User Participation in Product Design

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In industry there is a growing interest in user-centred design approaches. User studies, focus groups, and user trials are often employed in product design and also participatory design actively involving potential future users are becoming more widespread. The design of industrial products does however pose new challenges to participatory design. Unlike design of information systems, product design typically involves the design of both hardware and software simultaneously. Furthermore, product design typically involves a large and diverse group of stakeholders ranging from end-user over retailers and installers to marketing, engineering and manufacturing. This means that the participatory design process must be organized to address a wider specter of design issues, and it must be firmly integrated within the overall context of product development.

Over the last decade the participatory design environment in Scandinavia has turned increasingly towards product design. In collaboration with companies producing such diverse products as pumps, hi-fi equipment, hearing aids, mobile phones and building controls, researchers and design practitioners have developed participatory approaches both to 'blue sky' concept design, to platform design for new product families, and to detailed design of products ready for the market. Characteristic for this environment is the cross breed of user participation in the exploration of possible use contexts, and the collaborative design of product prototypes (form and interface, marketing and manufacturing implications etc.).

Until now very little literature exists on user participation in product design and many design professionals have to adapt methods and techniques from participatory design of information systems to an industrial context of product design. Based on experience from more than ten years of participatory design of industrial products in the Danish company Danfoss, the organizers are co-authoring a book on user participation in product design. With a draft of this book as the basis the organizers offer tutorial participants a comprehensive model of the user-centred design process and a set of methods and techniques to engage users in product design.

1. TUTORIAL GOAL

The goal of this tutorial is to familiarize participants with a user centred design process with extensive user participation, and to show how this process unfolds in the typical range of design commissions facing the product designer. Through lectures,

design cases, and games the participants will obtain a repertoire of exemplary approaches, methods and techniques for organising user participation in product design.

The tutorial mainly addresses participants who are familiar with the relevance of user centred design but seek a better grounding for participatory design when dealing with complex industrial products or larger product development organizations. Also, educators of participatory design will find inspiration in the richness of the industry based course material presented in the tutorial.

Design team events
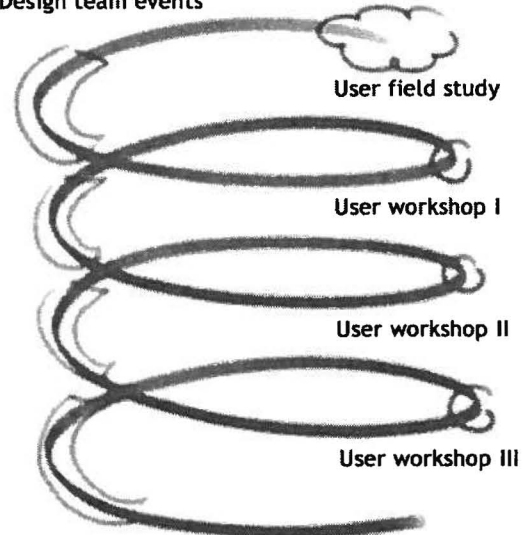
A spiral model of participatory product design as an iterative process propagated by dialogue with future users

2. TECHNIQUES
The tutorial will be centered on the spiral model of participatory product design *(event-driven design)* applicable throughout a wide range of design tasks.   Methods and techniques for user participation are dealt with in conjunction with a typical spectrum of design commissions facing the design professional.

2.1 Designing interactive products
The design of interactive products ready for the market is the 'bread and butter' of many in-house usability professionals, designers, and design consultants. This section shows how to organize user studies and user workshops that are compatible with industrial constraints of time and resources. These techniques

make it feasible to shift from a usability testing approach to a genuine user dialog as basis for design work [5]. Based on video examples from various user workshops participants will work with a User Workshop Design exercise.

2.2 Creating product visions

Users are a powerful resource also when moving from incremental product design to the development of breakthrough products [11]. This section offers an alternative to the technology-driven innovation approach dominating many companies. In a process of recurring user involvement [6], participatory inquiry [8], creative techniques like design games [7] and scenario acting [1&4] help engage users' imagination of potential future. Methods for anchoring the design within both the design tradition of the client [13] and the product development organization [3] become particularly important. Participants will be offered an opportunity to explore video documentation from a product vision project aiming at developing product concepts for industrial PDA's.

2.3 Envisioning product systems

When moving beyond the one-product-one-user paradigm to a situation where a multitude of networked products support a community of users, many of the traditional usability and participatory design methods fall short of producing usable design input. New conceptual frameworks for interactive products such as ubiquitous computing and tangible interaction open new and uncharted terrain for product design [2]. The designer's well established repertoire of examples of form and interaction for products become challenged and patterns of interaction involving the full human body in user practice previously considered archaic are reconsidered. To open entirely new perspectives this field requires radical methods and techniques of user participation such as collaborative design games [10], and improvising scenarios [9] and designing on site [12].

This section shows how extended techniques like multi-camera field studies, use context mock-ups, and multi-actor design games support the development of systems visions

The tutorial ends with a small design charette based on a case study of how product designers are brought into an industrial organization, the tutorial participants will get a first hand experience of how to position user centered design approaches into a large corporate setting.

3. ORGANIZERS

Jacob Buur, professor of User Centred Design with the Mads Clausen Institute since 2000. MSc in mechatronics engineering and PhD in design methodology. From 1992 manager of the User Centred Design Group at Danfoss.

Thomas Binder, head of the Center for design research at the School of Architecture at the Royal Academy of fine Arts in Copenhagen, MSc in mechanical engineering and Ph.D. in Science and Technology Studies. Studio director at the Interactive Institute in Malmo (1998-2003).

4. TUTORIAL SCHEDULE

9:00	Introduction & presentation round
9:15	Lecture: **Designing interactive products**
9:45	Hands-on exercises: User Workshop Design
10:30	Lecture: **Creating product visions**
11:00	Hands-on exercise: Exploring UCD practices
12:00	Lunch
2:00	Lecture: **Envisioning product systems**
2:45	Hands-on exercises: Design Charette
4:00	Reflection and discussion
5:00	Close

5. REFERENCES

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Introduction to Participatory Design

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ABSTRACT

This tutorial offers an introduction to Participatory Design (PD) for newcomers to the field. The tutorial will be held in the form of a combined seminar/workshop, offering participants a brief history of PD as well as hands-on experience of some of the methods used in PD practice. The instructors are researchers who have taught PD courses for graduate students as well as used PD methods in their own research projects for a number of years.

Keywords

Tutorial, Participatory Design

ORGANIZATION OF THE TUTORIAL

The tutorial will begin as a seminar, during which the organizers will give a brief overview of the research area and history of Participatory Design, as seen primarily from a Scandinavian perspective. After this, we will proceed with a mini-workshop, during which we will try some of the methods used in PD practice. Finally, based mainly on our own experiences, we will discuss benefits as well as challenges of using PD in practice, in student projects, research projects and 'real life' software development projects.

The tutorial as a whole is intended to be informal and interactive. Depending on the number of participants, we may divide into two or three smaller groups during the workshop part.

AIM OF THE TUTORIAL

- To give an introduction to Participatory Design both as a research area and as part of everyday software development practice
- To give an overview of the history of PD
- To offer hands-on experience of some PD methods
- To discuss some of the main themes of PD and what it might mean to try to weave them into teaching and research practices
- To answer questions and explore ideas about PD that are brought up during the tutorial

AUDIENCE

The tutorial is intended for newcomers to the field of Participatory Design, people who wish to get an introduction to and overview of PD in connection with attending PDC 2004. However, it is not a precondition for this tutorial to have registered for the conference.

ABOUT THE TUTORIAL ORGANIZERS

The organizers of the tutorial are from the Informatics and Work unit within the School of Technoculture, Humanities and Planning at the Blekinge Institute of Technology in Sweden.

Sara Eriksén is an assistant professor, with a PhD in Informatics from Lund University, Sweden. She has taught PD courses for graduate students at Blekinge Institute of Technology for a number of years. Before that, in 1989-95, she worked as a consultant, developing municipal information systems, a job where the employer deliberately encouraged and supported the use of PD methods. Her current research work concerns participatory design and development of IT in use in the public sector / e-government.

Annelie Ekelin is a Ph D student who is focusing on participatory design of community websites in her research work. In January 2003 she presented her licentiat thesis on design and reconfiguration of services and participation in e-government. Annelie has been involved in several research projects focusing on the social construction of technology in use during the past five years.

Jeff Winter is a lecturer in informatics who became interested in PD during his studies in Computer Science. For his master's thesis, he studied back-office work at a municipal planning department. He is interested in aspects of e-government such as the design of public services, and especially in the use of maps and geographical information. In the future he hopes to be able to do research in this area as a PhD student.

Video Techniques for Participatory Design: Observation, Brainstorming and Prototyping

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GOALS

This tutorial is designed for designers and researchers interested in learning specific video techniques for each phase of a participatory design process. The emphasis is on multi-disciplinary design: video is particularly effective for communicating across disciplines and ppproductively. Based on a combination of lectures, video demonstrations and hands-on exercises, participants will use video to find out about people in real-world settings, to explore and capture design ideas with users, to collaboratively develop prototypes and to evaluate design ideas with users. Participants will learn when (and when not) to use video and consider ethical issues, particularly informed consent. Vdeo iss a tool that can help users, designers, developers and key stakeholders gather, communicate and evaluate design ideas.

FORMAT AND ORGANIZATION

This tutorial is organized into four main topics, each with a brief lecture, video examples from earlier participatory design projects, and a design exercise. After covering video basics, participants will work in small groups and design an interactive project together. Each exercise builds upon the previous exercise, culminating in a video prototype to be presented by each group at the end of the tutorial. Topics include:

1. *Finding out about users:* interviews, cultural & technology probes, use scenarios
2. *Creating a design space*: generating ideas with video brainstorming
3. *Developing a design:* scenario-based design & video prototyping
4. *Collaboratively evaluating prototypes*: design walkthroughs and user studies

HANDOUTS

Participants will each receive tutorial notes including the course overview, introductions to each technique, exercise and data sheets, selected articles, an annotated bibliography and lecture slides. Selected sections of a book in progress, on Multi-disciplinary design, will also be included.

Each participant will receive an hour-long DVD tutorial entitled: *Using Video to Support Interaction Design*, which illustrates the techniques learned in class. The tutorial provides video equipment and paper prototyping supplies for creating video prototypes.

COURSE HISTORY

This tutorial is based on courses I teach on interaction design, for both graduate students and professionals. I have also taught it numerous times as a one-day tutorial. The specific techniques are based on 20 years of experience using video to support participatory design, including ethnographic and laboratory studies of users, multimedia exploratory data analysis, and the design of a wide range of multimedia and mixed reality systems.

Schedule:		
9:00	9:10	Introductions
9:10	9:30	Video demonstration / ethics
9:30	9:50	L1: Finding out about users
9:50	10:30	E1: Video interviews > scenarios
10:30	11:00	Break
11:00	11:20	L2: Creating a design space
11:20	12:10	E2: Video brainstorming
12:10	12:30	L3: Developing a design
12:30	2:00	Lunch
2:00	2:30	E3a: Scenarios & storyboards
2:30	3:30	E3b: Video Prototyping
3:30	4:00	Break
4:00	4:20	L4: Evaluating design ideas
4:20	4:50	E4: Design Walkthroughs
4:50	5:20	Final presentations
5:20	5:30	Conclusion

INSTRUCTOR

Wendy Mackay received her Ph.D. from MIT in the Management of Technological Innovation and is a former chair of ACM/SIGCHI. Initially trained as an academic Psychologist, she moved to Digital where she was first a programmer, then a manager, ultimately programming or responsible for over 30 multimedia software products, a pre-Hypercard multimedia authoring language and the computer industry's first multimedia system (IVIS). She has managed research and development groups in multimedia at Digital, MIT and Xerox EuroPARC and was a visiting professor at the University of Aarhus. She is currently Research Director at INRIA, in France, responsible for the In Situ research group. Her current research involves using video in the participatory design of mixed reality and multimedia applications.