but give initial flavor of what could be included.

Sketch of syllabus with “study modules” for a study programme for Human-Centered AI

### **I INTRODUCTION TO HCAI (5 cu)**

1. Basics of Human-Centered AI (HCAI)
  - a. Definitions of AI and HCAI
  - b. Example systems (and their advantages & problems)
  - c. HCAI characteristics - “AI UX goals”

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- d. Different forms of being an AI “user”, e.g. Human-AI partnering
  - e. Ethical principles
  - f. Exercises, readings
2. **Multidisciplinary collaboration between technical and humanistic AI professionals** (see example description below)
- a. Roles of technical, human sciences, design, philosophy/ethics professionals, and how they can effectively communicate and work together in groups
  - b. Common concepts
  - c. Collaborative frameworks for multiple disciplines
  - d. Processes & concepts -> methods that fit different disciplines’ ways of working

## II AI TECHNIQUES (5 cu)

3. AI techniques and how they appear in applications/systems
- a. Machine Learning “for dummies”
  - b. Techniques for Intelligent User Interfaces (NLP, machine vision, etc.)
  - c. Role, uses and gathering of (high-quality) data

## III DESIGNING HCAI (5 cu)

4. **Design approaches** (see example description below)
- a. Overview of suitable human-centered design approaches; underlying principles and how they may fit AI applications’ special characteristics
  - b. Value-Based Design, Experience-Driven Design, etc.
  - c. Design and evaluation methods and tools
  - d. Design methods applied to AI applications: Customer Journey Map, experience canvases, UX goals, ...
  - e. Evaluation methods: Wizard of Oz, large scale online surveys, ...

## IV PROJECT WORK COURSE (5-10 cu)

6. Hands-on project in an interdisciplinary team, from a topic provided by an industrial company or a research group

Example descriptions of the building blocks:

### **Multidisciplinary collaboration between technical and humanistic AI professionals**

AI projects are often led by technical experts. When human-centered approach is utilised, the roles, skills and tasks of psychology, design and ethics professionals in AI design and development need to be explicitly understood and intertwined to the overall development process. A firm basis of common (and different) concepts must be formed to enable effective communication and working together in multidisciplinary groups [5]. Furthermore, collaborative processes and methods for these disciplines need to be established to fit different disciplines’ ways of working. These processes/approaches include agile development, iterative testing with end-users, data-driven application evaluation in context, and ethical expert evaluation. The theoretical frameworks reviewed in this study module will be exercised with case studies that allow appreciation for the need of the contributions from the different disciplines.

### **Design approaches**

The potentially highly disruptive and far-reaching influences of AI systems call for new sensitivities and perspectives in the practice of HCI design. To complement the conventional human-centric design as a well-established and commercially broadly utilized approach, various other design approaches and philosophies have been proposed over the last few decades. Notable examples include value-sensitive design [6], critical design [7], sustainable

design [8], speculative design [9], and socially responsible design [10], and many more. We argue that future AI designers need competences that allow them to more holistically reflect on the values and assumptions underlying proposed solutions, to elicit discussion on designers’ responsibility with the help of speculative artefacts, to conceive artefacts that are capable of communicating ideas with psychological and ideological weight, and to envision alternative socio-technical futures where AI technology can impact different behavioral, cultural and societal dynamics. In other words, rather than tools for crafting, such approaches provide tools for thinking in new ways and being mindful of why we design things. While such approaches have been traditionally used as tools to question certain implications of technology, they are increasingly used also as methods to innovate. To this end, we suggest adding to the syllabus a conceptual map of various alternative design approaches, the principles they build on, and assignments of trying the approaches in practice. Our preliminary map covers various holistic, responsibility-oriented, sustainability-oriented, diversity-sensitive, value-sensitive, speculative, and provocative approaches.

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