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Heritage

Having a say

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This chapter focuses on the early history of Participatory Design projects up to the first Participatory Design Conference in 1990. It explains how the political and social movements of the 1970s and 80s formed a stage for translating participatory research into development of computer applications. Some of the early action projects are described in order to give readers an understanding of the problems and challenges. A central focus is on the roots of Participatory Design in enabling workers to gain a voice in the technologies that affect their working lives. It concludes with reviewing theoretical underpinnings as well as summarising some guiding principles.

The Introduction focuses on the motivations and struggles in early work-oriented design. The general political context is described in order to situate the early projects in the complexity of enabling workers to gain a voice in decision-making about technology. Both action-based projects and theoretical sources are used to explain the development of Participatory Design's guiding principles.

Readers will learn about the early struggles to give voice to those who traditionally lack power in the development process. Equalising power relations and mutual learning are both a motivation and an outcome of the Participatory Design heritage. Of equal importance is the understanding that design and development must be situated in the real, everyday actions of people using technology. The early history is *not* intended as a 'birth story' but rather as a series of struggles that grew out of some mistakes and into new ways of looking at computer system development, traces of which can be seen today in many design situations.

The early heritage demonstrates how difficult it is to do more than 'involve' users in design. Bringing about more equal power relations and actually fostering emancipatory participation remains a critical challenge. The projects discussed here each begin with motivating factors and conclude with lessons learned and the need for further research. Participatory Design history tells us that mistakes and unanswered questions still abound.

Introduction

The roots of Participatory Design are deep and broad. We begin here in the 1970s when progressive ideas spread from the society at large into emerging computer system development in

the workplace. This early heritage is intriguing in many ways because the seeds of later participatory approaches have inherited some of the victories of earlier projects as well as some of the continuing challenges.

This chapter lays out some of the struggles in the history of the now maturing – after more than four decades of growth – field of Participatory Design. We discuss some of the lessons learned in the 1970s and 1980s as we address the following questions: What motivated initial projects for choosing a Participatory Design approach? What was in fact designed? How may the heritage be conceptualised? What does the heritage have to offer to those who strive to apply Participatory Design inspired approaches today? Our focus is on Participatory Design action projects where the needs of groups of workers drove researchers to take note of how previously unheard voices could be important in design of technologies. These early projects are discussed within the political context of the 1960s, 70s and 80s, a cold war environment that gave rise to the importance of strong voices speaking out on social issues that affected groups with access to fewer resources. The chapter takes us up to the first Participatory Design Conference in 1990, where the ideas and practices in the early period began to be pulled together into a coherent set of principles. The following chapters will cover later developments within Participatory Design.

We start in Scandinavia in the 1970s with some exemplary cases of projects with what was then known as data processing. In some ways it is no surprise that the heritage discussed here starts in places where trade unions and collective bargaining were strong and able to influence power relations in the workplace. These cases involved trade union activists who sought ways to influence the fast-paced automation that was emerging on their shop floor. The early trade union work set out to ask systems researchers as 'experts' to help them better cope with workplace problems – and indeed Participatory Design helped the workers do this, but it also flipped the project on its ear by introducing the system designers to a whole new set of problems.

We then proceed with a short introduction to another strong inspiration for Participatory Design – ethnographic studies about the introduction of technology into workplaces. These types of studies gave voice to office workers and technicians as they experienced the consequences of workplace change. Chapter 5 gives more detail about the ethnographic approach.

Finally, the chapter provides an overview of some of the main theoretical roots of participation; a topic that will be further explored in Chapter 3. The more specific principles, practices and techniques that Participatory Design has provided may be – and have indeed been – used for other purposes and with other intentions. Understanding and appreciating the theoretical roots of participation are seen as necessary for obtaining what this chapter will begin to describe as genuine participation. And we conclude with some principles we feel are instrumental for carrying out contemporary, genuine and action-based Participatory Design.

While this book describes concepts and practices affecting tools that are applied now to a wide range of digital artefacts – going well beyond the workplace – this chapter focuses on the work-oriented heritage of this field. But the lessons learned bear repeating, as without history we are often left to repeat some of the same mistakes – and as we know too well, the challenges of multi-party participation combined with constantly changing technologies are fertile ground for making mistakes! The participatory perspective we introduce here brings those issues back up to the surface.

The need for participation, in essence, recognises that tensions exist between those with some form of knowledge and power and those without. Kensing (1983) argues that basic requirements for genuine participation include access to information, resources (time, money and expert assistance) and the power to influence decisions. In an extensive review of

Participatory Design projects, Clement and van den Besselaar (1993) suggest further that appropriate participatory development methods and organisational and technical flexibility are also needed.

Political context

What came to be known as Participatory Design started as a reaction to changes in society at large, rooted in local communities as well as in workplaces. In Germany and Austria, for example, where some community groups were experimenting with ways to actively involve citizens in local issues, a new type of process, called a 'Future Workshop', engaged citizens in important issues (see Jungk and Müllert 1987). In the US, where burning social issues such as civil rights and urban problems needed to be addressed through grass-roots action, Participatory Action Research (PAR) began to gain serious hold in the research and public sector communities (see Whyte 1991). Also in the US, the war in Vietnam propelled activists to examine technology through groups such as Computer People for Peace and, later, Computer Professionals for Social Responsibility (CPSR), which became involved in key influencing political policies around technology issues, and which sponsored the Participatory Design conferences from the very start. In England the path-breaking socio-technical approach, among other activities, evolved to directly confront the fact that technology had social and political roots (Mumford 1972). The socio-technical approach spread well beyond England and was, in fact, used widely in Scandinavia among employers' associations.

Within the field of computer science the times and tensions were also reflected through the lens of professional organisations. Until the later 1980s, most computer programs were custom designed for huge mainframe computers; there were no generic applications to re-apply to different companies or situations. Systems analysis and design – the process of developing mainframe computer systems – was strongly influenced by management principles that controlled the flow of how programs were designed. Classic textbooks on design (e.g. Yourdon 1982; Demarco 1979) advocated a 'waterfall model' where problems were defined by management with no input from those who would be using the system. In the early 1980s as micro-computers (precursors to mini and desktop computing) began to emerge, the concept of 'users' began to emerge. Human–Computer Interaction, and its professional association Computer Human Interaction (CHI), focused on how then-emerging interfaces could be designed for presumed 'users'. Computer Human Interaction, however, borrowed the cognitive assumption from earlier computer system design, establishing a set of procedures that stemmed from how designers thought users might think. From a participatory perspective, this cognitive approach is considered a central fallacy in that it assumes that individual users' thoughts could be transcribed into programmed interfaces and applications. Even when users were invited to laboratories to test out interface designs, the focus was on 'capturing' user eye movement or keystrokes, rather than actually involving the users in the context of their own work. Computer Supported Cooperative Work (CSCW), a professional conference group, distanced itself from the single-user cognitive approach, focusing instead on the social and cooperative nature of work. CSCW's origins coincided with the beginning of network and distributed systems in the late 1980s as it introduced ethnographic and social science analysis into computer system design. But CSCW also had a central fallacy to many who moved into what later became Participatory Design: namely, the focus levelled work and workers with management and failed to examine the political nature of work and its power relations. The CSCW conference of 1988 gave birth to a sub-group that was concerned with the conflicting and politically sensitive issues of workers and their muted voices. This sub-group created the first Participatory Design Conference in 1990, joining forces with CSCW colleagues, yet giving voice to the politics behind all design.

Early action projects

The action-based stories in this chapter begin in Norway, where workers in the Iron and Metal union teamed up with Kristen Nygaard, a computer scientist, and Olav Terje Bergo, an economist, from the Norwegian Computing Centre (Norsk Regnesentral) in order to have a say at the bargaining table about how computers should be introduced at the workplace.

Kristen Nygaard, who pioneered this stream of work in Norway in the early 1970s, referred to it as a 'knowledge strategy' for trade unions (Nygaard and Bergo 1975a). Nygaard, an early developer of what is considered the first object-oriented computer language,[1] stressed that in order to have a say in relation to the ways in which technology is introduced at the workplace, workers and their organisations have to build up a 'knowledge base' to draw on when they met with management. While unions had the right to bargain about wages and working conditions, the idea of having the right to bargain about the type of technology-mediated change brought into the workplace was very radical for its time. Yet, as we shall see, the knowledge-base strategies worked up to a point. Nygaard and the unions soon found that other forces came into play.

Out of these early experiences grew three types of projects that tried to take workplace actions and workers seriously; each addressed concerns that didn't have clear problem definitions or methods for solving them, and each brought forth new lessons for new problems that still need to be attacked. The first we call Knowledge Strategy projects, which began to unravel the very unequal balance between workers, who knew little about technology, with system developers who, like designers today, spoke in a language that was hard for the workers to understand and relate to. The second set of early projects are called Design and Intervention projects where, building on and expanding the knowledge base of workers, the concern was to show, by concrete examples, that there are technological alternatives, and that those alternatives reflect different starting values. Indeed, this is very much the case with social networking and communication design situations now: the clear need to demonstrate alternative visions. The third type of projects involved ethnographic analyses of relations between work, workers and technology. As a reaction to the decontextualised studies of such relations that were most common at the time, American anthropologists, who were affiliated with the Xerox Palo Alto Research Center (located in Silicon Valley, California), applied their skills in the interest of understanding a new domain. Today various versions of ethnographically informed analysis have found their way – with or without anthropologists – to the design of many different kinds of technologies.

Knowledge strategy projects

The idea of involving workers in decisions about technology didn't suddenly spring out of the air; two significant management and political situations acted as triggers. One factor, not unique to Scandinavia, was the widespread use of management strategies to divide and conquer workers' power by automating tasks and de-skilling workers. For an elaborate discussion of such issues see Greenbaum (1975) and Sandberg (1979). These management actions, while having precursors at the turn of the twentieth century in Scientific Management, sought to standardise and simplify work tasks in order to create interchangeable workers as well as interchangeable manufactured parts. Standardisation and simplification were intended to lower wages and better control the workforce (see Greenbaum 1979). Charlie Chaplin's film *Modern Times* (from 1936) illustrates the outrageous effects on workers whose skill is removed and inserted into automated equipment. The process of de-skilling workers can still be seen in jobs such as those in call centres, where work practices are standardised to reduce labour costs and fit into computerised routines. The Norwegian Iron and Metal workers were experiencing this as Nygaard and Bergo began working with them in the early 1970s.

The second factor was indeed unique to Scandinavia, where legislation and workplace agreements had been written in the late 1960s and through the 70s allowing workers the right to information and some degree of co-determination over the conditions of their work. The limitations in these arrangements, however, were contested in the knowledge strategy projects described here, where workers often had to fight for information about management's technology plans.

The Norwegian NJMF[2] project from 1970 to 1973 (Nygaard and Bergo 1975a, 1975b), the Swedish DEMOS[3] project from 1975 to 1980 (Ehn and Sandberg 1983; Ehn 1988) and the Danish DUE[4] project from 1977 to 1980 (Kensing 1981; Jacobsen et al. 1981; Kyng and Mathiassen 1982) were based on similar concerns. While we discuss lessons learned from all these projects, we have chosen to give a detailed account of the rationale and activities of only one of these, the NJMF project, as it became an inspiration for later work.

In these early projects workers and researchers analysed the specific problems with new technology at the workplace and developed strategies to boost workers' power in relation to management's technology initiatives. The projects were carried out as action research and were organised as a reaction to workers' experiences from a vast number of co-determination experiments carried out cooperatively between the employers' federation and the labour movements in each of the Scandinavian countries. In the Danish case, for instance, workers reported that these experiments stopped before any substantial changes towards real influence had been achieved, and workers were reluctant to press for more influence for fear of reprisals (Tjørnehøj 1976; Ehn and Kyng 1987). These experiments were inspired by socio-technical research at the Tavistock Institute in England (see e.g. Trist et al. 1963; Trist 1981; Mumford 1983).

The English projects were rooted in the path-breaking notion that technology was a result of a social and political process, and therefore attention to technical design was embedded in all levels of discourse from the shop floor through political action. Since the early 1970s, Mumford and associates had worked on a socio-technical approach (see Mumford 1972, 1993a, 1993b; Mumford et al. 1978) advocating development of the social and technical systems more or less parallel to each other. This approach strove for efficient use of technology and increased job satisfaction for the intended users. The approach was heavily critiqued by Scandinavian researchers involved in trade union projects in the mid to late 1970s. The critique was twofold (Ehn and Sandberg 1979; Kyng and Mathiassen 1982). From an ideological point of view, the approach to workers' participation was evaluated as too narrow, because workers were mainly participating as informants in a process dominated by managers and their specialists. Further, the proposed techniques for decision-making in projects were evaluated as naïve, because they suggested that decisions should be taken by voting, thus not reflecting the distribution of power at the workplace. However, the socio-technical approach should be acknowledged for insisting on a focus on organisational as well as technical issues, and also for introducing prototyping as early as 1978 (Mumford et al. 1978, p. 250).

The Iron and Metal project

The Iron and Metal project started as workers realised that their deteriorating working process involved dislocation, de-skilling and less influence on their own working conditions. Additionally they saw the need to push co-determination rights to include the right to information about technology (see Nygaard and Bergo 1975a).

Nygaard and Bergo (1975b) report on an important lesson they learned at the very beginning of the project, and one that pops up again and again: namely, that the best-laid plans are not the way the project will end up! So though plans are helpful resources for action (Suchman 1987) in complex situations, participatory designers need to be prepared to alter plans as they learn

more about the situation and the context. When the Iron and Metal project began, there had been very few projects that had taken the interests of trade unions as their starting point, so there was little experience to build on. Initially, Nygaard and Bergo describe that they had planned the project in a rather traditional way, *without* the active participation of the workers, relying instead on the researchers to conduct the analysis. This comprised:

- mapping the goals and interests of the workers and their union;
- analysing three other management systems used in Norway, showing how the purpose and mechanisms inscribed in these systems affected the interests of the workers and their union;
- formulating workers' requirements for these systems;
- analysing the trade union's earlier experience with building competences;
- analysing which competencies were needed in relation to information technology and management.

In the initial plan these activities were to be carried out by the researchers, while workers and the union were to be involved mainly through interviews.

The reaction from trade unionists was that it would be interesting to see the results, but that they couldn't see any practical relevance. How were the workers supposed to make use of the knowledge produced? The two researchers then realised that they were in the process of producing reports that would end up unread on the bookshelves in the trade union hall. The results they were about to produce did not fit into the reality of the workers' lives; they could not use the knowledge developed as a resource for action.

In order to fill this gap, Nygaard and Bergo got together with the workers and their union and began to apply action research practices in order to build technical and organisational knowledge for the workers to use in negotiations with employers and their management experts. Action research, an important component of Participatory Design, seeks to engage both the affected workers and the outside researchers in studying and remedying existing problems (Greenwood and Levin 1998).

Nygaard and Bergo describe the rationale for the new research design, involving action research, in the following way:

- The purpose is to develop new knowledge geared towards the workers' ability to take action to increase their say over the ways in which the computer systems are introduced at the workplace.
- Actions for change require that the goals are discussed (and shared) among the workers, and that the actions are part of a plan.
- Results of the research are not reports and papers, but all *actions* taken by workers, at the local or the central level, that are based on the research project, and that intend to increase the influence of workers on information technology and management in the companies.
- Therefore reports and papers are useful only if they lead to such actions among workers.

Thus, the project had a triple focus on what Wagner and Gärtner (1996) later called Arenas A, B and C: namely the individual project arena (A), the company arena (B) and the national arena (C).

Based on such a rationale, the new research design had the following elements:

- A strategy report focusing on *actions* that would call for new knowledge
- Iterative development of *teaching materials*
- A *working process*: at the four participating companies 20–30 workers in smaller groups met every other week for a few hours to discuss problems with computer systems and management – and how to deal with such problems. The researchers functioned as lecturers and consultants and sometimes as students, as they realised they had much to learn about how mainframe management systems worked in practice. The groups then produced reports that were primarily written by the workers.

While the first research design was oriented towards analysis and proposals made by the researchers, the second research design focused on establishing a *learning cycle within the union*, where actions for change generated needs for new knowledge, which furthered new actions. And the workers involved found their own voice and technical vocabulary to use in negotiations with management.

And here, through the first mistakes, we find a key argument for what is now called Participatory Design. Literature in the field commonly bases the need for participation on several arguments. One, a political argument, emphasises that people *should have the right* to influence their working conditions. Another central argument is pragmatic. Its focus is that in the process of involving people who will be affected as active participants, learning will take place between the 'experts' and the participants which can result in better designs. And as we will see, this process of learning between and among the different power groups came to be known as 'mutual learning', a cornerstone of Participatory Design.

For Nygaard and Bergo it was both arguments and at the same time – not one without the other. It is through participation that new ideas and knowledge would be produced or sought for, and this was part of the process for standing up for one's rights. The project showed that rights were not something given by those in power – rather, rights were something workers had to fight for through knowledge-based negotiations.

Voicing participation

In this way, what we call genuine participation as practised by proponents of Participatory Design is significantly different from participation as seen by other traditions such as user-centred design, contextual design and user-driven innovation (Norman and Draper 1986; Beyer and Holtzblatt 1998), and other approaches that offer some form of 'user empowerment', which have become more 'mainstream' today. While Participatory Design differentiates itself from these other approaches we place the practice within a spectrum of ways that prospective users of a technology can get involved. However, Participatory Design as an emancipatory approach has little regard for approaches that solely involve users as informants through interviews, focus groups or other one-way techniques in a process otherwise controlled by information technology designers and their clients/managers. Such one-way data-gathering approaches we do not consider to be genuine participation.

In addition to the local achievements obtained by active participation of union members, the early Scandinavian projects also contributed with other types of results that should be briefly mentioned. For instance, the Scandinavian researchers reacted against the idea that technology at the workplace should take place solely under the co-determination agreements that were in place in their countries. Instead, in the Swedish DEMOS project, Ehn and Sandberg (1979) proposed that introduction of technology at the workplace should be based on negotiation within collective bargaining rights, just as wages and working conditions are negotiated. Second, and perhaps more significantly in terms of lasting effect, the Iron and Metal project was

the basis for the formulation of the Norwegian technology agreement signed by the trade unions and the employers' federation in 1975 (see Ciborra and Schneider 1983; Mathiassen et al. 1983). Third, many tools and techniques that have been developed within Participatory Design (see, for example, Kensing and Blomberg 1998, and also Chapter 7 of this volume) have been adopted by other approaches, although more often than not without the emancipatory rationale upon which Participatory Design approaches are founded. Fourth, another long-lasting result came from the Danish DUE project. For more than a decade, up to ten one-week technology courses for trade unionists were organised by the researchers, who had also developed the teaching materials (Kyng and Mathiassen 1982). Finally, the researchers also developed new university courses on technology analysis and design based on their experiences with the trade unions. Such courses, in updated versions, are still offered at bachelor's and master's levels. Further, master's and PhD theses were produced and contributed to building an additional branch of computer science and information systems called Human–Computer Interaction and Computer Supported Cooperative Work.

Not all issues were dealt with in these early projects. Indeed, the Iron and Metal workers did not end up implementing any new technology; rather, the outcome was a new process. The most apparent missing link was probably the idea that in order for workers to gain real influence on technology at their workplace, new technologies have to be designed based on workers' interests and values. This became a key issue in the subsequent projects.

Design and intervention projects

The knowledge strategy projects began to nibble away at the problem of how workers could learn more about computers and how the systems designers/researchers could learn more about what workers really needed in the workplace. But then came the problem that if workers really got involved – not just as users but as participants – would the design of alternative systems be different? The answer, as we will see, is still part of an ongoing conundrum, lurking today at the heart of designing truly new tools and applications.

While participants in the earlier projects did not engage themselves directly in the design and implementation of new information technology applications, this became the focal point of later strategies like UTOPIA (1981–4) and Florence (1984–7) and many subsequent projects. The rationale for this was that while experience from the early projects had shown that strong unions may increase the workers' influence on technology, this was a necessary but not a sufficient condition for real changes to take place. It appeared to be necessary to create alternative technologies as well as to fight vendors' monopoly over technological choices.

The UTOPIA project was carried out by computer and social science researchers at the Swedish Centre for Working Life, the Royal Institute of Technology, also in Sweden, and Aarhus University in Denmark. The project cooperated with a supplier Liber/TIPS and a Swedish and a Danish newspaper. It focused on typographical issues such as page make-up and image processing in the newspaper industry. The goals of the UTOPIA project were to develop technology for graphical workers that contributed to high-quality newsprint products, skilled work and a democratic organisation of work, goals that sharply contrasted with the management-driven objective of de-skilling workers (Ehn and Kyng 1984; Bødker et al. 1987; Ehn 1988). The project aimed at creating technological alternatives with an involved trade union based on their interests and concerns. The researchers set up a technology laboratory, in which trade union representatives participated as skilled workers in prototyping technology for page make-up and image processing. For the workers, control over their work process and the quality of work and results were paramount issues.

The motivation for engaging in alternative technology production was that the knowledge strategy projects of the 1970s in Norway (Iron and Metal), Sweden (DEMOS) and Denmark (DUE) had realised that existing production technology more and more often constitutes an insurmountable barrier preventing the realisation of trade union demands for the quality of work and a meaningful job (Bødker et al. 1987). Further, the rationale was that it could be more realistic to try to develop technology applicable for a whole industry rather than local unions formulating alternatives for each of their employers to implement. The project therefore set out to produce a 'demonstration example', showing that trade union development of technology would be a feasible strategy (ibid.).

The idea of cooperating with the technology companies and the newspapers aimed to bring the research prototypes closer to commercially viable products that could be tested in real-life situations. However, it turned out, not too surprisingly, that management and even the funding research agency were not interested in the changes in work organisation and training that the research project had crafted. Further, the journalists' union also lost interest in the idea as they began to pursue other interests – an issue that occurs all too frequently in participatory projects, as workers and community groups also have other things to do (Ehn 1988). As a result, the prototypes were never turned into commercial products. Interestingly, the problems of vendor monopoly and worker or user lack of interest still loom large in the challenges facing participatory practitioners.

However, through the technology laboratory, the UTOPIA project went one step further than the earlier work: it brought workers out of their workplace into a joint space where they could freely experiment and imagine the types of digital tools they might need. This was long before prototyping and off-the-shelf applications were common, and so it was difficult to help spark people's imagination of future alternatives. Even now, with all the building blocks of interface designs, applications and social networking software, the problem of *imagining* alternative solutions still rears its head. The UTOPIA project's concept of setting up laboratory-like settings where designers/researchers and prospective users could work together to mock-up or prototype new technologies and new ways of working, is one of the lessons that still stay with us. Further, the UTOPIA project developed and designed new ways of looking at future possibilities that inspired and influenced Participatory Design methods (see Chapter 6) and Participatory Design tools and techniques (see Chapter 7).

The Florence project was another example of a research project with design and intervention strategies. Unlike the UTOPIA research, though, it brought the focus directly back into the workplace (Bjerknes and Bratteteig 1987, 1988). A motivation for the project was to build computer systems for nurses' daily work, focusing on communication and the professional language and skills of nurses in order for them to gain control over the computer systems and their own working conditions. And a central idea was that technological solutions should be tested in real work situations. Florence was also carried out by researchers and workers, this time nurses at two hospitals in Oslo, Norway, and two computer scientists and an anthropologist from the university, although in this case the union was not a partner.

As with earlier projects, Florence focused on workers whose voices were rarely heard, and feminist concepts from the period were an important influence, particularly in relation to fostering an environment where nurses felt comfortable to speak out about what was important in their work. While the project did not involve unions it did actively engage nurses who saw their work through the eyes of their patients, rather than through the lens of doctors' orders or computerised procedures.

The project made a prototype based on the existing paper-based 'kardex' – the nurses' equivalent to the physicians' medical record. Reflecting on the final evaluation meeting, the

researchers note (Bjerknes and Bratteteig 1988) that while the nurses used the system, it was not easy to grasp how the system actually fitted their work. Developing an understanding of the way work gets done and listening to the voices of the actual people in the field remain key lessons that still live on with Participatory Design today – lessons that continue to present an enormous challenge in the national and international development of medical records systems.

The Florence project was among the pioneers – for the purpose of designing new computer applications – in applying observations of real work situations in combination with more detached techniques such as interviews and workshops. Inspiration for this came from, and overlapped with the work of, American anthropologists, as we shall see in the next section.

While the motivation for Florence was to help the nurses give voice to their concerns at work, a strict workplace orientation on the nursing profession was difficult to maintain; other occupational groups, like physicians and nursing assistants, wanted to be considered as well. This is a problem that remains today as different groups or stakeholders within an organisation may have conflicting power relations and thus differing views about what activities an application should support. There are no easy fixes for this problem, but as we will see in the concluding part of this chapter and in subsequent chapters, there are principles and tools and techniques that help groups speak for themselves.

Ethnographic analysis of relations between work and technology

Another important part of the Participatory Design heritage is the influence of the work practice and technology research area at the Xerox Palo Alto Research Center (PARC) on early explorations of the role of ethnography in Participatory Design. Anthropologists at PARC were involved in studies of the relations between people, technology and work in the service sector in the US. They performed detailed analyses of the ways work gets done, the in situ rationales that workers apply, and the technologies and other resources they bring to bear. They were able to show how new technologies, when introduced into the workplace, shape the working practices of office workers and service technicians and the people with whom they interact. Their work demonstrated the consequences of relying solely on the managers' or information technology designers' understanding of work, and began to argue for the importance of involving workers in the design of new technologies.

These workplace studies dealt with: office workers (Wynn 1979; Suchman 1983; Suchman and Wynn 1984; Blomberg 1987); service technicians (Orr 1990); and ground operations at an airport (Brun-Cottan et al. 1991). In her much acclaimed book *Plans and Situated Actions,* Suchman gives a profound critique of the then dominant cognitive science approach to technology design as it relied on an understanding of human activity where plans direct action. She advocated an alternative view, where plans are seen as potential resources for action but need to be understood as they unfold in situ (Suchman 1987, 2007).

Later, the anthropologists at PARC joined forces with computer scientists to find ways that such detailed studies of work practices could inform a participatory approach to the design of technology. Here we will just mention some of the earlier works, as Chapter 5 goes into more detail. Suchman and Trigg (1991) and Jordan and Henderson (1995) describe how video recordings may be used for analysis and design. Blomberg et al. (1990; further developed in Blomberg et al. 1993) were among the first to provide a methodological introduction to the guiding principles of ethnographically informed analysis when it is conducted as part of technology design. Ethnographic approaches strive to gain an appreciation for what workers are doing and how they see things. Blomberg et al. (1993) describe 'four main principles that guide much ethnographic work':

- [Ethnographers make] a commitment to study the activities of people in their everyday settings … as opposed to a laboratory or experimental setting.
- [Ethnographers hold] a belief that particular behaviours can only be understood in the everyday context in which they occur.
- Ethnographers describe how people actually behave, not how they ought to behave.
- [E]thnographers are concerned with describing behavior in terms relevant and meaningful to study participants. This contrasts with the requirements of survey research where relevant categories must be known before the study begins.

(Blomberg et al. 1993, pp. 125–6)

In the rest of the book you will find many examples of how ethnographically informed analysis has found its way – with or without the involvement of anthropologists – into the design of work-related technologies, as well as other forms of Participatory Design.

Voice and democracy: theoretical roots for participation

In the deep-rooted system of Participatory Design heritage, there are many theoretical currents that have served to nurture active involvement in technological design. It was apparent in the cases described in this chapter that supporting new voices meant breaking with the Cartesian dualism inherent in traditional computer development work. As Ehn, one of the UTOPIA project researchers, explained it in *Work-Oriented Design of Computer Artifacts*,

> The prototypical Cartesian scientist or system designer is an observer. He does not participate in the world he is studying, but goes home to find the truth about it by deduction from the objective facts that he has gathered.
>
> *(Ehn 1988, p. 52)*

And, growing out of the Xerox PARC studies mentioned earlier, Lucy Suchman's book *Plans and Situated Actions* (1987) set the stage for understanding that human actions – in and outside the workplace – are not simple steps followed according to plans, but rather actions situated in the concrete situations before us.

From inside the world of computer science, influential works such as Winograd and Flores's *Understanding Computers and Cognition: A New Foundation for Design* (1986) critiqued the Cartesian and rationalistic traditions of system design, and set in motion a new framework for understanding that 'in designing tools we are designing ways of being' (p. xi). And setting these ideas in motion, Schön's book, *The Reflective Practitioner* (1979), helped early experimenters understand how both workers and designers could actively reflect on their work in the midst of concrete situations.

Here we focus on three crucial roots in the early history that both inspired projects and helped set up working principles and practices: (1) *Political economy*, workers' movements and rights in the struggles between workers and management/capital; (2) *Democracy*, the belief in the right of people to express themselves in governments and communities, and its extension in the workplace and in the design of technology; and (3) *Feminism*, the grass-roots movement of women asking questions and initiating change through direct actions.

There are, in addition, multiple strands of influential thinkers and writers whose work has influenced the need for participatory actions about technologies. Clearly, a movement as broad

as this has numerous starting points and what are often called 'birth stories'. Our intention is not to seek out these 'birth' myths, but rather to weave heritage stories together in a pattern that newcomers can understand. It should be noted that computer system design, as technological practice, was embedded in top-down thinking, and that books like *Understanding Computers and Cognition* (Winograd and Flores 1986), as well as Herbert and Stuart Dreyfus's *Mind over Machine* (Dreyfus and Dreyfus 1986), were instrumental in breaking down the barriers that formal rule-oriented computer science placed in the way of user participation.

The early Iron and Metal workers project in Norway was based in a Marxist critique of capital and the mechanism through which the power of capitalist control pushed workers into corners where their skills and knowledge were taken away in the interest of faster, cheaper production. Later projects, such as UTOPIA with the graphic workers, sought to directly confront management rule with creative worker involvement. These works were inspired by Braverman's *Labor and Monopoly Capital* (1974), which showed that management, acting in the 'best interests' of corporate boards and shareholders, got more labour out of workers by a process called 'de-skilling' – removing the knowledge of workers from their daily tasks and embedding it into the control of technical systems – both administrative and machine- (computer) driven. In *In the Name of Efficiency* (Greenbaum 1979) Greenbaum showed that the de-skilling process, while being transported to the very computer programmers and operators who were thought of as 'highly' skilled, was not a natural or inevitable occurrence, and therefore could be fought.

For many, the pragmatic philosophy of John Dewey has been inspirational as it addresses active engagement in creating and maintaining democratic practices. While much of Dewey's writing has been directly applied to education, it has resounding notes for Participatory Design of technologies. At root is the concept of bottom-up active engagement through personal experience. This means, of course, that ideas and actions that grow out of one's experience in a work situation, as in an educational experience, form a cornerstone in shaping the tools that are applied to that experience. In essence, Dewey's beliefs go far beyond the idea of user involvement, or simple user-centred design. Like the early heritage cases described in this chapter, his work seeks not only to help people gain (and retain) knowledge but to use that knowledge towards broader, more fundamental goals such as freedom and democratic rights.

On the issue of freedom, for example, Dewey argues that:

> There can be no greater mistake, however, than to treat freedom as an end in itself … For freedom from restrictions, the negative side is to be prized only as a means to freedom which is power; power to frame purposes; to judge wisely, to evaluate desires by the consequences, which will result from acting upon them; power to select and order means to select chosen ends into operation.
>
> *(Dewey 1938, p. 64)*

Feminism is a third strand underpinning participatory actions. An integral part of feminism gives voice to personal experience. In the 1960s, women around the developed world acted upon their experience and developed grass-roots practices to gain and regain voice and control over their own lives. By the 1970s and 80s these actions were supported by a wealth of literature giving voice to previously invisible thoughts and actions. In the sciences, for example, Evelyn Fox Keller (1985) asked why 'objectivity' and 'impersonal judgment' were the basis of what was considered good science. And, by extension, research like the Florence project with nurses asked why computer systems designed for nurses should be designed by systems professionals without the experience and personal knowledge of nurses' daily work (Greenbaum 1990). In fact, today,

feminist movements, including those now strongly based in developing countries, are giving voice to previously invisible questions and actions, examples of which will be given in Chapter 10.

Reflecting on heritage: guiding principles

The heritage of Participatory Design is not set in stone. Movement from simple involvement to active participation has many beginnings in different situations. However, for those entering the field we offer our interpretation of a set of basic principles. Further, we acknowledge that such principles have been practised in different ways because of power relations in local conditions, as well as the ethical and political concerns of individual Participatory Design projects.

Understanding the conditions for and the consequences of 'in some way' actively including people in technology design and implementation has been the glue that keeps this maturing field of academics and professionals together. The principles and practices of these groups have further been stimulated by ongoing discussions of the theoretical and political underpinning of participation, as well as experimenting with new ways of developing methods that facilitate participation.

While the early cases described in this chapter grew out of strong union movements, the basic set of beliefs and practices lives on in areas where trade unions are not a central focus of power relations or may not exist. These principles are based firmly on:

- *Equalising power relations* – finding ways to give voice to those who may be invisible or weaker in organisational power structures. Clearly, in the workplace settings described in this chapter both management and technical experts had more power than the workers on the shop floor, thus giving voice to workers was a critical starting point. In community and local government settings it is important to help people with less money, power or influence to find ways of asserting their needs to those in power. This is an integral part of:
- *Democratic practices* – putting into play the practices and role models for equality among those some call 'stakeholders'. Democracy is often thrown around as a concept that is assumed to happen by itself but, as Dewey and others point out, it requires educated and engaged people acting on their own interests and in the interests of the common good. The projects described here made strides in attempting to bring participants up to speed in this process by educating them in technical jargon, where necessary, and engaging them in the process of project-building. But democracy does not happen in the abstract, and is rooted in:
- *Situation-based actions* – working directly with people in their workplace or homes to understand actions and technologies in actual settings, rather than through formal abstractions. As we saw from the studies in this chapter, the early projects broke the mould by moving away from formal, abstract technical description towards activities by and with people in their working environment. These actions gave rise to:
- *Mutual learning* – encouraging and enhancing the understanding of different actors by finding common ground and ways of working. As people with technical expertise work with workers on the shop floor – when they actually engage and listen and take note of conditions and questions – then both the technical experts and the workers have a chance to learn from each other. The process of mutual learning can give rise to:
- *Tools and techniques* – that actually, in practical situations, help different actors express their needs and visions. These early projects developed a range of techniques for active engagement through training programmes, paper-based mock-ups, prototypes and workshops. Later chapters will describe additional tools and techniques that have been added to a participatory repertoire. These tools are important for helping people develop:

- *Alternative visions about technology* – whether it be in the workplace, home, public place or elsewhere – ideas that can generate expressions of equality and democratic practices. And as mentioned earlier, alternative visions about technical choice are difficult to imagine, even with new software tools and applications. But the book returns to this issue later on.

The pre-1990 heritage cases described in this chapter each experimented with confronting several of these guiding principles in order to give people a voice in technology that affected their daily lives. The following chapters proceed from these roots, expanding on lessons learned and problems left unsolved.

Notes

1 Simula, considered the first object-oriented programming language, was designed to simulate traffic flow patterns for streets. Instead of the focus on procedures, which marked all earlier programming languages, Simula introduced the concept of objects – or data elements which could be integrated into any part of the program.
2 NJMF is a Norwegian acronym for Norwegian Iron and Metal Workers Union.
3 DEMOS is a Swedish acronym for Democratic Control and Planning in Working Life.
4 DUE is a Danish acronym for Democracy, Development and EDP (Electronic Data Processing).

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