Picture Scenarios: An Extended Scenario-based Method for Mobile Appliance Design

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Abstract
This paper presents an extended scenario-based design method for the design of mobile appliances. This method builds on the results of two studies with designers in industry. Central to the method is the representation of dynamic use context, a core characteristic of mobile appliance use, with the use of picture scenarios. The initial use of this method in three design workshops is reported here, along with the feedback of the participants.

Keywords
Methods, scenario-based design, mobile appliance design, dynamic use context, picture scenarios.

THE ROLE OF DYNAMIC USE CONTEXT IN MOBILE APPLIANCE DESIGN

According to the literature the dynamism of the user’s situation seems to be the outstanding characteristic of mobile devices (Kjeldskov 2003, Vetere et al. 2003), and more difficult to capture than other characteristics of mobile devices such as screen size and attention issues (eg. Nilsson 2003). The focus is no longer only on the system, but on the changing use situation. Dynamic use context means that the complex context the user moves through changes in a quick and fluid manner (eg. Soerensen 2002). From this point of view, dynamic use context is not merely the background scene, but actively provides possibilities for the user to interact with the environment (Dourish, 2004). This indicates a mutual relationship between context and user. Dynamic use context expresses itself by a sequence within which user’s actions are embedded. Changing goals and needs of the user are only understandable by this underlying context. We are interested especially in these mutual interactions of user and context. Therefore the question addressed in this paper is: how should a method be shaped to be effective for designers working on mobile appliance design? The contribution is seen in a new method or tool for user interface designers to specifically capture dynamic use context mobile appliance design.

RESULTS FROM FORMER STUDIES

To get a better understanding of dynamic use context and the requirements for a new method for mobile appliance design, two studies in industry with user interface designers involved in mobile projects were conducted. The aim of the first study that contained interviews with eight designers, was to find out about the specific characteristics and needs of mobile appliance design projects in industry. The results of study one confirmed the importance of a mobile appliance design method to express dynamic use context. There is a strong emphasis that the challenge for mobile projects is the many different and varying use situations, that is the dynamic use context. Most of the other challenges are not exclusively relevant for mobile projects. The representation of context or use situations is seen as the critical problem that has to be addressed in an early stage of the design process and has the chance to impact upon some of the other conditions such as choice of functions. More than half of the interviewees had a clear understanding of the influence of changing use situations on the choice of functions in mobile appliance design. The ones who had thorough understanding opposed the transfer of design ideas from the desktop application and proposed the transfer from the use context instead. The desired process is that function follows context. The designers want to know what people are doing while they are mobile and to know the needs of these people in changing contexts before they start designing for them. This can be summarized as designing for certain user in a certain context with a certain goal.

These results served as a filter to decide on scenario-based design methods. Few system design methods focus on the context of use and are able to envision design (Howard et al. 2002). Scenario-based design (SBD) methods are able to do so and they are a good starting point for expressing context of different use situations in mobile appliance development. However, the challenge for an extended scenario-based design method for mobile appliance design is that scenarios describe context, but not dynamic use context. Possibilities have to be explored to express the sequence of events in an efficient way. In written form the length of the description might increase in an inefficient way. Further, different aspects of context have to be expressed in a systematic way. Finally, a shared understanding of scenarios should be found as a basis for communication.

A second study – a case study - in industry was conducted to find out about the use of scenario-based methods and requirements for an extended SBD method for representing dynamic use context. The results of this case study were that scenarios were often not fleshed out in much detail and the role of the scenarios in different
process phases was not clear to all team members. Therefore, they caused different interpretations and were a source of misunderstanding among the designers. Especially in early design phases, scenarios would have needed more details to really lead the design discussion and clarify the goals of the future user. However, the use of pictures was interesting in combination with these short scenarios providing a kind of overall context. Context conditions were not explicitly expressed in scenarios and only seen as an example of situations in which the different functions could be used. The results of the study are presented in more detail in Pedell & Vetere (2004).

CONCEPTUALIZATION OF AN EXTENDED SBD METHOD

Considering the abovementioned results, scenarios were constructed in the form of picture scenarios. They were created in the following manner: The basis was rich user data collected in the field including citations from interviews from a project dealing with the communication of intimate couples. Some central scenes of the data were formulated into textual scenarios, which were the basis for the creation of a detailed storyboard (see Figure 1). The storyboard is needed to take the photos in an efficient and systematic way in the next step (see Figure 2).

Figure 1: Creation of story board
Figure 2: Taking photos
Figure 3: Cast list

Without a storyboard, photos risk being forgotten, especially those of parallel actions. In the next step, the photographs were put into sequence and supplemented with textual elements such as descriptions and call outs. The creational process from the textual scenario to completed picture scenario of 3-4 pages ready to be introduced to the further design process takes about four to five hours.

Figure 4: One page of a picture scenario

From an HCI point of view, the picture scenarios are a combination of firstly classic scenario elements (Rosson & Carroll 2002) such as actor, activities, goals, plans, evaluation, setting, and events. In addition the picture scenarios contain rich context descriptions and citations from ethnographic studies. Secondly, the picture scenarios follow the ideas of personas (Cooper 1999). The characters are presented in a cast list of actors important for the scenario (see Figure 3) and representative of the user group. The cast list introduces the actors of the picture scenario. Finally, the picture scenarios use photo novels as an integration format.

Picture scenarios provide the possibility to express sequence and capture important moments of context and its changes. The picture scenario is able to code different contextual aspects such as social, cognitive and physical in the form of double coding (textual and visual) to support a shared understanding by those involved in the design project. Figure 4 shows an example of a picture scenario and the different contextual elements whose coding is familiar from comic books (e.g. Eisner 1996). The presented picture scenario is on the level of a problem scenario and describes the communication between a couple who are organising a shared resource – their car.

FIRST FEEDBACK FROM THREE DESIGN WORKSHOPS

This section summarizes the feedback of the participants of three one-day design workshops where the scenarios were used to present communication problems. Feedback from one workshop influenced the running of the next
to eliminate identified problems from the former workshop. In all three workshops, the feedback was collected in an open feedback session and via a questionnaire.

**1 Workshop with User Interface Designers from Industry.** The first group was with the same designers from industry from whom the initial requirements for the method had been collected. They were split in three groups with four designers working on the same scenario about communication problems during a business trip based on data collected from business travelers. In general they gave very positive feedback. They liked the very concrete format and the fact that everybody had the same picture in front of them. In their opinion, “text only” leads to different ideas about the scenario and needs a repetitive reading process. The pictures gave them the feeling of familiarity with the actors and their communication problems. They stated that they had the pictures present in their minds leading them through the different discussions throughout the day. Also positively rated was the picture within the picture as an isochronic representation of parallel actions which is a core problem in representing communication issues in textual scenarios.

Negatively rated was the density of problems expressed by one scenario (eight pages expressed according to the participants about twenty problems). They would have preferred having more and shorter scenarios. In addition, long textual descriptions were undesirable and too close to textual scenarios. They liked the expression of the plot via call outs and pictures because of its easy reading. Another negative aspect was confusion about the target group of this method. There was interest in knowing if this could possibly be used with end users of a new system or only in internal designer workshops. The designers directly involved in the business traveler project were resistant to leave already existing design ideas and felt this to be a barrier to work in a creative way with the picture scenario. Finally, the designers were concerned about the expenses involved in creating picture scenarios.

**2 Workshop with User Interface Designers from Academia.** In the second workshop, shorter scenarios were used in three groups of four designers with less textual descriptions. The importance of this design workshop was to transfer the method to another audience and another project. The group consisted of twelve academic user interface designers. This group saw the picture scenarios as a very good starting point for identifying and communicating problems. The pictures were described as creating a basis for discussion and took the role of a framework for guiding communication in sharing ideas with the group, pointing to specific areas and solutions, and focussing and controlling the discussion. Picture scenarios helped to point to things in communication and provided a great way to convey the user problems. The pictures themselves enhanced the understanding of the scenario, because they facilitated easy comprehension of the story. In addition, the pictures added to the richness and clarity of scenarios. Some of the participants also stressed that they perceived the scenarios as being enjoyable to read and work with.

There was a split in opinion regarding how much the picture scenarios facilitated creativity. Whilst some of the participants saw them as a good springboard for new ideas and saw a possibility of expressing new situations, other participants only occasionally referred back to the scenario. Some even felt restricted by them in finding new solutions, because they felt stuck with ‘problem pictures' in the creation of new ideas. The picture scenario was described as prescriptive and controlling. A danger seen by the designers was that they led to an unintended detail in the assumption that every thought or comment written in the scenario was of major importance.

**3 Participatory Design Workshop.** In the last workshop, the group consisted of participants of a user study who had no design experience. One designer facilitated every group of three to four participants. Their role was to lead them through the process and give guidance on the use of the picture scenarios without influencing the participants’ design ideas. These participants were far less critical about the prescriptiveness of the picture scenarios and did not feel restricted as did the designers from the former workshops. In contrast, they took the picture scenarios as they were and understood them as an example. The participants felt guided by the scenarios. They often mentioned that the picture scenarios helped them to focus their attention on potential problems or issues and helped them to understand the design activity in making the context clear and easy to understand. Another important point was that the scenarios facilitated the communication amongst the group members. They broke the ice, initiated the group activity, and increased communication by referring back to the scenario. An interesting result was that the picture scenarios helped to put the participants’ experiences into perspective. They felt that their life situations were well captured and that they gained an overall picture about the data through the scenarios. Finally, the scenarios gave them a start to come up with new ideas. In comparison to the designers, the participants of this workshop were just as creative and engaged in the design activities. Perhaps, due to a lack of comparable activities or methodological knowledge, there was no negative feedback from these participants.

**DISCUSSION AND CONCLUSION**

There are differences and similarities to existing approaches – both discussed in this section.

**Textual scenarios.** The most obvious difference from purely textual scenarios is the combination of pictures and text – a combination applied in only a few other approaches. For example, Millen (2000) uses photographs, but these are directly taken from the field. No other method has been found in literature where the linking of
photographs constitutes the scenario itself. Further, the problems are expressed with a strong focus on context. A few other approaches make use of visual material to express user requirements within their context such as “the rich picture” described by Monk and Howard (1998), but in the presented approach the context takes a central role in being coded in its different aspects. The result is a very structured description of context and activities in parallel. Single pictures represent frozen moments of activity. In linking these moments with emphasis on context a sequence of context is expressed and not only fragments of context such as in textual scenarios. Usually, textual scenarios describe actions in their chronological order. A lot of description is needed to describe parallel actions. The format of the picture scenario supports an isochronic representation of parallel actions.

**Storyboarding.** In HCI the term storyboarding refers usually to a technique that uses screens to represent a linear course of action. However, there are some major differences to picture scenarios. Storyboards are commonly used in design to be a visual representation at different levels of design. Some use them as a participatory design technique in the requirements phase, some as a representation of Web site design (Badre 2002). These techniques do not emphasise on the context in which the system will be used, only on the design itself. Therefore, the connection of the storyboard to the requirements is unclear. Further, the combination of picture and text is not elaborated. The literature about sequential art elaborated this duality of picture and text (e.g. Eisner 1996). Picture scenarios are more similar to the first storyboards of Walt Disney who used it as a representation of scenes.

According to these initial experiences, picture scenarios seem to be promising in mobile appliance design. In general, they strongly support the communication of different stakeholders in mobile appliance design. Further work has to be done to find a balance between prescriptiveness and creative guidance of the picture scenarios.

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