Introduction to Human-Computer Interaction

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ABSTRACT
The objective of this course is to provide newcomers to Human-Computer Interaction (HCI) with an introduction and overview of the field. Attendees often include practitioners without a formal education in HCI, and those teaching HCI for the first time. This course includes content on theory, cognition, design, evaluation, and user diversity.

KEYWORDS: Human-computer interaction; HCI Education

ACM Classification Keywords
• Human-centered computing~Human computer interaction (HCI)

1 BENEFITS

This 3-unit course gives newcomers background in the field of HCI to make their conference experience more meaningful. It provides a framework to understand how the various topics are related to research and practice.

2 LEARNING OBJECTIVES

The objective of this course is to provide newcomers to HCI, practitioners without a formal education in HCI, and those teaching HCI for the first time, with an introduction and overview of the field. In addition to introducing basic concepts and discussing the differences between HCI research and HCI practice, the course will provide enough structure to help understand how the advanced material in the CHI 2019 technical program fits into the overall HCI field.

3 CONTENT

The course material is divided into seven sections:

1. **HCI in a nutshell**: this section begins with a brief history of the field of HCI, a discussion of its multidisciplinary nature, and differences between HCI research and practice. We will discuss the disciplines at the historic core of HCI, such as psychology, computer science and engineering, and disciplines that more recently have been influential in HCI, such as design, library science, and entertainment. Furthermore, this section will include a discussion of the "most common misunderstandings in HCI"

2. **User-centered design (UCD) and gathering requirements**: this section presents UCD core principles, techniques such as surveys, interviews, focus groups, ethnography, and participatory design, common barriers to adopting UCD, and some development processes and lifecycles related to UCD;

3. **Theory-based HCI approaches:** in this section, we very briefly describe cognitive engineering, activity theory, distributed cognition, and semiotic engineering;

4. **Human cognition and HCI:** this section describes the human cognitive, perceptual, and motor systems, exploring aspects of attention, memory, mental models, predictability, performance, and information overload, together with some implications for design;

5. **User diversity:** in this section, we discuss some general user differences, such as expertise, age, gender, educational level, language, and culture, as well as disabilities and situational impairments. We also discuss techniques for ensuring that interfaces will be usable by the widest range of potential users;

6. **HCI design:** this section describes several input and output devices, as well as corresponding design issues related to their characteristics; it presents an evolution of UI devices and interaction paradigms; it discusses design issues related to error, search, and information visualization; finally, it presents some design principles, prototyping techniques and tools for supporting UI development;

7. **HCI evaluation:** this section describes why, when, where, what, and how to evaluate interfaces; techniques such as usability testing and expert-based evaluations, and appropriate metrics for HCI evaluation.

Throughout the course presentation, methods and techniques will be illustrated by real examples from industry and academia.

4 AUDIENCE

The intended audience is made up of professionals in information and communication technology-related fields who have not yet had a systematic exposure to the discipline of HCI. This course often includes three specific groups of attendees: 1) first-time attendees of the CHI conference who are newcomers to HCI, 2) HCI practitioners without a formal education in HCI, and 3) individuals who will be teaching HCI for the first time and are therefore collecting structured approaches and various examples to reuse in their own courses.

5 PREREQUISITES

There are no prerequisites for this course.

6 PRESENTATION FORMAT

The course is formatted as a lecture, with specific industry examples given throughout. The course will include three hands-on exercises, about requirements gathering, design, and evaluation. Suggested reading lists will also be provided, for multiple audiences: practitioners without a formal education in HCI and those who will be teaching HCI for the first time.

7 INSTRUCTORS' BACKGROUND

Jonathan Lazar is a Professor in the College of Information Studies, Associate Director of the Trace Center, and core faculty at the Human-Computer Interaction Lab, all at the University of Maryland. He has published 12 books, including "Research Methods in Human-Computer Interaction" (co-authored with Feng and Hochheiser, 2nd edition), and "Ensuring Digital Accessibility through Process and Policy" (co-authored with Goldstein and Taylor). He has published primarily on interface accessibility for people with disabilities, user-centered design methods, and the relationship between HCI and law and policy, and is the recipient of the 2016 SIGCHI Social Impact Award.

Simone Barbosa is Associate Professor of Computer Science at PUC-Rio, Brazil. She has co-authored the HCI textbook recommended by the Brazilian Computer Society, "Interação Humano-Computador" ("Human-Computer Interaction" in Portuguese), and has engaged in several HCI design projects with industry. Since October 2017, she has been co-editor-in-chief of ACM Interactions Magazine.

Combined, Jonathan and Simone have taught "Introduction to HCI" classes for more than 35 years and are both still passionate about teaching it. They have also taught versions of this course at CHI 2014, 2015, 2016, 2017, and 2018.

8 RESOURCES

Attendees are encouraged to consult the books listed below. Suggested readings for follow-up information will be given during the course.

[1]   Tom Tullis. Bill Albert. 2013. *Measuring the User Experience*, Second Edition: Collecting, Analyzing, and Presenting Usability Metrics. Elsevier/Morgan Kaufmann Publishers.

[2]   Simone D.J. Barbosa. and Bruno S. da Silva. 2010. *Interação Humano-Computador*. Ed.Campus/Elsevier.

[3]   Rex Hartson. and Pardha S. Pyla. 2012. *The UX Book: Process and Guidelines for Ensuring a Quality User Experience*. Elsevier/Morgan Kaufmann Publishers.

[4]   Jonathan Lazar, D. Goldstein, A. Taylor. 2015. *Ensuring Digital Accessibility through Process and Policy*. Elsevier/Morgan Kaufmann Publishers.

[5]   Jonathan Lazar, J. H. Feng, H. Hochheiser. 2017. *Research Methods in Human-Computer Interaction, 2nd edition*. Elsevier/Morgan Kaufmann Publishers.

[6]   Kent Norman. 2017. Cyberpsychology: An Introduction to Human-Computer Interaction, 2nd edition. Cambridge University Press.

[7]   Jenny Preece, Yvonne Rogers, Helen Sharp. 2015. *Interaction Design: Beyond Human-Computer Interaction, 4th edition*. John Wiley & Sons.

[8]   Ben Shneiderman. 2016. *The New ABCs of Research*. The Oxford University Press.

[9]   Ben Shneiderman, C. Plaisant, M. Cohen, S. Jacobs, N. Elmqvist, N. Diakopoulos. 2016. *Designing the User Interface: Strategies for Effective Human-Computer Interaction, 6th Edition*. Pearson/Addison-Wesley.