

Photography Based Artefact Analysis

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Abstract: Users and the context of use are the heart of user-centred design. If the users' tasks are irregular or varying the information gathering is difficult. In our study we used photography based artefact analysis to gather information about these kinds of problematic situations. The combination of artefact analysis and participative observations proved to be a practical and viable solution. In this paper we describe the photography based artefact analysis method.

Keywords: artefact analysis, user-centred design, photography based research

1 Introduction

The knowledge of the users and the context the product will be used in is the basis for the user-centred product development (Beyer & Holtzblat, 1998). Only by understanding by whom and for what the product is used we can develop the right product. In this research we studied the work of elevator and slot machine maintenance workers (hereinafter referred as workers). We used participative observations and photography based artefact analysis to research the job descriptions of the workers. In this paper we describe in detail the photography based artefact analysis method.

Especially infrequent activities are such that direct observations may be ineffective and artefacts may prove to be more useful (Dix et al, 2003). Because of the workers' large working areas and somewhat irregular tasks, we decided to use artefact analysis.

Our target users repair and maintain heavy machinery (elevators and slot machines). It was difficult and in many cases even impossible to collect the physical artefacts, so we decided to use photographing to collect them. Based on the large working area and in particular elevators workers' wide range of machines of different manufacturers and models, we decided to use probing techniques to generate the photographs.

Our own experiences with the participative observations strengthen our view that in observations the observer almost always influences the observed phenomenon (Cozby, 1977). The most problematic and complex machines were not serviced during the observations and the workers seemed to over simplify their tasks so that the observer could surely understand what is happening. In the artefact analysis we avoided these problems by letting the workers collect the artefacts themselves. We gave each of the workers a disposable camera and asked them to take photographs during either one or two workdays. This method provided us with more comprehensive collection of artefacts than what we could have gotten by taking the photographs ourselves.

Probing methods are usually used to find out the subjective opinions and even fear, prejudice and hopes of the users (Gaver et al, 1999). By allowing the workers take the photographs themselves we gained valuable information about their point of view regarding their work. The interview conducted after the photographing phase allowed us to understand the reasons and meanings behind the photographs and tasks or goals that motivated them. Participative observations gave us basic information and background about the work of the maintenance personnel and helped us plan the interviews.

2 Description of the Method

Four maintenance workers, two from each of the elevator and slot machine companies, participated in the photography based artefact analysis. All the workers had over 15 years work experience in their current jobs and in the case of the elevator company they had received special elevator maintenance training.

The workers were given a task to take photographs from tools and things they encounter during one or two workdays. The title for the pictures was: "Tools and devices needed in my profession". The disposable cameras were given to the workers in person and for their convenience they returned the cameras by mail. The workers selected themselves the days during which they took the photographs. We encouraged them to take pictures during the whole day and not to pay too much attention to the technical or artistic excellence of the photographs. We instructed the workers that fast snapshots taken in real situations were at least as good as if not even better than carefully designed and thought set-up photographs.

After receiving the cameras back from the workers, the pictures were developed and analysed briefly, based on the information gathered during the participative observations. Some of the pictures' compositions were sufficient that we could easily name the task during which they were taken, while in other cases we could not identify the subject or task depicted in the picture.

The pair interviews were arranged one week after the taking of the photographs. In the interviews were present one or two researchers and two workers from the same company. We presented no strict agendas for the interviews, as the aim was to go through the days' activities during which the photographs were taken. The main focus was on the photographs, but the workers were encouraged to go through the whole course of events during that particular day. The workers in the studied companies had shared responsibilities on maintenance locations, so that colleagues can function as back-ups when someone is sick, on leave or otherwise unavailable. This shared domain knowledge encouraged the workers to comment and ask questions when the other was explaining the events of his workday. Thus, the interviews became more like informal conversations among fellow employees. The pair interviews were conducted in informal environments such as cafeterias or company coffee rooms.

The job descriptions were formed based on the pair interviews, photographs and knowledge gained from the participative observations. The descriptions were written in story format each describing the details about one workday in the worker's life.

3 Results

The artefact analysis and participative observations made it possible to understand the tasks and duties of the workers and also we gained better understanding of the workers' usual daily activities. Neither of the methods produced a full view to the domain field. However, they supported each other and together gave us a wide understanding of the work context.

For the artefact analysis we received approximately 20 photographs from each of the workers, identifying a comprehensive collection of tools and devices important to them. From the researchers point of view the backgrounds and surroundings in the photographs proved to be almost as important as the intended objects. Because the photographs were taken during real workdays, they told a lot about the actual tasks and working environments. Figure 1 shows an example of a photograph where the orientation and location of the artefact outweighs the artefact itself. On the other hand there is no actual work visible in the photographs. The work assignments are mainly conducted alone, so often the workers could not find another person to take pictures of their tasks or use their colleagues as models.



Figure 1: A screwdriver positioned in the elevator door so that the door stays open and the repairer can work inside the elevator shaft.

During the pair interviews we also collected many war stories (Sommerville, 1992). These heroic tales about the problems and innovative solutions to them passed from one worker to another, gave us a new view to the communications between the workers.

The artefact analysis revealed many stereotypes the workers have towards their own work. For example one person took pictures of welding machines (Figure 2.) although he had not used one in work for many years. Nevertheless, welding machines and other big tools were considered essential from the workers' point of view. Another worker took photographs of his power drill even though he had not used it during the research period.



Figure 2: A set-up picture of a welding machine.

4 Future Work

Our future goals include conducting another round of photography based artefact analysis and validating and refining the workers' job descriptions.

5 Conclusions

Photography based artefact analysis proved to be a good solution in cases where target users' tasks are irregular and varying and the working area is large.

In the elevator and slot machine maintenance cases the tools are so big that extracting the real artefacts is impossible.

Photographs help to remember the events better and give more structured answers to questions (Collier & Collier, 1986). >From the interviewer's

point of view the photographs also made the interviews more fluent and conversational. The workers did not have to explicitly describe every single detail in the working environment, because the photographs acted as memory aids and reference material.

The taking of the photographs got the workers more involved in the process and motivated them to participate in the research. It also increased their interest towards their colleague's photographs as they were discussed during the interviews.

The participative observations were essential to the successful completion of the pair interviews. Understanding the work domain of the workers was crucial in understanding and analysing the photographs. In many cases this removed the need to discuss the tasks in general. The worker could just start telling what he was doing in the context of a picture and, in some cases, use the photographs as cartoons or storyboards to demonstrate the ongoing task.

The pair interviews were essential, as in many cases the worker was the only person knowing the reasons and motivations behind the photographs. We found that no second-hand knowledge or interpretation could replace this information. To fully understand everything that is in a picture you either need to be a native in the subject domain or to get an interpretation from a native person (Collier & Collier 1986).

Taking pictures during a whole workday proved to be a good strategy and provided the workers a much needed memory aid. Between the taking of the photos and the pair interview there was about a weeks break, so we could develop the films and pre-analyse the photographs. Although the pictures helped to remember the events there were some problems in recalling the actual situations behind the pictures. In many cases the photographs taken just before and after the current one helped to remember the main task and then to pinpoint the exact subtask that was taking place in the photograph. If the pictures had been analysed in random order and without bigger perspective, this supporting effect would have been lost. One potential strategy would have been to ask the workers to keep a diary, but that would have made the study much more laborious to the participating maintenance workers.

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