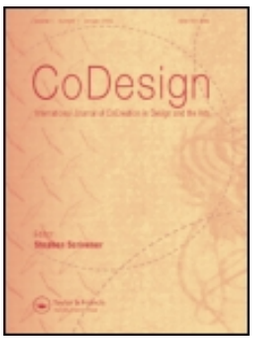

Taylor & Francis
Taylor & Francis Group

CoDesign
International Journal of CoCreation in Design and the Arts

ISSN: 1571-0882 (Print) 1745-3755 (Online) Journal homepage: http://www.tandfonline.com/loi/ncdn20

Contextmapping: experiences from practice

Froukje Sleeswijk Visser , Pieter Jan Stappers , Remko van der Lugt & Elizabeth B-N Sanders

To cite this article: Froukje Sleeswijk Visser , Pieter Jan Stappers , Remko van der Lugt & Elizabeth B-N Sanders (2005) Contextmapping: experiences from practice, CoDesign, 1:2, 119-149, DOI: 10.1080/15710880500135987

To link to this article: http://dx.doi.org/10.1080/15710880500135987

CoDesign, Vol. 1, No. 2, June 2005, 119–149

Taylor & Francis
Taylor & Francis Group

Contextmapping: experiences from practice

FROUKJE SLEESWIJK VISSER*†, PIETER JAN STAPPERS†, REMKO VAN DER LUGT† and ELIZABETH B.-N. SANDERS‡

†ID-Studiolab, Faculty of Industrial Design Engineering, Delft University of Technology, Landbergstraat 15, 2628CE, Delft, The Netherlands
‡Make Tools, LLC, 183 Oakland Park Ave., Columbus, Ohio 43214 USA

(*Received 22 November 2004; in final form 29 March 2005*)

In recent years, various methods and techniques have emerged for mapping the contexts of people's interaction with products. Designers and researchers use these techniques to gain deeper insight into the needs and dreams of prospective users of new products. As most of these techniques are still under development, there is a lack of practical knowledge about how such studies can be conducted. In this paper we share our insights, based on several projects from research and many years of industrial practice, of conducting user studies with generative techniques. The appendix contains a single case illustrating the application of these techniques in detail.

Keywords: contextmapping, user experiences, generative techniques, design conceptualisation

1. Introduction

Increasingly, designers need information about the contexts of people's interactions with products in order to design products that fit into the lives of the people who will use them. In combination with information about the company (e.g. marketing, production capabilities) and about the skills of the design team (multidisciplinary: professional designers, engineers, usability professionals) the contexts of product use form an innovative base for human-centred design (Sanders and Dandavate, 1999).

Recent literature on design conceptualisation shows an increased interest in the role of contextual information in driving the design process, e.g., Bodker (2000), Hekkert and van Dijk (2001), Mattelmaki and Batterbee (2002) and Grudin and Pruitt (2002). Our work on contextmapping involves users intensively in creating an understanding of the contexts of product use, and therefore can be regarded as a form of Participatory Design. In Participatory Design (Schuler, 1993) users and other stakeholders participate in the design process to ensure that the resulting designs fit the way people will actually use the

*Corresponding author. Email: f.sleeswijkvisser@io.tudelft.nl

CoDesign
ISSN 1571-0882 Print/ISSN 1745-3755 online © 2005 Taylor & Francis Group Ltd
http://www.tandf.co.uk/journals
DOI: 10.1080/15710880500135987

product in their own lives. Traditionally, Participatory Design has involved users in evaluative research: testing existing products or prototypes of developed concepts. In exploring contexts, users are involved in what is called generative research, which inspires and informs the design team in the early phases of the design process. Cultural probes (Gaver, Dunne and Pacenti, 1999) and generative techniques (Sanders, 2001) are two sets of techniques we have focused on in our work. These techniques aim to create context awareness by eliciting emotional responses from the participants. Figure 1 shows generative techniques used in a group session. Such sessions produce varied and rich views, anecdotes, and explanations about the explored context which include the use situation and the users' concerns, memories, feelings, and experiences surrounding it. These kinds of findings are highly informative and inspiring to design teams.

Putting these techniques in practice relies on experienced researchers and a good deal of common sense. Most publications tell you the *why* behind the generative techniques, but rarely report practical knowledge about actually conducting studies.

In this paper we would like to fill some of the gaps in the procedure. In recent years we have been exploring the potential of these techniques and developed practical experience of conducting studies with these techniques. The paper focuses on the practicalities of conducting generative research and reports our experiences in contextmapping studies. It is based on over one hundred research projects in total conducted at Delft University of Technology (see note 1) and in industrial practice (see note 2; one of the authors, Liz Sanders was a co-founder of SonicRim, a design research consultancy). The studies explored the contexts of a variety of topics, addressing social, emotional, and functional aspects of user-product interaction. Product areas included consumer products, such as communication devices for families, online shopping, home entertainment, museum visits, and tourist information. Also professional products were included, such as tools for knowledge workers, long term care nurses, surgeons, critical care nurses and diagnostic workstations for radiologists. Most of the examples that are cited in this paper come from the University projects due to the proprietary nature of most of the work done for industry. One example is presented as a case study in the appendix.

Figure 1. Participants in a group session with generative techniques for the shaving experience study (Sleeswijk Visser, 2003). Participants make collages about their shaving experience and present these to the group.

In these studies, a great variety of forms and formats of generative techniques were used. It is outside the scope of this paper to give a complete description of all of these cases, and neither do we think that a statistical summary would benefit the reader. Instead we will draw examples from three recent cases of MSc graduation projects of Industrial Design Engineers in Delft. These studies were conducted in collaboration with industrial partners, and shared a similar basic format, in which the different steps of the generative research process are recognizable. One of these cases, '*the experience of shaving*' study (Sleeswijk Visser, 2003), is described in greater detail in the appendix to this paper. This study focused on men's experiences of shaving or trimming their beards. In it, two group sessions with four participants each were conducted. The other two studies were '*the kitchen for 2015*' (van Beusekom, 2005) and '*high security admittance*' (Visser, 2005). Materials from this last study have also been applied in courses and workshops for design students and practitioners in 2004.

2. Basic principles

Contextmapping is a young and emerging field. Its framework is still underdeveloped. In this section we introduce what we mean by the terms context, experience and contextmapping. We indicate what kind of information we are looking for (context) and how the information is elicited (generative techniques) that is useful for design team (creating the contextmap).

The definition of context as 'the environment of human-computer interaction' indicates where context begins, but does not indicate where it ends. It just states it is what is outside the product. The term 'context' is a slippery notion. Context has many components besides time and space. We use the term context to refer to 'all factors that influence the experience of a product use'. The way in which a product is used depends on its user and on a variety of factors in the environment. In this definition, the role of an existing product can be small; especially when compared with most conventional user studies. A designer always has a view on what the context is like, but this is always a guess, a personal view, based on personal experiences. Research with real users serves to provide a richer, more dependable view on situations in which products are or will be used.

Studying the context of product use helps designers to gain empathy with users, to avoid fixation on preset assumptions about the user or the product, and to create innovative concepts on how a product can be experienced. We agree with Dourish (2004) that contextuality is a relational property, that the scope of contextual features is defined dynamically, that context is an occasioned property and that context arises from an activity. From this view we emphasize the importance of carefully redefining the context for every design problem.

Even though they are closely related, the terms context and experience differ in subtle ways. A description of a context surrounding a product use builds on the experiences of people. A context has components of time and space, whereas experience always occurs in the context of time. An experience is a subjective event, felt only by the person who has the experience. An experience can be ephemeral, i.e., lasting only for the moment. It is the point where memory and imagination meet. A basic mechanism in generative techniques is to let people construct a view on the context, by calling up their memories of the past and by eliciting their dreams of the future. Figure 2 shows this full set of experiences (e.g. memories, the present moment and dreams) in the experience domain. The moment is inextricably woven into past memories and future events. Experience includes past, present and future (Sanders, 2001).

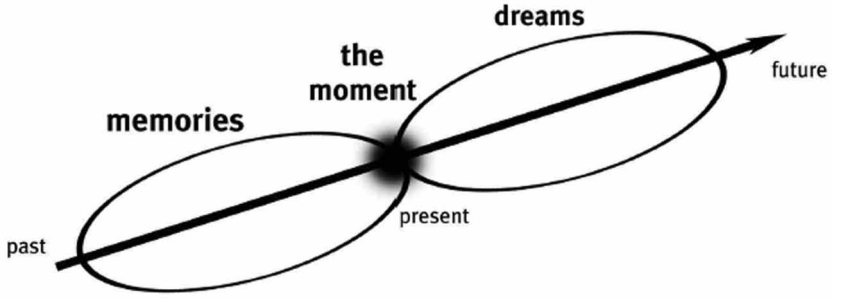

Figure 2. The experience domain (adapted from Sanders, 2001).

Conventional user study techniques, such as interviews, observations and focus groups (Preece *et al*., 2002), uncover explicit and observable knowledge about contexts. The main limitation of conventional techniques, as far as designers of future products are concerned, is that they only offer a view on people's current and past experiences, but provide little hold on the future. For learning about potential future experiences, we need to include peoples' dreams and fears, their aspirations and ideas.

Sanders introduced generative techniques in the early 1990s (Sanders, 1992) to fill this gap in order to gain knowledge about what people know, feel and dream. The use of these projective techniques provides a view to reveal future states of people. These techniques can reveal tacit knowledge and expose latent needs (Sanders, 2001). Tacit knowledge is knowledge that people can act upon, but cannot readily express in words (Polanyi, 1964). Latent needs are those that people are not yet aware of. They are needs that become realized in the future.

The diagram in figure 3 shows the relationships between the various forms of data gathering and their ability to access different types of understanding of the user experience. The generative techniques are located in the lower parts of the triangles.

What people experience is often determined by *tacit* knowledge or *latent* needs and is often difficult to express in words. With generative techniques, participants are guided in small steps to constructing and expressing deeper levels of knowledge about their experiences. In this way it is possible to get access to a hidden world of user experience, and thereby build a better understanding of it, which can then be used for design purposes.

The basic principle behind generative techniques is to let people make designerly artefacts and then tell a story about what they have made. Examples of such artefacts are the collages on the table shown in figure 1 and the map shown in figure 7. The process of making artefacts such as drawings, collages and models, enables people to access and express their experiences. People reflect on, re-live and to some degree re-feel their experiences when they express themselves in these ways. The creative process makes them aware of their experiences. After creating the artefacts they explain what they have made. Especially in their stories, there is rich and useful information for designers (Stappers and Sanders, 2003).

The aim of contextmapping is not just to elicit contextual information, but also to bring it to a design team in a form that serves the generation of human-centred designs. In order to be useful for designers, this information should be rich and broad, but also leave room for the designer's creativity. The term contextmapping indicates that we think this information should be presented as a map indicating roads, dangers, and opportunities to

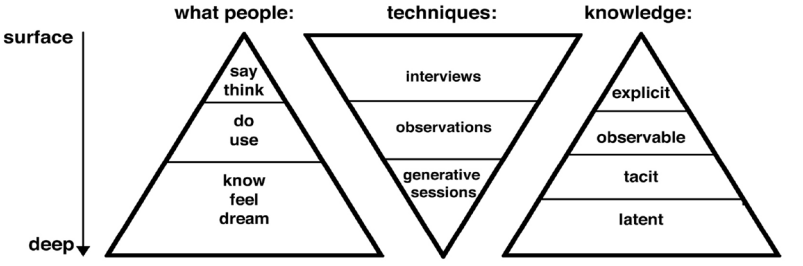

Figure 3. Different levels of knowledge about experience are accessed by different techniques.

the traveller, not as a mere route prescribing a fixed solution. Just like the traveller who uses the information on a map to negotiate his way through the terrain without confusing the map with the terrain, the designer uses the contextmapping information to make his way through the design process. In the next session we describe the phases in which this map is constructed.

3. The contextmapping process

A contextmapping study typically involves a sequence of research steps including preparation, sensitizing participants, group sessions, analysis and communication (see Figure 4). In this section, we first give a brief overview of the phases focussing on their function in the whole process of contextmapping. Then we elaborate on each phase.

Preparation

Every user study starts with a preparation phase. Setting up the study involves the formulation of goals, planning, selecting participants, choosing techniques, etc. These elements are known by conventional research practitioners. With generative techniques, however, extra attention is needed in formulating goals. Generative research appears less formal than more traditional forms of research but its successful application rests on carefully selecting the main directions of exploration.

Sensitization

The next step is to *sensitize* the participants and prepare them for group sessions. Sensitizing is a process where participants are triggered, encouraged and motivated to think, reflect, wonder and explore aspects of their personal context in their own time and environment. A sensitizing package consisting of little activities or exercises is sent to the participants at home in the period before the session. They may get several days to weeks

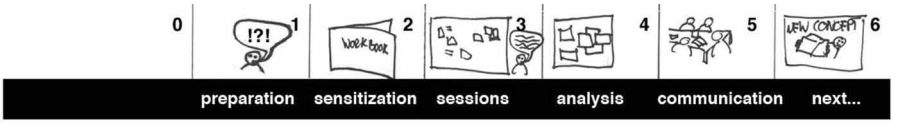

Figure 4. Procedure of a contextmapping study.

to complete the sensitizing package. Sensitization over a longer period, typically one or more weeks, prepares participants to access their experiences and to express and discuss these in the group sessions. The quality of the information learned in the sessions depends greatly on the depth and length of sensitizing.

Sessions

A session is a meeting in which participants do generative exercises. Participants receive instructions and sets of expressive components, and create artefacts that express their thoughts, feelings, and ideas. Their experiences are revealed when they are asked to present and to explain these artefacts to the other participants in the group.

Analysis

The qualitative data collected in the sessions are rich and diverse. The artefacts created by the participants contain many stories and anecdotes related to the topic. The stories and anecdotes are usually recorded on video and audio. Transcriptions of the verbal protocol are also made. The study is not meant to support or reject existing hypotheses, but to explore the context, uncover unexpected directions, and widen the view of the design team.

Communication

The final step is bringing the results to the design process. For the early phase of the design process, the results can both inform and inspire the design team. Conventional 'written' reports often fall short in communicating effectively to design teams. Techniques that are more interactive, such as workshops, cardsets, and persona displays can be used to enhance the design team's understanding for and empathy with users.

In the following sections, we propose practical guidelines for each phase based on our experiences with contextmapping.

3.1 *Preparing the study*

In the preparation phase, the researchers discuss and choose methods and techniques that are most useful for the subsequent phases of sensitizing, group sessions, analysis, and communication. In planning the study, time for recruiting and sensitizing participants is taken into account. A general rule of thumb is that it takes one or two weeks to recruit participants, and sensitization takes place over a few days to two weeks. So usually preparation starts at least three weeks before the session.

Goal statements

As in any qualitative research activity, a clear goal helps one to focus and structure throughout the various phases, including how to set-up exercises for the sensitizing package and for the sessions, and how to analyse and communicate the findings. For example, one student team was designing a baby buggy for young parents. None of the students was a parent yet. They carefully formulated their goal of the study. Instead of the too-broad 'having insight in the use of baby buggies', they formulated their goal as 'what is it like to be a parent and what concerns, feelings and attitudes do they have when

being on the way?' This goal statement helped them decide how to analyse the data, what to look for, what to leave out and finally what to communicate to the company. Note that the product itself is not mentioned in the goal. This is usually the case in the generative stage of the design process.

In generative techniques a clear goal statement is especially relevant, as the resulting data is fragmentary, multi-layered and consists of individual stories, which makes it difficult to create hierarchical structures (Sleeswijk Visser, 2003).

Preliminary mapping

Prior to the study researchers map their knowledge and views of the experience domain. The primary map has two goals: It reduces the risk of the researcher projecting his/her preconceptions on the participants, because these have been made explicit. Secondly, it supports the researcher in formulating instructions, and provides a starting structure to analyse the results. Arising new topics brought forward by the participants can then be added. In the shaving experience case we created a mindmap (Buzan and Buzan, 2000) with everything that we thought had something to do with shaving experience (see appendix, figure 2). Moreover, having an initial map helped us to be able to differentiate what we already knew from what we learned from the participants. If we had not done this, many of the new insights would have seemed obvious in hindsight.

Participant selection

The people who use a product now will not necessarily be the ones who will use the new product in the future. This needs to be considered when selecting participants for a study. Inviting a variety of people for a group session often leads to rich and diverse discussions.

The background of participants influences the session. We have experienced that some participants are better able to think associatively than others. One participant showing strong associative reflections about the subject can encourage others to explore their experiences on a more abstract level. On the other hand, a group dominated by strong associative thinkers is best avoided, because such a group tends to discuss abstractions rather than reflect on their personal and concrete experiences. Including one participant with creative job, like graphic designer or architect, can have a positive effect on the generated information. A participant group consisting mainly of product designers is difficult because they are problem-solution minded and therefore fail to make their own experiences explicit (Stappers and Sanders, 2003).

Depending on the scope and formality of the study, the total number of participants can vary from six to over one hundred participants. We have done group sessions with three participants that worked quite well. However, talking with three people reveals fewer stories because there is less opportunity for participants to reflect on each other's experiences. We find that four to six people works best as the number of participants in a single group session. Four is large enough to create a group feeling and have group discussions and six is small enough to pay attention to every individual. In a group with more than six participants it becomes more difficult to pay attention to every individual. Doing two or more sessions reduces the possibility of group dynamics suffering from topics only mentioned by one or a few dominant participants.

3.2 *Sensitization*

In the sensitizing phase, participants perform a series of small exercises designed to let them think about past experiences, and make them 'reflective practitioners' (Schön, 1983) of their present experience. The sensitizing process enhances the quality and quantity of contributions that participants make in the later generative sessions (Sanders and William, 2001). The basic principle of the exercises in the package is to let people express memories, opinions, dreams etc around the central topic of the study. In our projects, participants receive the sensitizing package (e.g. different documenting assignments and reflective exercises) about one or two weeks before a session is scheduled.

They do these assignments in their free time and in their everyday environment, which makes them feel free and relaxed and they can pay their full attention to their feelings, attitudes and routines.

Origin of sensitizing tools

The development of sensitizing techniques and tools started at Fitch in the early 1990s (Sanders, 1992). Working in a parallel time period, but independently, Gaver *et al.* introduced the Cultural Probes technique (Gaver *et al.* 1999). These techniques employ similar components, but may use these for different purposes. Gaver *et al.* states that ''probes are collections of evocative tasks meant to elicit inspirational responses from people – not so much comprehensive information about them, but fragmentary clues about their lives and thoughts'' (Gaver, Boucher, Pennington, and Walker, 2004, p. 53). Probes are intended to be used in the early stages of design to gain empathic understanding of a context of use and to help spark new design ideas. The probe packages are created carefully and are a means to establish a conversation between users and the design team.

With the Cultural Probes approach, the returned probe is the main data resulting from the study. Within the contextmapping framework, the sensitizing tools and techniques are step one in a process specifically meant to sensitize the participants as a preparation for the generative sessions. The main objective of the sensitizing tools, is to establish self-reflection on the part of the participants, which is then harvested during the generative sessions.

Sensitizing tools and Cultural Probes both take playful and subjective forms. Small playful exercises trigger the participant to reflect on his/her experiences without analyzing too much. Typically, each exercise elicits a fresh perspective on the situation that is explored. The sensitizing packages are meant to stimulate reflection on the participants' daily experiences. They are also sources of information for the researchers, but are usually not designed for structured analysis as is the case for questionnaires.

Here are a few elements that have been used both in Cultural Probe packages and in sensitizing tools:

- **Disposable camera.** Participants are sent disposable cameras and are asked to take pictures of things in their environment or things that appeal to them for certain reasons. They are asked to write comments about each picture. This technique delivers strong visual material and gives a lot of freedom to the participants. The ideal application of this method is to send disposable Polaroid cameras to the participants, because then the time between taking a picture and writing down the comments is kept short, and the reasoning is fresh.

- **Workbook.** This is a small booklet with open-ended questions to answer, things to draw, such as 'draw a diagram of the things you did while travelling to work this morning'. To make it easy for people to express themselves, often little stickers are included as starting points for participants to express their thoughts or feelings. It must become their personal workbook and be fun so that they keep working on it.
- **Diary.** A diary is like a workbook, but is focused on asking the participant to do, write or draw something each day. This supports the participant to continually think about the subject and maximizes the use of the timespan before the actual session.
- **Postcards.** Pre-stamped postcards can be sent to participants. Every postcard has a little question or exercise. The participant answers the postcard and sends it back. It is fun to get postcards and it asks very little effort from the participant. The surprise of getting the postcard draws the participant's attention to the subject of the study in a playful and engaging manner. Postcards tend to be used primarily as probes.

In interviews or group sessions, participants may refer to the package in their stories ('*...Well, in the workbook I have drawn what my kitchen looks like and I realised that there is just too much stuff, but I like it, because it is my stuff...*'), which demonstrates the reflection effect of the sensitizing phase. These packages are not just for sensitizing: when they are completed and filled with rich information about personal experiences, they provide a visual inspiration (see figure 7) source for designers.

Creation of sensitizing packages

The exercises and assignments need to elicit stories, clues, thoughts from the participants. From our experiences in the different projects we have formulated the following approaches and tips for creating exercises and materials for the sensitizing package:

- The design of the sensitizing package is playful and professional at the same time. Playful because it ought to be fun to work on it and it should encourage participants to freely wonder, reflect and listen to their thoughts and dreams. It should invite participants to bring in their own ideas. The sensitizing package is professional in appearance, so that participants feel that they are taken seriously and need to respond as experts on their experience domains.
- The subject of the sensitizing package is usually broader than the subject covered in the sessions. The subject of the shaving experience study was shaving, while the subject of the sensitizing package was body care (see appendix). If the sensitizing exercises are too specific, participants might have specific answers ready during the session and work less intuitively.
- The activities are inspirational and provocative. This allows the participants to take the initiative and surprise the researchers as well as themselves. For instance, by simply asking '*What sports do you do?*' the answer will probably be '*Swimming and tennis*', which will not evoke a strong reflection on the person's experience. When given a box with the label '*The sports I like*' and a centerpoint that says '*The ones I do now*', participants will write down more, even draw pictures, and will be set to think about underlying motivations for (not) practicing sports.
- The sensitizing package stimulates participants to reflect on a daily pattern over a few days, and in this way they will slowly become more aware about their

experiences. The diary exercise is one way of doing this. Taking photos over a number of days is another way.
- The design of the sensitizing materials invites participants to write their ideas or impromptu comments. Therefore the package includes sufficient white space. As people are hesitant to write on books or originals the design of the package is informal.
- Working on the sensitizing packages should require people no more than five to ten minutes per day (often they will do a lot more, though).

Finally, we have found pilot testing of the sensitizing package useful, to see if the compilation of the exercises and the materials work as assumed.

3.3 *Sessions with users*

The set up of studies with generative techniques varies. Here we primarily address group sessions, but individual or pair sessions are also possible (see table 1 for some advantages and disadvantages of various types of sessions).

In a group session the sensitized participants come together to share their experiences. A session usually has two to three exercises, and last about two hours (see table 2). Individual and pair sessions follow the same plan, but do not take as much time.

With each exercise the participants are triggered to express deeper levels of feeling or knowing. For the different exercises, various toolkits are available. Three toolkits are shown in figure 5; picture and word set for collaging, simple colourful abstract 2D-forms for cognitive mapping and 3D forms for Velcro-modelling.

The range of meanings of the components within a toolkit can be extended through the use of coloured pens, markers, glue and scissors. Participants are asked to use a subset of the toolkit components together with pens, glue etc to make artefacts, to express their

Table 1. The advantages and disadvantages of group, pair or individual sessions.

	Advantages	Disadvantages
Group sessions	• Participants can react to each other's experiences; • A global view of the context and various user experiences will be created; • A large amount of diverse information is generated in one session.	• Without professional moderation, one dominant participant can influence the group; • It is difficult, although possible, to obtain individual responses.
Pair sessions	• Participants feel comfortable because they are with a friend, spouse, parent, etc.; • Participants may reveal things about each other; • The session can take place at the participant's home or workplace.	• Less diversity in the total range of participants since members of the pair are related or acquainted.
Individual sessions	• A lot of attention and time can be devoted to a participant and this can bring out detailed information; • The session can take place at the participant's home or workplace.	• A participant can feel inhibited, because it may feel as if a psychologist is testing him/her about feelings, experiences and needs; • It is more time-consuming than groups.

Table 2. Timetable used for group sessions in the high security admittance project.

time	action	checklist
5 min	Introduction	Explaining set up session, goal and that they are experts on their own experiences
5 min	Warm-up	Introduction of participants by explaining their bunches of keys
	Exercise 1: collage of being admitted	Use these pictures and words to express how you feel about being admitted in the broadest sense
20 min	"Make" part	
20 min	"Say" part	Present collage
10 min	Discussion	Reaction on each other' stories
5 min	break	
	Exercise 2: draw ideal ritual	Make a drawing (or collage) to express your ideal ritual of being admitted in a building in the future (2050). Express how it feels
20 min	"Make" part	
20 min	"Say" part	Present drawing
10 min	Discussion	Reaction on each other' stories
10 min	Remain talking	

Figure 5. Some generative techniques used in practice by SonicRim.

thoughts, feelings and/or ideas. The resulting artefacts may be in the form of drawings, collages, maps, models, stories, storyboards and plans. After the making, mapping or modelling, the participants present the story of the artefact they made. Their stories often reveal their unmet needs and expose their aspirations for the future.

These techniques are only a few of the techniques that are available. The full range of generative toolkits and techniques is infinite and is constantly increasing in variety. Usually a range of different generative techniques is used together in one session (Sanders, 2000). The choice of a technique depends on what the researcher wants to explore. Collaging is an accessible technique for eliciting memories and emotional responses and is often used early in the generative session (Stappers and Sanders, 2003). Flowchart mapping and cognitive mapping are good for eliciting intuitive relations of patterns or processes. Modelling enables participants to embody their ideas or give form to their unmet needs. The components of these toolkits are deliberately ambiguous so they can be interpreted and used in a variety of ways.

We describe the collaging toolkit in detail, because we have used this technique many times. Normally a set with about a hundred images and a hundred words is recommended for a collaging toolkit. In the kitchen for 2015 project we have used a set with just 56

images and 130 words. The richness in the created artefacts and the stories of the participants were comparable with the richness of other collaging exercises with toolkits with around 120 images. The collection of images and words needs to be carefully chosen. During one of our first projects we offered the participants a very open set of materials for collaging, i.e., magazines. We expected that these materials would give participants more freedom to express themselves. Instead, the participants had more difficulties in creating the collages, because they didn't know how to start. In addition, information in the magazines distracted their attention for the making of the collage (e.g. they started to read advertisements).

We use the following guidelines in creating a set of collage images.

- The image content is diverse (e.g. nature, people, animals, interactions, fantasy, objects) and has different contexts (work, home, holiday, emotion, thoughts, etc).
- People in the images reflect diversity in age, gender and race.
- There is a balance between positive and negative images and between concrete and abstract images.
- Over-aesthetic images or print-quality images are avoided. Our design students often select a set with aesthetic images, because they were trained to create expressive moodboards. Many times we have corrected their sets by explaining that the set should not have one consistent style, rather it needs to show diversity in order to stimulate the participants while gazing through the set of images.
- Subject-related images (e.g. an image of a shaving man for the experience of shaving) may be necessary but should be kept to a minimum. These images may help the participants to get started, but the participants must be able to create their own shaving context on the collage.
- Many, but not necessary all, of the images are open to interpretation since participants have to tell their own stories with the images and words. Ambiguous images are interpreted in many different ways, which is useful for helping the different participants express their feelings and dreams. Figure 6 shows an image that was used as part of a collaging set in the experience of shaving study. This particular image was used by three participants for very different reasons as can be seen in the following verbatim quotes.

P1: 'I always shave myself in the evening. So I dive into my bed, completely fresh and clean.'

P4: 'I feel very sharp after shaving.'

P3: 'I always shave myself before going to work. I work in the swimming pool as a swimming teacher.'

Figure 6. Image used in a collaging toolkit that was interpreted in many ways.

Group sessions

A session normally begins with a warm-up activity to 'break the ice'. The participants are given a chance to feel at ease, because they usually do not know each other and may be asked to talk about personal matters.

Sometimes the sensitizing packages can become part of the group discussion. In the high security admittance study participants teamed up in pairs and interviewed each other about their packages. Each participant then introduced his/her partner to the group, indicating one interesting thing that struck him/her about the package. It is also legitimate not to refer to the sensitizing packages at all during a session.

After the warm-up, one of the generative techniques is used. There is one general instruction that characterizes the generative 'making' exercise (Sanders, 2000): '*Use these components to express how you feel about the experience of xxxxxx. You can do whatever you want, as long as it makes sense to you.*' After the drawing, collage, mindmap, flowchart, or model is made, which will take about 15–20 minutes, every participant explains his/her created artefact to the group. Subsequently, a group discussion takes place. This overall flow of events can be repeated two or three times using different types of generative toolkits.

The first exercise opens the minds of the participants by stimulating them to make associations and revive memories. For this, we usually do a collaging exercise. This is an accessible technique because participants can easily make associations with images and words. After the first exercise, deeper levels of feeling or knowing can be touched. In the kitchen for 2015 project we used cognitive mindmapping as a second exercise. We gave the participants small abstract colourful forms of paper, stickers and pencils, glue and scissors and the assignment to express with these tools one of the routines they often do in the kitchen, and what it is like (see figure 7) We were impressed how easy it was for the participants to express their routine with this very abstract toolkit. This may not have been the case if we had used this as a first exercise.

In the last exercise, we tend to ask participants to express their needs and dreams for the future. Any of the techniques is suitable as a last exercise, although we often do a modelling exercise, creating an 'ideal' product. This can be done with a Velcro-modelling toolkit, as in figure 6 or with just a box with a wide assortment of 'tinkering' materials. In the kitchen for 2015 project, the participants were asked to create a model for a product, which expresses their desired needs and wishes for something in the kitchen for the near future.

After the discussion of the last exercise it is advisable to keep the cameras rolling because, often the participants have opened up their pathways to experiences and want to continue sharing them with others. This last informal step often delivers useful information. More than once we have found that participants were unwilling to end the session, totally gripped by the subject, which had seemed a mundane, even boring, topic a few hours earlier.

Facilitating a session

It requires one's full attention to lead the group through the session, asking the right questions at the right moments and managing the group dynamic. The person who will lead the analysis should be able to observe, concentrate and listen to what the participants say and do, while making interpretations; this allows little time for anything else. He or she should not lead the session. Therefore it is advisable to have a second researcher in the role of facilitator managing the process.

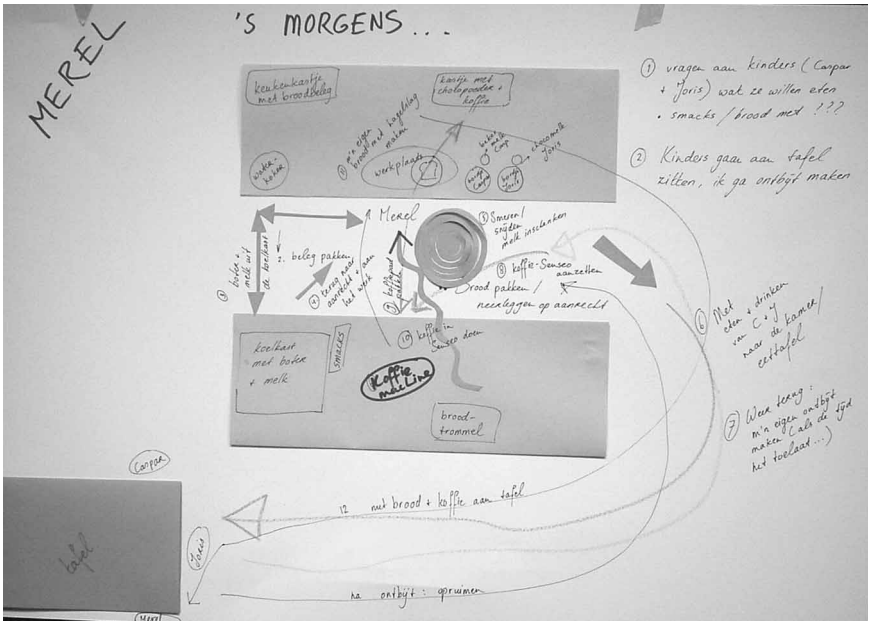

Figure 7. Mapping exercise of a routine in your kitchen.

Participants need to be guided in a step-wise process to facilitate awareness about their own experiences. From the various studies we conducted we have learned that small steps are often needed. In an evaluation about the sessions of high security admittance study, participants mentioned that they had difficulties with the abstraction levels in the exercises; '*A few more exercises in between would have helped me better in revealing and expressing my experiences for myself and to the group*.'

Besides the step-wise process into participants' experiences, contextmapping studies involve the emotional side of participants and facilitators should know how to deal with this. Sometimes participants come up with very personal, emotional stories. The facilitator should know how far to go and where to stop. In the high security admittance study, for example, one participant started to talk about his happiness of being admitted in the world of fathers. A second participant immediately reacted on his story by telling her experiences of having difficulties to get children. A third participant was pregnant and felt the need to tell her story too. In a few minutes the emotional level of the discussion was very high. At that moment, the facilitator thanked the group for sharing these personal stories and mentioned the courage of the participants, but stopped the discussion by making a comment on a meta-level, showing that the exercise does reveal interesting stories, and then continued with a following exercise.

The participants are encouraged to feel that they are the experts in the experience domain being explored and the facilitator must believe that to be true. It is the facilitators' task to lead the discussion, and the participants' task to express their thoughts and personal experiences. The participants are told that nothing they will say is 'wrong' and that everyone has their own experiences and that each person should respect the experiences and opinions of the other participants.

3.4 *Analysis*

The sessions and workbooks produce a rich, lively and varied, but complex set of data which is not readily structured. Analyzing the information from the generative sessions is a young field, that still is in an exploratory phase. The information of the contexts of product use, as stated in the preparation section, is fragmentary and multi-layered. The created artefacts are the means that the participants use to express their experiences. The information of the context of product use can be distilled from the explanations of the created artefacts. Therefore analysis focuses on the stories the participants tell about the artefacts. Approaches for analysing visual elements alone, such as Zmet (Coulter, R.A., Zaltman and Coulter, 2001), and Kansei (Stappers and Sanders, 2003) are explored, but have not led to satisfying results, because much more information is anchored in the stories of the participants and in the relationships between the visual elements and the stories.

With the Grounded Theory approach for analysis (Corbin and Strauss, 1990), data is studied to discover structures without using pre-set expectations of the data. Potential indicators of a phenomenon are discovered during the analysis, rather than being hypothesized in advance. We follow an approach that is largely in line with Grounded Theory to analyse data gathered from generative techniques and suggest the following three-phase structure for generative data analysis:

Phase 1: Fixate on the data
By being present at the sessions, the researcher has already learned a lot about the experience domain. Right after the session, the researcher documents all these thoughts and remarks, because memory will fade in time. Then the researcher turns to the audio- and video-documentation. Writing down all that is said during the sessions is a time consuming activity, but it makes it possible to annotate and highlight quotes. Working with transcripts works better than listening to a tape and forwarding and rewinding it all the time.

Phase 2: Search and be surprised
After the raw data and first insights have been captured, it is time to search through the information for interesting indicators. This is a fuzzy process that works well when the researcher is physically surrounded with all the session materials; the tapes, the transcripts, the created artefacts, etc. The different stories are checked: Which topics are mentioned? Why do participants mention a topic? What do they say about it? What are their ideals? Many layers of information are discovered. With an open-mind, the researcher is prepared and surprised by what the participants have expressed. All the impressions and insights are written down. Making notes on small items or stationary post-it notes facilitates their rearrangement.

Phase 3: Find patterns and create an overall view
In the search for a variety of patterns, all the annotations and the data are organised and reorganised. Determining recurrent and/or striking themes about the experience creates an overview. Working spatially, e.g., on a wall or large boards, supports creating overviews and may show the relations between different experiences and themes visually.

This three-phase structure allows the researcher to explore and find patterns. Our experience is that the three phases can be followed in less or more intense analysis.

The goals and timing of the project influence the intensity of analysis. Of course, analysing the data of six people is different from analysing the data of sixty people. When more than ten participants are involved it is advisable to use multi-relational databases to store and structure the data. Analysis of generative data can take place over a few hours or several weeks and can be done in teams or by one individual.

When practiced in industry, the key is to discover effective and efficient ways to quickly analyze large amounts of qualitative data. An approach that has been used successfully at SonicRim proceeds as follows. A team of researchers works in parallel, meeting daily, to share insights, throughout the course of analysis. One member, for example, is responsible for the analysis of the sensitization materials. Another team member is responsible for analyzing the first collaging exercise, another for the second exercise, etc. Each member becomes, in this way, an 'expert' on the data they focus on for documenting, summarizing and analysing. They work separately throughout most of the day, but get together regularly, at least once a day, to share observations, ideas and preliminary insights. The sharing activity influences the members to return to their focused analysis activities with a heightened sensitivity to emerging patterns. Moreover, inferences that start to form in one part of the data are quickly adjusted and refined by a member looking from the perspective of another part of the data. Then, when all components of the data have been documented and summarized, the team of researchers works together to generate the conclusions and to develop the design implications or recommendations.

Software-based qualitative analysis packages such as NUD*IST or ATLAS.TI, often used in ethnographic research, can also be useful for large data sets. We haven't fully used these software packages yet, but we do believe that they support the analysis effectively for certain projects. We are somewhat reserved to apply these software packages, because we have found large organizational space (on walls or desks) extremely useful for structuring data and forming hypotheses. Data on a screen, although coded and structured, does not offer an inspiring and flexible workspace for analysing fragmentary information about context of product use. The jargon and symbols of these programs are quite abstract and do not encourage the team to view data with empathy and might restrict the multi-layered approach to the data.

Within design student projects, time for analysis is often short. Design agencies show the same need; they are very interested in conducting contextmapping studies, but do not have time to do so (Jacobs, 2003). If one is interested in beginning to do generative research, we suggest investing more time spent in preparing and sensitizing and less time spent in analysis. For a quick study it is necessary to at least review the recording of the session once and to create an overview by checking which themes the participants mention most often. Just paying attention to the created artefacts alone is not recommended, because the participants' stories carry much knowledge about their experiences and the contexts of product use.

3.5 *Communicating the knowledge*

Capturing the information is necessary in order to share the knowledge with all members of the multi-disciplinary design team. To inform and inspire all members of the team (e.g. designers, engineers, financial managers, marketing managers and public relation specialists), the results need to be accessible, shareable, useful and understandable during the entire human-centred product development. Diggens and Tolmie (2003) show how diagrammatic forms can be used to convey ethnographic data, but the results of a

contextmapping study consist of a multitude of fragmentary clues and directions about peoples lives. The data is multi-faceted and multi-layered, and addresses issues both functional and affective, both general and personal, both objective and subjective. It should be presented appropriately. Anecdotes narrated in the session are often found more inspirational for designers than are abstract interpretations. Common ways of presenting user studies are written reports, video highlights and workshops (Sleeswijk Visser, 2004). Other ways to present the findings, i.e., more descriptive and visual ways, are needed to represent and communicate these complex data, because the outcome has to create empathy and engagement of the design team for the users. In this paper we concentrate on the communication for the early phases of the development process, i.e., idea generation and conceptualisation. In these phases designers need to immerse themselves in the information and use their creativity.

One approach we found very effective is to communicate the findings by presenting a compilation of carefully selected raw data (see figure 8) and clues towards interpretations. Key themes and relations in the information can be selected for presentation. To illustrate these themes and relations, anecdotes work well, because anecdotes appeal on the level of experience. Parts of the sensitizing package or parts of the created artefacts can be used as visual illustrations of themes and relations. Visualisations (e.g. models, theories or diagrams) of the patterns that have been identified through analysis suggest relations between themes and observations that can be considered by the design team, even if they are not formulated in a definitive theoretical framework. Through judicious use of typography, diagrams, and illustrations the designer is invited to explore the findings from the research team in different ways. The aim in communication is to find ways both to present information and to provide inspiration, to give freedom of interpretation, yet also support argumentation, to promote and enrich discussion between designers and other members of the design team (Sleeswijk Visser, 2004). Many of the existing techniques for conveying results are using narrative structures such as personas, storyboards, scenarios or scripts. These structures integrate several findings into stories involving 'real' people, rather than targeted groups and have shown to be effective methods to stimulate designers to empathise with the depicted people, rather than merely reason about them.

The findings need not be conveyed through a document alone. By means of workshops, researchers and designers are able to discuss the analysis process and the findings, and sometimes do a joint exercise with the data.

In design practice, companies use the findings during idea generation, to inspire concepts, and as a means to argue and discuss concepts in decision meetings. Communication tools should support action as well as reflection (Bodker, 2000) and are a means to provoke new ideas. The information should encourage communication between all members of the multidisciplinary team.

The findings can be useful during other phases of the development process. When important decisions have to be made, a clear and convincing argument can be made using a scenario of the interaction based on the design and the knowledge about its context. When testing prototypes of the concept the information can be used as reference. For example: how will users experience it? How should we test the prototype? Here it is possible to let the same users, together with new users, participate in the concept evaluation. This allows continuous reflection during the whole development process. Finally the information from the research can be used to support the selling of the product to wholesale trades. The product, developed on a human-centred base, unites the experiences of users and the contexts in which it is or will be used.

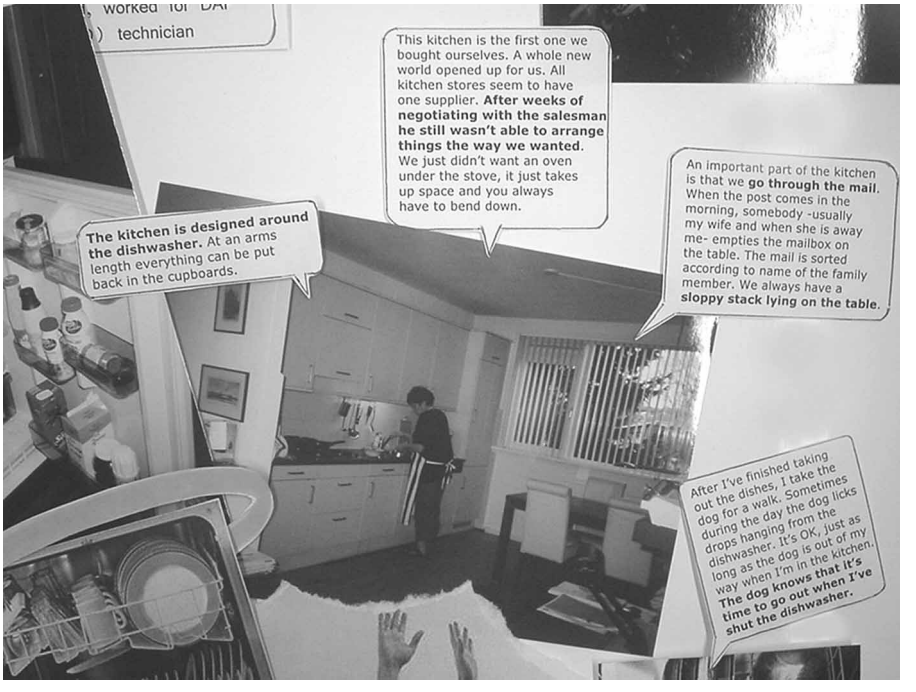

Figure 8. A raw data compilation: Part of a collage representing the kitchen experience of one of the participants (from van Beusekom, 2005). Parts of the actual data, photos of the sensitizing package and anecdotes of the transcript are combined to present the context of the kitchen for each participant.

4. Discussion

In the preceding sections we described contextmapping as an intensive research activity, and discussed a framework of six separate phases, and the distinct roles for the user, designer and researcher. In practice, however, the rigour and intensity of the research varies from project to project. The phases are often not that clearly separated and the roles of stakeholders often overlap and mix.

Intensity

Contextmapping techniques can be applied across a range of intensity, varying from single sessions with a handful of participants and little formal analysis to large research projects with over a hundred participants and intensive analysis. The studies in industry are usually larger and faster and involve significant analysis by a team of researchers. The more intensive studies are typically conducted in larger companies or in academia. The cases used to illustrate this paper are of medium size, involving under a dozen of participants and analysed mainly by a single student researcher, who also used the outcomes in producing a concept design. In the smaller cases, often no real 'map' is left as documentation. Although such sessions are appreciated and used by designers, there is a need for documentation even for these small-scale studies. If we want these techniques to be useful for smaller projects in design practice, we will have to develop methods that can

be graded in intensity. We hope the practical guidelines given in this paper provide the first steps forward in this direction.

The boundary zone of analysis and communication

In our model we separated phases of the contextmapping model. In practice, activities in these phases continue and overlap. In particular, the analysis phase and the communication phase often fuse in one activity. In the section on communication we have mentioned that the results of a study consist of the combination of raw data and interpretations. But does it end here? No, it is just the beginning of a conceptual design phase with the experiences from real people as input. When the findings are presented as 'facts', the design team is not stimulated to play with the data. When the findings are presented as purely raw data without showing the multi-layered character, the design team does not know where to start. Creating inspirational input, engaging empathy with users asks for an intensive appropriation and transformation of the results by all members of the design team. We believe that there is yet a lot to be explored on dimensions of interpretation, involvement of team members during analysis and participation of team members in the act of communicating. The first author's PhD research project takes place in this particular zone where analysis, communication, and use of context information during conceptualisation meet.

The different roles of the researcher, designer, and user

Conducting a contextmapping study involves different stakeholders, whose roles intertwine and overlap. The whole design team can be actively engaged in the study. For instance, the designers who will use the outcomes can (and should) be involved in creating the sensitizing exercises for the users. For the designers being present at some part of the group sessions is valuable. By participating in the analysis and presentation of results, the designers are immersed more deeply in the user's context, rather than if they are passive recipients of those results. Our experience is that design projects often cannot afford extensive user research. When little time and budget is available, the designer takes the role of the researcher. Moreover generative techniques are flexible to apply in different situations. Small, rough, one-day studies are useful as are intensive research, which can take up to a few weeks. Both reveal interesting and useful data about the context of product use. Even with a one-day study enough time needs to be made for the sensitizing process for users, researchers, designers and other members of the team. Figure 9 graphically summarizes how the involvement of different parties varies throughout a contextmapping study. Typically, the project is carried out by researchers, and designers participate in preparation and analysis, and users' participation ends after the sessions. In addition, especially with the design of professional products, users are highly motivated to remain involved in later stages of the design.

5. Conclusion

The past decade has shown an undeniable rise in the involvement of users in the creative parts of the design process. In our own experience, we have seen a rapid growth in students' interest in generative techniques, and the willingness of companies to let us explore these techniques in collaborative projects. Reactions to earlier drafts of this paper

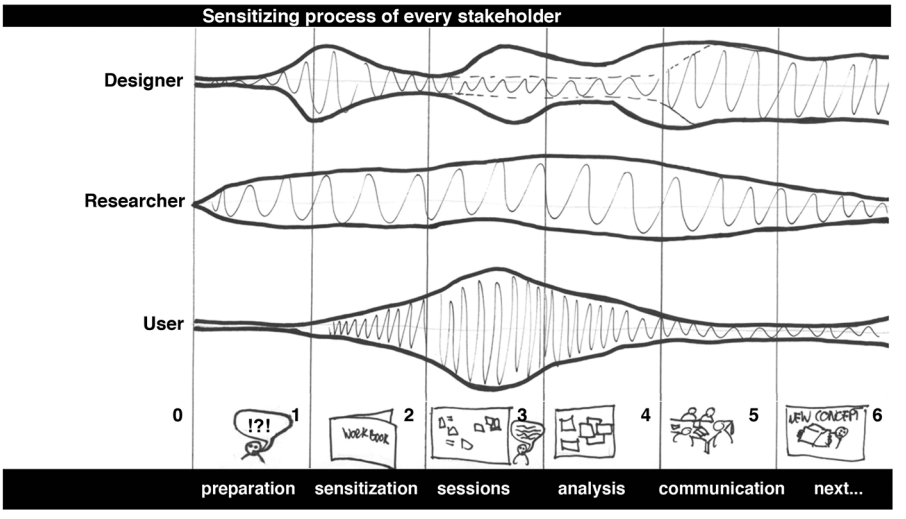

Figure 9. The involvement of the stakeholders varies through the stages of the study.

underscored the need for practical knowledge on employing generative techniques in design. In academia, new approaches to user studies, such as generative tools and cultural probes, have become common topics at design-oriented conferences. Until now, however, publications have highlighted the background philosophy, underlying principles, or practical results, with limited attention to the methodology and practical issues in conducting these studies. As a result, many people have been reinventing the wheel, when it comes to group sizes, types of exercises, the structuring of sessions and the intensity of analysis. By means of this paper we hope to provide a foothold for the practitioner and researcher regarding these matters, allowing them to further develop the theoretical basis of the field.

Notes

1: research projects at the TU Delft include studies on: rituals of entrance, information flow in intensive care, sharing personal media, basic atmosphere controller, use of detergents, shaving products for men, workstation for radiologists, private patient room, luggage concept, kitchen for 2015, information device for tourists, high security admittance, packaging for sweet spreads, baggage system in cars, baby buggy, furniture in student rooms, physiotherapists' worktable, waiting, communication tool for elderly.

2: research projects in industry include topics on: families communicating, the knowledge worker, the home experience, home entertainment, remote controls, shopping online, shopping for pet food and supplies, working in alternative postures, paper towels, toilet paper, the museum experience, hospital patient rooms, working in small business, working in large business, working away from primary workspace, baby diapering, the middle school teacher's work, PC gaming, virtual PC, hotel for frequent travellers, CAPD (Continuous Ambulatory Peritoneal Dialysis), personal and family security, fun learning for children, the surgical suite, food preparation and consumption, moms and their babies, driving a car, and operating a military loader.

Acknowledgements

We'd like to thank our students who were involved in the various projects, from which we are able to learn and constantly improve our model of contextmapping. Thanks to V. Visser and M. van Beusekom for sharing their information and the experiences of their graduation projects. We also like to thank the many students at TU Delft and The Ohio State University, and the practitioners who participated in the studies, especially those who also reacted to earlier drafts of the paper.

References

Beusekom, M. van., Vision on a future Electrolux kitchen for 2015. (Unpublished) Master's Thesis, Industrial Design Engineering. Delft University of Technology, 2005.

Bodker, S., Scenarios in user-centred design – setting the stage for reflection and action. *Interacting with computers*, 2000, **13**, 61 – 75.

Buzan, T. and Buzan, B., *The mind map book. Millennium edition*, 2000 (BBC Worldwide Ltd: London).

Coulter, R.A., Zaltman, G. and Coulter, K.S., Interpreting consumer perceptions of advertising: An application of the Zaltman Metaphor Elicitation Technique. *J. Advertising*, 2001, **30**, 1 – 21.

Corbin, J. and Strauss, A., Grounded theory research: Procedures, canons and evaluative criteria. *Qualitative Sociology*, 1990, **13**, 3 – 21.

Diggens, T. and Tolmie, P., The 'adequate' design of ethnographic outputs for practice: some explorations of the characteristics of design resources. *Proceedings of First International Conference on Appliance Design*, 2003, pp. 76 – 86.

Djajadiningrat, J.P., Gaver, W.W. and Frens, J.W., Interaction relabelling and extreme characters: Methods for exploring aesthetic interactions. *Proceedings of the conference on Designing Interactive Systems: Processes, practices, methods, and techniques*, New York, 2000, pp. 66 – 71.

Dourish, P., What we talk when we talk about context. *Personal and Ubiquitous Computing*, 2004, **8**, 19 – 30.

Gaver, W., Dunne, T. and Pacenti, E., Cultural Probes. *ACM Interactions*, 1999, **6**, 21 – 29.

Gaver, W., Boucher, A., Pennington, S. and Walker, B., Cultural probes and the value of uncertainty. *ACM Interactions*, 2004, **11**, 53 – 56.

Grudin, J. and Pruitt, J., Personas, participatory design and product development: An infrastructure for engagement. *Proceedings of Participatory Design Conference*, Palo Alto, 2002, 144 – 161.

Hekkert, P. and van Dijk, M., Designing from context: Foundations and applications of the ViP approach. *Designing in Context: Proceedings of DTRS 5*, edited by P. Loyd, and H. Christiaans, 2001, Delft University Press.

Jacobs, W., Onderzoek van methoden om consumenten te betrekken in het vroege ontwerpproces. (Unpublished) Master's Thesis (in Dutch), Industrial Design Engineering. Delft University of Technology, 2003.

Mattelmaki, T. and Battarbee, K., Empathy probes. *Proceedings of the Participation Design Conference*, Malmo, 2002, 266 – 271.

Preece, J., Rogers, Y. and Sharp, H., *Interaction Design: Beyond Human-computer Interaction*, 2002 (Wiley: New York).

Polanyi, M., *Personal Knowledge: Towards a Post Critical Philosophy*, 1964 (Harper & Row: New York).

Sanders, E.B.-N., Converging perspectives: product development research for the 1990s. *Design Management Journal*, 1992, **3**, 48 – 54.

Sanders, E.B.-N. and Dandavate, U., Design for experiencing: New tools. *Proceedings of the First International Conference on Design and Emotion*, edited by C.J. Overbeeke and P. Hekkert, 1999, TU Delft.

Sanders, E. B.-N., Generative tools for codesigning. *Collaborative Design*, 2000 (Springer-Verlag: London).

Sanders, E.B.-N., Virtuosos of the experience domain. *Proceedings of the 2001 IDSA Education Conference*. 2001.

Sanders, E.B.-N. and William, C.T., Harnessing people's creativity: Ideation and expression through visual communication. *Focus Groups: Supportive Effective Product Development*, edited by J. Langford and D. McDonagh-Philp, 2001 (Taylor and Francis: London).

Schön, D.A., *The Reflective Practitioner*, 1983 (Basic Books: New York).

Schuler, D. and Namioka, A., *Participatory Design: Principles and Practices*, 1993 (Hillsdale: Erlbaum).

Sleeswijk Visser, F., Een structuur om de context van productgebruik in kaart te brengen. (Unpublished) Master's Thesis (in Dutch), Industrial Design Engineering. Delft University of Technology, 2003.

Sleeswijk Visser, F., van der Lugt, R. and Stappers, P.J., The personal cardset – a designer-centered tool for sharing insights from user studies. *Proceedings of Second International Conference on Appliance Design*, Bristol, 2004, 157–158.

Stappers, P.J. and Sanders, E.B.-N., Generative tools for context mapping: tuning the tools. *Design and Emotion: The Experience of Everyday Things*, edited by D. McDonagh, P. Hekkert, J. van Erp and D. Gyi. pp. 77–81, 2003 (Taylor and Francis: London).

Visser, V., Experiencing entrance admittance. (Unpublished) Master's Thesis, Industrial Design Engineering. Delft University of Technology, 2005.

Appendix A: The experience of shaving: A case study

(This case study was conducted for a manufacturer of consumer goods (see appendix, note 1)).

The aim of the study was to learn about the shaving experience of men and to create a map for designers which describes the context of shaving. By having real users participate in the research, we wanted to gather functional and affective information to inspire design teams in designing products for a new shaving experience. At the start, we had no particular product in mind. The target group for the study consisted of men with ages between 20–60 who shave at least once a week. It contained men who were dry and wet shavers. A recruitment agency for marketing research selected and recruited 10 participants from their database. Two sessions with five participants each were set up. We used a diary as a means of sensitizing the participants before they came to the generative sessions. In the sessions the collaging technique was used because we needed rich and emotional input about shaving.

A.1 Preparation and planning

Figure 1 gives an overview of the research plan showing two weeks for preparation, one week for sensitizing the participants, one week for the sessions, and two weeks for the analysis and communication. Two researchers were involved in this study.

We started by making a mindmap (Buzan and Buzan, 2000) about our own knowledge of shaving (see figure 2). We wrote down everything that we thought could possibly play a role in the experience of shaving. This was useful to get a view about the possible factors of the context. After the analysis, our insights were compared to this map. Here we found that the sessions really gave new insights about shaving experiences. Before we could only guess and think of our own experiences. For instance we thought that the light and lighting would be important items. But it turned out that the participants didn't really mention the lighting. Instead they mentioned that, when shaving, they really see themselves in detail in the mirror. It is for them the only moment in their lives when they carefully check their face. Some men experience shaving as a confrontation with their body aging.

In a pilot study the diary and the set-up of the session were evaluated and adjusted. We also started to collect images and words for the collaging toolkit in the first week.

A.2 Sensititization

One week before the sessions the participants received a diary. The theme of the diary was 'body care', not 'shaving', in order to prevent the participants from focussing only on shaving. The theme of shaving was only related to some of the questions. The questions

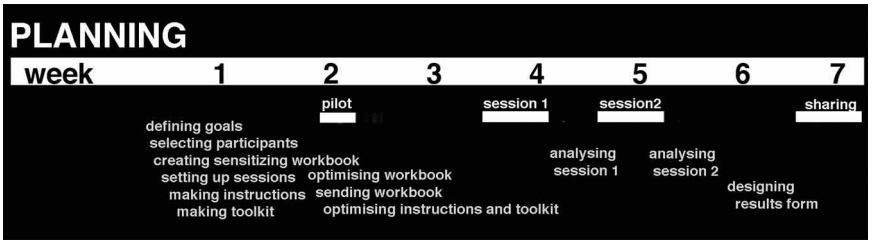

Figure 1. An overview of the research plan.

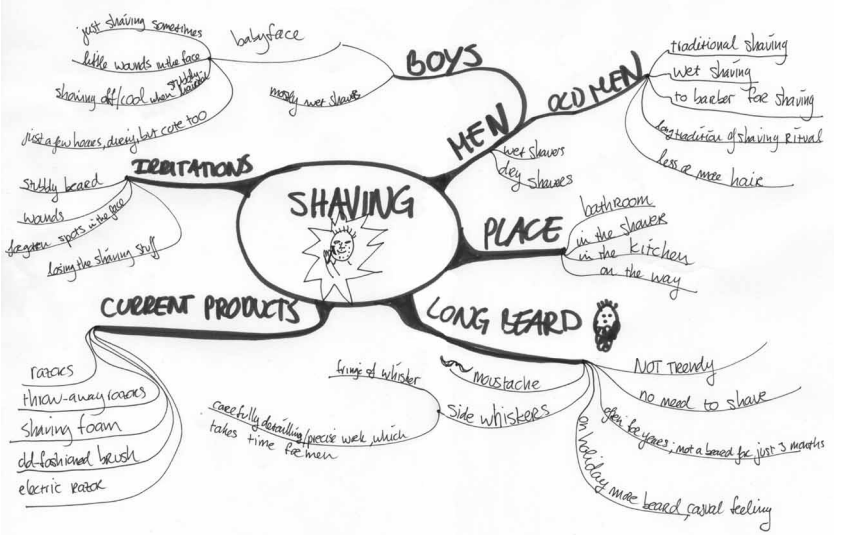

Figure 2. Mindmap about the shaving experience made before the research.

and instructions in the diary were often open-ended. The first instruction was to draw a map of their bathroom. This was followed by questions about their personal appearance; when do they think they look good and what do others expect of their personal appearance? In the last pages of the diary the participants were asked to make notes about activities of body care for five days (see figures 3 and 4).

The diary made the participants think about their daily routines in a general way. It is likely that the participants had not thought much about these routines before.

Figure 4 is a filled-in diary page. This person had a slow start for the day, and was not feeling good about it. He had spent the morning reading, then washed himself a bit and didn't shave! Because he has written this down, some awareness about his shaving experience popped up. In the group session this participant mentioned also that this diary made him realize that he doesn't feel comfortable in public if he had not shaved that day. But he actually likes to have a beard of a few days. So on the first day of not shaving he avoids having contact with people where possible. But the following days he feels good and attractive. He never lets his beard grow for more than five days.

Another participant mentioned that filling in the diary made him realise that he spends a lot more time in the morning on showering, shaving and brushing his teeth than he

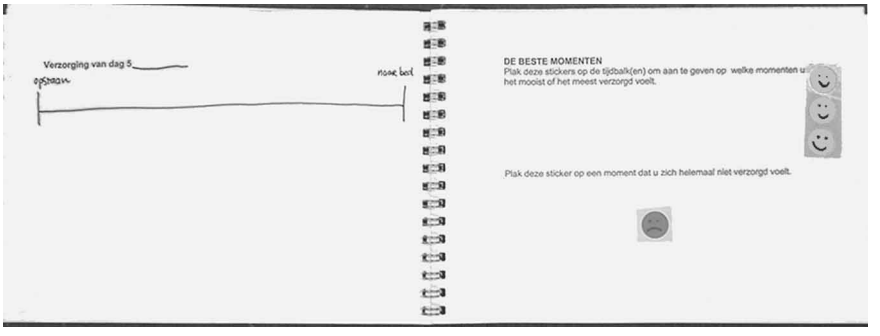

Figure 3. One of the exercises in the diary. The instructions say: 'Make notes for five days when you do these body care activities. This is the page for the fifth day'. On the right page: 'Use these smiley stickers to mark moments when you feel good and attractive. Use the sad sticker to mark when you feel bad concerning body care.'

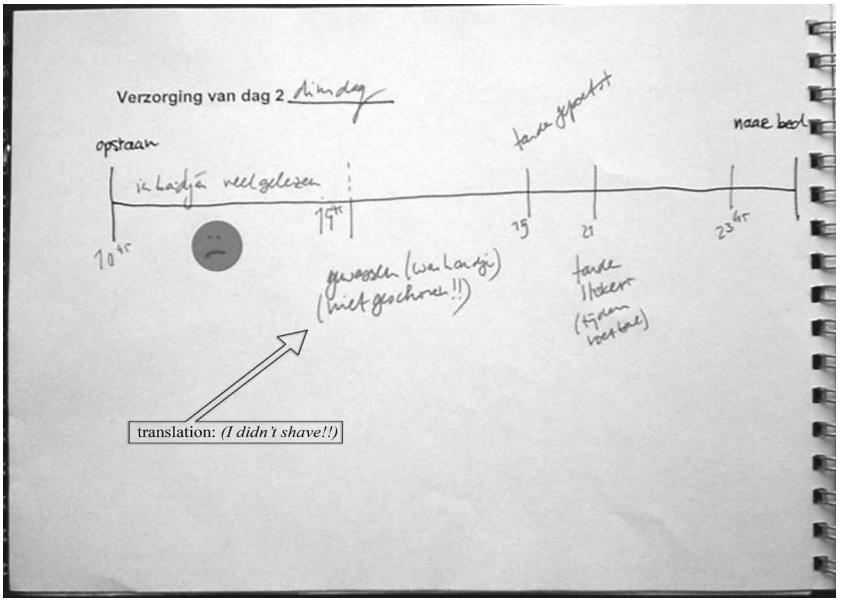

Figure 4. An example of a filled-in diary page from the exercise above.

thought he did. He also mentioned his wife looked through the diary and they started to discuss their morning patterns.

In these ways, the diaries made sure that participants had been actively engaged with the topic of body care all through the week before the sessions.

A.3 The sessions

Two sessions were set up, each with five participants (see table 1 and figure 5). At both sessions just four participants showed up, which is a common problem in recruiting. Both sessions followed the same procedure as outlined in table 1. In a session we did two

Table 1. The case was part of the graduation project of the first author (Sleeswijk Visser, 2003). The project was done in cooperation with P5 Consultants, usability professionals (www.p5-adviseurs.nl) in The Netherlands for a shaving product manufacturer.

Time	Action	Checklist
5 min.	Introductions	Goal: insight into experience, You are the expert, Basic rules
5 min.	Warm-up	Images of animals Every participant selects a picture of an animal with which he can identify most and presents the animal and himself to the group.
5 min.	Instructions for collage making	Use the images and words to make associations and to bring back memories about shaving this morning or whenever.
20 min.	Collaging "the shaving environment"	Environment of shaving: where, what, who, when, situation, seeing, feeling, hearing, scenting, tasting, mood? Think about the last time you shaved.
25 min.	Present collages	Explain your collage to the group. You can react to each other's stories.
10 min.	Group discussion	Reacting on each other's stories
15 min.	Collaging "feeling before, during and after shaving"	Why do you shave, how do you feel, how do you feel about shaving, what happens, are there changes: your feelings and state of being, what is the effect?
25 min.	Present collages	Explain your collage to the group. You can react to each other's stories.
15 min.	Group discussion: Ideal having exercise with attributes for aliens	What would be the ideal situation? What should shaving be like in the future?
5 min.	Closing comments	
15 min.	Walk out	

collaging exercises: The topic of the first exercise was 'Make a collage about your shaving environment.' The topic of the second was 'How do you feel, before, during and after shaving?' As a last exercise we used another technique; a variation of interaction relabelling (Djajadiningrat, Gaver and Frens, 2000). The participants were given a box with ordinary products, like a wine opener, a telephone, a cup, etc. With these objects they had to imagine how aliens from Mars would shave. By letting participants focus on this fictional situation, they address their imagination, and are better able to express their latent needs and to let go of the constraints of the current situation.

At first the participants didn't talk much and they felt kind of awkward, but soon they started to tell more and more. They came up with detailed memories, e.g., about shaving during their military service related in figure 6. They told about their early morning awakening routines, and what they liked or disliked about shaving.

A.4 Analysis

The evening after each session we wrote down all their impressions and insights we had had during the sessions. These sessions generated much data, consisting of diaries, collages, our notes and videotapes of the sessions (see figure 7).

Figure 5. Participants making their first collage.

Figure 6. One of the collages including part of the story told by one of the participants.

The following day we started analysing the data. We conducted the analysis in an intense and formal way, spending more than a fulltime week on it. A transcript was made

Figure 7. The sessions produce a wealth of data: diaries, collages, videotapes of the sessions.

of the videotapes. This was quite a job, but necessary. The videotapes, the collages and the diaries were studied together. Insights were written on yellow post-its. On large sheets of paper we wrote or drew annotations of interpretations and relations in different colours. We especially studied the parts of the videotapes where participants explain their collages (see figures 8 and 9).

To help manage the amount of data we decided to create a file for each participant. Everything that was said by one participant was placed in this file, together with his collages and his diary. Now we had eight separate stories of individual experiences of real people. A typical quote for each individual was selected:

P11: *I do not shave, I trim my beard!*
P12: *I always shave a bit on good luck*
P13: *I actually shave dry. Just routine.*
P14: *Sometimes I sing a song while I'm shaving!*
P21: *I hate shaving. It irritates me!*
P22: *I think it is kind of sexy.*
P23: *I want to be free in choosing when I want to shave.*
P24: *I get a kick from making very straight lines in the foam on my face while shaving*

The last step consisted of creating an overview of the overall shaving experience across all the participants. We made interpretations about:

- The goals men want to achieve by shaving: *Feeling fresh, being attractive, waking up, etc.*
- The meanings of shaving: *obligation, to be creative with your looks, to treat yourself well, etc.*
- The emotions men have towards shaving: *Happy, sad, angry, excited, bored, etc.*

A.5 Communication of the results

Communicating the results to designers who had not been present during the sessions and analysis was an expressed purpose of this study. This meant that the presentation and communication of the results was extremely important. We developed a communication tool for the design team: the personal cardset (see figures 10 and 11) that was used in combination with a workshop. Each card represented one participant's shaving experience. The backside of the card contained his entire story. The front side (see figure 11) had a selection of quotes, sometimes with illustrations extracted from the diary

Figure 8. A participant tells his story by presenting his collage.

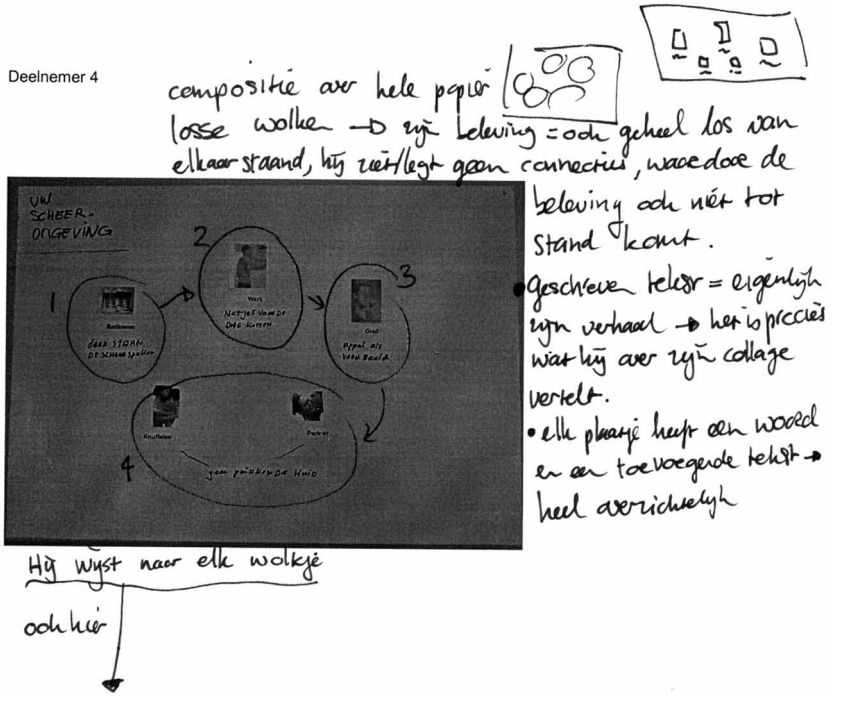

Figure 9. Notes by one of the researchers about one participant's collage. Here the researcher explored the videotapes to see if the way of presenting (order of topics, intonation, gestures, composition, etc) reveals extra information.

Figure 10. The personal cardset.

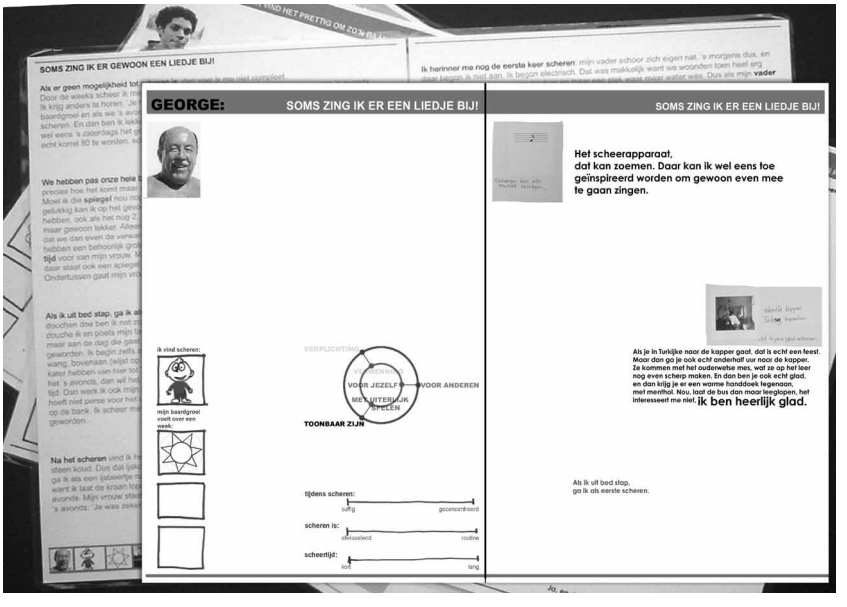

Figure 11. Front side of one card.

or the collages. The researchers' interpretations were visualised in various diagrams representing emotions, goals and meanings that the men associated with shaving.

Every card carried a (fictive) photo and a name to encourage empathy for 'real persons' (for reasons of privacy, names and photos were not of the participants). The cards contained a combination of raw data (the complete individual story) and interpretations provided by the researchers (colour coded themes and diagrams representing emotions, goals and meaning). Striking themes were colour coded across the cards in the text on the backside in order to allow the user to easily find relations between the experiences of different participants.

The users of the cards (i.e., members of the product development team) could share information by physically handing each other the cards. It was left to the designer if he/she wanted to search for relations between the experiences by comparing cards or by going into depth in one or two individual experiences. The cards were laminated and delivered with a set of non-permanent pencils. Designers could write annotations or ideas right on the cards. In this way the information converges directly with the insights and ideas of the designers. The cards did not present fixed conclusions, but encouraged the designers to make his/her conclusions on the basis of directions suggested by the researchers. The value of the cards was evaluated in a small experiment, where pairs of designers used these cards in generating ideas for innovative shaving products (see figure 12).

In the workshop, the designers used a variety of strategies in using the cards. Some designers were looking for problems mentioned by participants to solve. Other designers did not want to know possible problems, but developed a new kind of view on shaving. They often projected the story of the participant on themselves, thus showing their empathy for the real users. '*This guy, he is exactly like me, I shave the same way and I*

Figure 12. Designers using the information while generating ideas.

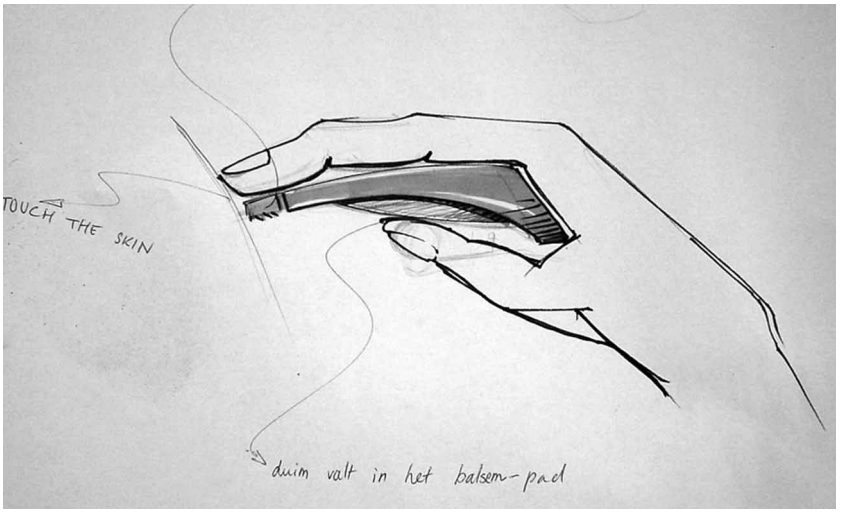

Figure 13. One of the concepts: A shaving device which allows your fingertips to immediately feel the effect. By feeling every move, the shaver may build a memory of the shaving actions on his skin because it is 'in his fingertips'.

would also never do it on holiday.' A female designer said: '*I never had a boyfriend shaving like this guy. And this card, I have the feeling I know really personal stuff about him, he could be my neighbour!*' The set of cards gave each designer freedom in using the information during idea generation and created various interesting concepts.

A.6 Concepts

The case in this appendix shows how user experiences can be shared with designers. Designers quickly apply the information in generating new ideas and concepts. One such idea is presented in figure 13.

Note

1: the case was part of the graduation project of the first author (Sleeswijk Visser, 2003). The project was done in cooperation with PJ Consultants, usability professionals (www.p5-adviseurs.nl) in The Netherlands for a shaving product manufacturer.