

Mindtape: A Tool for Reflection in Participatory Design

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ABSTRACT

This paper reports on the explorative use of video recordings in studies of distributed collaboration. The primary goal is for the analyst to acquire a better understanding of the interaction. A concurrent aim is to take the Scandinavian System Development tradition one step further and explore, together with users, what goes on in their minds. For this purpose, a method called Mindtape has been developed, the essence of which is to review a priori selected video sequences in a dialogue with the users.

Mindtape enhances the analyst's understanding and helps to clarify or reject interpretations. At the same time, it shows promising possibilities as a tool for mutual learning processes. The users become aware of obstacles, new behaviors and meeting cultures evolving. By allowing users and analysts to get a better understanding of the process of interaction, Mindtape may also be used to inform design.

Keywords

Video, learning, meeting cultures, Participatory Design, Scandinavian System development, CSCW.

INTRODUCTION

Video has been used for various purposes, e.g. to capture and analyze breakdowns in communication indicating delay in the travel of sound as a significant problem [15], to identify the optimal "roomware" configuration of meeting room collaboration [18] and to identify how to foster awareness of colleagues while minimizing the accompanying loss of privacy [20]. Video has also been applied in studies of control room work and as a tool for reflection [19], to inform participatory design workshops and to serve as basis for developing scenarios used in design workshop [12]. And it has been used in research on learning and cognition, discussing the method of quantitative and qualitative analysis of video recordings

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[7, 14]. IRL (Institute for Research and Learning) has developed a framework for Interaction Analysis of complex work and learning situation [4], and video has also been used as tool in usability testing where tapes were reviewed together with the users [3]. This approach allows the research to cross over from objectification of the user to participation of the user. At the same time, the participation of users may generate a dialogue and result in mutual learning between designers and users.

The Scandinavian systems development tradition is diverse, but closely tied to collaborative design with developers and users [10]. It focuses on the qualitative approach to systems development [9, 10], and the researcher is an active participant in the project. The design process is iterative and based on dialogue, and the understandings that emerge and the representations chosen are under constant construction and interpretation. In Denmark, usability work has developed into an interdisciplinary collaboration based on the Scandinavian System Development tradition [1], and video is used extensively, often employing a critical, hermeneutic approach [2].

MINDTAPE

Our interest is centered on a group of users' experience with a CSCW prototype¹, where we use video recordings of distributed collaboration to explore, together with users, what goes on in their minds. Our primary goal is to acquire a better understanding of the interaction.

Reviewing videotapes together with the users is one way of securing the validity of the researcher's interpretation [5]. But at the same time, that tape seems to serve as a mental trigger [11]. When users hear and see dialogue unfolding between themselves and their colleagues, their memory is triggered in a very special way. The users seem to recall, in extremely detailed, what they did, why, what they expected to happen, what they thought when a visual image appeared on the screen, why they juxtapose another image etc. They seem capable of making internal thought processes explicit,

¹MANICORAL - Multimedia And Network In Cooperative Research And Learning, EU 4TH Frame Program

and it is almost as if a "Mindtape" of their tacit inferences is being replayed.

"When Paul said that it hit me immediately, there was a mistake in my analysis... The model showed the areas which overlapped .. but I remembered the feeling of: "Yes, I knew it". And then I realized that when I had worked with the model, I had this feeling inside me all the time that something was not quite right. But I did not know what it was ... that is why I get (click on) the other file and ask Paul...".

This thought process, which Robert was sharing with us, was taken from a video reviewing of a group of researchers who collaborated using a CSCW system. When the tape was analyzed, the event made no sense, and the idea to present the sequence to the users for clarification occurred. The outcome was a surprise. The viewing opened up for – at times – elaborate explanations and comments to thought processes behind the behavior we were able to observe on the tapes [13].

Such detailed descriptions of thought processes cannot be captured through more traditional methods as e.g. Thinking Aloud. This method has been used extensively aiming at getting access to what goes on in the user's mind [7, 16, 17]. Here, the user is encouraged to think aloud while interacting with the system, to express what s/he thinks, what surprises her/him, irritates her/him or gives him/her an aesthetic pleasure, etc. Obviously, a detailed analysis of a Thinking Aloud video sequence, followed up with an in-depth inquiry will – to some extent – be able to produce a verbalization of some of the tacit inferences. However, thinking aloud does not come naturally, and it is not a method that is easy to master. Besides, users are shy about thinking aloud, they tend to forget to speak out. They think faster than they can speak and their thoughts are much more complex than they can verbalize. Besides, the cognitive load of having to think aloud takes the users' focus away from the task they are supposed to do. The method constraints on their creative thinking processes, because they cannot flow with the ideas that occur, when they constantly have to transform them into words. Many of the thoughts cannot be expressed in real time while they are interacting with the computer and the files and taking part in a dialogue with a colleague. Such thought processes are taking place much faster because they lie underneath or surround the language [8].

The use of the Mindtape method seems promising because the processes of insight that runs associatively while the user interacts with a computer system and other participants may become partly explicit. It is specific for Mindtape that the video sequence triggers a running commentary while the events are shown on the tapes. These video images make the user recall the thought processes that took place, and the explication flows easy with the actual sequence of events structuring the recalls. It is not the users memory that structures.

THE CSCW PROJECT: MANICORAL

MANICORAL (Multimedia And Network In Cooperative Research And Learning) was a user driven research and development project, the aim of which was to develop a Distributed Collaborative Visualization system (DCV) for a dispersed group of European geophysicists. The project was supported by the European Union's 4th Frame program: Telematics for Research.

The geophysicists were investigating the use and exploitation of Radar Altimetry Data in connection with ocean surface and the ice surface in reference to climatic changes. Their project Altimetry For Research Into Climate and Resources (AFRICAR) was supported by the European Space Agency.

In the following we report from a CSCW supported meeting where one senior scientist from Austria (the host) had some new satellite data that he wanted to present and discuss with the other researchers from Italy, the Netherlands, Great Britain and Denmark. The collaboration was a multicast, same time meeting, including the following tools: audio, video (talking head) and a shared whiteboard. The video recordings were done at three different geographical sites in order to capture the interaction from different site views.

We will introduce a number of problems revealed during our analysis of the video recordings, which we carried into the Mindtape session. Our approach to the data focused on "being open to the material to let it speak to you ..but more than anything to have a feeling for the" material. [6]. We were in unknown waters trying to capture interactions and communication between three different sites at the same time, and did not know exactly what to expect. We simply had to be very open minded in our approach to the tapes.

Connection disappear- or does it?

The meeting session had been running for about half an hour. Only one Danish site² was logged on to the Austrian presentation, but the transmission was not running smoothly. As a result, the participating Dane was very frustrated. When a second Danish site logged on, number 1 greets him with a welcome remark. However the newcomer at the second site did not respond. Then, number 1 then tried to communicate with the hosting Austrian, but he did not respond either. He then tried desperately to get in touch with the other participants. But as he got no response to his oral question, "does anybody hear me?", he started typing on the whiteboard. To his surprise, the page disappeared in the middle of typing and another page was shown on the screen. By now, he was completely confused as to what is going on.

Shortly after this, participant number 2 informed the Austrian host that participant number 1 was no longer logged on, "It seems that participant 1 is out, but you can continue with us.

² There are two sites in Denmark. One at the University of Copenhagen and one at The National Survey and Cadastra

Number 3 is here as well.” The Austrian continues his presentation, but at this point participant number 1 gave up.

Why Mindtape

Comparing transcripts of the dialogues from each site shows that number 1’s remark of welcome is heard clearly at number 2’s site. So why did he not respond? We can also see that number 1’s typing can be seen at both the Austrian host site and at the other sites, so why didn’t anyone comment on his writing? And why did participant number 2 take on the role of mediator informing that number 1 was out, but number 3 had logged on? We needed to find the cause of these communication problems, and Mindtape sessions were carried out with participant number 1 and participant number 2.

What Mindtape revealed

In the Mindtape session with participant number 2, he himself calls attention to the communication problem. To the question: Why did you not react on the welcoming remark, there was no answer at first. Instead, he looked very concentrated at the recorded video sequence. Then after talking his way around the question, he answered that he had not ready to communicate. He had logged on half an hour late and wanted to organize his screen, especially the video images. At the same time, he was trying to concentrate on the Austrians presentation. That was why he didn’t respond to number 1’s welcome, but he had heard it.

When he was shown the sequence with number 1’s typing and asked about his lack of response, it became clear that number 2 had not seen, and did not see, the writing on the whiteboard. Despite the fact that the video sequence showed it. We actually had to run the sequence twice before number 2 saw the writing. He suggests that it was his concentration on the Austrians presentation that had prevented him from paying any attention to the writing.

Discussion

The analysis revealed that although a talking head appears on the screen, it does not indicate that the participant is ready to participate. It seems necessary that each participant announce explicitly when s/he is capable of “being present” in the virtual room and ready to participate. This differs from the physical face-to-face meeting. When you appear physically in the room, you are present, even if you are unable to participate in the discussion, or you may not be accessible because you are occupied with other things. However, your behavior will show this to the other participants in the room. Besides, there is a vast experience with physical meeting behavior, which participants know how to interpret, whereas there are no conventions or rules to rely on in virtual multicast meetings.

It is the same problem with the unanswered question. It is important with immediate and explicit feedback whenever a question is asked or a comment is made. In this connection one of the participants took it upon himself to act as mediator by announcing explicitly what he can see in his video and audio window: Participant number 1 was out. This behavior

pattern may be seen as an element in developing of a meeting culture in virtual rooms. When something goes really wrong, somebody has to step in and mediate. This role is also known from face-to-face meetings when a participant intervenes between two discussants and offers e.g. a reformulation. However, the problem seems more severe in virtual meetings, because without explicit feed back, you are really lost.

Viewgraphs and language problems

The Austrian host imported his overheads to the common whiteboard. During this presentation he referred to one of them as “viewgraph no. 5”. He asks if everybody had the viewgraph.

The videotape from the Austrian site showed the host clicking on a file and an overhead with text coming up on the whiteboard (viewgraph number 5). We also hear him ask the Danish participant if he had viewgraph number 5. But the answer was negative, “I haven’t got your viewgraphs, but I have your page no. 5”. The videotape from the Danish site showed participant number 1 checking the whiteboard, which showed a lot of text. After searching for the information he identified the text as page 5, and he repeated that he had page number 5.

Why Mindtape

This exchange caused a lot of frustration and provoked irritation. It was clear that either the connection was not functioning properly, because the graphic files took too long to arrive. Or perhaps there was a misunderstanding, although what the breakdown in the communication was all about was not clear. The analysis of the tapes from the 3 sites showed that the problems were not the connections, and therefore we decided to follow up on the problem with a Mindtape session with the Danish participant.

What the Mindtape showed

When we (A) asked the Danish participant (P) about the specific situation, he did not remember exactly what had happened, and he did not initially recall any problem. However, gradually he became aware of the concept, explaining it as the Austrians translation of German.

A: He is talking a lot about viewgraphs.

P: Yes..

A: What do you expect when he says viewgraphs.

P: I just expect ..well, a graph

A: A graph, yesBut he is calling all his pages

P: yes, view...

A: viewgraphs

P: Yes, but this is his free translation from well... German

A: Yes, but the problem is that we are waiting for a

graph,

...[]...

P: But when he says ..well, viewgraph no. 5, then I expect that it is page 5 (A: Yes) in ..well.. his session

A: Okay...so you are not confused that he is using the word viewgraph

J: No not at any.... He could have said picture, figure or page that would have been the same

We then ran the video sequence where the host (H) asked the participant explicitly: "Number 1 have you got the viewgraphs?" And the participant answered "I haven't got your viewgraphs, but I have your page no. 5".

Upon hearing this, the participant looks a little confused, and did not comment. But then he reasons explicitly:

P: Now I use figure...I can't make up my mind

A: What do you mean that you cant' make up your mind

P: Should I say one thing or another

A: Figure or graph or...

P: Or viewgraph

A: ..Yes

P: Or maybe just page

Discussion

In a physical setting, it would have been immediately clear to the participant what the Austrian host meant by viewgraphs. The participants would have seen him put an overhead full of text (or a graphic figure) on the projector and heard him refer to either of them as viewgraphs. But this cannot be seen in the virtual meeting system, hence the confusion and misunderstanding.

The Mindtape session showed that because the working language of the group is a second language to all the participants, there is a potential for misunderstandings, which are not easily detected, in a virtual meeting. A language barrier exists when users cannot express themselves in their mother tongue and have to rely on another language. The problems seems to be reinforced in virtual collaboration where it is necessary to be consciously explicit in the communication and develop conventions about concepts and common consent about their uses.

The understanding gained during the Mindtape sessions was used to run a video session for all participants showing the misunderstandings and the problems caused by the lack of feedback. As such, the videotape and the Mindtape session served as tools for mutual learning processes where all the participants in the MANICORAL project became cognizant of the need for consistency in the use of concepts, and of pro-

viding explicit feed-back. .

Talking bodies

The last Mindtape session, on which we what to comment, we have named Talking Bodies. During the session with the Austrian host, one of the other participants looked very concentrated at the screen while moving his hand in a kind of turning movement, thumb stretched. It was hard not to see the movement, but did it mean anything?

Why Mindtape

Was it a sign of stress, was he was just turning his hand because his muscles were tired from constantly being ready to click the mouse? Or could the movement be a response to the scientific explanation given by the Austrian host, a way to physically draw an abstract concept in order to conceptualize and reflect upon the implication?

What Mindtape showed

We asked the geophysicist about the movement, but he did not remember making the turning movement with his hand. The video sequence was then run. To the question whether he was just stretching his hand, his answer was a definite no. He looked intently at the tape and then remembered that he was trying very hard to grasp the coordinates that the Austrian host used to explained some matrices.

This sequence also showed the participant moving the cursor along the graph on the screen as the Austrian was explaining an issue. To the question why he did that, he laughed and refused that he had done the movement. The sequence was replayed and the participant was amazed at what he saw, pointing out that he moved the cursor without being aware of doing it. However, he suggested that he was trying to explain something to somebody else present at his site.

Discussion

The Mindtape session gave unexpected insight into the use of body movements in the knowledge construction process. Thus, the participant was using his body movements to understand an abstract graph explained and presented in a virtual meeting where there was no other immediate feedback. At the same time, the Mindtape made the geophysicist aware of knowledge embedded in the turning of his hand [9] through which an abstract concept became physical.

CLOSING REMARKS

We initially developed Mindtape to acquire a better understanding of interaction. At the same time, we wanted to take the Scandinavian System Development tradition one step further and explore, together with users, what goes on in their minds. With the present exploration of the method it holds promises. Mindtape does help the clarification or rejection of interpretations. At the same time, it shows promising possibilities as a tool for mutual learning processes in a system development project with user participation.

As argued it seems that the processes of insight that run associatively while the user interacts with a computer system and

other participants may become partly explicit. And here it is the sequence taking place on the video that triggers a running commentary. As pointed out, it is not the users' memory – but the actual events that generate structure. However, it could be interesting to explore Thinking Aloud sessions followed up with in-depths interview. Obviously, the data from the two methods can not be compared directly, but the depth and quality of the investigations may help to determine the quality of Mindtape.

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