

PDC '90

**PARTICIPATORY DESIGN
CONFERENCE**

PROCEEDINGS

MARCH 31 - APRIL 1, 1990

SEATTLE, WASHINGTON

EDITED BY AKI NAMIOKA AND DOUGLAS SCHULER

Ginn Keusing

INTRODUCTION

Purpose of PDC'90

Despite a proliferation of methodologies for designing computer systems, we commonly end up with systems that are difficult for workers to master, poorly suited for their tasks, and perceived by them as job-threatening or job-degrading. How can we do better?

Participatory Design represents a new approach that differs from the traditional one in many respects:

- It rejects the assumption that the goal of computerization is to "automate" the skills of human workers, instead seeing it as an attempt to give workers better tools for doing their jobs.

- It assumes that the users themselves are in the best position to determine how to improve their work and their work life. In doing so, it turns the traditional designer-user relationship on its head, viewing the users as the experts -- the ones with the most knowledge about what they do and what they need -- and the designers as technical consultants.

- It views users' perceptions of technology as being at least as important to success as fact, and their feelings about technology as at least as important as what they can do with it.

- It views computers and computer-based applications not in isolation, but rather in the context of a workplace; as processes rather than as products.

Participatory Design has been more successful in Europe, especially in Scandinavia, than it has been in the United States, where the techniques are less well known. It has also been applied, thus far, more to the design of custom systems for particular work sites than to the design of "off-the-shelf" applications and computer-based appliances sold by vendors.

To promote greater understanding of Participatory Design in the U.S. and to explore its applicability to the design of "off-the-shelf" applications, the Computers in the Workplace Project of Computer Professionals for Social Responsibility (CPSR) sponsored a conference, Participatory Design Conference 1990 (PDC'90). PDC'90 brought together researchers, system designers, and users to explore the topic through talks and workshops. The conference took place on Saturday and Sunday, March 31 and April 1, 1990, at the South Campus of the University of Washington, in Seattle, just before the ACM Conference on Computer Human Interaction (CHI'90). Cosponsors of PDC'90 included the Computer Science Departments at the University of Washington and Seattle University.

The first day of PDC'90 consisted of invited talks by noted researchers and practitioners of Participatory Design and representatives from computer labor organizations, in particular, Ellen Bravo of the National Association of Working Women (9to5). The second day consisted of half-day workshops, a plenary talk by Participatory Design pioneer Dr. Enid Mumford, and an open discussion to evaluate the conference and indicate some next steps.

This volume documents PDC'90, including text for some of the invited talks, proposals and summaries of the workshops, and some supplementary materials on Participatory Design from both talks and workshops.

We would like to extend special thanks to Lucy Suchman for her work as program chair, Doug Schuler and Aki Namioka for editing the proceedings, and Dave Lvinger for coordinating local arrangements in Seattle. In addition, we would like to thank Eric Blossom, Darlene Crane, Carolyn Curtis, Marcia Derr, Leslie Eliason, Danielle Fafchamps, Roger Hayes, Heather Holmback, Noreen Jacky, Dave Kadlecek, and Lesley Kalmin for all their work to make PDC'90 happen. Special thanks to Lois Toback of the CPSR national office for handling the PDC'90 bookkeeping on top of her regular duties. Finally, we wish to acknowledge the generous support of Max Palevsky.

Paul Czyzewski, PDC'90 Co-Chair

Jeff Johnson, PDC'90 Co-Chair

Eric Roberts, CPSR National Secretary

CPSR AND THE WORKPLACE PROJECT

CPSR is a non-profit, national organization of computer professionals concerned about the social implications of computing technologies in the modern world. Members of CPSR believe that computer technology should be used to make life easier, more productive, enjoyable, and secure. As technical experts, CPSR members provide the public with realistic assessments of the power, promise, and limitations of computer technology. As concerned citizens, they direct public attention to the critical choices regarding applications of computer technology, especially where there are potentially dangerous consequences or important and widespread social implications. Since its founding in 1983, CPSR has achieved a strong international reputation.

In its early years, CPSR focused its attention upon uses and misuses of computers in military systems, most notably the Strategic Defense Initiative. More recently, CPSR has expanded its program to include other areas where computer technology has an impact on society, for example, privacy and civil liberties, and, most relevant for PDC'90, the workplace.

CPSR's involvement in workplace-related issues grew out of a sub-group of the Palo Alto chapter called the Computers in the Workplace Project. Members of the Workplace Project are interested in preventing abuses of computing technology and in developing positive strategies for integrating new technologies into the workplace. The activities of the Workplace Project over the past three years have included:

- Collecting and reviewing readings on Computers in the Workplace, including such topics as Health Effects of VDTs, Electronic Monitoring of Computer Workers, Social Impact of Telecommuting, and Participatory Design (bibliography available from CPSR),
- Writing and distributing papers (collectively known as the WORKING PAPERS),
- Sponsoring talks and panels,
- Distributing "Computers in Context", a video on Participatory Design,
- Participating in related efforts by others, e.g., a conference on "Changing Technologies in the Workplace" organized by California Assemblyman Tom Hayden,
- Publishing a monthly report, WORKING NOTES, of Project activities.

PDC'90 was conceived, planned, and executed by the Workplace Project with help from the CPSR/Seattle chapter.

For more information about CPSR or the Workplace Project, write:

CPSR P.O. Box 717 Palo Alto, CA 94301

PDC'90 SCHEDULE

Saturday, March 31

- 8:30 am Registration (Coffee, tea, and juice provided)
- 9:30 am Welcome -- Jeff Johnson, PDC'90 Co-Chair
Eric Roberts, CPSR National Secretary
- 10:00 am Origins of the Scandinavian School: Why and How -- Kristen Nygaard, University of Oslo, Norway
- 11:00 am Hazards of Omitting User Involvement -- Ellen Bravo, National Association of Working Women (9to5)
- 12 noon Lunch -- Portage Bay Galley (in South Campus Center)
- 1:30 pm Constraints in Product Development Organizations -- Jonathan Grudin, Aarhus University (on leave from MCC)
- 2:30 pm Experiences in Participatory Design -- Kari Thoresen, Norwegian, Computing Center, Oslo, Norway
- 3:30 pm Break
- 4:00 pm Strategies and tools for Participatory Design -- Pelle Ehn, Aarhus University, Denmark
- 5:00 pm Panel: Applying the European approach in the U.S. -- Chair: Lucy Suchman, Xerox Palo Alto Research Center
Panelist: Frank Emspak, Center for Applied Technology, Boston; Joan Greenbaum, LaGuardia College and Columbia University; Harley Shaiken, UCSD

Sunday, April 1

- 8:30 am Coffee
- 9:00 am Morning Workshops (to be scheduled based upon demand, see below)
- 12 noon Lunch Break
- 1:30 pm Afternoon Workshops (to be scheduled based upon demand, see below)

5:00 pm Closing Address -- Enid Mumford, University of Manchester

5:30 pm Open Discussion and Evaluation of PDC -- Chair:
Lucy Suchman, Xerox Palo Alto Research Center.

PDC'90 Sunday Workshops (to be scheduled based upon demand)

TECHNIQUES FOR COOPERATIVE DESIGN

Susanne Bodker, Kaj Gronbak, Kim Halskov Madsen
Aarhus University, Denmark

In Aarhus, Denmark and its surroundings we have developed various techniques to support different aspects of participatory design. In this workshop, we will demonstrate how the different kinds of techniques may be combined. Techniques to be explored will include:

- o Metaphor-based design, in which metaphor is used to stimulate fantasy about how computers may be used at a workplace. For instance, a library may be seen as both a "warehouse" and as a "meeting place," giving rise to quite different computer applications and a quite different task for the staff at the library.
- o Cooperative prototyping, a technique to involve users actively and creatively in prototyping with designers. The idea is to rapidly develop one or more flexible prototypes, modelling central aspects of a future system. Breakdowns in simulated work situations caused by bad or missing design are rapidly turned into modifications of the prototypes in order to re-establish a work-like situation.

The workshop will contain an introductory talk where the motivation, results of experiences, and potential problems of each technique are described. Some scenarios of design situations from our research projects will be presented, and potential computer support for the techniques will be discussed. Finally we invite a discussion on the proposed techniques and their potential use in various system development settings

THE SCANDINAVIAN MODEL - FICTION AND REALITY

Pelle Ehn, Joan Greenbaum, Morten Kyng, Merete Bartholdy
Aarhus University, Denmark

There seems to exist a notion of a particular Scandinavian way of participatory design. This Scandinavian model (or many models) is deeply rooted in ideas of

industrial democracy and active user participation in the design process. The idea with this workshop is to give the participants a better understanding of state of art of the Scandinavian model -- of visions, but also of short-comings in reality. The workshop will also discuss constraints and possibilities of implementing the Scandinavian model in the U.S. context -- redesigning the model to be useful in redesigning the U.S. workplace.

The workshop/panel discussions are based on segments from two videotapes. The first one, Computers in Context (1986) is a video "selling" the Scandinavian model to a U.S. audience. The second one contains workshop situations from a conference on "Systems Development and Creativity" held in 1989 in Scandinavia. It highlights new methods and techniques for participative design like future workshops, role playing, prototyping, simulations etc.

This workshop/panel will be led by researchers who over the last fifteen years have taken an active role in the ideas and the reality of the Scandinavian Model.

DESIGN COMMUNICATIONS WORKSHOP

Steve Harrison, Scott Minneman
Xerox Palo Alto Research Center, USA

Successful designers establish and maintain a shared understanding of an emerging artifact. They accomplish this by communicating with each other. Designing with users requires involving them in the communications among the other players in a design effort. This workshop -- one of a series we have been doing since October 1988 -- will explore the role of communications and the effects of media upon design activities. It is broken into two parts, an exercise and then reflective discussion on the exercise. The exercise has three (or four) groups play roles in the design process.

- o Participants break into small groups, physically located in different rooms.
- o The groups take the roles of software engineers, users with short term needs, users with long term needs, and (optionally) programmers responsible for system maintenance.
- o The group exercise takes 2 hours. This is followed by a 1-hour discussion/debriefing.
- o Each group communicates to the others in order to complete the project, which is the the design of a system.
- o The communications between groups are restricted to just a few media: face-to-face, written messages, and videotapes.

Participatory design -- like other design approaches -- may be enhanced by including new communication media in everyday design practice. The workshop setting has proven to be an effective training ground for designers, using familiar and unfamiliar

media to explore the relationships which are fundamental to understanding the design process.

CONCEPTUAL FRAMEWORKS AND INNOVATIVE SYSTEMS DESIGN

Gerhard Fischer, Andreas Girgensohn, Andreas Lemke, Raymond McCall,
Anders Morch
University of Colorado, USA

The organizers of this workshop have been involved in developing conceptual frameworks and innovative systems in support of participatory design. We have built integrated, domain-oriented, knowledge-based design environments in a number of different domains, including architectural design, user interface design, COBOL and LISP programming. In this workshop we will give an overview of our systems and the conceptual frameworks behind them in order to provide "objects to think with" for the discussion, and to raise a set of general issues to be explored among the participants. The issues will include informing the user, critiquing design proposals, argumentation, high-level participant-oriented abstractions and end-user modifiability.

WOMEN AS PARTICIPANTS IN DESIGN

Benedicte Due-Thomsen
Copenhagen University, Denmark

In this workshop I present three different theories for design and ask participants to reflect on difficulties they see in imagining themselves as the designers or users assumed by those theories. The focus will be on women's possibilities for participation, versus the possibilities described in the theories. Would we like to be one of the design participants within the theories? Why and why not? What changes would we like? Following the discussions I will present some guidelines for how present theories and methodologies could be changed, based on my own research applying a gender perspective to some of the major theories of system design.

RECIPROCAL EVOLUTION OF RESEARCH, WORK PRACTICES AND TECHNOLOGY

Christina Allen, Roy Pea Institute for Research on
Learning, Stanford University, USA

Our goal in this workshop is to provide participants with hands-on experience of the reciprocal evolution of technology design, work practices and research, through activities involving two multimedia computing projects, Picasso and MediaWorks.

The workshop will include a brief review of the aims of the two projects, followed by:

- o Group work to analyze videotape segments of people working together with traditional communications technologies and with the Picasso and MediaWorks technologies.
- o Generation of design scenarios, based on the video analysis.
- o A discussion session on the implications of the analysis and design scenarios for research into work practices and the exploration of technological alternatives.
- o Critical reflection on what was learned in the sessions, including comparison by participants with what they currently do.
- o A report from the organizers on how the tools actually changed work practices, how the tools were changed by what our users suggested and what we observed, and how our research concerns developed in response.

ETHNOGRAPHIC FIELD METHODS AND THEIR RELATION TO DESIGN

Jeanette Blomberg Xerox Palo Alto Research Center, USA

This workshop will explore the relevance of ethnographic field methods to the design of new technology. We will begin by discussing some of the principles that guide ethnographic research, and then ask in what ways the ethnographic approach might provide new ways of thinking about design practice. For example: (1) that we often design for "worlds" we know little about, (2) that the member's point of view might provide valuable information to help shape design, (3) that our designs impose a particular view of the world on others, and (4) that the use and therefore the meaning of technology is embedded in a larger social/historical context.

Through the workshop we will outline some of the methods that have been developed to get at the member's point of view (observation, participant-observation, open-ended interviewing, interactional analysis, etc.). These methods typically involve (1) the personal involvement of the investigator, (2) an improvisational style of work, (3) a willingness to be in situations out of one's control, (4) an iterative approach to understanding. The workshop will be led by an anthropologist and by industrial and human interface designers who have been adapting the ethnographic approach to their design practice.

GRAPHIC RECORDING IN SYSTEMS DESIGN

Darlene Crane

Crane Consulting, USA

This workshop will introduce the use of graphic recording techniques to improve the results of interaction between users and computer professionals during system analysis and design and will explore their use later in the development process. The use of graphic recording allows project teams to leap beyond professional jargon and to make fundamental user needs clear to both users and designers. Graphic recording also stimulates the development of creative solutions by the entire team. The techniques have been refined for six years with joint user/technical teams in complex business and other project environments.

By emphasizing demonstration and practice as well as discussion, this workshop will give participants skills they can take back to their jobs and use immediately.

When in doubt, DRAW.

ORGANIZATIONAL POLITICS AND PARTICIPATORY DESIGN: OR WHY PROJECTS FAIL

Paul Scheer Mattel Toys, USA

This workshop will emphasize participants' experiences with organizational constraints. In addition to sharing individual experiences, explanatory models will be sought along with the critical skills needed to make a project succeed, skills that are not normally a part of a technical education.

Systems developers and users sometimes find themselves at odds due to a mutual failure to appreciate what the other needs in order to be successful. At other times user and developer are united in an endeavor that is not fully supported (or is totally unsupported) by management. In these and other situations, effective participatory design requires effective alignments underlying the system development process to empower the end user.

PARTICIPATORY DESIGN WITH NON-PROFITS

Margaret Benston, Simon Fraser University, Canada

The 'workplace' is generally conceived of as a place where work is done for wages but there exist a wide variety of non-profit groups, especially volunteer organizations, which also operate offices and have a variety of communications and information needs. Along with businesses, such groups are attempting to introduce both new office and new communication technologies into their activities. Systems and procedures developed for commercial establishments may or may not be suitable for such groups since the assumptions by which they operate are often quite different from those of businesses or public sector offices. Women's groups, solidarity groups and others working for social change, for example, operate according to egalitarian and cooperative principles and have structures that are quite different from the usual office hierarchy. These groups would seem a natural

constituency for participatory design applications since many of the principles on which they operate are closely compatible with those underlying the participatory design approach.

A half-day round-table workshop in which people who are working with non-profit groups, especially volunteer groups, could share their experiences, would provide a forum to discuss some of the special problems and potentials found here. I have been working with communication systems in particular but any examples of participatory design with this constituency would be suitable for the workshop.

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INVITED SPEAKERS

Ellen Bravo, 9to5, National Association of Working Women.

Ellen Bravo is Associate Director of 9to5, National Association of Working Women, and is also the Executive Director of the Milwaukee chapter. She was appointed to the Wisconsin Comparable Worth Task Force in 1984 and to the state's Minimum Wage Advisory Council in 1986. She has written and spoken extensively on the subjects of women and work, pay equity, and the effects of workplace automation.

Pelle Ehn, Information and Media Science, Aarhus University, Denmark.

Pelle Ehn is an Associate Professor at the University of Aarhus, and since the mid-1970s he has conducted practical research on participatory design. This work includes the DEMOS project, a cooperation with workers in a newspaper, a repair shop, a warehouse, and a steel mill to develop strategies for local union participation in systems design. In the UTOPIA project, he cooperated with newspaper workers to develop alternative computer-based technology based on the concept of quality of work and product. Now he is working on the COOP project, developing tools and methods for user/designer cooperation. He has authored, co-authored, or edited several books on participatory design and related topics. He earned the Ph.D. degree in 1988 from the University of Umea, Sweden. Pelle Ehn has been extensively involved with the Center for Working Life in Stockholm, which was established to assist in the implementation of "co-determination laws" that ensure worker involvement in the introduction of new technologies. His writings include *Work-Oriented Design of Computer Artifacts*, (Stockholm: Arbetslivscentrum, 1988) and "The Collective Resource Approach to Systems Design," in *Computers and Democracy: A Scandinavian Challenge* (Avebury, 1987).

Frank Emspak, Center for Applied Technology, Massachusetts.

Frank Emspak is Project Director for the Center for Applied Technology in Boston, Massachusetts. The Center, which is supported by the Commonwealth of Massachusetts but operates independently of state control, assists small and medium-sized manufacturers and their unions in applying appropriate technology to the workplace using human-centered, skills-based automation as its technical model. Before joining the Center, Mr. Emspak worked for eleven years as a machinist and union representative for the General Electric Company.

Joan Greenbaum, LaGuardia College and Columbia University

Joan Greenbaum is Associate Professor of Computer Science at LaGuardia Community College (CUNY) and also Associate Professor of Economics at Barnard College of Columbia University. Professor Greenbaum has been actively involved in research about participatory design and workplace practices. She is the author of the book *In the Name of Efficiency: Management Theory and Shopfloor Practice in Data-Processing Work* (Temple University Press, 1979) and is co-editor (with Morton Kyng) of *Design at Work* (Lawrence Erlbaum Associates, forthcoming, 1990).

Jonathan Grudin, MCC Austin (on leave at Aarhus University).

Jonathan Grudin is a Visiting Associate Professor at the Computer Science Department of Aarhus University, Denmark, on leave from the Human Interface Laboratory of the Microelectronics and Computer Technology Corporation (MCC). He spent several years working in product development organizations as a programmer and software engineer, and his MCC research focuses on user interface development practices in large development companies.

Enid Mumford, Manchester University, England.

Since 1969, Enid Mumford has been Senior Lecturer in Industrial Sociology at the Manchester Business School of Manchester University. Educated in Social Science at the University of Liverpool, Professor Mumford has written extensively on the topic of computers and work for more than 25 years, beginning with "Living with a Computer" in 1964. Her more recent works include *The Quality of Working Life in Western and Eastern Europe* (Greenwood Press, 1979), *Research Methods in Information Systems* (North-Holland, 1985), and *XSEL's Progress* (Wiley, 1989).

Kristen Nygaard, Professor of Informatics, University of Oslo, Norway.

Within the field of computer science, Professor Nygaard is best known for his pioneering work in the 1960s as a developer of the programming language SIMULA, now considered the first object-oriented programming language. In the late 1960s and early '70s, Nygaard, with funding from the Norwegian government, launched a movement of cooperation between trade unions and computer system designers. The distinctive feature of his approach was a commitment to taking the unions beyond a defensive, critical attitude toward the application of computer-based technology to positive, technologically innovative visions of how computing might be applied in the workplace. The approach he developed emphasizes the essential place of values in system design, the importance of user participation in the design process, and the role of mutual learning in system development. The projects he organized resulted in model legislative agreements on worker participation in the system development process, as well as in a new generation of computer science research and development throughout Scandinavia.

Harley Shaiken, University of California, San Diego.

Harley Shaiken is Professor of Communications at the University of California in San Diego and writes extensively on the effects of automation on the nature of work. His books include *Work Transformed* (Holt, Rinehart, and Winston, 1985) and *Automation and Global Production* (UCSD, 1987). At the 1988 conference on "Changing Technologies in the Workplace" sponsored by the California Assembly's Labor and Employment Committee, Professor Shaiken delivered the keynote address on "Technology in the Workplace: New Challenges and Opportunities."

Lucy Suchman, Xerox Palo Alto Research Center.

Lucy Suchman is a researcher in the System Sciences Laboratory at Xerox Palo Alto Research Center, where she manages the Work Practice and Technology Area. She received her Ph.D. in Social/Cultural Anthropology from the University of California at Berkeley in 1984. Her publications include *Plans and Situated Actions: The Problem of Human-Machine Communication* (Cambridge University Press, 1987).

Kari Thoresen, Norwegian Computing Center, Oslo, Norway.

Kari Thoresen has been a Research Scientist at the Norwegian Computing Center in Oslo since 1972. Her research pertains to systems development in an organizational perspective. Recent projects have been in cooperation with hospital nurses, planning departments in small municipalities, and systems developers in the Norwegian Telecommunication Administration. She has been a member (85-87) of the Norwegian Advisory Council to the Government on IT policy, and a Norwegian representative to IFIP TC 9. She received a masters degree in natural sciences from Oslo University, Norway in 1966.