Cooperative design of communication support for and with families in Stockholm – communication maps, communication probes and low-tech prototypes

Bo Westerlund, Sinna Lindquist, Yngve Sundblad

Författare: Bo Westerlund, Sinna Lindquist, Yngve Sundblad

Cooperative design of communication support for and with families in Stockholm – communication maps, communication probes and low-tech prototypes

Bo Westerlund, Sinna Lindquist, Yngve Sundblad
CID (Centre for user-oriented IT Design)
NADA, KTH
SE-10044 Stockholm, Sweden
+46 8 790 9100
[bosse, sinna, yngve]@nada.kth.se

ABSTRACT

In this paper we describe how the work in the InterLiving project ("Designing Interactive, Intergenerational Interfaces for Living Together") has started with families as design partners and we report some early experience. The project has its point of departure in "the user end" by letting the families themselves describe how communication comes into their living together by drawing communication maps and using communication probes.

Keywords

Co-operative design, intergenerational communication, family, design partner, design, communication probe, communication map, low-tech prototyping.

INTRODUCTION

The most successful technologies are rarely the catchy ones that appear as short clips in the evening news; they are more often the subtle ones that people find they cannot live without. Talking cars have come and gone, but post-it notes are here to stay. Our goal in the InterLiving project is to develop artefacts that disappear into the fabric of everyday life; that are taken for granted, but are essential. Of course, such technologies are more difficult to evaluate, so we must also develop new ways of understanding their importance. Rather than developing technology on our own and presenting it to end-users in focus groups or laboratory settings, we will design new artefacts together with families and evaluate them in vivo, through long-term studies.

Thus, InterLiving wants to offer an alternative to today's technology-push and work-centred development of new computer artefacts. Rather than emphasising productivity, InterLiving is about connections among human beings. We begin with real people, with complex family lives, and seek to understand how to integrate new technology in subtle, non-obvious ways.

New technologies often come at a cost. The much-

appreciated car phone that lets you call to say you will be late picking up the children because of a traffic jam becomes a nuisance when it rings during dinner. Technology makes it too easy to place a higher value on strangers at a distance than family members in the same room. While useful, even essential at times, the telephone is an intrusive technology that disrupts as well as enhances daily life. In contrast, we hope InterLiving technologies will be less obtrusive and merge seamlessly into daily life.

Families as design partners

We believe that co-operative design is critical throughout the design and development of all technologies and that the family members recruited for the InterLiving project should be treated as design partners, not subjects in an experiment. Our research team has extensive experience in partnering with users, both with professionals, as in [Bødker, et. al., 1987], [Sundblad & Tollmar, 1995], [Mackay et. al., 2000], and with children, as in [Druin, 1999], [Benford et al., 2000], [Alborzi et al, 2000]. See also [Bødker, Ehn, Sjögren & Sundblad, 2000].

In the EU FET (Future Emerging Technologies) research planning there is a strong awareness of the importance and value in bringing in end users as design and development partners, see [Wejchert 2001].

We expect the approach of working with families, as design partners, will provide a unique opportunity to explore and reinterpret new technologies in the context of their use. We are especially interested in emergent innovations and will encourage family members to reflect on their use-in-context throughout the co-design phase of the project.

The InterLiving project

InterLiving is a cooperative project between researchers from different scientific disciplines; ethnology, psychology, industrial design and computer science, and six families, three in Sweden and three in France.

InterLiving is coordinated by CID (Centre for User Oriented IT-Design) at KTH (the Royal Institute of Technology) in Stockholm, Sweden. Partners are INRIA (Institut Nationale de Recherche en Informatique et Automatique) in Paris, LRI (Laboratoire de Recherche en Informatique Université de Paris-Sud) and HCIL (the Human-Computer Interaction

Lab) at the University of Maryland. InterLiving is funded for three years from 2001 by the EU IST FET research initiative "The Disappearing Computer".

Aesthetics

It is not only a matter of understanding what the artefacts the families are willing to place in their different homes should do and how they should work. We need to get the whole picture, which includes the products' appearance and expression. "We surround us or not with all kinds of things. There are certainly practical reasons but we also have more subtle, symbolic reasons for doing so."[Nippert-Eng, 1996]

We need to be able to design the artefacts in such a way that the families will accept to have them in their homes. This can of course include all kinds of aspects like status, exclusiveness, etc. The results could even involve "invisible" design, where the technology is hidden.

Since we only have to consider the situation when the artefact is in the home we can focus on the "needs and desires" that the families express. We do not have to consider other aspects such as marketing, branding, manufacturing, distribution, disposal, recycling and price.

FINDING AND SELECTING THREE FAMILIES IN SWEDEN

In February we advertised in Metro, a free morning tabloid that is available on all public transportations in Stockholm, and which claims to be read by around 500 000 people. It was a small advertisement with short information, including expectations of at least three generations and a three-year involvement.

Around 40 people responded to the ad, most of them by phone. They asked questions about "rules" of commitment and also explained why they were interested in participating. We sent them all a letter with a more detailed description of the InterLiving project. Those that still were interested after reading the letter were asked to fill in a form with names, ages and addresses of the persons in the families willing to participate in the project.

We got seven responses to select from. All the households included in the family must live reasonably near Stockholm to make it possible for us to serve the technology that we need to install in their homes later in the project.

The research group made a few more criteria for the participating families: We also wanted the three families to differ as much as possible from each other concerning ages, computer habits and geographical spreading, since different surroundings requires different communication practices.

The three families that were chosen were distributed in ten different households. We are well aware of that this choice is not a selection of average Swedish families! It is more a choice of motivated and open-minded people that are willing to spend time working together with their family members and us.

THE FIRST MEETING

One Saturday in March, 2001, we gathered the families at CID's project agora for a rather informal meeting. We presented ourselves, the InterLiving project and other on-going research at CID. The families made a brief presentation of themselves. Their ages varies from nine months to 73 years in totally 10 households.

We also handed out and described communication probes, described below, one probe for each household.

Communication maps

We asked them to make a "map" to visualize the family's communications and relations. The maps would inform us of the families' communications, structure and relations. We also hoped that the maps would help the families to start thinking specifically about communication.

The three families were all given a 70x100 cm paperboard, lots of pencils, crayons, glue, scissors, magazines (for picture material), etc. to use. All family members were very engaged in creating maps corresponding to their different communication patterns and devices.

When they were finished the families were given the choice of presenting only to us researchers or to everybody. They did not hesitate to show and thoroughly describe their maps to everybody and were also very curious about the other maps.

Comments

Everyone was fascinated by how much the maps differed from each other both in expression and in what they emphasized; means of communication, time and events or places. (Se figures 1, 2, 3 and 4)

Figure 1. This communication map describes the different communication channels very detailed. Note that there is a lot of communication with the son's ice-hockey team (the lower right heart).

Figure 2. The father in the family above is often on travels. The contact is then kept with the help of mobile phone.
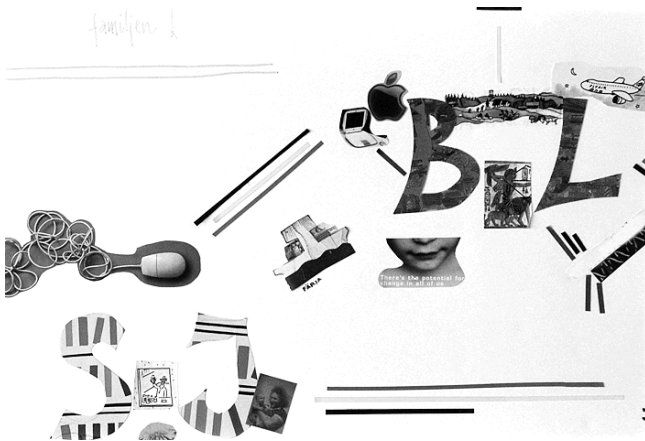

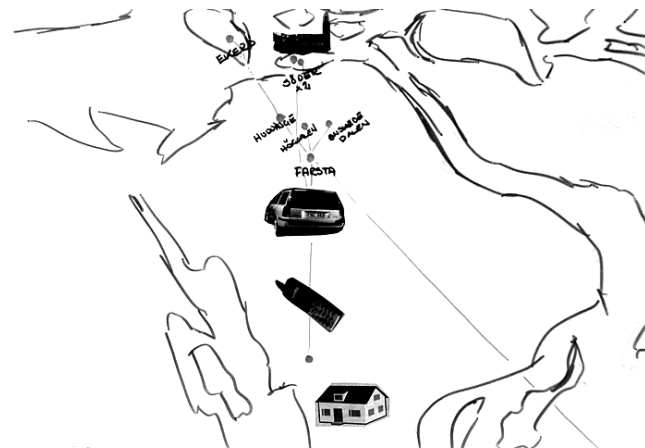*Figure 3. This communication map illustrates specific information about the different households.*

Figure 4. This communication map emphasises locations and events

COMMUNICATION PROBES (CULTURAL PROBES)

The basic idea is that the families themselves describe their communication through the probe. A kit of Cultural Probes is a package with different material "designed to provoke inspirational responses." "Like astronomic or surgical probes, they are left behind and hopefully return fragmented data over time." (after [Gaver et al., 1999]).

The kit that we gave each household contained a few items that we hoped would help the families give us researchers a good understanding of their communication, "communication probe". The material in our kit was chosen and produced so that the contents would have an integrated appearance. Se figure 5.
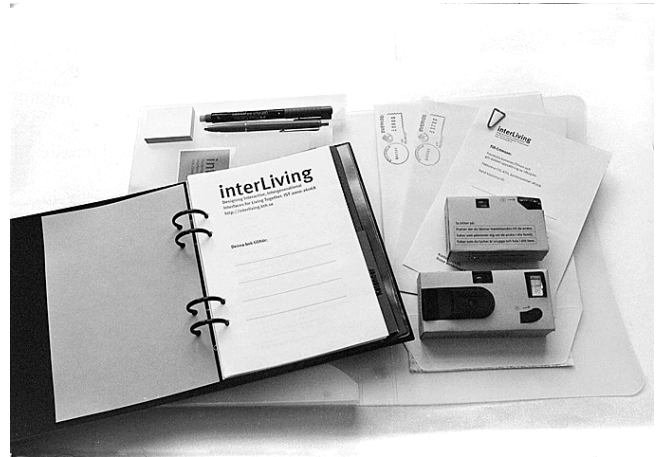
Figure 5. The material in the communication probes was chosen and produced so that the contents would have an integrated appearance. The binder contained the Communication Diary, the Note Book as well as some information about the project.

The families were given five weeks to enter information into the different probes and return them to us.

Each kit included:
• a Communication Diary where the families should write down all their contacts during two weeks; one "ordinary" week and one holiday week. The idea behind this was to receive more data because of the supposed different pattern of communication during an ordinary week and a holiday.

The pages in the diary were plain white without any headings or divisions. We did not want so restrict or press the families into filling any predefined space.

• a Note Book where they could write freely about contacts, appearance and the project. These pages were also plain white papers.

• a Binder where the Communication Diary and the Note Book were placed. In the binder we also put all the instructions, dates, contact information and the ethics statement. At the end there was also a plastic pocket,

encouraging the people to even put small artefacts or other "stuff" to expand the notes.

• two Disposable Cameras - with instructions to take photos of:
- Places where you leave messages to the others.
- Things that remind you of the others in your family.
- Things that you find neat in your home. (or ugly)

• a pen, one permanent marker to make comments on the photos.

• addressed envelopes with prepaid postage for development of the photographs (two copies) and sending commented photos and the other material to the researchers.

Comments

We decided to give each household just one type of camera for the three different tasks, instead of one for every task. The important part is when they get the photos back and write their comments on them with help of the questions.

They are several people that will take pictures and it is better if the cameras get used up quickly so they will get the photos back quickly, which also makes it easier to remember who took the photo and why.
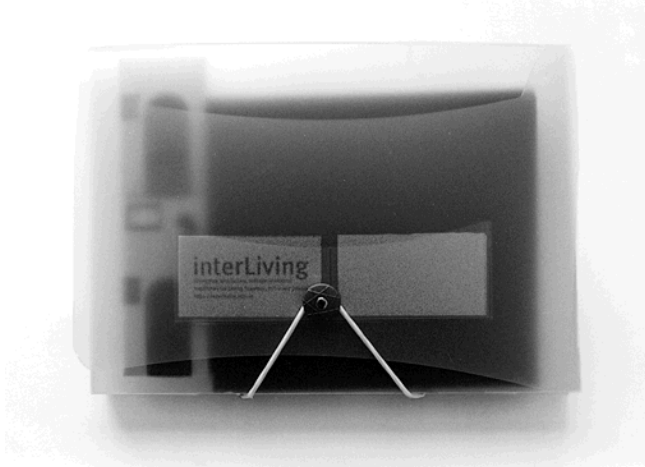
Figure 6. The folder that all the communication probes were delivered in.

Figure 7. The cameras had the three questions printed directly on them.

FOLLOW-UP VISITS TO FAMILIES

After a couple of weeks we visited each household for approximately an hour to answer new questions that had arisen since the first joint meeting. We also had a look around, so that we could put the probe photos into their context. It was also necessary for us to have an idea of what the family members meant when they wrote e.g. "home" or "in the kitchen" in their diaries and notebooks.

PROBES RETURNED

A month after the first meeting with the families the data from the probes started to arrive at CID. We studied the information and reflected upon the similarities and differences. This resulted in a set of questions that we thought would be interesting to ask all the households.

Comments

The probe method seems to have made the family members very aware of their different communications over time. It helped them to reflect and put words on some of their needs and ideas.

Of course we know that nothing is objectively neat or ugly. But we consider design and expression as part of functionality and by asking such a basal question we hope to start a process where the family members reflect on artefacts' appearance and character.

INTERVIEWS

The households were visited a second time for interviews. These lasted about one hour and were videotaped. The data from the probes was used in the interviews as well as questions.

Analysis

The videos from the interviews were analysed and an eight minute long summary video was assembled. The video was to be used for giving all the households some common ground at the second workshop. Short video cuts from the interviews were sorted under different themes:

• Privacy / Reachability

• Blackboard / Calendar

• Play / Games / Music …

• Help with homework / Company

• Expression / Characters

Figure 8. The second Swedish family workshop at CID's project agora.

SECOND WORKSHOP

The second workshop with the Swedish families took place at CID's project agora in mid June.

The workshop was divided into three basic steps:

* Use scenarios, where the focus was on problem description.

* Brainstorming to generate ideas for solutions

* Finally the families developed one idea each further and produced simple low-tech prototype artefacts accompanied with design scenarios.

Use scenarios

The families got twenty minutes to formulate scenarios where colloquial situations illustrate how the family communicates and how things can go wrong and/or there is room to improve the communication. We stressed that they should be specific, describe something that is real to them and not try to generalize.

Comments

All of the families came up with very interesting stories, rooted in their everyday life

The general theme was about misunderstandings due to incorrect assumptions about what others know. Children assume that what is told to one parent automatically also is known by the other. Parents assume that children can determine the degree of urgency of a phone call.

An example is "See you as usual":

Grandfather had agreed with grandmother that he would pick her up by boat. He said: "See you as usual", thinking of a certain landing stage. But she thought he meant another landing stage 100 meters away. It took an hour and much irritation and worry before they found each other.

All in all seven different use scenarios were presented.

The results produced were great, just the sort of colloquial situations we think are good as starting points for the future work.

The scenarios told by the families provide a very promising design material. They were detailed, founded in the patterns of everyday life. They were also clearly influenced by the families' new awareness around communication issues, as a result from previous project activities.

Within the scenario format the participants also expressed the emotional charge in the events accounted for: the frustration, longing and pleasure that underline communication activities.
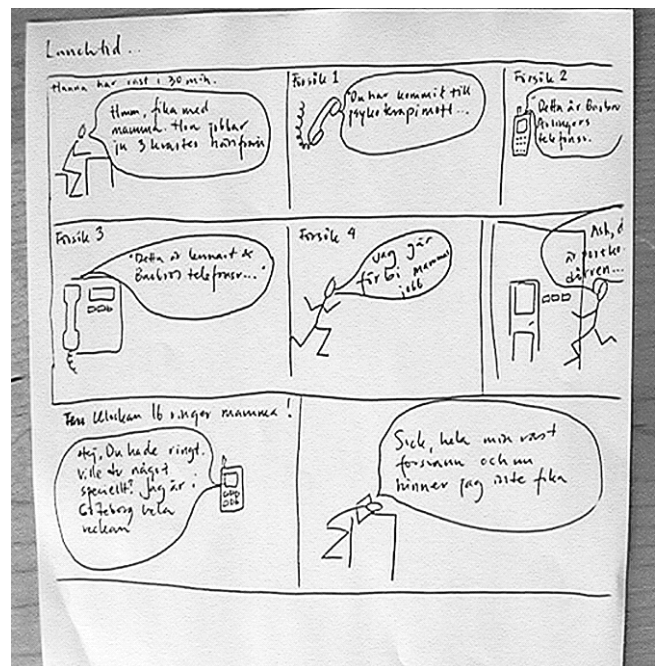

Figure 9. One of the use scenarios was drawn in a storyboard manner.

Generation of ideas

The families were then asked to generate ideas for solutions ("things") with connection to one of the scenarios above. Guidance for the exercise was: fast, many ideas, do not reject anything. They had thirty minutes for this phase.

As a help the families got printed forms where ideas could be filled in fast, in text and/or pictures. Seven different forms for seven different types of ideas:

• A boring idea
• A cheap idea
• An original idea
• A strange idea
• A smart idea
• A funny idea
• A technical idea

We prepared the forms in order to clarify the scope of this exercise both in matter of quantity (each family was given a pile of idea sheets) and quality. The labels helped to point out that no idea should be dismissed at this stage and to broaden the spectrum of solutions. The forms were also an invitation to playfulness, and we introduced them with a nonsensical example of a new innovation: the birthday cake fax machine.

The forms were helpful, especially for the children that received a format for idea generation, which they could complete without adult assistance. The nutty labels also helped saving some ideas from an early dismissal as being "too boring". On the other hand, for some of the participants the idea flow was stopped as they felt forced by the labelling on the forms to categorise finished ideas.

Figure 11. Looking for pictures in magazines.
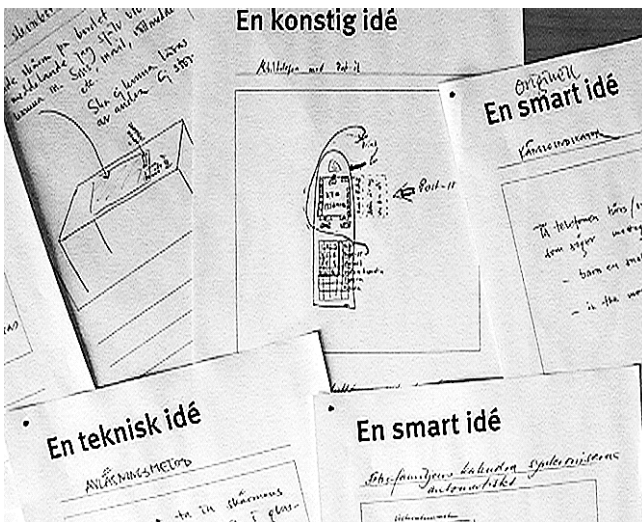
Figure 10. The ready labled sheets of paper that were used for generating ideas.

Design scenarios / Low-Tech prototypes

In the next step the families were asked to choose one of the ideas (things) and continue with them in three different ways:

- Scenario: How the new thing will be used
- Prototype: Simple shape of the thing that can be used when presenting the scenario.
- Image-board: A collage with pictures and newspaper clips etcetera, that gives a feeling of the aesthetic qualities imagined: colour, expression, material etc.

For this part of the workshop the families worked for one hour.

Figure 12. Building a prototype in clay.

Four concepts were accounted for by the families. The results were well thought out and clearly developed from the ideas. Three of the proposals have substantial common parts, which indicate interesting paths to investigate.

No group described their ideas also with the aid of an image-board (collage), probably because of lack of time and of lack of examples from us how it could look.

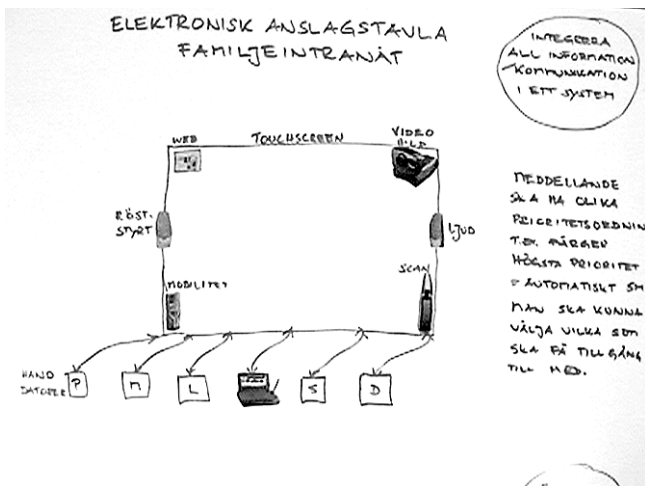All projects were described with the aid of simple and clear prototypes. Se figures 11-16.

Figure 13. One illustration clearly showing how the proposed system should work.

Figure 15. Design scenarios illustrated by simple low-tech prototypes made of cardboard used in scenarios captured with a Polaroid camera.

Figure 14. Another prototype during presentation.

Figure 16. A low-tech prototype used in the design scenarios above.

Persons involved in the workshop

There were nearly 30 people at the workshop, seventeen could come from the families and nine researchers. Three of the researchers were occupied with observing and taking video notes. One took care of lunch and other arrangements. The rest were involved in leading the workshop and observing the work at a closer level.

OBSERVATIONS

The families have already produced a great deal of data during these first months that will be thoroughly analysed and used as input for upcoming workshops and other activities.

The results from the workshop described above seem to more point to problems than solutions. We realise that we have to "dig further" in future workshops and other activities.

We have experienced, again, that users show great inventiveness when given the opportunity to think and

reflect over their needs in everyday situations. The three different and very fruitful aspects in the communication maps from the three families came with (and because of) the lack of more detailed guidance. The low-tech prototype design session produced interesting ideas.

The family activities to support can be described with four C:s: Communication, Collaboration, Co-ordination, Company.

Most of the ideas that came up as low-tech prototypes fall into the category Co-ordination and Communication, but we could observe ideas of Company type, mainly from the younger and older family members, that were not pursued because of the "power structure" in the families.

All through the second workshop, participants kept working within their family group.

The four design concepts were presented: three of them coming "collectively" from the three families, the fourth one being presented by one of the children. The three collective concepts all focussed on co-ordination and communication, whereas the fourth concept focussed on evasion (being able to fax oneself to another place). This highlights a fundamental question in working with families: How does the dynamics of the family structure influence on the proposals of the participants? What differences are there between collective proposals made by one family group, and individual proposals, or ideas developed by a cross-section of one type of family members (mothers, children, grand-parents)? These are questions that we will pursue in upcoming workshops.

Thus it is important in the future work to divide the families into age / role groups for performance of idea and design sessions. Very important in the co-operative design practise is to have the researchers / developers involved as partners on equal footing with the users in the design groups. This involvement could and should be stronger than in the work with the families so far.

FUTURE ACTIVITIES

InterLiving is a three year project of which the activities here described only represent the first half year at one of the sites. The intention is to further deepen the understanding of communication patterns and needs within and between households in the families and gradually design and bring in supporting technology with the families as partners. Thus the activities described above are the first steps of work in progress.

The next step will be a workshop in September where the families will divided into age / family role groups forming design teams together with researchers. Elaboration and analysis of the previous results as well as first ideas of supporting technology will be discussed and developed.

In parallel similar activities are conducted in Paris with the three French families. InterLiving researchers from France,

Sweden and USA participate in all workshops collecting and exchanging experience.

More long-term, supporting technology will be co-operatively designed and developed together with the families. The aim is that one result from InterLiving will be technology that supports intergenerational family communication, not just used as a transient new gadget, but used long-term as it fulfils real needs.

The other main result will be better understanding of communication within and between intergenerational households in families.

REFERENCES

Alborzi, H., Druin, A., Montemayor, J., Platner, M., Porteous, J., Sherman, L., Boltman, A., Taxén, G., Best, J., Hammer, J., Kruskal, A.., Lal, A., Plaisant Schwenn, T., Sumida, L., Wagner, R., Hendler. J. (2000). Designing StoryRooms: Interactive Storytelling Spaces for Children. *Proceedings of ACM Conference Designing Interactive Systems,* DIS 2000, ACM Press, pp.95-104.

Benford, S., Bederson, B., Akesson, K., Bayon, V., Druin, A., Hansson, P., Hourcade, J., Ingram, R., Neale, H., O'Malley, C., Simsarian, K., Stanton,D., Sundblad, Y., & Taxen , G. (2000). Designing storytelling technologies to encourage collaboration between young children. *Proceedings of the 2000 Conference on Human Factors in Computing Systems: CHI 2000,* ACM Press, pp. 556-563.

Bødker, S., Ehn, P., Kammersgaard, J., Kyng,M., Sundblad, Y. (1987). A Utopian Experience, *Proceedings of the 1986 Conference on Computers and Democracy,* Avebury 1987, pp.251-278.

Bødker, S., Ehn, P., Sjögren, D., Sundblad, Y. (2000). Co-operative Design — perspectives on 20 years with 'the Scandinavian IT Design Model', *Proceedings of the First NordiCHI Conference,* Stockholm Oct.2000, 9 pages.

Druin, A. (1999). Cooperative inquiry: Developing new technologies for children with children. *Proceedings of*

the 1999 Conference on Human Factors in Computing Systems, CHI 99. ACM Press, pp. 223-230.

Gaver, B., Dunne, T., Pacenti,E. (1999) Cultural Probes. *interactions,* 6 (1), Jan. 1999, pp.21-29.

Hindus, D. (1999). The Importance of Homes in Technology Research. *Proceedings of the Second International Workshop on Cooperative Buildings (CoBuild'99)*

Mackay, W.E, Ratzer, A.V., Janecek, P. (2000). Video artifacts for design: bridging the gap between abstraction and detail. *Proceedings of ACM Conference Designing Interactive Systems,* DIS 2000, ACM Press, pp.72-82.

Mynatt, E.D., Rowan, J., Craighill, S., Jacobs, A. (2001). Digital family portraits: supporting peace of mind for extended family members. *Proceedings of the 2001 Conference on Human Factors in Computing Systems,* CHI2001, ACM Press, pp.333-340.

Nippert-Eng, C. (1996). *Home and Work: Negotiating Boundaries*, University of Chicago Press

Rosenman, M.A., Gero, J.S. (1998). Purpose and function in design: from the socio-cultural to the techno-physical, *Design Studies 19*, pp. 161-186.

Sundblad Y., Tollmar K. (1995). The Design and Implementation of the Graphical User Interface for Co-Desk, *Computers and Graphics*, 19 (2), pp. 179-188.

Wejchert, J. (2001). Journeys across i^3, *i^3 Magazine,* no.11, July 2001, pp.28-34.