

# Sharing User Experiences in the Product Innovation Process: Participatory Design Needs Participatory Communication

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This paper presents a model of communicating user experiences to design teams. The model comprises three qualities of communication: enhancing empathy, providing inspiration and supporting engagement. A new participatory communication tool is developed and explored in two empirical studies. The first study investigates the use of the tool during idea generation by design teams. The second study compares four different communication tools to study the qualities of empathy and inspiration. Our findings indicate the value of making the receivers of the information participative in the act of communicating. In this way designers become co-creators and co-owners of the information, resulting in higher degrees of acceptance and use. The participatory nature of the proposed tool spurs deeper understanding and more intensive use of insights from user studies in the creative process.

## Introduction: Rich User Experiences

More and more companies have recognized the need to learn from users in order to develop innovative user-centred products (e.g., Kristensson et al., 2002). Participatory design methods help designers to empathize with the prospective users of the product, and to understand the functional, personal and social contexts in which the product functions (Forlizzi & Ford, 2000). Especially during the creative phases of the design process, e.g. idea generation, having access to information about user experiences is of great value for designers.

Many techniques are available for eliciting user experiences (for an overview, see Aldersey-Williams et al., 1999). Here we focus on the results from context-mapping studies (Sleeswijk Visser et al., 2005). Context-mapping techniques strongly rely on self-expression of explicit and implicit knowledge people have about their experiences. These techniques produce data and insights that address functional, personal and social aspects of the experience. For instance, a statement like 'I do not shave on Saturday. That day I do not go

to work' conveys a number of different aspects about how the speaker experiences shaving in the morning: it is a routine task; he does not enjoy it; and his motivation is social rather than individual. In a context-mapping study elicited user experience data needs to be digested and fed into the design process. The latter is the main issue in this paper: how to communicate the rich results of context-mapping studies to design teams?

A wide spectrum of communication tools is available in practice. At one end of the spectrum, analysis reports tend to provide generalizing, abstracted conclusions in which a lot of the richness of the data is lost. Moreover, research results are often formulated for a research audience, not for a design audience (Adams et al., 1998; Bruseberg & McDonagh-Philip, 2002; Bueno & Rameckers, 2003). Current practice relies heavily on such formal reports (Lillis, 2002). At the other end of the spectrum, the 'raw' data, such as transcripts of participatory sessions or interviews can be too bulky for designers. Not all designers are skilful researchers, nor do they have time to analyse the data from scratch (van Veggel, 2005; Bruseberg & McDonagh-Philip, 2002).

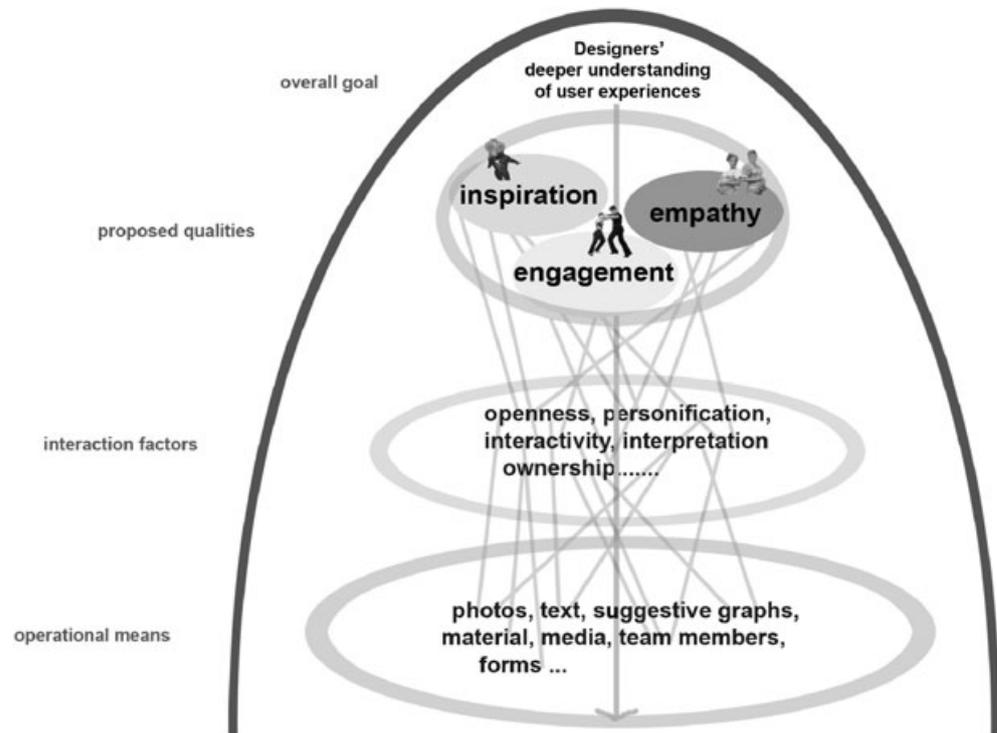


Figure 1. Model of Communication of User Experiences

The challenge is to develop a communication form that encompasses the best elements of the two extremes: rich 'raw user data' and manageable interpretations. The aim is to find ways of presenting both information and inspiration, to give freedom of interpretation and provide direction, to stimulate ideation and argumentation in the design team.

In this paper we describe a model of communicating user experiences to design teams. This model is used as a reference to compare existing communication tools, and to develop and investigate a new communication tool, the 'personal card set'. Two empirical studies are reported in which design teams use the tool during idea generation. In the first study, the variety of ways in which design teams use the tool is observed. In the second study, the effect of the communication tools that vary in openness and interactivity on the quality and quantity of idea generation by design teams is compared. The paper concludes by discussing how further elements from the model can be used in research and design of communication tools for user experiences.

### Communicating User Experiences: A Model

The model of communication tools consists of three layers, as shown in Figure 1. The top

layer comprises qualities that determine user experience communication (empathy, inspiration and engagement); the second layer holds interaction factors that affect these qualities; and the third layer contains design means that operationalize these interaction factors.

#### Top Layer: Overall Goals

To provide designers with a deeper understanding of user experiences during the creative process, we propose three key qualities of communication: (1) enhancing empathy, (2) providing inspiration and (3) supporting engagement.

The first quality, 'enhancing empathy', refers to the designers' need to empathize with the users to understand their experiences on an emotional level (Black, 1998). When user experiences resonate with personal experiences a deeper understanding of the user experiences is obtained (Buchenau & Fulton Suri, 2000). Enabling designers to make personal connections will lead to a deeper understanding.

The second quality, 'providing inspiration', refers to designers feeling sparked and encouraged to find new design directions, create ideas and develop concepts. Designers' imagination needs to be stimulated by gaining insight in, and developing, different perspectives.

The third quality, 'supporting engagement', relates to the level of commitment designers

give, the curiosity and the motivation they develop to study – and keep on relating to – the user experiences throughout the design process.

In the present paper we focus primarily on the qualities of inspiration and empathy. Even though in the first study some inferences regarding engagement are made based on a short design exercise, we realize that the quality of engagement is better studied in a longer time span in-company study.

#### *Middle Layer: Interaction Factors*

The middle layer describes the relation between the communication tool and its data, and the design team using the tool.

#### *Openness: Showing the Raw Data*

Open-ended presentations invite designers to participate in structuring the information. Presenting raw data, e.g., by quoting anecdotes told by users, augments the sense of authenticity (McQuaid et al., 2003).

#### *Personification: Retaining the Personal Identity of Sources*

The stories of the individual users are felt most convincingly when presented in their own words, with all their shades of nuance in expression, and when they are attributed to the same, recognizable person (Adler, 2005).

#### *Interactivity: the Form Invites Organizing and Exploring*

The act of organizing and structuring the data promotes designers to form a deeper understanding of the users' situations and create a perspective for designing. A tool should support organizing the data with one's hands and being able to exchange parts of the data physically with each other (Stappers, 2006). As discussion is an important means of interpreting data and generating concepts, the data is accessible and intelligible for all members of a multi-disciplinary design team, and it is easy to share and refer back to.

#### *Interpretation: Suggestive Leads for Interpretation on Abstraction Levels*

The composed organization of the data suggests and invites directions of inquiry, rather than imposing rigid final interpretations. Presenting raw data, augmented by leads facilitates designers in interpreting, drawing conclusions and finding directions for the design.

#### *Ownership: Designers as Co-creators of the Data*

By receiving means for co-creation designers can get a sense of ownership over the data. Unfinished elements and space for adding own insights, conclusions and design perspectives engage designers with the data.

#### *Bottom Layer: Operational Means*

The bottom layer contains aesthetic choices, structuring devices and graphic elements that can be manipulated to affect this interaction.

The aesthetics of form and content of a tool are significant means to invite designers to explore it. A tool needs to be ready-to-use, require little or no instruction, and fit the creative practice of designers. A balance is required between text and image, answer and question, overview and detail, directions of interpretation and raw source data, patterns and anecdotes.

## **Current Tools**

Here, some of the most used current communication tools are identified and related to the proposed model of communication of user experiences.

The written report is most commonly used for communicating findings from user studies (Lillis, 2002). It usually contains a description of how the information was generated and analysed and it presents the most important conclusions. The form of reports, in which black and white text dominates, does not easily match the designers' visual and associative thinking processes, and is not judged as 'inspiring' by designers. However, a written report does provide a broad range of information on the user study.

Ethnographers have explored graphic summaries as a way of communicating: diagrams that organize and summarize the data. One example is the 'grounded innovation map' proposed by Diggins and Tolmie (2003). The map contains various levels of information. The highest level contains the principal categories identified by the designers. Levels underneath move through relationships between and within these categories. The lowest level contains labels representing anecdotes extracted from personal stories. Although the attempt to organize the data and present the multi-layered character of the data is a step forward, the tool does not enhance empathy with the users. For that, the jargon and the symbols remain too abstract. Nevertheless, diagrams help structure further discussions of the dimensions underlying the data by

stimulating visual interactions, such as pointing, laying out, and adding interpretations.

Videos can convey dynamic qualities of user experiences. Highlight videos allow the design team to observe user situations or product use. However, highlight videos foster a passive role of the receiver of the communication (Brun-Cottan & Wall, 1995; Buchenau & Fulton Suri, 2000).

The current communication tools presented above do not satisfy all three qualities of user experience communication. Formal reports do not appear to provide inspiration, ethnographic maps tend to obscure the view of the actual user, and highlight videos lack the interactive nature.

New communication tools that have surfaced in the domain of human-centred design attend to some degree the proposed qualities of empathy, inspiration and engagement. Examples are personas (envisaged fictional users, see Grudin & Pruitt, 2002; Pruitt & Adlin, 2006), narrative forms such as scenarios (Go & Carroll, 2004) and scripts (Henze & Kahmann, 2003). Raijmakers et al. (2006) developed a video-based tool named 'design documentaries', with the specific goal of inspiring designers.

### The Personal Card Set

The personal card set, shown in Figure 2, is a communication tool designed to simultaneously support inspiration, empathy and engagement. The interaction factors were used as design criteria.

The cards consist of elements ranging from raw transcripts, associations and tentative interpretations of the researcher, results from the analysis, and free-form elements inviting participation of the reader. Each card has the same graphic design, consisting of two sides of A4 paper, folded double into A5 size. Each card represents information from an individual user and is marked with a visual identity of that user (photo and name). Each card is laminated and the set comes in a box together with a set of non-permanent markers and a sponge. The cards invite designers to interactively structure and analyse them: they can create overview, re-arrange, select and compare the cards. The design of the cards invites designers to add their interpretations and react on the leads suggested by the researcher. Each card has plenty of white space for annotations of ideas/insights/conclusions, which can be made with the non-permanent markers, and can be wiped off with the sponge. This way, designers are stimulated to become active partners in the communication:

they visually personalize the information and they are stimulated to add their own insights.

### Study 1: Using the Personal Card Set

The principal objective of the first study was to explore how designers use the tool and to evaluate to what extent the cards supported the intended qualities of enhancing empathy, providing inspiration and supporting engagement.

#### *Procedure*

The personal card set was evaluated in concept generation sessions with professional designers and with Masters-level students in Industrial Design Engineering. Four sessions were held, each with a team of two designers. At the start of the session, the designers were given the assignment to create one or more innovative concepts for a shaving product, focusing on the experience of shaving. They then received the personal card set, with the explanation that each card contains the contributions of one user from a context-mapping study. This study had been carried out with eight participants, all men, and focused on their experience of shaving (for a more elaborate description, see Sleeswijk Visser et al., 2005). No directions were given regarding how the personal card set should be used, except that the design teams were asked to start by exploring the cards for about ten minutes. In the two-hour assignment the designers developed concepts for a shaving product (Figure 3 shows one example). To examine if and how the designers used material from the personal card set to support the argumentation of their concepts, the teams presented their results to someone acting out the role of a product manager. Afterwards, the designers were interviewed about their experiences with the card set.

From observing the designers during the sessions and interviewing them afterwards, their use of the tool, and their attitudes and opinions were explored, as well as the functioning of the personal card set's elements.

Our main observations are discussed below, structured by the interaction factors. In the discussion, the proposed qualities are addressed.

#### *Observations*

##### *Openness*

Fragments of the raw data were read intensely. The designers mentioned appreciating the

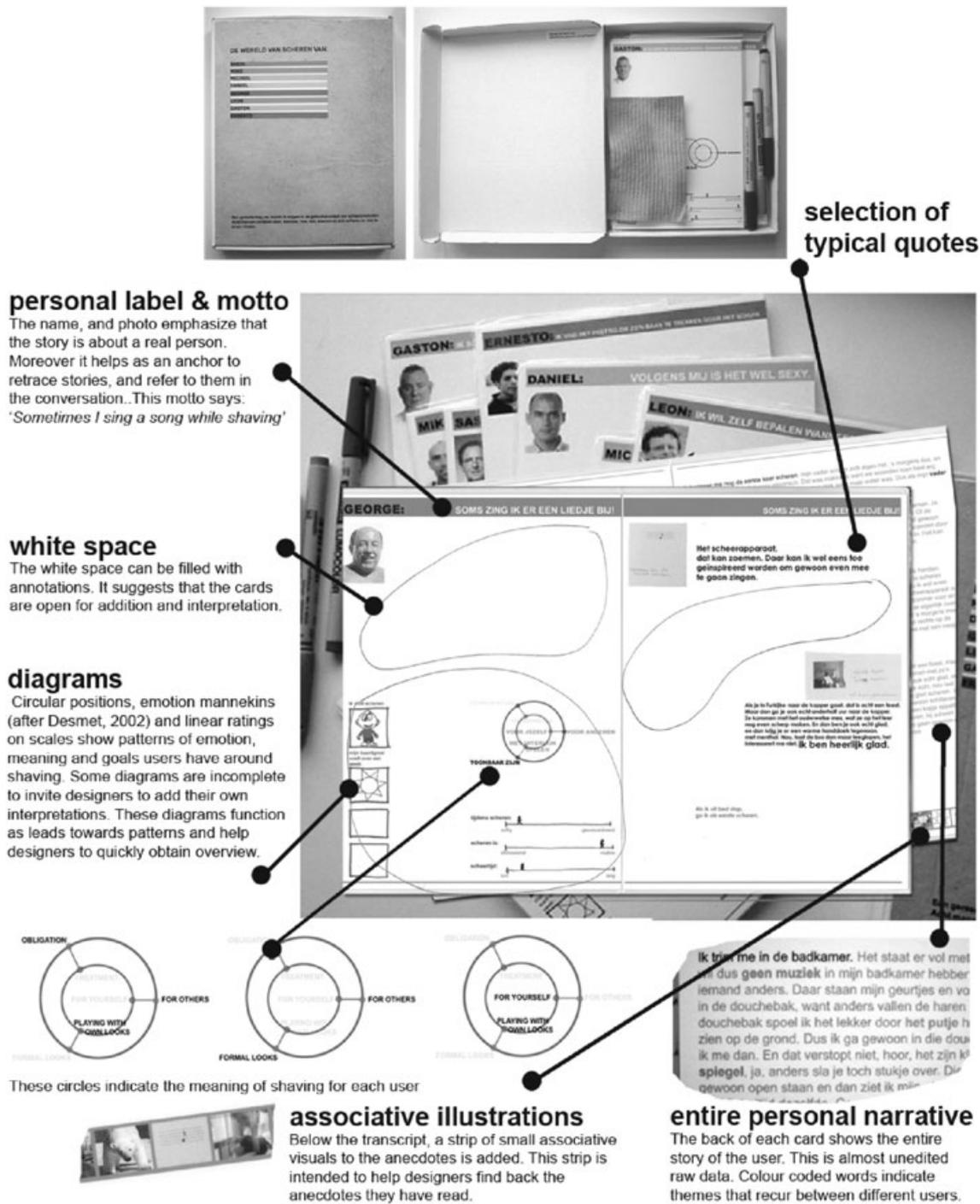


Figure 2. The Personal Card Set. Top: the box of cards (left: closed, right, open); bottom: the cards and their elements

'real data from everyday life', and most designers appreciated having insight in the entire transcript. Some designers felt the need to see more photos of the users; 'I really want to see more of this guy, what does his bathroom look like?' When presenting their concepts to the product manager, the designers often referred to quotes on the cards.

*Interactivity*

All teams made intensive use of the cards and used the cards throughout the design activity; the cards were used for formulating their starting points for the design. While sketching ideas, they frequently revisited the cards for new inspiration.

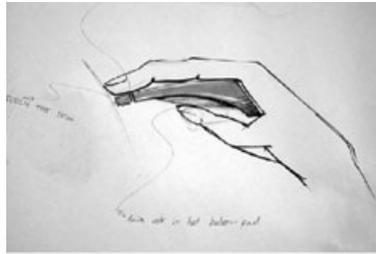


Figure 3. One of the concepts generated by the designers in the evaluation: A razor held inside the hand, establishing continuous contact between the skin of fingers and face

Various designers used the cards to physically organize the information in different ways (see Figure 4). Some designers looked for similarities across the set of cards, while others concentrated on a few complete stories.

#### *Interpretation*

Designers have different preferences and attitudes towards the suggestive leads and the entire transcript. The diagrams were carefully studied; 'Very clearly, I used them as reference points' and 'With these diagrams I can immediately start to work'. Some designers wanted to see more explicit structure in the cards; 'I would have liked more organized parts in the text. Now we had to search so much.' In contrast, others avoided the structured elements, such as the colour-coded words; 'I tried not to pay attention to the colour coded words. I prefer to decide for myself how to filter the information'. Some used the diagrams to create an overview or to decide which users they wanted to study more in-depth, while others tried to offset one card against another.

For finding design directions, some designers accepted the users' opinions as absolute truth and included it directly in their designs. For example, one team designed a long-lasting titanium razor mentioned on one of the cards. Other designers set up their own mini-theories. One team created a graphic of the 'fun value' during the shaving process based on grouping the cards in two sets: (1) experiences of fun during shaving and (2) experiences without fun during shaving (see Figure 5). The team drew a supportive diagram on a separate piece of paper.

#### *Personification*

The personification of each card contributed to anchoring the data and to sharing the information between the designers and the product manager. They mentioned their names and

sometimes even discussed and analysed personalities of the users. They used the names on the cards to refer to particular anecdotes or persons; 'Yeah, Leon and Daniel really take their time for it'. They read out loud from the cards to each other, linking the contents to their own personal shaving experiences; 'I am just like Ernesto, I shave exactly like him'. One design team, consisting of two female designers, used the different experiences to create an overview; 'I am a girl, and I need those stories to understand the contexts of shaving'. They designed with two specific users in mind; 'The concept is specially developed for Gaston and Sasja. I have the feeling I met Gaston, I really know intimate things about him. He seems a little bit like my neighbour. I can completely imagine how he shaves'.

#### *Ownership*

The designers did not make the cards their own. Designers rarely added their own insights on the cards and rarely wrote annotations on the cards themselves, but wrote and drew on separate pieces of paper. In the interview afterwards, they said they felt no need to add to the cards.

#### *Discussion*

Clearly, one cannot draw definitive conclusions from a small-scale study such as this. Nevertheless, the results provide some indication of the potential of the card set as a participative communication tool. Here the tool is reviewed through the three main qualities of communicating user experiences: does it convey empathy with the user, does it inspire designers to create product ideas, and does it support engagement with the user experiences?

Regarding empathy, the designers clearly identified with the users. The designers often referred to the names of the users, suggesting that they were designing with real people in mind. They often quoted the transcript, written in the users' personal idiom. Several designers mentioned that, even in the short time-span of the experiment, they had the feeling that they really got to know the users as if they had met them personally. This suggests that they related to the users' experiences as real events rather than abstractions.

Designers have different ways of getting inspired, and the tool allowed for these differences. The cards were used intensely by the designers during conceptual design activity. All participating designers judged it inspiring and useful. The cards triggered them to find



Figure 4. Designers organized the cards in many different ways. Clockwise from the top left: reading together, comparing diagrams, cross-referencing themes in transcripts, systematic spread-out comparison, detailed comparison of diagrams, and free categorizing of the cards

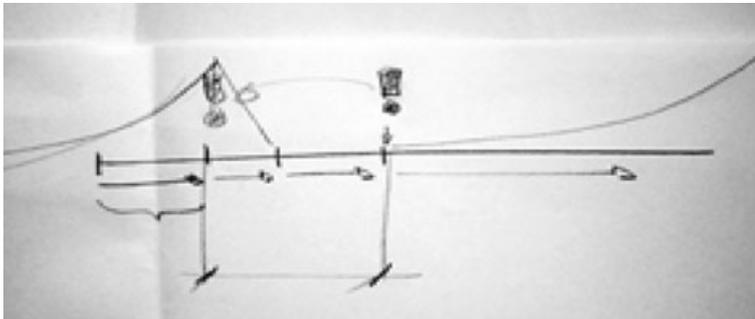


Figure 5. Diagram produced by a design team, depicting the 'fun value' before, during and after shaving. It shows a low value of 'fun' during the act of shaving itself

structures in the information. Some designers wanted freedom to find original design directions, while others were eager to build on suggested interpretations.

The designers were highly engaged; they used the cards many times during the sessions and discussed the information on the cards extensively. The designers mentioned that by using the tool they developed a deep understanding of what shaving experiences are, what aspects influence the experiences and what kind of feelings the users have. So, even in this short time-span, they were engaged with the data.

Surprisingly, the designers rarely wrote on the cards, even though this was clearly suggested by means of the coating, sponge and markers. One explanation might be that the

cards still had too much of a 'finished' appearance. They did not make the card set their own by, for instance, leaving visual marks. In that sense, the personal card set did not support ownership to establish engagement.

### Study 2: The Influence of Openness and Interactivity on Inspiration and Empathy

The aim of this study was to gain insight into how the interaction factors of openness and interactivity influence the qualities of designers' inspiration and empathy. In addition to the personal card set, three other tools were created from the experience of shaving data. The tools varied on openness and interactivity:

a report, a poster and statement cards were provided (see Figure 6). The statement cards and personal card set were highly interactive: they allowed the design team to organize and re-organize the data. The report and poster were fixed; design teams could not organize the data physically. The poster and the personal card set were open-ended: they showed primarily raw data without interpretations. In contrast, the statement cards showed interpretations, paraphrases of the data, added with the responding part of the transcript in small font. The report showed the interpretations of the researcher, with the raw data appearing in an appendix. As much as possible, the same aesthetics were applied in all four tools.

### Procedure

The study involved two-hour design sessions, in which each design team of two female

design students was given one of the tools with the assignment to create innovative concepts for shaving. For each condition, two sessions were held resulting in eight sessions (a to h, see Figure 7). Just female students were recruited for this study as they would not be able to draw from their own facial shaving experience.

As an indication of inspiration the number of ideas were counted (drawn ideas and verbalized ideas). As an indication of empathy the number of times the designers referred to the actual users (e.g., 'he', 'Leon', 'this man') were counted. In addition to counting these rough indicators for inspiration and empathy, the sessions were observed, the designers filled out a questionnaire, and they were interviewed about how they experienced the tool for triangulation purposes.

### Results

#### Number of Ideas and References

Figure 7 shows that the personal card set scores highest on both inspiration (number of ideas) and empathy (number of references). The open tools (personal card set and poster) score high on the number of ideas, suggesting that more openness has a positive effect on inspiration. The open tools score slightly higher on empathy as well.

One team (g), which had used the poster, scored quite high on number of ideas. They said: 'We would have had fewer ideas if we had more freedom. The poster helped us to get started and find directions for ideas.' Furthermore, the concepts created with the open tools appeared to be more innovative, while the concepts created with the closed tools (report and statement cards) appeared more similar to

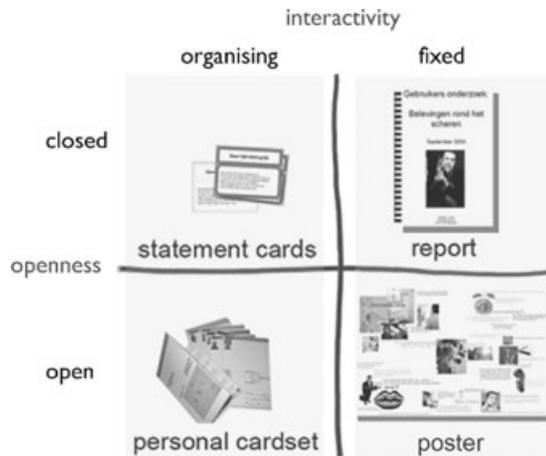


Figure 6. The Four Tools Vary on Openness and Interactivity

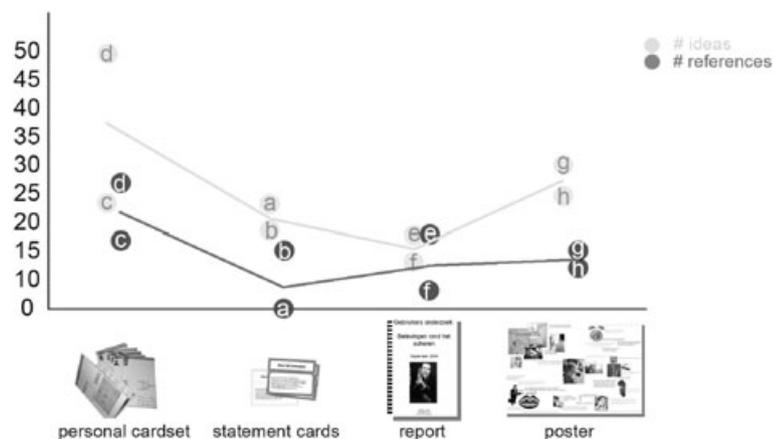


Figure 7. The number of ideas and references that were counted in the sessions. Circled letters (a-h) are identifiers for the teams; the lines connect the averages for each of the four conditions

existing shaving products. Design team (d), which used the personal card set developed an exceptionally large amount of ideas.

#### *Intensity of Use*

From observations we noticed that the organizing tools were used much more intensively during the sessions, compared to the fixed tools (poster and report). The fixed tools were used only in the first fifteen minutes of the sessions, and then left aside. One design team (e) revisited the report in the last few minutes to check whether their concepts matched the main findings of the report. Design team (f) mentioned that they had used their own creative techniques to get inspired. In contrast, the organizing tools (personal card set and statement cards) were used intensively throughout all four sessions.

#### *Referring to Users*

Four design teams (a, b, f, h) had not noticed that the data was based on the shaving experience of only four men. Three of these four teams had used a closed tool (statement cards and report). Design team (a), which had used the statement cards, did not make any reference to the users at all. Both teams working with the personal card set referred extensively to the users.

#### *Discussion*

This study explored variations of openness and interactivity in communication tools and how it affects inspiration and empathy. Even though this study was explorative in nature, clear differences could be discerned. One striking finding is that interactive tools were used much more intensively throughout the process. The other striking finding is that the personal card set seemed to elicit much more empathy with the users than the other three tools did. Only in the personal card set were the four users explicitly presented as four individual people. Design teams using the other tools did not always notice that the data originated from four men. This implies that the personification of the data might have a stronger influence on empathy than openness has.

#### **Conclusion**

The personal card set functions as a demonstration of how the proposed interaction factors could be realized in participatory communication tools. It is not a final format and certainly not meant to replace the formal

report. Rather, we used it as a research instrument to help us understand how to communicate user experiences to design teams.

In the personal card set we used only a small part of the spectrum of diagrams, schemes and graphs available. This is an initial step to study the desired qualities of participatory communication tools. Of course, there are many more ways to design a tool with these interaction factors. However, the idea of using cards as a means to represent user research findings has been adapted by more designers and researchers in practice (Pruitt & Adlin, 2006; Rodriguez et al., 2006; Postma & Stappers, 2006).

In this study we explored only parts of the communication model. The quality of supporting engagement, which was not included in the second study, will be addressed by means of a longer time-span in-company study. In our further research we will also address the other interaction factors. Here, only two of the proposed five interaction factors, openness and interactivity, were studied in depth. The three factors interpretation, personification and ownership need further research. The balance of raw data and suggestive leads to interpretation is subtle and each design team seems to have its own preference for level of interpretation. Further research will explore various means to explore this balance. Regarding personification, we will also explore various means (photos, detail, spoken language, handwriting, etc.).

The interaction factor of ownership deserves special attention. We thought that by making annotations on the cards the designers would leave visual marks that would help them to feel ownership over the interpretations in the card set. However, after use by the designers, the personal card set was visually still 'owned' by the researcher. The personal card set did not support enough co-creation and co-ownership of the information, as we think it should. In current research we are exploring design means for inviting designers to become 'owners' of the data, e.g., in the form of 'action posters'.

Another aspect for further research is how the communication tool is embedded in a communication approach within a design process. In the two studies we described, design teams performed a short assignment using the tool. In real-world application, the tool is likely to be a part of a larger communication approach, e.g., in the form of a workshop. Then, part of the communication is a workshop in which the data is presented, explained and discussed. Such a workshop and the communication tool introduced in the workshop are inherently related. Further research will focus on combinations of workshops and tools to promote

participatory communication. In addition, such studies will allow us to study engagement over a longer time-span.

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