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# UTOPIA: Participatory Design from Scandinavia to the World

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**Abstract.** Studies and design of information technology support for workplaces, especially workshop floors, office floors and hospital floors, have a strong tradition in Scandinavia, involving workplace users and their trade unions and other stakeholders. The projects emphasize the active cooperation between researchers and workers in the organizations to help improve their work situation. This tradition is analyzed in its historic perspective, starting with the roots in Norway in the early 1970s while highlighting the seminal UTOPIA project from the early 1980s. Today computer use and interaction possibilities are changing quickly with use contexts and application types radically broadening. Technology no longer consists of static tools belonging only to the workplace; it permeates work activity, homes, and everyday lives. The Scandinavian tradition of user involvement in development is facing up with the challenges of new contexts. The influence on past and current practices for international ICT system design is described and analyzed.

**Keywords:** Cooperative design, human computer interaction, participatory design, Scandinavian model of ICT systems development, user involvement, working life applications

## 1 Introduction

The study and design of information technology support for workplaces, especially workshop floors, office floors and hospital floors, have a strong tradition in Scandinavia involving workplace users, their trade unions, and other stakeholders. The projects emphasize the active cooperation between researchers and workers of the organization to help improve their work situation.

Since the early days, the obvious idea to involve as early as possible users in systems and interface design with low and high tech prototypes, has become a standard to which most developers at least pay lip service. That the practice is not necessarily followed is usually because of time constraints and lack of insight rather than reluctance. However, there are also inherent difficulties.

In the early 1970s, computer technology and use in Scandinavia was dominated by mainframes in “computer centers,” guarded by technicians in white frocks, with text

input and output, and rudimentary communication between installations. Few were aware of the future that promised broad and powerful use of computers that were developing in laboratories, especially in California.

### 1.1 Historical Roots – Kristen Nygaard

We all owe great gratitude to Kristen Nygaard as the father of worker involvement in workplace for computer development and use. His project with the Norwegian Iron and Metal Workers Union (NJMF) in 1972 made an initial move from traditional research and development of computer systems to working *with* people, directly changing and making more active the role of the local unions [1, 2]. This project has had great influence on all succeeding research and development of user participation in systems development leading into cooperative (or participatory) design. In general, the tradition has developed strategies and techniques for workers to influence the design and use of computer applications at the workplace. Not only did Kristen give a generation of academic computer scientists in Scandinavia their mother tongue for computer programming, SIMULA, inventing all main object-oriented concepts [3, 4], he also gave us the tradition of workplace user involvement.



Kristen Nygaard (1978)

Fig. 1. Kristen Nygaard (1926–2002).

### 1.2 Inspiration to Other Scandinavians

Kristen soon inspired Danish, Norwegian, and Swedish young computer and information science researchers and students. One of these was Pelle Ehn, who in 1975 initiated the DEMOS (DEMOKratisk planering och Styning i arbetslivet = Democratic Planning and Control in Working Life) project [5, 6]. A similar project was DUE (Demokratisk Utveckling og EDB = Democratic Development and Computer Processing) with researchers from Aarhus such as Morten Kyng [7].

These projects emphasized the active cooperation between researchers and workers of the organization to help improve their work situation. One strong goal was to ‘give the end users a voice’ in design and development of computer support in work places, thus enhancing the quality of the resulting system. The projects were part of the start of the “Scandinavian tradition” in system design.

## 2 UTOPIA

Based on the DEMOS and DUE experience and the shortcomings when using and adapting the technical systems at hand, Pelle Ehn and Morten Kyng decided to try a more offensive (“utopist”) strategy for worker involvement – direct participation in all design and development phases of computerized tools and systems in the workplace.

They found a good partner through their contacts with newspaper graphic workers, the Nordic Graphic Union (NGU), which became so interested that it financed half-time participation of six graphic workers from Stockholm and Aarhus, and formed a reference group led by the Norwegian NGU board member Gunnar Kokaas.

The natural choice for the project leader was Pelle Ehn, then researcher at ALC, the Center for Working Life in Stockholm, from which an interdisciplinary group with social and information sciences background became involved.

NADA’s (the KTH Computer Science department) involvement came when Pelle, whom I knew from other contexts, asked me about our interest to contribute with “technical imagination.” As head of department, I could get us, including about five other young researchers, involved in this for NADA somewhat unorthodox project. The other university partner was DAIMI (Computer Science) at Aarhus University.

UTOPIA is a somewhat far-fetched, acronym: Utbildning, Teknik Och Produkt I Arbetskvalitetsperspektiv (workable in all Scandinavian languages); that is, Training, Technology and Product in Work Quality Perspective, inspired by the name of classical book on an ideal society.



**Fig. 2.** From an edition of Thomas More’s UTOPIA from 1516.



**Fig. 3.** UTOPIA participants 1981–1986, from ALC, DAIMI, NADA, NGU.

## 2.1 Objective

The overall research objective of UTOPIA was to contribute to the development of methods for involving end users in all phases of design and development of IT support for their activities. This objective was based on experience from a concrete

case, the development of powerful skill enhancing tools for graphic workers in the light of the emerging graphic workstation technology. Quality of work and product was crucial. Both technical and social prerequisites, as well as obstacles and limitations were examined. The labor processes of page make-up and image processing in integrated computer-based newspaper production were in focus.

## 2.2 UTOPIA Activities

Main activities during UTOPIA were as follows.

- *Mutual learning* between the active participants: graphic workers, computer and social researchers
- *Common study tours* to graphic industry exhibitions and to important laboratories in the US, including Xerox PARC and Stanford University, where Terry Winograd was an important contact and supporter
- *Requirement specification* for a system for newspaper text and image pre-press production, under development by a Swedish manufacturer
- *Studying a pilot installation* of the image system in real production at the Swedish newspaper Aftonbladet
- *Dissemination*, especially to the graphic workers and to the scientific community, see below under “International recognition.”

They produced twenty “UTOPIA reports” in Swedish or Danish on different aspects of technology, work organization, and work environment. All (about 50,000) members of NGU received the final, 48-page edition no.7 of the project newsletter, Graffiti, translated into Danish, Finnish, Norwegian, Swedish, English, and Italian.

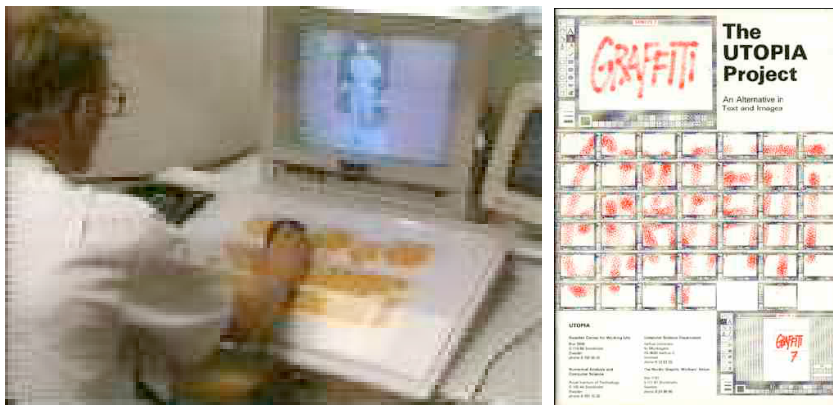


Fig. 4 & 5. Pilot installation at Aftonbladet & the newsletter GRAFFITI.

## 2.3 UTOPIA Tools

The tools and methods in the laboratory were innovations in the early 1980s. These include:

- Color slide mock-ups with picture sequences that were also pasted on the walls, for simulation of work processes
- Low-tech mock-ups of equipment (wooden mouse, cardboard laser writer etc.), material and menus (paper and plastic)
- A graphic workstation for illustrating prototypes of computer based tools
- A tool kit (box with waxed cards) for modeling and experimenting with work organization

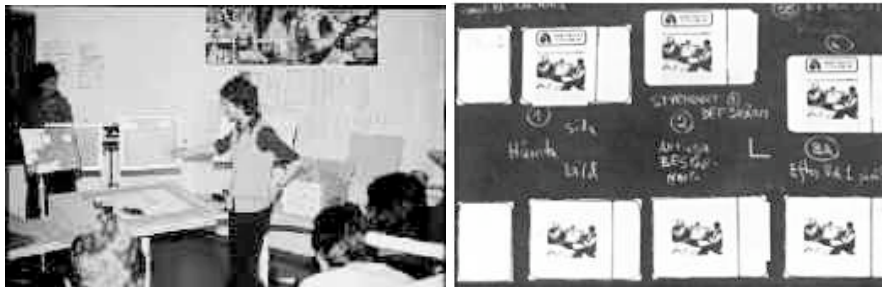


Fig. 6 & 7. Mock-up situation & work process simulation.

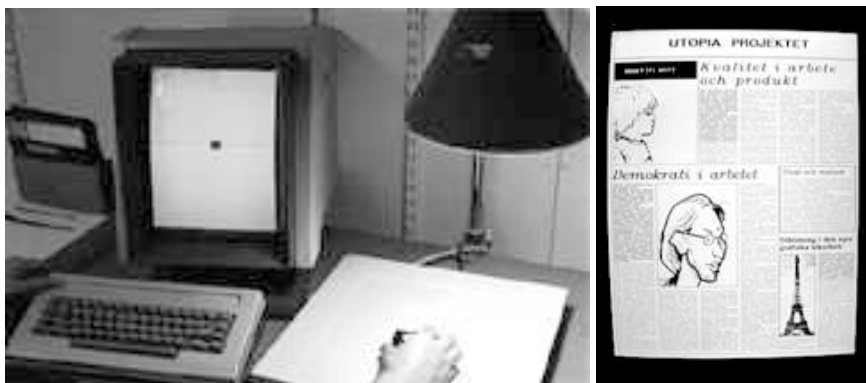


Fig. 8 & 9. Graphic work station with A4 screen (Perq, 1983, first commercially available in Scandinavia) & page make-up simulation.

## 2.4 UTOPIA Results

UTOPIA became a seminal project on methods for involving end users in all phases of design and development of IT support for their activities.

The main results were not so much the pilot computer tool built and used at Aftonbladet as compared to the experience and methods:

- *for the Nordic Graphic Union members*, who from UTOPIA knew, at least as well as their employers, the pros and cons of the emerging technology and what to require from it, for functionally and socially acceptable tools and systems in their work

- *for the researchers*, the challenging insight that the human interface is very important for how useful a computer based tool will be, inspiration for establishing IPLab (Interaction and Presentation Lab) 1985 at NADA and similar efforts in Aarhus
- *for the researchers and the design community* in general a methodology, Cooperative Design / Participatory Design, for involvement of end users together with interface designers and program developers on equal footing in computer application projects

### **3 UTOPIA Long-Term Experience**

In retrospect, we can see the following four main features of quality and experience from UTOPIA.

#### **3.1 Where Workers Craft Technology**

This characterization comes from the MIT Technical Review [8], with the observation that UTOPIA showed that it is possible to design information technology based on use requirements such as work organization, work environment, forms of cooperation, and working skills. At that time, this idea was almost blasphemy in some management circles and more mainstream today.

#### **3.2 Setting the Stage for Design in Action**

UTOPIA was precursor to current practices in interaction design in staging active design exercises such as the organizational toolbox and use of mock-ups and prototypes as a way to involve end users in design. Crucial are the means to create meaningful design objects for all participants (different groups of users and designers).

#### **3.3 Playing the Language Game of Design and Use**

UTOPIA gave a lasting contribution to the theoretical understanding of design with users through contributions such as Pelle Ehn's [9] and Susanne Bødker's [10] dissertations and several other papers. Today, a "Communities of Practice" perspective is the mainstream for understanding design and learning.

#### **3.4 Bringing Design to Software**

The title of this section, borrowed from Terry Winograd [11], underscores the fact that we could view UTOPIA as a "paradigmatic example" of how design thinking and practice can be brought into software development.



## **4 International Recognition – Cooperative / Participatory Design**

The UTOPIA and “Scandinavian model” experience formed a main theme of the 1985 Computers and Democracy conference in Aarhus as shown by the seminal paper [12]. At the 1988 CSCW (Computer Supported Cooperative Work) conference in Portland, Oregon, UTOPIA results appeared in an invited paper [13]. There were several more contributions by UTOPIA members and others from Scandinavia on cooperative design and collaboration. Many scientists from the US and Europe were involved and they greatly contributed to the further development and spread of these ideas.

The term “Scandinavian model of ICT design” is frequently used today in many contexts all over the world to characterize the approaches and practices emanating from these experiences. The “secondary result” of UTOPIA, the methodology, with ingredients such as low-tech prototyping, early design sessions with users, and iterations has had a great impact on ICT design in general.

We still maintain the term “cooperative design” but we recognize that the term “participatory design” has gained greater international use. In addition, biennial international Participatory Design Conferences (PDC) have taken place since 1992, arranged the first five times in the US, and then also in Sweden, Canada, Italy and Australia.

## **5 Impact on ICT Design in Practice since the 1980s**

The UTOPIA approach, with ingredients such as low-tech prototyping and early design sessions with users, has had a great impact on ICT design in general. This is the case not only where the methods were a main ingredient as in cooperative design / participatory design, but also as part of current common practices in HCI and in CSCW in general, and in later methodologies such as consensus participation, contextual design [14], and cooperative inquiry [15].

Since then, the methodology has developed (e.g. extended to involvement of all stakeholders in system design projects, see [16]) and been complemented with a battery of other methods into strategies for involving users for better-suited IT support. Some examples, many from Scandinavia, are use scenarios [17], technical probes [18], video prototyping [19], vision games [20], close cooperation with joint user experience between ethnographer, industrial designer and programmer [21], and overall process design. For example, the Cooperative Experimental Systems Development [22], and MUST [23] have provided an industrial method for the early phases of design.

The methodology has in my practice been used successfully for design, study and evaluation of ICT support for people such as graphic workers, office workers, programmers, teachers, school children, family members for intergenerational communication, call center workers, and artists [24]. A current project based on the

UTOPIA experience is user assessment of IT quality in workplaces, the Users Award [25]. Other researchers and developers in the cooperative design tradition could extend the list of projects considerably.

## **6 Conclusions – Still as Relevant Today**

It is clear from the aforementioned experiences that the “Scandinavian model” for ICT system development and use, as it was conceived in the 1970s and 1980s notably through the UTOPIA project, has been of utmost importance for forming design practice of today. It is often argued that the conditions in Scandinavia in the 1980s were uniquely favorable for a worker driven IT project, both politically and academically. There were resources available both for participation (in UTOPIA from trade union funding) and for research and development (from academic and research institute funding, including Arbetslivscentrum, for working life studies). This does not mean that the funding was without obstacles. The funding of the participation of a traditional computer science department NADA at KTH depended on its own priorities. The funding authority, STU, first denied it; later, it obtained a technology procurement grant to the newspaper Aftonbladet.

Though projects with such extensive work place user participation are rare, we should consider UTOPIA as a movement showing what is achievable and it should serve as an example for ambitions even under less favorable conditions.

The previous section showed many examples of methods developed in the 1990s that were improvements and modifications of the original methods and practices of the cooperative design approach for different conditions and situations; they illustrate the sound basis of the approach. The approach gives users a voice, an understanding, and knowledge as well as the cooperative design methodology. Even at early stages where they did not know the purpose of the design, it is important to focus on multiple users and uses and on the experience of use. Post-design evaluation was not enough. For exploring the many innovative new forms of interaction today and their use in mixing old and new technologies, multiplicity and ad-hoc configuration everywhere and anytime, for tailorability, adaptation and awareness in networks and communities, the “Scandinavian” cooperative design with users is needed at least as much as before.

Often the problems of user participation are discussed from the point of view of researchers getting access to the users. Yet, we should see user participation from the point of view of the conditions of the participation process, that is, how the conditions are set for users to participate together with designers (and managers). Experiences from cooperative design projects show problems that cooperative design research still needs to deal with.

There are indeed a number of difficulties to overcome. It is important to find the right set of participants, the right tools and techniques as well as the right location and physical space for cooperative design. Furthermore, it is important to create a setting where all involved groups can make active contributions that are meaningful to themselves as well as to other groups of participants. In our experience, this usually requires a serious change in attitude from some of the groups involved.

It is often seen that influence in non-work use of technology goes through consumerism and “voting with the users’/buyers’ feet”, which could also be a lever for workplace democracy when it comes to ICT support. The ideal that everyone could have full participation and control, and make use of head, hand and heart in their whole life, including work, can move closer as a result of cooperative ICT design and use.

“Common” workplaces can be as challenging and inspiring, e.g. in UsersAward [25], as the more “fancy” new mobile workplaces for media design etc. We need to work with all, old and new, workplaces in the spirit of “Digital Bauhaus” [26].

**Acknowledgments.** The cooperative design tradition owes its development to a large number of practitioners and researchers. I recognize the importance of discussions with many of them for our understanding of possibilities and limitations.

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