Tutorial — NordiCHI'2008

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1. Background Of Tutor

Gerhard Fischer is a professor of computer science, a fellow of the Institute of Cognitive Science, and the director of the Center for Lifelong Learning and Design (L3D) at the University of Colorado at Boulder. He is a member of the CHI Academy which honors individuals who have made substantial contributions to the field of human-computer interaction.

Gerhard Fischer has done research in *human-computer interaction, design, computer-supported cooperative work, computer-supported collaborative learning, creativity and creativity support tools, and software design for people with disabilities*. He has published and taught in these disciplines nationally and internationally. He has contributed to the framing of the NSF Programs on "Science of Design", "Human-Centered Computing", and "Creativity and IT". He is the principal investigator of two current major NSF grants (closely related to the theme of the proposed tutorial) entitled *"A Meta-Design Framework for Participative Software Systems"* and *"A New Generation Wiki for Supporting a Research Community in Creativity and IT"*.

2. Title

HCI Themes for the Future: Collaborative Design, Social Creativity, and Meta-Design

3. Objectives

The participants will be acquainted with themes which will play a critical role for HCI research and practice in the future. These themes will be instantiated with new conceptual frameworks and illustrated with specific examples of innovative systems that will be described and discussed in detail to illustrate how these challenges can be addressed. The presentation will be linked as much as possible to the concerns and experiences of the participants. The objective of the tutorial is to provide the participants with opportunities to think differently about future challenges facing design research and practice.

4. Content

The tutorial will focus on three major interrelated themes: (1) *design*, specifically *collaborative design* and an assessment of different design methodologies (including: user-centered design, learner-centered design, and participatory design); (2) *social creativity* which is required because complex design transcends the unaided, individual human mind; and (3) *meta-design* which creates environments for users to become active contributors rather than remain passive consumers.

The relevance of these themes has been demonstrated by their impact on:

- research, education, and design practices in companies, educational institutions, and research organizations in which we have collaborated;
- recent new programs at the National Science Foundation, specifically (1) "Science of Design", (2) "Human-Centered Computing", and (3) "Creativity and Information Technologies".

5. Audience

This tutorial is intended for HCI and design researchers and practitioners who are interested in innovative design themes for the future. No specific technical prerequisites are required. Some general familiarity with current Design, HCI, CSCL, and CSCW topics and practices will be advantageous as background knowledge.

6. Brief Description

6.1 Abstract

The participants will be acquainted with HCI themes for the future. These themes will be instantiated with new conceptual frameworks and illustrated with innovative systems. The presentation will be linked as much as possible to the concerns and experiences of the participants. The objective of the tutorial is to provide the participants with opportunities to think differently about the future challenges facing design research and practice and to illustrate with concrete examples how these challenges can be addressed.

The tutorial will focus on three major themes: (1) design, specifically collaborative design and an assessment of different design methodologies (including: user-centered design, learner-centered design, and participatory design); (2) social creativity, which is required because complex design transcend the unaided, individual human mind; and (3) meta-design which creates environments for users to be involved as active contributors rather than as passive consumers.

The themes of the tutorial will be illustrated with specific theoretical frameworks and innovative systems developed by the presenter and his colleagues and other research groups working on these topics. The relevance of these themes has been demonstrated by their impact on research, education, and design practices in companies, educational institutions, and research organizations with which we have collaborated.

6.2 Summary of Contents

The tutorial will be centered on the specific, but integrated themes of "Collaborative Design, Social Creativity, and Meta-Design" representing a coherent vision for the future of HCI based on extensive research by the presenter and his colleagues at the University of Colorado, Boulder as well as in collaborations with other researchers and research centers around the world.

6.2.1 Design and Collaborative Design

The tutorial will explore major aspects about design and collaborative design:

- *the importance of domain knowledge in design:* Domains are not natural, God-given entities, but they are part of the "sciences of the artificial" — they are constructs that serve our needs. Domains have boundaries, but these boundaries are not absolute; they are structuring mechanisms that help human beings cope with a world in which there is too much to learn and too much to know. Domain models should be designed to fit what people want to do — first through participation with users and eventually by users themselves requiring support for design in use, end-user modifiability, and meta-design.
- *the critical role of evolutionary models in design:* evolution is required by the fact that design often has to proceed without final goals and therefore has to cope with fluctuating and conflicting requirements. Theoretical foundations of the ill-structured nature of design, as well as empirical evidence, have shown that it is impossible to have complete specifications because requirements fluctuate over time and conflict with each other. The tutorial will provide evidence that evolutionary processes are ubiquitous and critical for social, educational, and technological innovations. The seeding, evolutionary growth, reseeding process model will be presented that is able to cope with fluctuating and conflicting requirements.

6.2.2 Social Creativity: Transcending The Unaided Individual Human Mind

The power of the unaided individual mind is highly overrated. Although creative individuals are often thought of as working in isolation, much of our intelligence and creativity results from interaction and collaboration with other individuals. Creative activity grows out of the relationship between an individual and the world of his or her work, and out of the ties between an individual and others. Much human creativity arises from activities that take place in a social context in which interaction with other people, along with artifacts that embody group knowledge, are important contributors to the process. Creativity does not happen inside people's heads, but in the interaction between a person's thoughts and a socio-cultural context.

Complex design problems require more knowledge than any single person possesses because the knowledge relevant to a problem is usually distributed among many stakeholders (an empirical finding which we have named "symmetry of ignorance"). Creating a shared understanding among stakeholders requires bringing different and often controversial points of view together and can lead to new insights, new ideas, and new artifacts.

6.2.3 Meta-Design: Empowering Users To Act As Informed Participants

Meta-design characterizes objectives, techniques, and processes for creating new media and environments that allow the owners of problems to act as designers contributing and benefiting from the creativity of all participants. A fundamental objective of meta-design is to create socio-technical environments that will help all learners and workers to be creative by being able to go beyond the explicitly described functionality of any artifact, to use it in new ways, to evolve it, and to explore its potential for new processes.

While meta-design shares some important objectives with user-centered and participatory design, it transcends these objectives in several important dimensions. Meta-design differentiates between two stages in the design and use of an artifact:

At design time, system developers engage in participatory design processes with users or their representatives to create environments and tools. In conventional design approaches they create complete systems and make decisions for all users' situational contexts and tasks that they can only anticipate.

At use time, users act as designers and extend the systems to fit their needs. Because the systems were "under-designed" at design time, unexpected uses at use time can be accommodated by the owners of problems.

7. Background Literature for the Contents of the Tutorial

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14. von Hippel, E. (2005) Democratizing Innovation, MIT Press, Cambridge, MA.

8. ADDITIONAL INFORMATION:

Additional relevant information about the research of the author can be found at:

http://l3d.cs.colorado.edu/~gerhard/papers.html