Exploring how user video supports design

Video has become a popular tool for informing designers about the people who will use a new product, and the environment where that product will be used. However, despite the popularity of video, it is not clear how designers actually make use of this video, nor how to organize a design process to use video effectively. Based on recordings of designers working with video and transcripts of their conversations we will show firstly, how the immediate act of watching the video triggers a process of focusing, secondly, how explaining what was seen and justifying why it is important leads participants to reflect on their points of focus, and thirdly, how reflections on points of focus can lead to reframing, or a new understanding of the problem at hand. This understanding is then used to reflect on the structure and organization of workshops that use video.

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1. INTRODUCTION

At the core of the participatory approach to design is the idea that the people who will eventually use the output of a design process have something of value to contribute. This contribution can be descriptive (educating designers about the context where the design artefact will be used), or creative (imagining how things might be in the future). Video is a tool that has been used in both the descriptive and creative realms. It has been used to objectively capture complex work habits and support a more in-depth analysis (Jordan & Henderson, 1985) (Suchman, 1991) and it has also been used subjectively as raw design material that supports design moves (Buur et al., 2000). There are numerous "success stories" of using video in design, and these by definition take a long-view and refer to positive outcomes. For example, Jordan and Henderson relate how video of births showed that during a contraction all people in the room would focus on the fetal monitor, whereas in hospitals without a fetal monitor, the woman would be the centre of focus (Jordan & Henderson, 1985). This insight would not have been possible without video.

In projects aiming at mass-produced products, the participatory design process takes a different form than those found in systems or building development where the user group can be readily defined and approached. When products are produced before they are sold, designers must work with *representative* users, who have no obligation to use the outcome of the process. In this context, video can act as an important mediator between the design team and prospective users.

The aim of this research is to establish a phenomenological description of how video from the real world is used by designers, and to map out directions in which it may be used more effectively in the future.

Our research method is Action Research, i.e. we stage experiments in an industry setting, hoping to generate positive outcomes. Our aim is not create universal truths, but instead to value softer frames over hard facts (Lawler, 1985) and imprecise models over precise ones (Argyris, 1980). The validity of our findings is measured simply by how well they explain the design discussions presented in this paper, and how relevant they are to practitioners for organizing future design processes that seek to make better use of video.

2. DIABETES & INSULIN INJECTION

The study was hosted by Novo Nordisk, a Danish pharmaceutical company whose core business is developing products for the treatment of diabetes. Novo Nordisk approached us with an interest in a more user-centred approach to product design, and so we proposed ethnographic field studies to provide insight into the daily lives of people with diabetes. As we were entering people's private lives, we decided to work through video recordings rather than attempt to bring people together with the design team in a more traditional workshop format. The video was created by visiting five people with diabetes, and encouraging them to talk about their experiences with diabetes, as they did daily activities such as buying groceries, injecting insulin or going to yoga class. Back at the company, our aim was to involve the design team

in a collaborative analysis of this video. The video was edited into 85 separate clips, ranging in length from 30 seconds to 2 minutes. Each clip was a single continuous shot where the start and end point was placed around an action or event that we considered surprising or interesting. (Jordan & Henderson, 1995) The participants were mostly mechanical engineers who work with designing needles and injection devices, although there were also participants from marketing, clinical research and in one case a diabetes specialist nurse. The number of participants varied from 4 to 12. The goal of the workshops was initially to get to know the people in the video, and later to use the video to identify design opportunities and envision new products.

3. HOW VIDEO GENERATES INSIGHT

What happens when designers watch video showing users or potential users of their product?

3.1 Multiple points of focus

In the following conversation, two workshop participants Mads, a mechanical engineer and Joanne, from the clinical research department are discussing a video clip they have just watched. They have been asked to write down what they find important on a video card (Buur & Søndergaard, 2000); a paper card that includes a clip number, a frame of the video and blank space for writing. The video they have just watched shows a man named Brian eating breakfast in a café.

Joanne: So, now we should describe him?
Mads: OK.
[Mads starts to write "Syringe" on the video card.]
Joanne: Even now I consider him a little alternative. I don't know why.
[Joanne looks over at what Mads wrote.]
Joanne: "Syringe". [4 seconds pause]
Mads: He's eating breakfast some place.
Joanne: Yes.
Mads: It's a little... Why isn't he at home?
Joanne: That's right. Yes, he's such a... what can we call it: Eating breakfast out?
Mads: Breakfast.
[Mads and Joanne laugh]
Joanne: Café guest. [7 seconds pause, Mads starts writing]
Joanne: Can we not just write that he... eats breakfast out?
[Mads writes "Café-breakfast" on video card]
Joanne: I'm thinking also about publicity, he really doesn't seem particularly shy. It seems to me that he is injecting himself in public there. I don't know, but it seems like it.
Mads: What is it called, public...?
Joanne: Public diabetic. You can explain it if they ask, no?
[Joanne laughs and Mads nods and smiles as he writes '"public" diabetic' on the video card]

What we find striking in this dialog is the numerous points of focus that the participants suggest. Joanne initially focuses on the qualities of Brian, identifying him as "alternative", while Mads writes "syringe" indicating that he has focused on the fact that Brian uses a traditional syringe to inject his insulin. (Mads designs insulin injection *pens*.) He then focuses on the fact that Brian is eating breakfast and then elaborates by wondering why Brian isn't eating breakfast at home. Joanne takes the focus of Brian not being at home and rephrases it to wonder why Brian is eating out in public. This leads to her to focus on Brian's personality, and to comment that he is not shy, as he seems to be about to inject his insulin in public.

Obviously, different people see different things in the same video. This is a powerful quality of video: even short clips allow viewers to find multiple focus points. After the workshop Mads commented that he liked working with Joanne since she was a "personal" observer and he was an "inventive" one, which together helped them to see "twice as much". The drawback is also evident in the start of this conversation as Mads and Joanne have difficulty finding something that they are both can agree is interesting. It is only when Mads wonders aloud why Brian is not eating breakfast at home, that they share a topic. Note that it was not Mads' initial focus that triggered Joanne's reaction, but his reflecting on that focus. Wondering why something is happening is different from merely identifying that an event happened. By wondering, a point of focus is identified and selected as being important enough to be investigated further.

3.2 Reflecting on points of focus

The next conversation shows on how designers reflect when trying to explain why a particular point of focus is important to them. Michael, a mechanical engineer and Hans from marketing, are viewing a video clip of Cynthia as she is buying groceries, and talking about using a PDA to track blood glucose levels. Michael is controlling the video, and Hans is writing on a video card.

Michael [dictating to Hans]: Used to use Gluco-Pilot but... it was too troublesome. [rewinds video]
Cynthia [on video]: I used to use it [palm-pilot PDA] to keep track of my blood sugars. In fact there is a program called Gluco-Pilot that you can load in, but...
[video paused for 5 seconds then restarted.]
Hans [at the same time as Cynthia]: "That you can load in", yeah?
Michael: Yeah. [6-second pause]
Michael: [dictating to Hans] "Used to use Gluco-Pilot, but to download it was a bother.'
[12 seconds pause]
Michael: [To Jason] That's actually a great video clip. I know of some people here that would really love to see that.

Both Michael and Hans have focused on Cynthia's comment about how she used to use her Palm-Pilot to keep track of her blood sugar levels, but she found that downloading the data to her computer was a bother. They have also deemed it important enough to write down Cynthia's exact wording on the video card. What we want to draw attention to in this dialogue is not the focusing, but what happens after the focusing: reflection. While waiting for Hans to finish writing, Michael comments that he thinks this clip would be useful to show to other people in the company. Unfortunately, we were requested not to mention the specific reasons why Michael found the clip "great", but the details of his rationale is beside the point. The key here is that he can identify what is important by referring to his experience. The side effect of reflection – making experiences explicit – is important for the design team to evaluate what they see in the video. In another workshop, participants viewed video of a woman telling how she had kept her diabetes secret from her co-workers for more than 30 years. One engineer suggested that perhaps this was an isolated case, but the other workshop participants disagreed. One cited statistics that a higher normal percentage of people with diabetes suffer from depression, another appealed to "human nature" and how it was natural to hide a weakness, a third repeated a story from a patient about how she had hidden her diabetes from her father so that she wouldn't be disowned, and another acted out a scenario at the dinner table where having diabetes would cause uncomfortable attention. All of these

techniques helped not only to validate that the stigma of diabetes was relevant to the design discussion, but a deeper understanding of the issue.

3.3 Reframing based on reflection

In some circumstances, the reflection on particular points of focus in the video leads to a more general reframing, or a new understanding of the design problem. In the following transcript, two mechanical engineers Peter and Claus are viewing a video clip of Cynthia as she prepares to do an injection in her kitchen. Michael and Hans are sitting at a computer on the other side of the table viewing the same video clip.

Cynthia [on video]: I need to get... Sorry, I need to get another pen tip. [walking to living room] Not very well... [looking in her purse] I have all these bags and bits and pieces of stuff... that I carry around...
Jason [on video]: This is where you keep your pen tips?
Cynthia [on video]: Yeah, normally actually they are in... [searching purse] I keep... [walking back to kitchen] I have a little place in my glucose kit... I keep in here extra cartridges of each, the NPH and the Novo Rapid, and at least 2 pen tips. [video clip ends]
Peter: Pen tips. [to Jason] That's the needles? [Jason nods]
Peter: Pen tips. Never heard of it.
Claus: It's much nicer.
Jason: No? You don't call them that ever?
Peter [to Claus]: Yeah, it is.
Claus: We're so needle fixated.
Peter: Needle sounds so drastic. [Turns his attention back to the computer.] Pen tips.
[12 seconds pass. From the other side of the table Michael breaks from a discussion with Hans to ask Jason a question.]
Michael: Why... Jason, Why does she call it "pen tips" instead of needles?
Jason: I don't know. That's just the term she uses. And, so then I just called them that also.
Hans: It's a good term.
Michael: It is.
Jason: I don't know if she invented it...
Hans: It's a very good term actually.
Michael: Especially if you don't like the whole concept of needles and injection, then it might make it more....
Hans: You don't have to say it at least. Needles.
Jason: You haven't heard that term before?
Michael: Pen tip? No.

The workshop participants all focus on the new term "pen tips". Partially, it is because they've never heard the term before, but the novelty of the term doesn't fully explain their interest. They note that it is a "good term", "much nicer" and less "drastic" than referring to "needles". It leads them away from their current "needle fixated" viewpoint to see that some people prefer to not even talk about "needles". This type of insight goes beyond identifying what is interesting or relevant in the video, as the participants are actually developing a new understanding of their design space. The term "pen tips" is a reminder that the people who use the needles have a different perspective than the designers, and it challenges the participants to reframe their understanding to include this new way of looking at the product.

This reframing is not limited to empathizing with the people who will use the eventual product. The reframing can also affect the design process itself. The following text is from a presentation during a workshop where the participants are describing Cynthia.

Hans: I think she was very organised regarding her disease, her diabetes, but I think she felt that she was missing an integration of things. It was all about she was missing things, it was all black the things, and we [indicating Michael] also talked about the integration of things. The BGM [blood glucose meter] regarding the injections. And also, we felt that the blood sugar measurements were just as important for her to talk about as the insulin. So, it felt like it was just a big issue for her in her daily work as taking the injections, or taking the insulin. In terms of going forward for a company like us, it's important to see that those two parameters are just as important to a diabetic. Whereas perhaps we have very much looked towards one of these things. It was surprising to me at least that the BGM was such an important tool as it is.

Hans states that Cynthia is "very organised" regarding her diabetes, and the problems she might have had with organisation were not her fault, but due to "missing integration" in the design of her diabetes products. He goes on to comment how it was surprising how blood sugar testing was just as important for Cynthia as the insulin injection. He doesn't see that blood glucose has much importance within the company (which doesn't manufacturer blood monitoring equipment) and this leads him to a reframing idea. He suggests that Novo Nordisk should perhaps concentrate more on the blood glucose monitoring aspect of diabetes to become closer inline with people living with diabetes. This suggestion shouldn't be taken too seriously as it was not made by a person in charge of the overall direction of the company, nevertheless it illustrates how the video combined with reflection of personal experience can lead a fundamental reframing or rethinking of the design problem.

3.4 Focus, reflect, reframe

From our analysis of the workshop dialogs, there is a general pattern in how the designers approach the user videos: Initially they focus on interesting events in the video; as they explain their points of focus they begin to reflect; and this process of reflection often leads to a reframing of how they understand the topic at hand.

Not surprisingly there are parallels to Schön's concept of reflection-in-action (Schön, 1983): Professionals make moves towards solving a given problem, and then reflect on the "back-talk" that emerges from their actions in order to direct future moves. This "reflective conversation" with the situation leads to a framing of the problem to be solved. This reframing is not simply a warm-up exercise before design, but is the core of the design process itself. In the words of Lanzara: "Much work of the designer is less concerned with finding a solution to a specific problem than with defining collectively what is the relevant problem and how to see it." (Lanzara, 1983) In our workshops video clearly engaged participants in a collaborative process of reflection, which resulted in new framings of the design problem. This is encouraging as it demonstrates that video can be used in a way that supports the existing process by which professionals solve problems in daily practice.

4. REFLECTIONS ON PRACTICE

How do our observations of focusing, reflecting and reframing help us to make better use of video in a design process? In the following section we will reflect on the structure and tools of the workshops.

4.1 Video supports points of focus

The video was "raw material" that was a catalyst for bringing different points of focus to the design discussion. The video doesn't *contain* the points of focus, as they only exist when people view the video, and actively start to identify them. In the first transcript, Mads and Joanne see completely different things in the same video clip. This is consistent with Jordan & Henderson's findings that bringing together people with different backgrounds provides a richer understanding of the video. (Jordan & Henderson, 1995) The soothing implications of this study, is that the editing does not dictate directly what the workshop participants will see. Even in short segments, video maintains an ambiguity that is necessary for design. However, while our minimalistic editing of the video didn't dictate interpretations, the sheer volume of video created means that not all interesting clips can be shown in a

workshop, which may distort what participants see. For example, in a workshop with video of Cynthia, the participants noticed that she kept her equipment in different bags, which led to ideas to help her to keep all her equipment in one place. However, a clip that was not in the workshop was Cynthia telling about how she kept back-up supplies so that even if she lost a bag, she would still be able to do her injection. In the next workshop, we introduced this clip to suggest that one bag for all her equipment would actually defeat the redundancy she had intentionally built into her system.

4.2 Video cards trigger reflection

Focusing on certain details in a video clip is a natural and intuitive act, but simply pointing out what is interesting in a video does not advance the design discussion. Points of focus must be explained as to why they are important to become topics of conversation. For example, in the first conversation, Mads finds the fact that Brian uses a syringe interesting and writes it down on the video card. However, as he doesn't explain his interest in the syringe, that topic of discussion is not continued by Joanne. Similarly, Joanne makes the observation that Brian is "alternative" but is not able to explain its relevance, and the topic is dropped. The video alone only encourages points of focus, not reflection on why those points of focus are interesting. However, the task of writing on the video card is particularly useful in that it encourages participants to stop and collectively reflect on what is important in the video. In comparison, a group in one workshop didn't use the video cards at all and simply watched one video clip after another with minimal discussion. In the conversation between Mads and Joanne was driven by their efforts to write down what was important in the video. At first they just note points of focus (e.g. "syringe", "alternative"), but as their conversation continues they start to explain why they think a particular focus is interesting. This type of reflection is hard work, so it is important to structure workshops so that participants are encouraged to do this conceptual heavy-lifting. The video card exercise creates time for this type of thinking to occur.

4.3 Presenting encourages reframing

There were moments of insight and reframing that occurred while viewing the video. For example, all the participants in the workshop were surprised by Cynthia's use of the term "pen tips" instead of needles. However, not all reframing is so immediate, or visible. An insight may remain a private thought, may only be revealed in a private discussion between two participants, or may not even be formulated at all. For this reason, the presentations that were part of all the workshops were crucial for capturing the key results of the workshop, and encouraging participants make their insights explicit. For example, it is in a presentation that Michael outlines the dilemma he has identified that Cynthia is a relaxed person, but she cannot be relaxed in order to properly manage her diabetes. The presentation and discussion after viewing all of the video not only allows participants to develop richer ideas and interpretations, but it helps to give focus to the key ideas that emerged from all of the video material. It is difficult to identify the exact moment that these types of framing insights occur. Did the presentation trigger this insight, or had it been previously formulated? It is not possible to untangle the presentation from the thought process, since the participants knew that after viewing the video they were going to present their findings. Nevertheless the presentation is a useful tool to give structure to the process. In the same way that the video cards encouraged participants to reflect on their points of focus in a video clip, the presentations helped to prioritize the key reflections and problem framing ideas that spanned all the video clips.

5. CONCLUSIONS

Our experience with conveying user input through video is that design workshop participants pass through three stages: Focusing, Reflecting and Reframing. Each of these stages can be encouraged and supported with specific tools. The video itself is presented raw with minimal editing, and participants intuitively have different points of focus as they attempt to make sense of it. The video card exercise encourages a collaborative reflection and justification of these various points of focus. These reflections lead to insight and reframing of the design problem, which are prioritized and highlighted to the rest of the design team during group presentations. As this three-phase process resembles other studies of the design process, user video can be integrated with and enhance normal, every-day design discussions. In this process we have created interest and respect for the process of bringing users into the design process, and have laid a foundation for richer participatory approaches in the future.

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