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Participatory Design: Issues and Concerns

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Abstract. We characterize Participatory Design (PD) as a maturing area of research and as an evolving practice among design professionals. Although PD has been applied outside of technology design, here we focus on PD in relation to the introduction of computer-based systems at work. We discuss three main issues addressed by PD researchers; the politics of design; the nature of participation; and method, tools and techniques for participation. We also report on the conditions for the transfer of "PD results" to workers, user groups, and design professionals that have characterized PD over time and across geopolitical terrains. The topic of the sustainability of PD within an organizational context is also considered. The article concludes with a discussion of common issues explored within PD and CSCW and frames directions for a continuing dialogue between researchers and practitioners from the two fields. The article draws on a review of PD and CSCW literatures as well as on our own research and practical experiences.

Key words: CSCW, design professionals, participatory design, politics of design, sustainability

1. Introduction

Participatory Design is a maturing field of research and an evolving practice among design professionals. PD researchers explore conditions for user participation in the design and introduction of computer-based systems at work. The first international PD conference was held in Seattle in 1990 and since then PD conferences have been held in the United States every second year.* These biennial conferences were preceded by conferences in Europe that focused on worker participation in technology design.** PD conferences have attracted researchers concerned "... with a more human, creative, and effective relationship between those involved in technology's design and its use, and in that way between technology and the human activities that provide technological systems with their reason for being" (Suchman, 1993). Drawing on the papers presented at these conferences, international journals like CACM, HCI and now CSCW have dedicated special issues to PD. Increasingly

* The proceedings of the PD conferences can be obtained by contacting CPSR at Computer Professionals for Social Responsibility, P.O. Box 717, Palo Alto, CA 94392-0717, USA.

** See e.g. proceedings from conferences sponsored by IFIP's WG 9.1 and WG 8.2: Briefs et al. (1993); and Bemelmans (1984). See also Bjerknes et al. (1987) from the Second Decennial Conference at the University of Aarhus, Denmark.

at universities and business schools in Europe and North America, courses and Ph.D. programs are addressing issues in PD. The field continues to provide a home for lively debates about appropriate and practical relations between work and technology and about techniques for the analysis and design of such relations.

Since the early days of PD, computer-based systems have become more and more integral parts of people's work lives. Many design professionals and managers alike are realizing that the skills and experiences of workers* need to be present in the design and organizational implementation of computer systems and the work they support. This, they argue, will help ensure a better fit between technology and the ways people (want to) perform their work. Increasingly, the results of PD research, in terms of an understanding of the relations between work and technology and the tools and techniques applied, are being integrated into design professionals' resources for action. However, the concern for worker participation in design that drives PD researchers has also been challenged in recent years by economic conditions that predominate on the international scene, where efficiency is emphasized over quality of work life and where the power of worker organizations is declining. Looking for new ways of connecting with workers (in addition to union participation) and new strategies for engaging managers and design professionals in cooperative design, some PD researchers have begun to reorient their efforts somewhat by cooperating with people situated throughout the organizational hierarchy and not soley workers and their unions.

In the remainder of the article, we describe three main issues dealt with by PD researchers: The politics of design; the nature of participation; and the methods, tools, and techniques used in PD. We address issues dealt with in CSCW that relate to PD and we conclude by calling for a continuing dialogue between researchers and practitioners from the two fields.

2. Issues explored in Participatory Design

Three main issues have dominated the discourse in the PD literature: (1) the politics of design, (2) the nature of participation, and (3) methods, tools and techniques for carrying out design projects. These issues recently have been explored in relation to the primary recipient groups of PD research, workers and design professionals. We find it useful to think about these issues in terms of Gärtner and Wagner's (1996) arenas for participation. They distinguish between three arenas:

* We use the terms worker and user somewhat interchangably while recognizing that neither are neutral terms. Worker can appear to exclude organizational members who are thought of as professionals (e.g. teachers, attorneys, doctors) as well as managers. By using the term worker, we do not intend to exclude these workers. Users is also an ambiguous term with an overly technocentric bias. The term orients readers to the relation of people to their machines although most people do not think of themselves primarily as users of technology. In addition, the term users can reference people with various relations to a technology and not simply the end-users. We have decided not to introduce yet another term and will use the term worker unless we want to draw attention to individuals as users of a technology.

1. Arena A: The *individual project arena* where specific systems are designed and new organizational forms are created (ibid: 195).
2. Arena B: The *company arena* where "breakdowns" or violations of agreements are diagnosed and hitherto stable patterns of organizational functioning questioned and redesigned (ibid: 196).
3. Arena C: The *national arena* where the general legal and political framework is negotiated which defines the relations between the various industrial partners and sets norms for a whole range of work-related issues (ibid: 198).

At various times in the history of PD research there have been differences in the emphasis placed on the three arenas of participation. The early PD projects attempted to link Arenas A, B and C, with the aim of exploring local conditions for workers' co-determination as a basis for influencing policies at the national level. PD projects during the last 20 years have shifted their focus somewhat to be more centered on Arena A, the individual project arena. Recently, however, concerns have been voiced that too few PD projects are engaged at the organizational or company level (Arena B) (Gärtner, 1998; Kensing et al., forthcoming) and that the PD community may have lost sight of the importance of participating at the national legal and political level (Arena C) (Bjerknes and Bratteteig, 1995; Beck, 1996, Greenbaum, 1995).

2.1. THE POLITICS OF DESIGN

From the very beginning PD researchers have been explicit about their concern with the politics of system design as it relates to the introduction of computer-based systems and the distribution of power in the workplace. Over the years PD has undergone changes and reconceptualizations concerning the nature of the politics of system design. PD research began in the mid 1970's in reaction to the ways in which computer-based systems were introduced in the workplace and to the deleterious effects these systems were having on workers (dislocations, deskilling, etc.). The introduction of computers at work was seen as central to a growing debate in Scandinavia and Germany about the place of industrial democracy in modern workplaces (Arena C). At the center of the critique was the neglect of workers' interests – those most affected by the introduction of new technology. PD researchers argued that computers were becoming yet another tool of management to exercise control over the workforce and that these new technologies were not being introduced to improve working conditions (see e.g. Sandberg, 1979; Kyng and Mathiassen, 1982)

Workers and their unions were concerned that the introduction of computers would reduce their control over their immediate work situation as well as the overall planning and administration of production. They saw that much of their work was being de-skilled and decisions that once were under their control were either being automated (build into the systems) or moved higher up the organizational hierarchy. They feared that ultimately this would lead to workforce reductions.

Although laws and agreements were in place in many European countries that mandated cooperation between management and workers over the introduction of new technologies, in reality workers found few ways to influence the course of technology intervention.

Researchers who were concerned that only the interests of management were being served by the design and introduction of new technologies established relations with trade unions. The intention was to build up technical and organizational competence among workers and shop stewards in order to strengthen their position at the bargaining table (Nygaard, 1979).

This strategy to rebalance the power of workers and management was first experimented with in Norway. The pioneering work of Nygaard and his associates in the NJMF project (Nygaard, 1979) was the foundation upon which later PD projects, the Swedish DEMOS project (Ehn and Sanberg, 1979) and the Danish DUE project (Kyng and Mathiassen, 1982), were launched. The strategy included a research agenda in which researchers and local trade unions explored the potential and actual consequences of introducing specific computer-based systems into the workplace (Arena A) and developed goals and strategies for workers and their unions to pursue in relation to management's technological initiatives (Arena B). Finally, they helped formulate and advocate the adoption of laws and agreements concerning union rights in relation to the introduction of computer based systems (Arena C). Soon other European countries were adopting this strategy and developing it within their own sociopolitical context. The main assumption guiding collaborations between researchers and workers was that if workers and their local trade unions built up knowledge about the relations between technology and work, formulated their goals, and developed local and national strategies for giving voice to their interests, workers would be able to assert greater control over their working conditions.

The results of these efforts included increased bargaining power due to better informed shop stewards, strengthened co-determination agreements, and national laws which guaranteed, to those who claimed their rights, information about management's plans for new technology. In addition, articles were published and theses written based on these projects leading to the emergence of an international community of researchers focusing on the interface between technology and the workplace.

In spite of the results of these early projects, workers continued to find it difficult to argue for alternative ways of using technology, in part, because management's goals and strategies often were built into the new systems and were reinforced by organizational distributions of power, making it difficult to alter the technology to fit workers' needs and interests. Researchers and workers were interested in determining if it would be possible to design, develop, and implement technologies which took as their starting point the needs and interests of workers. As Ehn (1993: 56–57) points out,

> Societal constraints, especially those of power and resources, had been underestimated [in the early projects]. In addition, the existing technology presented significant limits to finding desirable alternative local solutions ... The main ideas of the first projects, to support democratization of the design process, was complemented by the idea of designing tools and environments for skilled work and good-quality products and services.

The idea of designing tools for skilled work was explored in the UTOPIA project (1981–1984) where the hope was that computer tools and environments could be prototyped and built that would strengthen the position of labor in their efforts to improve working conditions and quality of work life. Although, in the end, the prototypes developed by the UTOPIA project never became commercial products, new tools and techniques for worker participation did result (Ehn, 1989).

For years there have been heated debates between those researchers who argue that the adversarial relation between managers and workers is unavoidable (collective resource approach) and those who stress the need for cooperation between managers and workers (socio-technical approach). In the introduction to *Computers and Democracy*, Bjerknes et al. (1987: 4) raise the question, "Are the perspectives (collective resource and socio-technical) too different and have the strategies diverted too far for a fruitful discussion of theoretical and practical experience in the context of democratization?" They do not answer this question, but based on an evaluation of many projects since, including those reported in this special issue, we believe that this is not the case. In fact a strong argument can be made that some degree of cooperation with management has been necessary for the success of many PD projects.

In countries like the US, with a different socio-economic climate and where debates about industrial democracy have not been as prevalent, researchers have looked for other ways of pursuing participatory design agendas. Some researchers built on the work of Braverman (1974), Noble (1977) and Winner (1977) in recognizing that computer-based systems and the processes through which they were designed and implemented tend to increase managerial control (see e.g. Greenbaum, 1976; Clement, 1994). Others, starting from a critique of specific techniques used to create more user-friendly systems* (Blomberg et al., 1993; Holtzblatt and Jones, 1993; Muller, 1993; Muller et al., 1995), developed strategies for direct worker participation in decisions about the shape and character of technology interventions. Through these efforts and others, researchers raised the awareness of the consequences of excluding the voices of workers in technology considerations and experimented with new approaches for engaging workers directly in technology design and implementation.

During the 1980's the conditions for industrial democracy changed throughout Scandinavia and Europe, including a decrease in the bargaining power of unions.

* Most usability techniques were developed for laboratory environments and were found to be ill-suited for understanding the experiences of users with technologies in their everyday work environments

These changes required PD researchers to rethink some of the assumptions and strategies that characterized their work. In particular, they refocused their attention on the rationales for participation and the ways differently positioned actors within an organization could influence technology design and implementation (Blomberg et al., 1997). We will return to this issue in the following sections.

2.2. PARTICIPATION

As mentioned earlier, many recent PD projects have concentrated their efforts in Arena A, the individual project arena. In these projects users are represented in project groups and steering committees and take an active part in analysis and design, evaluation of standard systems, and organizational implementation. In part because of a reduced focus on Arenas B and C, discussion in the PD literature about the degree and types of participation required to bring about changes at the organizational or national political arenas has been limited. As more and more PD researchers actively renew their commitment to organizational and political change, we expect to see an increase in published papers addressing effective participation strategies for arenas B and C.

Clement and Van den Besselar (1993) in a review of ten PD projects in the 1970's and the 1980's reiterate three basic requirements for participation outlined by Kensing (1983): (1) access to relevant information, (2) the possibility for taking an independent position on the problems, and (3) participation in decision making. They add two additional requirements: (4) the availability of appropriate participatory development methods and (5) room for alternative technical and/or organizational arrangements. The participation of the intended users in technology design is seen as one of the preconditions for good design. Making room for the skills, experiences, and interests of workers in system design is thought to increase the likelihood that the systems will be useful and well integrated into the work practices of the organization. Of central importance is the development of meaningful and productive relations between those charged with technology design and those who must live with its consequences. PD researchers hold that design professionals need knowledge of the actual use context and workers need knowledge of possible technological options. The epistemological stand of PD is that these types of knowledge are developed most effectively through active cooperation between workers (and increasingly other organizational members) and designers within specific design projects.

The assessment of which organizational members should be involved in technology design and implementation has changed over time. In the early days of PD, the central concern was to increase the participation of workers and their unions or those with little say over technological and organizational design issues effecting the workplace. Managers rarely participated in these projects. Even today the role of management in PD projects is often intentionally restricted. Some have worried that management's participation would silence the voices of workers and under-

mine the goal of increasing workers' say over their working conditions. Bødker (1996) reports that while managers participated in some seminars and meetings during the course of the AT project, they were asked not to take part in a future workshop for fear their presence would make employees reluctant to express their views honestly.

Increasingly, however, people positioned throughout the organizational hierarchy (including management) and with various relations to the technology design effort are included in PD projects. Kensing et al. (1998) report on a project in which the participation of managers, internal design professionals, and users was considered a condition for the success of the project. Korpela et al. (1998) argue for the need to involve community members who will be served by the system under development and not solely end users. In a discussion of PD in consulting, Gärtner (1998) reports that "Customers [those funding the project] will support and pay [for the project] only if they consider risks involved to be acceptable with respect to expected outcome." In this case the involvement of the funding managers is required to secure the resources needed for the project to move forward.

Participatory design projects have varied with respect to *how* and *why* workers have participated. At one end of the spectrum, worker participation is limited to providing designers with access to workers' skills and experiences. The workers have little or no control over the design process or its outcome. Here projects are initiated at the behest of managers or design professionals. Workers are asked to participate in those aspects of the project where their input is viewed as valuable (e.g. description of current work practices and testing/evaluation of technology) but left out of most technology-related decisions. This limited level of participation is viewed by many PD researchers as insufficient to meet the goals of a participatory design project. What is missing is a commitment to the possibility of real worker influence over the direction and outcome of the technology design effort (Greenbaum, 1996).

At the other end of the spectrum workers participate, not only because their skills and experience are considered valuable, but also because their interests in the design outcome are acknowledged and supported. Worker participation is considered central to the value and therefore the success of the project. Here workers participate in negotiations over how projects are organized and what outcomes are desired. They take an active part in (1) the analysis of needs and possibilities, (2) the evaluation and selection of technology components, (3) the design and prototyping of new technologies, and (4) the organizational implementation.

In many PD projects it is not possible for all those affected by the design effort to fully participate. In these cases the choice of user participants and the form of participation must be carefully considered and negotiated with relevant organizational members, including management and the workers themselves. At times researchers or design professionals suggest the type of workers needed for the project (e.g. representatives of various occupational groups, workers with particular skills). Alternatively existing worker organizations may identify project participants. In

the early trade union projects, the local union selected representatives from the participating companies and the central trade union choose steering committee representatives.

In making these choices, it is important to be clear about the motivations for participation, the scope of participation, and the resources allocated for the project. In addition, the relations between those taking an active part in the project and those who do not should be carefully considered and attended to throughout the project. Although as Bødker (1996) cautions "The collective experiences of participation are often only for those directly involved in the project, and only while the process is running" (1996: 217), establishing appropriate relations with other organizational members increases the likelihood that the influence of the project on technological and organizational change extends beyond the immediate project group and endures after the researchers leave.

2.3. METHODS, TOOLS, AND TECHNIQUES

In addition to the political and theoretical explorations of participation, PD researchers have developed practices that promote productive worker-designer cooperation. The early trade union projects were primarily concerned with developing methods for participative analysis of relations between work and technology and strategies for union influence over technology projects run by managers and IT professionals (Sandberg, 1979; Kyng and Mathiassen, 1982; Ehn, 1989). These experiences to a large extent led to the development of methods, tools, and techniques in use today.

Mathiassen (1981) has introduced useful distinctions between methods, tools, and techniques in his work on theories and methods for systems development.[⋆] For Mathiassen a method has limited *application areas*[⋆⋆] depending on, for example, the type of organizational and technological change desired or the number of people involved. A method also provides a particular *perspective*[⋆⋆⋆] on a phenomena (e.g. an organization and its needs for computer support) and is composed of a coherent collection of *tools*, *techniques*, and *principles of organization*. Following Mathiassen we discuss principles of organization that characterize PD projects as well as the rationale for employing PD tools, techniques, and methods.

2.3.1. *Principles of organization*

PD projects are often organized around the formation of work groups that carry out many of the activities of the project. In addition, workshops are frequently arranged

⋆ See Andersen et al. (1990) for a full discription. The distinction was originally proposed by Mathiassen (1981) (in Danish).

⋆⋆ PD has been applied in a wide range of application areas (e.g. the public and private service sectors, manufacturing, local and centralized administration, hospitals, libraries, law offices, schools and universities).

⋆⋆⋆ The perspective of PD research expressed in sections 2.2 and 2.3 also holds for PD methods.

where other organizational members participate. Some projects have steering committees who are kept informed about the activities of the work groups and who may serve in an advisory capacity. Among the activities of the work groups are developing a common understanding of the current relations between technology and the organization of work, exploring new organizational forms, formulating system requirements, and prototyping new systems.

Equally important to the principles of organization are the issues of resource and time allocation. PD projects often take place in "greenhouse" settings where projects are shielded from the harsher realities of organizational life. At times special resources are allocated to the project. In addition, deadlines may be relaxed and participants given time off from their daily work, allowing time for experimentation. In these somewhat protected situations, researchers are able to experiment with new approaches. However, to be effective in the long run, PD practices must survive in "real world" settings with their limited resources, conflict and serious time constraints.

Responsibilities and accountabilities also vary depending on how projects are supported and initiated. PD projects have a variety of funding sources, including corporate sponsors, government agencies, worker organizations, and consultancy relations. There are also a variety of ways in which PD projects are initiated. At times, PD researchers are contacted by organizations familiar with PD and interested in collaborating on a design project. At other times, the researchers make the initial contact with an organization where a productive PD project is thought possible. Some PD projects are undertaken to explore specific technology possibilities (Blomberg et al., 1996) while others have a more open-ended technology agenda. When the technology direction has been established in advance, it is critical that the participant organization views the proposed technology direction as valuable.

Finally, questions of how potential conflicts over appropriate systems development processes and outcomes are negotiated form part of a project's principles of organization. Although not extensively dealt with in the PD literature, accounts of delicate and sometimes difficult negotiations over design alternatives do appear in reports on PD projects. For example, Simonsen and Kensing (1997) describe a situation where a manager opposed the project because she felt the system being designed challenged her authority.

2.3.2. *Tools and techniques*

Traditional approaches to system design make it difficult for users to see the connections between their work and abstract and technically-oriented descriptions of new systems. As Blomberg et al (1993: 146) state, these approaches "... provide little opportunity for designers to learn about the everyday work practices of potential users" and we would add for workers to learn about possible technology futures.

The development of tools and techniques is a key focus for PD projects. Innovative tools and techniques developed and extended in the context of particular

projects have become part of PD researchers' repertoire for action. PD techniques employ informal ways of presenting the relations between technology and work, including visualizations (Brun-Cottan and Wall, 1995), and concepts readily accessible to workers. The tools and techniques promote a practice where researchers and design professionals are able to learn about users' work, where both technology and work organization are in focus, and where users are able to take an active part in technology design.

Beginning with the early projects, researchers found it useful to review written materials and observe current technologies in use. They held workshops where workers discussed their experiences using existing technologies. The researchers and workers visited other work sites to learn about alternative uses of technology and jointly evaluated possible ways of intervening in and influencing the technology initiatives sponsored by management. In addition, researchers developed courses, gave lectures, and supervised project work where technology and organizational issues were explored (see e.g. Kyng and Mathiassen, 1982). In Denmark approximately two thousand workers attended these courses from the mid 1970's to the late 1980's and in many European countries similar courses were developed. Newly articulated and better informed views about possible technology interventions emerged from these interactions between workers and researchers that were later expressed at joint worker-management negotiations.

In conjunction with establishing long term working relations with worksite participants, questionnaires and interviews also have been used to gain a view of the relations between technology and work across organizations. Increasingly, ethnographically-inspired fieldwork techniques are being integrated with more traditional PD techniques (Blomberg et al., 1996; Bødker, 1996; Beyer and Holtzblatt, 1997, Kensing et al., forthcoming). The primary techniques of ethnography include open ended (contextual) interviews and (participant) observations, often supported by audio or video recordings. These techniques are employed to gain insights into unarticulated aspects of the work and to develop shared views on the work.

Complementing these tools and techniques for work analysis are those focusing on system design such as scenarios, mock-ups, simulations of the relation between work and technology, future workshops, design games, case-based prototyping, and cooperative prototyping (Kensing, 1987; Ehn, 1989; Greenbaum and Kyng, 1991; Trigg et al., 1991; Mogensen, 1992, 1994; Blomberg et al., 1996; Grønbæk et al., 1997). These tools and techniques avoid the overly abstract representations of traditional design approaches and allow workers and designers to more easily experiment with various design possibilities in cost effective ways.

PD projects often include the use of scenarios and mock-ups. Kensing et al. (1998) use scenarios to describe new applications in relation to envisoned work practices as a basis for deciding which applications and technologies to prototype. Ehn and Kyng (1991) explore the use of mock-ups as a way for designers and users to "experience the future." They suggest that because mock-ups are inexpensive,

easily understandable, and allow a degree of hands-on experience, they are well suited for early design explorations.

Grønbæk et al. (1997) advocate the use of cooperative prototyping where users and designers collectively explore the functionality and form of applications as well as their relations to the work in question. They state that, "To design cooperatively, to develop visions of technology in use, it is important to give these visions a form that allows users to apply their knowledge and experience as competent professionals in the process" (ibid: 217). This type of cooperation requires access to adequate prototyping tools, and as pointed out by Blomberg et al. (1996) it also requires the availability of workers' actual work materials (case-based prototyping). Trigg et al. (1991) and Mogensen (1992) also emphasize how prototypes act as "cytalysts" and "triggers" in discussions about the relations between work and technology, and that these discussions lead to mutual learning.

Tools and techniques used in PD projects all have the common aim of providing designers and workers with a way of connecting current and future work practices with envisioned new technologies. They do this by giving participants access to the concrete, lived experiences of designers and workers alike.

2.3.3. *Methods*

Developing a *single* participatory design method has not been the aim of PD researchers. However, some groups have systematically organized their design practices into a coherent ensemble of tools and techniques. For example, Grønbæk et al. (1997) offer an approach, Cooperative Experimental Systems Development (CESD) that, "... is characterized by its focus on active user involvement throughout the entire development process; prototyping experiments closely coupled to work situations and use scenarios; transforming results from early cooperative analysis/design to targeted object-oriented design, specification, and realization; and design for tailorability" (ibid: 201). Beyer and Holtzblatt (1997) have introduced a customer-centered approach called Contextual Design that focuses on early design activities. Potential users and other organizational members are interviewed while they work to provide input to the product definition process. Kensing et al. (forthcoming) have developed the MUST method, focusing on cooperation between users, managers and internal IT professionals who are responsible for the design and implementation of computer-based systems. Their method provides concepts and guidelines for the design of coherent visions for change, including technology, work organization, and the skills users need to perform their work in the new technological and organizational arrangements. Blomberg et al. (1996) describe a "work-oriented design" approach where field studies of work are combined with case-based prototyping.

2.4. MAIN RECIPIENTS OF PD RESEARCH

The issues explored in PD can be viewed through the lens of the intended beneficiaries of the research. PD researchers have a double agenda. On the one hand, they are interested in designing useful, experimental technologies and practices that are informed by interactions with worksite participants. On the other, they are interested in developing more effective PD methods and practices that could be adopted by professional system designers. As such there are two primary audiences for their work: (1) the workers and other organizational members who will benefit from the design project and (2) design professionals who may adopt participatory design agendas and approaches. In addition, policy makers and decision makers at the organizational and national level also are important recipient groups for PD research. Arguments supporting particular policy positions (e.g. the need for US labor involvement in technology issues, the value of worker participation in technology design and workplace implementation) can be strengthened by reference to the experiences of PD projects.

Below we outline differences in focus of projects whose main recipients are workers and design professionals respectively.

2.4.1. *Workers*

For most PD projects the primary recipient groups are workers and worker organizations. These projects typically have two main goals:

1. Developing and evaluating design practices that support more effective worker/designer cooperation and establishing the necessary conditions for cooperation within an organization (process oriented).
2. Designing and evaluating work and technology systems that support the organization's work activities (product oriented).

Workers benefit by having (1) systems that better fit the ways in which they (want to) work, (2) more participatory design practices and methods, and (3) strategies for successful integration of these new technology designs.

2.4.2. *Design practitioners*

In an attempt to propagate and sustain PD practices after the research project ends, researchers have established participatory projects with internal design practitioners. Working with design practitioners, PD researchers strive to embed PD within organizations by developing locally articulated design practices and guidelines. These projects help design practitioners integrate PD practices into their repertoire for action. One direction taken has been to adapt principles and techniques from ethnography in ways that take account of practical and organizational constraints on practitioners, but that go beyond traditional design approaches.*

* See e.g. Blomberg et al. (1993); Beyer and Holtzblatt (1997); and Kensing (1998) for ways ethnographic techniques have been integrated into design efforts.

In addition, those working in academia, have integrated PD into their teaching in the hope of changing the work practices of future generations of design practitioners. Although as Kautz (1996) points out "The topic of participatory design has not yet been a central interest in the context of formal education for computer professionals," developing curriculum for training system designers in PD methods has been of concern since the early trade union projects (see e.g. Kyng and Mathiassen, 1982). Today in Europe and North America a growing number university faculty are developing courses and supporting project work in PD. Although courses differ, students are acquiring an appreciation for the value of worker participation in design and learning tools and techniques of participatory design, including ways of understanding the use context. For a PD perspective on the curricula debate see Bennett et al. (1992), Kautz (1996).

2.4.3. *Sustainability of PD projects*

Clement and Van den Besselar (1993) note that the experimental nature of most PD projects often leads to small-scale projects which are isolated from other parts of the organization. When the researchers leave, the participatory processes seldom diffuse to other organizational entities. Two of the lessons learned from their examination of PD projects are that "users must increasingly gain in their ability and willingness to take on the roles of the animator(s)* ... [and] a wide range of actors outside a group must learn of the achievements [of the project] and care about its survival" (ibid: 35). PD projects increasingly are addressing the question of how to develop a local knowledge base that can help sustain PD as a practice after the researchers depart (Bødker, 1996; Kensing et al., 1998, among others). As Bødker notes, "What one does in a project is not only for the project, but should place the organization in a position where the experiences can be used, by the organization on its own, further on in time, and in particular with respect to the future development of the technology (tailorability, etc.)" (Bødker, 1996: 220). Gärtner and Wagner (1996: 212) also contend that for participatory design projects to be successful designers need "... not only to analyze existing actor networks but ultimately to redesign them in ways that help establish and maintain participative structures." In the absence of changed organizational structures, it is likely that once the researchers leave the scene the changed practices will be difficult to maintain.

3. CSCW and PD

There is considerable overlap in the problems addressed by research in CSCW and PD. In fact many individuals publish in both fields. However, there are differences in the emphasis placed on their shared concerns of technology design, cooperative work analysis, methods and techniques, worker participation, and organizational

* Animator is the role most often played by the researchers in these projects.

and political change. Still, at the heart of both is a commitment to designing systems (both technical and organizational) that are informed by and responsive to people's everyday work practices.

3.1. CENTRALITY OF TECHNOLOGY DESIGN

As noted by Schmidt and Bannon (1992), CSCW is a design-oriented research area with technology at the center of the research agenda. Schmidt and Bannon (ibid: 11) state that "CSCW should be conceived as an endeavor to understand the nature and characteristics of cooperative work with *the objective of designing adequate computer-based technologies*" (italics added). They caution that social science contributions to CSCW should be "... to explore exactly how insights springing from studies of cooperative work relations might be *applied and exploited in the design of useful CSCW systems*." Grief (1988: 12) affirms that CSCW research should address "... the question of *how to design and refine good groupware* – software that will allow people to work together with the best help they can get from the computer" (italics added). A great deal of PD research also is directed at designing computer-based systems, but the explicit motivation for such design efforts is often to strengthen workers' control over their work lives and to create more democratic work environments. Technology design is but one aspect of a strategy aimed at achieving these larger workplace objectives.

3.2. SPECIFIC FOCUS ON COOPERATIVE WORK

CSCW has a specific focus on understanding the system design requirements of *cooperative work*, where cooperative work is distinguished from individual and other types of work. There has been considerable discussion in the CSCW literature about exactly what cooperative work should be taken to mean. Schmidt and Bannon (1992: 15) assert in a lengthy exploration of various possible interpretations of cooperative work that the term "... should be taken as the general and neutral designation of multiple persons working together to produce a product or service." And they go on to caution that this should not imply that the relations among those working together be amicable or that the boundaries of the "group" be clearly specified.

PD has made no attempt to demarcate a category of work called cooperative, but instead has focused on developing cooperative strategies for system design. There may be an implicit assumption underlying PD research that work, by its very nature, is cooperative and therefore there is no need to distinguish cooperative work from work more generally. Also because PD research is not centrally focused on technology design, distinguishing between systems that support cooperative as opposed to other types of work holds little value. For CSCW research, the result of singling out cooperative work has been that the design requirements for overtly

cooperative work (e.g. joint authoring, distributed team work, etc.) has often been the focus of technology development efforts.

3.3. DEVELOPING TOOLS AND TECHNIQUES

Although CSCW researchers have developed approaches to support the development of CSCW systems, Schmidt and Bannon counsel that "... CSCW should not be defined in terms of the *techniques* being applied." (1992: 10). Conversely, PD is defined, in part, by the techniques and methods used, namely strategies that allow for the direct participation of workers in project definition and design specification. A great deal of emphasis has been placed on developing and formulating these methods and techniques so that they can be adopted by others.

3.4. WORKER PARTICIPATION

There is a commitment in CSCW that designs be informed by analysis of work practice. While there is discussion in the CSCW literature about how to construct productive relations between those doing work analysis and those designing CSCW systems, there is no explicit commitment to *direct user participation* in design. In fact, some have argued that it is too costly and logistically problematic to have users directly involved in design (see Bentley et al., 1992; Hughes et al., 1993). As an alternative, social scientists and others may act as user surrogates or representatives in design discussions. In PD direct user participation in design is one of the hallmarks of the field although as Mambrey et al. (1998) suggest, sometimes it is valuable to augment direct user participation with what they refer to as user advocacy.

3.5. ORGANIZATIONAL AND POLITICAL CHANGE

PD is not defined by the type of work supported, nor by the technologies developed, but instead by a commitment to worker participation in design and an effort to rebalance the power relations between users and technical experts and between workers and managers. As such PD research has an explicit organizational and political change agenda. PD conferences are characterized by lively debates about whether the PD community has lost its way and has become too focused on technology design issues at the expense of a concern for strengthening workplace democracy. In contrast, questions of workplace democracy and political change are rarely discussed on the podiums of CSCW conferences. Instead CSCW conferences feature spirited debates about whether there's too much emphasis on technology design as opposed to workplace studies and visa versa. However, Shapiro (1994) questions the wisdom and feasability of ignoring political issues in CSCW design. He notes that, "... work and technology arrangements are changed (invented) for instrumental reasons. Hence too there is a necessary politics of

design (ibid: 423)". Although not often directly addressed in the CSCW literature, politics often lies just beneath the surface of issues central to CSCW design (group work, cooperation, distributed collaboration, etc.).

4. Toward a continuing dialogue between CSCW and PD

In many ways there already exists a strong dialogue between CSCW and PD researchers. Here we want to suggest some possible directions for continued interactions.

4.1. CSCW CONTRIBUTIONS TO PD

1. PD researchers may find it productive to integrate CSCW technologies into their collaborative projects. For example, meeting support technologies might be used in designer-worker interactions or media space technology might be productively employed in PD projects where workers are geographically distributed.
2. PD researchers could learn from CSCW studies of cooperative work about the conditions for establishing cooperative relations between designers and workers.
3. PD researchers could follow the lead of their CSCW colleagues and begin to pay more attention to the evaluation of technologies developed using PD approaches. Even though the criteria for success may differ, a critical stance with respect to the design outcomes could strengthen PD's position as a viable system design strategy.
4. PD researchers could learn about strategies for connecting studies of work and system design from CSCW.

4.2. PD CONTRIBUTIONS TO CSCW

1. CSCW researchers could become more aware of the importance of understanding that systems always exist in particular organizational and political contexts and that these contexts shape what is possible organizationally and technically.
2. CSCW researchers could come to appreciate the benefits of active worker participation throughout the design process and begin to adopt PD techniques for such participation.
3. CSCW systems could be further developed in and adapted to particular organizational settings using PD techniques.
4. CSCW researchers could learn about strategies for connecting studies of work and system design from PD.

5. Concluding remarks

In this introduction to PD we have only been able to touch briefy on some of the issues and concerns that have engaged PD researchers and practitioners. We know we have left out reference to important contributitions to the field. We hope, however, that CSCW readers will be stimulated to examine the possibilities in their own work for alternative, more participatory system design approaches and will contribute to the ongoing discussion of the relation between PD and CSCW.

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