

IndiAction: a case study on user centered product design methods in rural India

Tijn Kooijmans, Wouter Reeskamp, Anouk Slegers, Katrien Ploegmakers

Department of Industrial Design
University of Technology Eindhoven
P.O. Box 513
5600 MB Eindhoven
The Netherlands
team@indiaction.com

ABSTRACT

This paper demonstrates certain important aspects, when designing a product for people, who possess different socio-cultural background, vis-à-vis a design team. The practical experience gained, relating to user centered product design, is documented as part of this study. The focus of the current project centers on designing a device for Tele-dermatology, which needs to be user friendly to health workers in rural India. An important conclusion, demonstrated by this case-study, is that certain methods of adapted ethnographic fieldwork have the potential to overcome socio-cultural gaps. Secondly, the article advocates the relevance of creatively processing the fieldwork to make it applicable for design suggestions. An attempt has also been made to demonstrate the capability of mid-fidelity prototypes, which can serve as a vehicle for effective communication between potential users and a design team. This prototyping design process has been performed to establish correlation between the test findings from ethnographically inspired fieldwork and the effecting improvement in the usability of the final product, taking a specific peer group as a reference point. This was done by staging a collaborative design event.

Author Keywords

User centered product design, interaction styles, rural India, ethnographic fieldwork, Tele-dermatology, IndiAction

INTRODUCTION

The IndiAction project team (www.indiaction.com) has conducted a design project for Philips Medical Systems in rural areas of the Udipi district in the Karnataka state of India. The time span of these activities was very limited as only eight weeks were spend in India. This made it a very representative case for applying user centered design methods in a project under industrial constrains.

Project case: Tele-dermatology

To illustrate the applied methods of user centered design, it is important to have an impression of the designed product that is subject to these methods. Furthermore, this

subsection will address the targeted users who have been involved in the IndiAction project.

The designed product is part of a Tele-dermatology system. Tele-dermatology enables dermatologists to diagnose or refer a dermatology case on distance. Rural health workers will use a special digital photo camera and a basic computer system to collect the necessary information for a specialist to handle the case. Information can be sent trough a telephone connection on a store-and-forward basis (Ministry of Communication and Information Technology India 2003).

The part of the system which this project focused on is the acquisition of pictures and patient data by the rural health workers. For the acquisition of pictures a digital camera is needed. For entering the necessary patient data, symptoms information and case history, a handheld computer is necessary to utilize the job of the nurse, who daily visits households in surrounding villages.

The targeted users for this part of the system are female health workers specialized in maternal and child health. The formal name for these nurses is Auxiliary Nurse Midwife (ANM). A peer group of four ANMs are the center of attention for the fieldwork and the design event that will be addressed in this paper.

Relevance of user centered design

The ANMs in the selected peer group, unfamiliar to the design team in terms of socio-cultural background, basically had no experience with digital electronics. This means for example that they are unfamiliar to conventional controls and iconography of a digital product. To overcome these gaps, it was relevant for the design team to aim for a better understanding of, amongst others, the ANMs' experience with using products in daily life. For this purpose, adapted methods of ethnographic field, fieldwork processing methods and a collaborative design event with the ANMs were used.



Figure 1: ANM during house visits in the rural area

CLARIFICATION OF USED METHODS

Ethnographically inspired Fieldwork

During the first three weeks of the stay in India, the design team wanted to understand the world from a user's perspective. Although the team was very much aware that ethnographic studies are the key to do this (Agar 1996), they realized that doing this inexperienced in such short time span is overambitious. Moreover, industrial constraints that needed to be dealt with were time, read money, and the specific goal of the fieldwork, which was not about understanding the ANMs completely but about introducing new products to them. It was therefore decided to conduct the ethnographic fieldwork 'quick and dirty' (Sperschneider and Bagger 2003) and focus on the user's work environment and her tacit knowledge in interacting with products. In this sense, it is more valid to talk about ethnographically inspired fieldwork.

At first a passive approach was taken. The team members 'shadowed' four ANMs at two healthcare centers ('Let me walk with you'), see figure 1. Both the visits of general doctors, specialists, patients, and the more regular activities like visiting households and taking care of young mothers, were in scope. Moreover, they asked the nurses to show them around in their work environment and act out situations with team members as patient ('Show me your normal procedure') with the help of an interpreter. Both regular procedures and interactions with her environment (rooms and equipment) were addressed.

A valuable step in the team's opinion was the introduction of 'new' equipment to the nurses (digital camera, Discman and MP3-player) and the discussion provoked by this. It gave an idea of which conventional models related to digital electronics, like for instance iconography or controls were applicable for design suggestions. All this was taped on video and after analysis noted on post-its and flip-over-sheets.

Creative processing of fieldwork

To discuss the outcomes of the fieldwork, the team categorized the observation into categories. The first category was 'Who', containing four personas (Grudin and Pruitt 2002). These also functioned as a means of communicating their impression of the peer group to others. The other categories were: 'What', a visual overview of present equipment, 'Where', maps of healthcare centers with present equipment and furniture, 'When', a time table of a typical working week, and finally 'How', which was the most relevant for the designers. The 'How' category consisted of 'video cards' (Buur and Binder 2004) with observations from the fieldwork. They contained a statement about the observation and its context, selected from the video captured during the ethnographically inspired fieldwork.

The video cards were used as input in a brainstorm session to define a spectrum of the 'interaction styles' (Buur and Binder 2004) performed by the ANM. This was done by combining related cards in groups and writing down their resemblance. Some of these interaction styles are very extreme and contradicting. This was made clear when the team named them using metaphors based on other activities, like for instance: 'Use the product like a choirmaster leading his orchestra' or 'Use the product like a soldier preparing his rifle'. These were visualized in mood boards (fig. 2) to be used as a creative engine while making design suggestions for the product. For instance, one interface design is based on the accordionist metaphor (fig. 3).

A collaborative design event

During the design event mid-fidelity prototypes or 'Wizard of Oz' mock-ups were used, which means that the operation is simulated in a way that is hardly noticed by the participants (Preece et. al. 2002). These mock-ups functioned as design suggestions and were discussed during the event. The design event was organized with two designers and two ANMs from the peer group. The goal of the event was to gain suggestions for design improvement

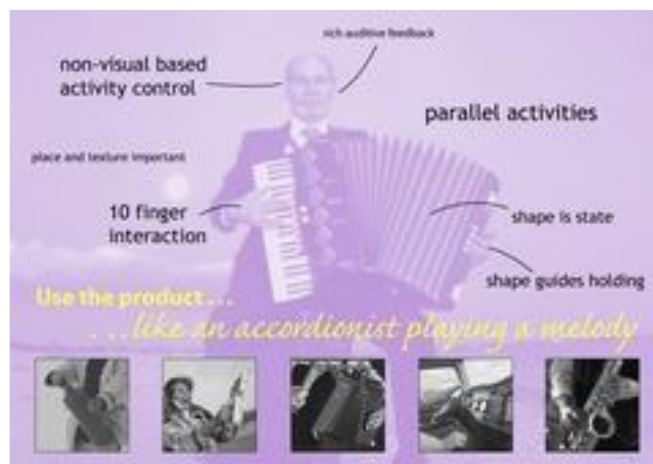


Figure 2: Interaction style 'accordionist'

by observing and discussing the interaction with the mock-ups. Furthermore, the team wanted to test the observations of the ethnographically inspired fieldwork.

To achieve a collaborative atmosphere where the ANMs help the designers improving and selecting the design suggestions, the following guidelines for organizing a collaborative design event, which are described in the chapter about design collaboration in ‘User Centered Product Design’ by Buur and Binder (2004), were used:

- Join the users in the test setting
- Use video documentation as discussion tool
- Invite several users to cooperate
- Involve users in design activities

The event started by explaining the mock-ups in rough outlines, although leaving space for exploration from the participants’ side. In this explanation the designers acted humble and underlined their openness to criticism. The focus of the meeting was addressed as having the participants’ advice on improvements for the design suggestions. The ANMs were the ‘experts’ in this matter, and the designers were not giving them the impression that they are part of an experiment or test.

After this the team asked them to pretend that one designer was a patient, and that she should use the system (fig. 4). Since the nurse had absolutely no lack of imagination, it was no problem to create an open and relaxed atmosphere for the event. The team let them explore the system their selves until it took so much time that it caused frustration. It was solved by apologizing and explaining that the designers were not satisfied with that aspect and continued. After the ANMs used a design suggestion the team enquired for their opinion on the different aspects of the design, based on a comparison with another mock-up.

A relevant note on the organization of the collaborative design event is that one should understand that during the event the designers were facilitators and therefore controlling both the agenda and discussion. This is of



Figure 4: ANM and designer acting out a future scenario

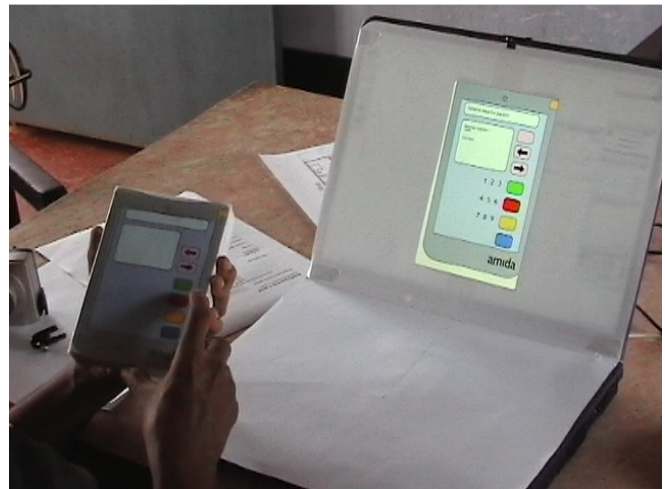


Figure 3: ‘Wizard of Oz’ mock-up using four left hand fingers like an accordionist

course theoretically a limitation to the influence the peer group has, but to the team’s opinion this was the only way to gain relevant input. This since the difference in both profession and language was too big to have an open discussion.

EVALUATION

Reflection on used methods

Ethnographically inspired fieldwork

Although conducted under severe time constraints, the fieldwork proved to be very valuable when designing for people from a different socio-cultural background.

First of all because much of the preliminary research done in The Netherlands now really started to live within the design team. Dust, humidity and the power cuts in the target area were already known, but after having seen it themselves, the team was more able to consider the consequences for a product. Hence, it stimulated the designer’s empathy towards the local situation.

Secondly, the ethnographically inspired fieldwork was valuable for us to build up a good relationship with the peer group. When the designers met the ANMs the first time, they looked up to us engineering students from the Western world. But this diminished after every new visit. This helped in creating a good atmosphere for the design event.

Furthermore, the combination of various fieldwork methods was valuable to get an overall picture of the user’s world. ‘Acting out’ helped to see how the ANMs deal with patients, while the ‘shadowing’ session provided information on daily activities that the ANMs probably wouldn’t have mentioned during an interview.

The fieldwork, focusing on interaction with products was useful to get an impression of the user’s experience with them. During the ‘acting out’ session the users seemed for

example very capable and experienced with using mechanical products. By introducing new electronic products, the team saw her applying existing techniques of using mechanical products on them, which was very valuable.

Creative processing of fieldwork

The first part of the translation process from ethnographically inspired fieldwork to design suggestions were the ‘who, what, where, when and how’ questions. The visualization into poster formats and the video card game was valuable for the designers to structure the information, but also for others to get an impression on the user’s world.

The second part of the processing was the generation of interaction styles as categorization tool of the fieldwork observations, which seemed very valuable as a creative engine. Although it was noted that the link back to observations became less direct, this method did provide the team with more ‘out of the box’ design suggestions. Nevertheless, the direct use of the fieldwork observations still needed to be kept in mind.

A collaborative design event

When working with users who are not experienced with digital products, mid-fidelity prototypes showed their usefulness. As explained before, these prototypes showed direct feedback on a computer screen. By letting the participants interact with the prototypes, they and the team could see direct results of their actions, which made it possible to see problems in use and find out their preferences. Compared to using prototypes that give no direct feedback, this method reduced the amount of imagination the participants needed to understand the use. This helped to prevent misunderstandings in communication during the design event, which otherwise often occurred.

The interactive ‘Wizard of Oz’ experiment made it possible for the participants to try and compare different alternatives. This set the right stage for valuable comments and feedback, which helped to overcome the language barrier in the Indian context. In this way, they proved to be a good vehicle of communication between the participants in a design event.

Practical findings with design collaboration

Involving multiple users to stimulate co-discovery learning, as stated by Buur and Binder (2004), is not recommendable if you want to gain better understanding of the user in this context, since the participants switch to their mother tongue when talking to each other. Meanwhile, it’s also hard to interrupt them and the event becomes more chaotic. The team had better experiences when an event was conducted with only one user, who had to stick to English.

Secondly it was noted that the adaptation of words from the user’s world can help to avoid obscurities when dealing with things the participants never saw before (fig. 5). The



Figure 5: Discussion between ANMs and designers

team got around this problem by replacing unknown words with examples from their own world, like the ‘cassette’ from a tape recorder as a replacement of the word ‘memory card’. This was a good way to give the participant more recognition and understanding.

Furthermore it was noticed that talking in comparisons helps to take the participant’s feedback beyond a superficial level. When the designers asked which of the two cameras the ANMs favored most, the team also got to know why they considered them just good or bad. This was not the case when they were asked for their opinion on one case only, so comparisons are a valuable tool for getting a deeper understanding in the participants preferred usability aspects of a product.

To provoke criticism, the team emphasized the little work done to create the mock-ups. Furthermore, only one person explained several mock-ups instead of everyone explaining their own idea. This way criticism was not related to a person but to the ideas only and the participant dared to give more feedback in this case. In the team’s experience, trivializing the ideas was a good way to get more open feedback from the user.

Finally, the use of an interpreter for improving the communication during the event turned out tricky in this case. The interpreter knew a lot about the participants (she was their supervisor) and she therefore gave a lot of personal interpretations, instead of translating what the participants were saying. Still, an interpreter might be of value to improve communication with the participants, but then it is recommended to have one from an unrelated background.

CONCLUSION

Extrapolating this case study on user centered product design in rural India leads to an understanding that present methods of ethnographic fieldwork, adapted for industrial constrains, are relevant for a design team to gain insight in a (potential) user’s tacit knowledge on interacting with

products. Moreover, the case study showed that certain methods of processing the fieldwork can help designers to move from field observations to design proposals for a product, taking into account direct observation as well. It can finally be stated that collaborative design events are relevant to let designers and users collaborate on the improvement of a design proposal but have their bottlenecks when applied in an unfamiliar culture. Using mock-ups to enrich communication between participants and adapting vocabulary and attitude of the designers improves their applicability for this context.

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