

Initiative in Participatory Design

Kim Halskov Madsen

Information & Media Science Department, Aarhus University

Niels Juelsgade 84

DK 8200 Århus N, Denmark

halskov@imv.aau.dk

<http://www.imv.aau.dk/~halskov>

ABSTRACT

Video and audio recording are commonly used within the PD field as a means of gaining insight into the work practice of the users but only rarely used as means for reflection on the participatory design process itself. The few exceptions are cases involving the use of scenarios and prototypes. This paper proceeds along this path but in contrast with the previous studies the current study concerns an interview-like conversation between designers and users very early on in a design project. The study of the designer-user interaction has a particular concern for initiative in participatory design.

Keywords

Participatory Design, discourse analysis, initiative

INTRODUCTION

According to the political motivation for participatory design "in a democracy people have the right to influence their own work place, including the use of technology" (Greenbaum & Madsen 1993 p. 47). Numerous PD approaches have been suggested as means of facilitating active user-participation and initiative in design as a vehicle for a democratic process. A recent survey by Muller, Wildman & White (1993) provides an overview of the diversity of PD practices including structured sessions like Future workshops and a large number of practices applying some kind of design artifact such as prototyping, mock-up and card-games. In another survey by Kensing & Munk-Madsen (1993 p. 81) 26 tools and techniques for knowledge development are listed most of which are documented in the literature. But according to the survey 7 of those have not been documented within the systems design literature including the PD field. Among those undocumented PD practices we find *interviews*. It seems that conventional interviews within the PD field traditionally have had a low status and been neglected in spite that probably most PD

projects include some sort of interview-like conversations between users and professional designers.

Use of video and audio recording are important tools for participatory designers when they try to come to grip with current work practice and the complex relation between technology and work. Suchman & Trigg (1991) report on the successful use of video when trying to understand the relation between technology and work in an airline operations room. They also refer to a study by other people from PARC (Tang, Minneman, and Bly) of interface designers working co-operatively. In a subsequent project by Blomberg, Suchman & Trigg (1994) video is used as a medium for reflection on the work practices and use of prototypes in a law firm. In more general terms Wall & Mosher (1994) and Brun-Cottan & Wall (1995) argue for the use of video as a means of representing users' work practice. Holmqvist and Andersen (1991) have used audio recording of language usage at a work place as a means of gaining insight into work practices. All of those projects have in common that they are concerned about the work practice of the people being designed for and do not use video or audio recording to gain insight into the design practice itself including the co-operation between designers and users.

As rare exceptions, Holmqvist & Madsen (1989), Trigg, Bødker, & Grønbæk (1991) and Timpka & Sjöberg (1994) have studied designer user interaction during design sessions using either video or audio recordings. The study reported in this paper proceeds along this path but whereas the previous three studies concern design sessions where tangible artifacts like prototypes and scenarios are used, this one concerns an interview-like conversation between designers and users very early on in a design project.

The conversation analysis in the main body of the paper has a particular focus on initiative. Though the PD tradition emphasizes the shared goal of end-users and the professional designers as well as the importance of setting up a process with symmetrical contributions, minor control etc. there are mainly one in a conversation who has the initiative with respect to subject and goal of the conversation. Despite the narrower band with of audio as opposed to video, the approach of the study takes what people say as the way of getting access to what goes on in designer user interaction.

In *PDC'96 Proceedings of the Participatory Design Conference*. J. Blomberg, F. Kensing, and E.A. Dykstra-Erickson (Eds.). Cambridge, MA USA, 13-15 November 1996. Computer Professionals for Social Responsibility, P.O. Box 717, Palo Alto CA 94302-0717 USA, cpsr@cpsr.org.

Schön (1983) has argued that "we can think about doing something while we are doing it" and that this ability not only to *reflect on action* but also to *reflect in action* are important qualities of professional designers. And, according to Schön (1983) and Lanzara (1983) design practice is governed by previous situations and examples rather than by rules and fixed categories. Hence, rather than providing guidelines for designers concerning language usage and behavior, the goal of this paper is to create a greater awareness concerning the nature of participatory design sessions by providing an analysis of a specific design session.

The paper starts by an overview of the three related studies mention above which provide the platform for the analysis of a specific design session.

THREE RELATED STUDIES

Holmqvist & Madsen (1989), Trigg, Bødker & Grønæk (1991), and Timpka & Sjöberg (1994) have studied design meetings where tangible artifacts like prototypes and scenarios are used. The studies are based on detailed analysis of field data but with different theoretical orientation - linguistic discourse analysis, a practical application of interaction analysis, and grounded theory respectively.

The aim of Timpka & Sjöberg (1994) "(...) is to explore the dynamics of small group meetings where rules for a 'democratic dialogue' are used". The aim of Holmqvist and Madsen (1989) is also to explore the dynamics of small group meeting but with a particular concern for initiative and control. The aim of Trigg, Bødker & Grønæk (1991) is to better understand the involvement of the user in prototyping sessions with a particular concern for the shift of control and initiative among the designers and the user.

Designing support for academic writing

Holmqvist and Madsen (1989) report from an analysis of the interaction between a designer and an academic writer during the prototyping of a system for keeping track of literature references and notes. The prototype was implemented in HyperCard. The designer was a researcher himself and the academic writer had some knowledge of HyperCard and had actually done some HyperCard scripting himself. The design project was conducted as part of a research project on computer support for cooperative design.

The analysis of a 2 hour long prototyping session starts out from the observation that during any conversation there is almost always - at least temporarily - one of the speakers who has the initiative by defining the topic etc. The particular concern for the shifts in initiative during the sessions is accomplished by concentrating the discourse analysis around linguistic aspects like topic, concepts, mood, modality and boundary markers. The use of these concepts are illustrated by the following examples from the transcript of the conversation during the prototyping session in question.

Topic

D¹ I have made some of the sub-systems that you have not made. Let me show you what I have made and then we can discuss it and try to put together what I have made and what you have made

The excerpt is from the beginning of the session where the designer takes the initiative by defining the topic and course of the prototyping session. He states that he is the one to start being active.

Concepts

D This is the list of all the notes (...) ² you can search in the list and you can point in the list (...) and when you point in the list you go to the card with this name

AW Yes

The concepts 'search' and 'point' are about what you can do with the list of notes and reflects a system perspective rather than work processes.

Mood

D This is the subject list

AW yes

D this is where we have the subject keywords

The declarative mood of the designer's statements reflects that he has the initiative by describing what he sees. Alternative moods are the imperative mood signaling request for actions and the interrogative mood signaling request for information.

Modality

D This is the book list, we might need a better term for that

The modality ('might') is weakened opening up for the academic writer to enter the conversation with his opinion about the terms used. In general modality is used to signal the force or certainty of a statement and may be reflected by verbs like 'can', 'may', 'should', and 'must'.

Boundary markers

[The designer and the researcher is having a social conversation about a research program] ³

D OK!

The boundary marker 'OK' indicates that the social talk is over and that the designer closes this part of the conversation in order to resume his agenda as defined initially. Other kinds of frames are 'well', 'now', and 'good'.

¹D is the designer and AW is the academic writer.

²(...) indicate that part of the transcript is omitted.

³Meta description of the conversation is in "[" and "]".

Designing support for case handling

Trigg, Bødker & Grønbæk (1991) report from an analysis of the interaction between two designers (two of the authors) and a case worker during the prototyping of a case handling system for an Urban Planning Department at a Municipal office. The prototype was implemented in HyperCard.

The analysis of a 36 minute long prototyping session revolves around the issues of shift of control and initiative among the designers and the case worker, and around the role of the prototype as a mediating artifact. The following examples illustrate the main observations of the analysis.

Patterns of interaction

Two recurring patterns emerge during the analysis. According to the first pattern, S⁴ attempts to pass the control to E by asking how the prototype may be used but E responds negatively by asking a question about the prototype or, as in the example below, the question by S triggers E to start to talk about her own work:

S What is it then that you need to go in and look at, is it the area overview or site number overview?

E It's probably more, it's a little bit different. When I work with local plans

S m hm

E then I look at the addendum to see how it looks

In the words of Trigg, Bødker & Grønbæk (1991 p. 72): "Thus attempts to hand control to and initiative to E did in fact succeed, although not in the ways S and K expected".

The second pattern begin by S/K attempting to hand control to E who then uses the prototype for a while until E pulls back and from the computer and start to reflect on a situation of breakdown.⁵

Machine-Focused Interaction

E is also active during the machined focused part of the prototyping session where the designers are modifying the prototype on the fly as illustrated by the following example where S is in the process of modifying the prototype:

S (...) and so there should be another field on the same card, which (.) is called owners

E (...) There must be a place where one can see who owns the site. But maybe one can see that, in a completely different place

Work Practice-Focused Interaction

During the work practice-focused interaction E, of course, very much has the initiative. The pattern here seems to be

⁴S is one of the designers and E is the case worker.

⁵A 20 line example may be found in the original paper by Trigg, Bødker & Grønbæk (1991 p. 73).

that E "turn the focus of the discussion on standard letters [i.e. a general issue concerning an element of her work] to an actual case from her work"⁶ (Trigg, Bødker & Grønbæk 1991 p. 77).

Designing support for primary care

The project studied by Timpka and Sjöberg (1994) is about the development of a hyper-media system for primary care teams. Health-care practitioners, engineers from a software company and researchers from a university (including one of the authors) participated in the design project. The research method applied is grounded theory which is an inductive approach strongly guided by field data to the construction of social theories (Timpka and Sjöberg 1994 p. 75).

Timpka and Sjöberg report from the analysis of the interaction during four design meetings. In the first meeting a prototype was discussed and the following three meetings were organized around the discussion of various design scenarios. The data recorded amounts to seven hours of video recording.

The descriptive model developed using a grounded theory approach distinguishes between three domains of socio-cultural reference: The voice of participatory design, the voice of practice, and the voice of engineering. Within each voice the models distinguishes between three dialects Storytelling, conflicts-and-power, and target value.

The use of the basic distinctions of the various voices of the model is illustrated by the following examples from the case study.

Voice of participatory design

"Participants in design meetings use this voice to encourage and moderate discussions, and mediate between practice and technology", (Timpka and Sjöberg 1994 p. 78). As an example:

GP1⁷I'm sitting here and thinking if you could do that, then I would quickly see the frequency of document use. That's a way of sorting this out yourself

D yes ...

GP1 ... I believe that if I, myself, if I had that (...)

The "yes" of the designer support the general practitioner in developing his narrative.

Voice of practice

"The voice of practice (...) speaks from the individual practitioner's view and expresses experiences from work practice", (Timpka and Sjöberg 1994 p. 80). As an example:

⁶A specific example, The 'Axel Hansens Gade' Story, may be found in the original paper by Trigg, Bødker & Grønbæk (1991 p. 77).

⁷D is the designer and GP1 is one of the general practitioners.

GP1 I believe that after ten years you still need to consult a book the younger doctors may have to look but the older one get, the more experience you get

Voice of engineering

"The voice of engineering expresses knowledge of technology, technical possibilities, and technical constraint", (Timpka and Sjöberg 1994 p. 80). As an example:

D But to have the computer directly interpret the GP's ⁸ spoken dictate, and have it printed ...

DP⁹ It will not be possible during the project time

AN ANALYSIS OF EARLY DESIGNER-USER INTERACTION

The context for the study is the co-operation between a computer science research center at a university and a non-profit organization which has as its main activity the arrangement of an annual outdoor music festival. The music festival is a 4 day long event encompassing in 1995 more than 140 performances at 8 different stages with 90 000 spectators. The Festival as an organization consists of 35 activity groups each responsible for areas such as booking of bands, accommodations, catering, transportation of musicians, etc. see (Bertelsen 1996).

The Festival has over the recent years grown from a manageable size to a situation with an increased complexity which has motivated to consider information technology as an element in managing the festival. As it happened one of the many volunteers working for the festival was also a computer science student at the computer science department of The Research Center and he became the initial link between The Research Center and The Festival. At the first formal meeting between those parties it was agreed to enter a co-operation on design of computer support for the festival. The focus of the design activities became pre-production which is the part of the preparation for festival directly related to the various performances and include ensuring that light and sound equipment, instruments, dressing room facilities, catering facilities, transportation etc. is properly available during the days of the festival.

The Sound & Light activity group is responsible for ensuring that light and sound equipment as well as additional instruments is available. Furthermore the group acts as a mediator between the agent of the bands and the other groups involved in pre-production. The student was a member of the Sound & Light group and provide to the people at The Research Center a brief introduction to pre-production work.

⁸GP is a general practitioner.

⁹DP is a designer and a general practitioner.

Specific examples

The analysis reported in this section is of the first meeting between the 4 designers from The Research Center (including the author of this paper) and 3 people from the Sound & Light activity group. The analysis focuses on the first part of the meeting where the purpose was to have the sound and light people tell the designers what their part of pre-production consists of.

The meeting was tape recorded and later transcribed without any notation of pauses, pitch etc. just as repetitions of single words and 'hm' and 'mm' have been omitted. The method of analysis is similar to the one applied in the study by Holmqvist & Madsen (1989) and focuses on topic, concepts, and mood but with an additional concern for the role of work materials and the use of narratives.

Topic and concepts

The following excerpt is from the beginning of the session:

D1¹⁰The idea is that we start out from a schedule for the next three weekends, and it is based on the idea of starting out from the pre-production work, which we know a little about from S¹¹ who has talked about it a couple of time, and made drawings and talked about it, and made some transparencies of what you have got here. And then the idea was that we talked to you today, and the next weekend we manage to handle four or six groups from whom you either get information or provide information to their benefit, and then we talk to you again the 11th and the 12th [the last of the three weekends scheduled]. And what we would like to was to get an impression of how you work and which material you use, how you do it and what goes fine, and what one shouldn't change, and where there are bottlenecks and thing that could be done in some other way and better. And then we have brought along a PC because there was some software on it that we would like to show you

The designer start out by defining the topic and the roles of the people involved. The sound and light people is going tell the designers about their work and the designers are going to show some software. That is, for the first part of the session the designer passes over the initiative to the sound and light people and they are going to talk about their work. In the other part of the session the designers are going to talk about technology.

¹⁰D is one of the designers.

¹¹S is the student.

Though the topic, of the first part of the meeting was defined by the designers to be the current work practice of pre-production, the sound and light people a couple of points in time try to change the topic to talk about design ideas:

SL1¹² and this is one of the things that I very much would like to come out of this. To be able to get a printout of a production plan a daily-production-plan [SL1 elaborate his design idea]. We also do [another festival] that was only one day. Also in that case I made a list [by hand] which I would like to have as a printout. Could you imagine that?

SL2 jaah
[SL1, SL2 and SL3 jointly elaborate the idea]

D2 And what you have got here is a mini-version made by hand for a limited part of the festival.

SL1 yes

D1 You said that you also did [the one day festival]. Have you done more for stage [name omitted] than for the other stages?

In a long sequence SL1 suggests a design idea and jointly elaborate the idea together with SL2 and SL3 without any interruption from the designers. When D1 re-enters the conversation he re-focuses the topic to be about current work practice rather than design ideas.

The patterns seem pretty clear, whenever the sound and light people attempt to move the conversation into a discussion of the future system the attempt is ignored by the designers. The voice of silence is a powerful voice. As another example consider:

SL1 Could it be an idea to scan [into the computer] something like this?

SL2 I believe it is too much work. I still believe that something like this have to be kept in hard copy because those guys on the stage can't carry a portable.

SL1 no

D1 Those numbers, are they channel numbers [for walkie-talkies]?

SL1 yes it is

Rather than ignoring the subject raised by the sound and light people the designers could have provided some kind of feed back indicating that they were aware of that this was a design idea which would be considered later on in the project. Or, the designer could more explicitly have explained during the design meeting that they consciously

tried to avoid jumping to design of the future system too early.

The pattern is also reflected by the sound and light people's use of concepts like database and screen layout from systems engineering whereas the designers maintain the focus by strictly avoiding engineering concepts. As an example:

SL1 Yes it would be nice to have a print-out. Instead of doing it by hand. That is always nice. And that is where the great advantage with some kind of 'remember'-database would be nice. You have seen this, two sets of screen layout.

D4 but this about keeping track of the details in those two lists [on the material in front of him] that is not important?

Mood

Since the designers are in a position where they want to learn about the work of the sound and light people a majority of their statements are interrogatives. The general pattern is exemplified by the following exchange about the 'rider' which is the documents that represent what has been agreed between the festival and the band:

D1 Does the Music activity group get the rider before you do?

SL1 Yes, we get it from the Music group

D1 you get it from the Music group

D2 then they have extracted some information they need about price and so on

SL1 yes, as soon as the Music group gets such a contract, we get it

Whereas D1 asks a true question D2's statement is more complex. In term of something which grammatically is a declarative he formulates a hypothesis about the state of affairs which actually is an interrogative, he want to test his understanding of what is going on and at the same time he signals that he has gained some understanding of the procedures of the festival. The second statement of D1 is a declarative that signal that the designer is paying attention to the sound and light people. Both kind of statement leave the initiative with the sound and light people.

Interrogatives may take variety degree of openness as in the following exchange:

D1 Booking and the Music group, is that the same, or ?

SL yes. In the Music group there are bookers

D4 What else is in the Music group?

SL1 There are four in the Music-group, and the two old ones book most of it and the two young book some

D4 What else do they do?

¹²SL is a sound and light person.

SL1 They put together the program. I mean they research. Pretty closed group, but obviously business nature.

The first question has a closed set of potential answer, 'yes' and 'no'. The second is more open but still rather focused. The last question is very open leaving much initiative to the sound and light people as to what to talk about. Patton (1990) recommends to ask truly open question in his guide to qualitative interview and evaluation.

Work materials as triggers of conversations

For the design meeting, the sound and light people were asked to bring along various documents like notes and correspondence from last years files. Such material played an important role during the design meeting. Whereas the sound and light people, especially the chief planner, often for fairly long sequences were leading the conversation it turned out that when the various pre-production material were brought into the conversation there was opened up for a much more frequent interaction between designers and sound and light people. The following conversation is from the point in time where the sound and light people are going through the folder for one of the bands. On the desk is a drawing of the stage with risers, i.e. platforms to place instruments etc. on:

D4 Who makes the stage plan?

SL1 They [the band] do. They send it to us

SL3 and then there are some notes that there is not enough space for the last riser

SL1 yes, it says on the first page, the drawing you have got it has three risers. So they write us - [name of stage is omitted] stage - that there is simply not enough space for the last one.

D2 and that means that they [the band] have been notified or what?

SL1 I really do not know. We ought to have caught that one

The material that the designer and the sound and light person have in front of them create a very productive opportunity for all people involved to play a very active role.

In other situations the materials are used as mean for the designers to take the initiative and bring the conversation back on the track where they believe it belong as in the following situation where SL1 is taking about his vision of a having a database and the designer wants to bring the conversation back to current work practice:

SL1 Yes it would be nice to have a print-out. Instead of doing it by hand. That is always nice. And that is where the great advantage with some kind of 'remember'-database would be nice. You have seen this, two sets of screen layout.

D4 but this about keeping track of the details in those two lists [on the material in front of him] that is not important?

To summarize materials play two significantly different roles. They provide an opportunity for the designer to enter the discussion by having something to trigger questions, and they provide a means for the designers for bringing the conversation back to the mode of addressing issues concerning current work practice.

Narratives as sources of information

Narratives in terms of stories from specific incidences from last years festival was an important means of communication and way for the sound and light people to maintain the initiative:

D2 But what kind of situation do you get involved in? How serious does it need to be?

SL1 [omitted]

SL3 or a band that leave the trombone in Milan.

SL1 Who was that?

SL2 [name omitted]

SL1 that was really a mess!!

SL2 But, it is not a problem to find a trombone on a Saturday night when everything is closed. You simply call all the other stages and asks 'do you know somebody who wants to lend out his trombone'. And then you sit down and wait and 10 minutes later most of them calls back and tells you that they know exactly where you can lend one and then you get the one closest to you.

SL1 That is really fun

To summarize, the designers initially take the initiative by defining the topic and the roles of the people involved. The sound and light people is going tell the designers about their work and the designers are going to show some software. The sound and light people a couple of points in time try to change the topic to be design ideas whereas the designers either ignore those initiatives or encourage the sound and light people to talk about work practice, for instance by asking questions about the material at hand from last years festival. It seems like the sound and light people have not accepted, consciously or unconsciously, the whole agenda of the meeting which apparently is negotiated among the participants during the session.

Another kind of pattern emerge concerning mood, in particular interrogative and declarative. Since the designers are in a position where they want to learn about the work of the sound and light people a majority of their statements are interrogatives in a number of varieties. The degree of openness of the interrogatives, some of which are grounded in the work materials, leaves varying amount of initiative to the sound and light people. Some of the declaratives are

used by the designers to test their own understanding of the current work practice and hereby become interrogatives while at the same time the initiative is passed to the sound and light people.

Topic, concepts, mood, work materials and narratives are apparently all important ingredients in coming to grip with the notion of initiative.

DISCUSSION

The study of the interaction between the designer and the sound and light people both share some commonalities with previous studies and raises some additional issues.

Engineering and work practice

All studies address the distinction between engineering and the work practice of the users.

Trigg, Bødker & Grønbaek (1991 p. 72) make the interesting observation that even in cases where the focus where on engineering issues the user in a productive way entered the conversation.

The session with the sound and light people was remarkable in that it was the sound and light people who addressed technology issues rather than the designers.

Artefacts

The study by Trigg, Bødker & Grønbaek (1991) has as particular focus ".... prototypes as catalysts during discussions between designers and potential users" (ibid. 61). The agenda is to investigate the potential of a specific prototyping approach. According to the findings of the study the prototype, though in unexpected ways, did provide opportunities to pass the initiative to the potential end-user.

The study by Holmqvist and Madsen (1989) and the one by Timpka & Sjöberg (1994) do not employ the design artefacts as key elements in the accounts of the sessions.

The study of the session with the sound and light people demonstrate that artefacts like forms and other kinds of documents provide opportunities for shifts in initiative.

Storytelling

All studies, except the one by Holmqvist and Madsen (1989), draw to the attention that stories play an important role during the design sessions by providing valuable insight into the work practice of the users.

Trigg, Bødker & Grønbaek (1991 p. 81) states that "Such stories typically reveal exceptional cases and valuable details about the work that might otherwise be overlooked if users are encouraged only to provide abstract and overview like descriptions of their work practice". In Schön's (1983 p. 160) words "Storytelling represents and substitutes for first hands experience". It is obvious that storytelling is a means for the users to keep the initiative.

Initiative

Thought addressed from different angles, all studies are concerned about initiative in design. Holmqvist and Madsen (1989) approach the issue by focusing on the linguistic categories topic, concepts, mood modality and boundary markers. For instance declarative mood of the designer's

utterances leaves the initiative with him as opposed to the imperative mood signaling request for actions and the interrogative mood signaling request for information which may pass the initiative to the other speaker. Modality play a similar role since weak modality open up for the other speaker to enter the conversation as opposed to strong modality which leaves the initiative with the speaker.

Trigg, Bødker & Grønbaek (1991 p. 72) address the issue of initiative by analyzing attempts by the designers to pass control to the case worker by asking to focus on the prototype. Though "the study is based on a *fine-grained* [my emphasis] video based analysis" (ibid. 63) the analysis is not grounded in the fine-grained linguistic distinction between interrogatives and imperative. For instance they do not distinguish between an imperative like (ibid. 73):

S Yeah. Try to see whether you can find any information you need in some of these tables

and an interrogative like (ibid. 72):

S What is it then that you need to go in and look at, is it the area overview or site number overview?

For Timpka & Sjöberg (1994) rules for a 'democratic dialogue' seems to mean that everybody involved have an equal opportunity to participate or take the initiative in the conversation. The voice of engineering and the voice of participatory design are both means primarily used by the designer to maintain the initiative. By the same token the voice of practice is a means for the user to take the initiative.

The study of the session with the sound and light people has proceeded along the same line as the study by Holmqvist and Madsen (1989) by trying to come to grip with the notion of initiative by the notions of focus, topic, concepts, materials, and mood.

In all sessions, both the ones previously reported and the one with the sound and light people, technical or machine focused discussion does not exclude the active participation of the users.

ACKNOWLEDGMENTS

I would like to thank the organizers of the festival who took part in the design session. Olav Bertelsen, Morten Kyng, and Preben Mogensen (together with the author) were the designers from The Research Center (DEVISE) who took part in the design session. Arne Kjær provided many valuable comments to a draft of this paper. This work has been supported by The Danish Research Council's Programme for Informatics PIFT (grant number 5.26.18.19) and Aarhus University Research Foundation.

REFERENCES

Bertelsen, O (1996): The Festival Checklist: design as the transformation of artefacts, in this volume.

- Brun-Cottan, F. & Wall, P. (1995): Using Video to Re-Present the User. In *The Communications of the ACM*, vol 38 no 5 (61-71).
- Greenbaum, J. & Madsen, K.H. (1993): PD, A Personal Statement, *The Communications of the ACM*, vol 36 no 6 (47).
- Holmqvist, B. & Andersen, P.B. (1991): Language, Perspectives, and Design. In Greenbaum, J. & Kyng, M.: *Design at Work*, Lawrence Earlbaum (91-119).
- Holmqvist, B. & Madsen, K.H. (1989): Initiative in Cooperative Design, *Proceedings of The 12th Information Systems Research Seminar in Scandinavian*, Skagen (271-292).
- Kensing, F. & Munk-Madsen, A. (1993): PD: Structure in the toolbox. *The Communications of the ACM* (78-85).
- Lanzara, G.F. (1983). The Design Process: Frames, Metaphors and Games. In Briefs, U. & Ciborra, C. & Schneider, L.: *Systems Design For, With and By the User*. Amsterdam: North-Holland Publishing Company, (29-40).
- Muller, M., Wildman, D. & White, E. (1993): Taxonomy of PD Practices: A Brief Practitioner's Guide. *The Communications of the ACM* (26-27).
- Patton, Q. (1990): *Qualitative Evaluation and Research Methods*. Newbury, CA: Sage Publications.
- Schön, D. (1983): *The Reflective Practitioner*. New York: Basic Books.
- Suchman, L. & Trigg, R.(1991): Understanding Practice: Video as a Medium for Reflection and Design. In Greenbaum, J. & Kyng, M.: *Design at Work*, Lawrence Earlbaum 1991 (65-89).
- Suchman, L. & Trigg, R.(1992): Reflections on a work-oriented design project. In *PDC'94 Proceedings* (99-109).
- Trigg, R., Bødker, S., & Grønæk, K. (1991): Open-ended Interaction in Cooperative Prototyping, A Video-Based Analysis. In *SJIS* vol 3 (63-86).
- Timpka, T. & Sjöberg, C. (1994) : Voices in Design: The Dynamics of Participatory Information Systems Design. In *PDC'94 Proceedings* (75- 85).
- Wall, P. & Mosher A. (1992): Representations of work: Bringing designers and users together. In *PDC'94 Proceedings* (87- 98).