BRINGING PARTICIPATORY TECHNIQUES TO INDUSTRIAL DESIGN ENGINEERS

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ABSTRACT

There is a growing need for designers with research skills and designers that are able to design for the user experience, next to or instead of technical issues. Over the past five years we have developed so-called 'contextmapping' techniques to inform and inspire design teams about the experiences of the prospective users of the products the team designs. In this paper we present the key elements of this teaching programme, and explain how we divided the elements over different courses in the Industrial Design Engineering curriculum in our university.

Keywords: participatory design, user-centered design, education, context, ethnography

1 INTRODUCTION: THE RISE OF PARTICIPATORY DESIGN

The scope of design in the fuzzy front end has widened. Next to product form, function, and usability, increasingly deeper levels of product experience regarding emotion, value, needs and dreams have become ingredients to inform the design process.

More and more, companies ask for designers with research skills and designers that are able to design for the user experience. Sanders [7] describes how the field of design research can be divided into a number of areas, with a split between well-established (and large) user-centered design and the newer participatory design approaches. The key distinction lies in the role allotted to the user, who is a passive object of study in the former, active participant in the latter approach.

In establishing user-centered design curricula, teaching the new participatory design paradigms has become important. In this area, the classical roles of designer, user, and (consumer/usability) researcher are being redefined. Whereas in (a caricature of) the classical paradigm, the designer is the expert who has the bright new ideas, and who receives information from the researcher who conducted surveys or observation studies in which users featured as subjects, in the new paradigms, these roles are interwoven. Designers also take on roles of researchers, and work with users intensively. The users get the role of 'experts of their experiences' [8], and are provided with expressive tools to enable them to play an active role in requirements setting, idea generation, and even concept development. In our teaching, we aim to equip design students to deal with these changes.

2 CONTEXTMAPPING AS A PARTICIPATORY DESIGN STREAM

Over the past five years, our research team has explored techniques for 'contextmapping': charting the user experience through participatory design studies, and communicating the insights with and to design teams. Research in this area has been tightly coupled to the new Master curricula of Design for Interaction and Strategic

Product Design in Delft. Studies of industrial practice underscore this need: designers in R&D departments often complain that the information they get about users (e.g., segmentation of target groups, as delivered by marketing research) does not help them in concept development [9].

We chose the term *contextmapping* to express a cartographic metaphor. The goal of a contextmapping study is to provide the design team with inspiring, actionable information showing opportunities and pitfalls, and providing overview, insight, and empathy. The contextmapping techniques have been successfully applied to integrate expert knowledge from different domains, and especially in exploring user experiences, needs, and values. (See [1] for an overview of publications)

In the courses, we equip our students with an understanding of the benefits and limitations of user studies, of the different roles involved, of the type of information gained, and of the (qualitative) analysis and (expressive) communication methods which are needed to supply the design team with relevant, inspiring insights on the user experiences. This involves developing a sensibility for and skill in dealing with analysis and communication.

Primary goal of the courses is to establish a mindset change, i.e., understanding how the different roles of designer, user, and researcher can merge. We do not strive to bring all students to the same level of skill in this, as it requires a motivation for user-centered design as well as an aptitude. But in our experience, we expect 95% of the students to understand the techniques involved, 40% to have had a first taste in using them, and 10% to acquire the skills by applying the techniques in their own subsequent projects.

3 BASIC PRINCIPLES AND THEIR DIFFICULTIES

In this section we briefly review the key learning points that lie at the basis of the courses.

3.1 The notion of 'context' and 'experience'

The word 'context' has a checkered history in design, and therefore requires explicit definition. In our courses, we define it as "the context of user interaction with products," which we immediately operationalize as "the Aristotelian questions of what? how? who? when? where? how long? with whom? what for?…that a designer must know about when designing the interaction between user and product." This definition makes clear that for every design problem, the design team must choose which factors are important. There is no overarching single theory that can be taken off-the-shelf and applied straightforwardly to any design problem. In a similar vein, we describe rather than define 'experience' as those parts of the interaction beside physical use and cognitive understanding, e.g., affective factors and motivations, needs and values, but also practical issues such as daily routines. The aim of conveying the user experience is to allow the designers to empathize with the user, to step into their shoes, and to take a rich user perspective when developing ideas and concepts for products and services.

Figure 1 illustrates the experience elements in the context of brushing one's teeth. This simple, everyday routine turns out to be intimately connected to people's feelings. Not only practical ones (it takes time), or superficial annoyances (noisy, cleaning), but also affective factors such as the social relations with other people using the bathroom. In one study, it was found that brushing teeth and shaving are for many men the moments when they reflect on themselves, for instance because the see that they are getting older [8]. In user-centered designing, these factors can be key elements in creating a design vision, and finding new directions for products.
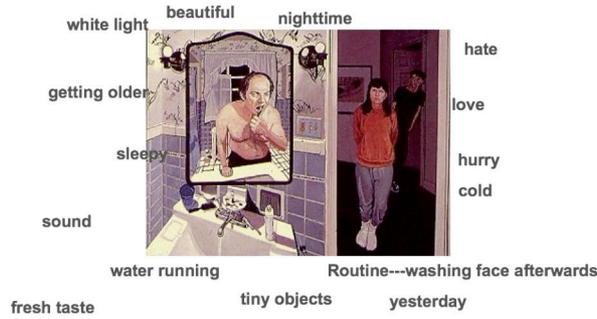
Figure 1 Elements of the context of brushing one's teeth.

3.2 The process: sensitizing, qualitative analysis, and communicating

Participatory design is a time-intensive process. In explaining contextmapping we follow the process in Figure 2, which starts with setting up the goals of the design project, and proceeds with through gathering information from users, which is then structured, shared with the design team, and deployed in idea generation and conceptualization. All these steps take time, not only for work, but also incubation time in the creative processes involved. For instance, in the 'sensitization phase,' we use cultural probes [2] and generative workbooks [6]: participating users get to do expressive exercises about the topic that was selected for the project (e.g., 'the shaving experience of men' or 'social contacts of elderly'); this involves users doing self-observation and reflection. This takes time. If not enough time is given to sensitizing, the user's contributions become superficial, as the gut reactions given to a rapid-fire questionnaire. To appreciate these processes, students need to go through them themselves.
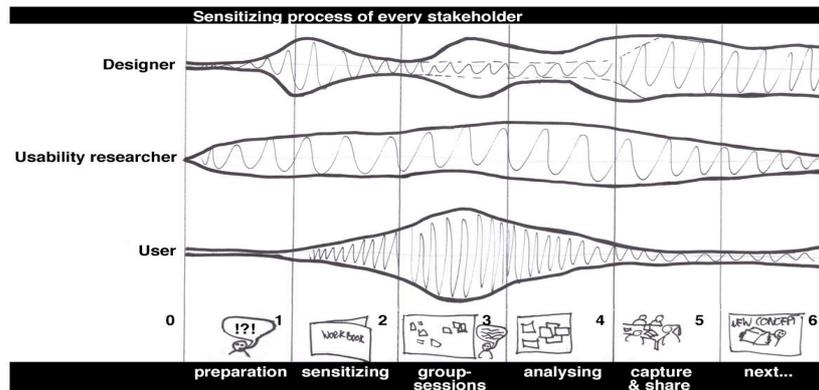

Figure 2 Steps in the contextmapping process, and involvement of stakeholders.

Figure 3 Tools and techniques: workbook, session, analysis, and communication [8].

3.3 The roles of user, researcher, and designer

As we mentioned above, the roles of *designer*, *user*, and *researcher* become mingled and interwoven, as shown in the top of Figure 2. In fact, the creative contributions which in a classical design process were clearly separated to people from particular professions, are mixed up. The *researcher* releases control over the precise question of research by allowing *users* to take initiative over the direction of the knowledge development. *Users* are brought in the position of 'expert of their experience'. Similarly, phases of analysis and concept generation, hitherto neatly split between *researcher* and *designer*, tend to be less separated. Analysis and synthesis can meet in new forms of communication, carried out jointly by *researcher* and *designer*.

3.4 Expressive techniques: say, make, and do

Also new for all students are the techniques for getting at deeper levels of tacit and latent information. All of us have been in an interview, and most have an understanding of observation as a research method. Generative techniques, however, lead to confusion, as in these techniques *users* are given tools which had been reserved for *designers*: collages, diagrams, models. With these tools, users make expressions of their experience, which can take the *form* of product proposals or collages, but which serve as *carrier* to help them express not concrete solutions (e.g., "a mobile phone with big buttons"), but deeper-lying motivations, needs, and values ("a need for mobility and easy access") [5].

4   CONTEXTMAPPING IN THE CURRICULA

Elements of contextmapping are taught to student groups varying in size and background in the BSc (40 hours over three weeks, 220 students), MSc (85 hours over one quarter, 130 students), elective courses (85 hours over one semester, 15 students), and in the PhD program (4 year project, 3 students).

Teaching to large groups had big implications for the way we taught courses, especially the basic courses. We have found that it is impossible for students to grasp the issues from lecturing alone. Key ingredients (a sensitizing process, associative thinking, qualitative analysis, and finding the right nuance in timing, in ambiguity, and in aesthetics of the materials) have to be experienced in order to be understood and appreciated. We therefore to start by giving students hands-on experiences, e.g., of how it is to participate as a user in a sensitizing process and generative session, before we explain the theory behind it. The experience is followed by reflection, theory, and –for those who choose to– experimentation (see [3]). But without a taste of the phenomenon, the theory remains a lifeless abstraction.

In the BSc course, 3rd year students work in groups of five and get an assignment to create an image of a part of real people's lives. They can use interviews, or observation studies. They are not told how to do it, but have to give weekly poster presentations,

during which they get feedback from staff and fellow students. This loose setup suffices to let students learn about the value of understanding users, and raises interest in user-centered design in many of the students.

In the MSc course, we provide explicit theory and brief, hands-on experiences of the ingredients mentioned in section 3. Here also, students first experience the process as a 'participating user', and then receive the theory; in this we follow Kolb's experience-reflect-theory-apply learning cycle. The course is positioned as a theory course, with small practicals to let the students 'taste' of the techniques. If they want to practice the techniques, they can do so in some of the design projects in their programme. A larger number of students picks this up, and applies the techniques in group design projects, or in their individual graduation project.

Contextmapping is part of the Faculty's research programme, and currently three PhD students are strengthening our understanding of and ability in the techniques in PhD research projects, each focusing in on a part of the process of Figure 1 (current projects are communication issues, [10]; mapping social contexts for design [4]; participatory design with difficult-to-reach groups [5]). Findings from these research projects are very rapidly finding their way into the MSc course.

Also we set up elective courses which involve industries and research projects, with small groups of motivated students. Such projects can focus on specific experiences, such as a study into the experience of shoecare (Figure 5, left); or they explore theoretical issues of one of the phases (see Figure 1 and 3), such as novel ways to communicate user experiences (Figure 5, right). This helps to ground our education and research into the needs of industry, and at the same time helps to inform industry with the newest techniques in this area. Such elective courses have to be conducted on a small scale, because they combine education, practice, and research and require intensive involvement from industry and researchers.

Figure 4 Poster presentations in BSc course; group session practical in MSc. Course.
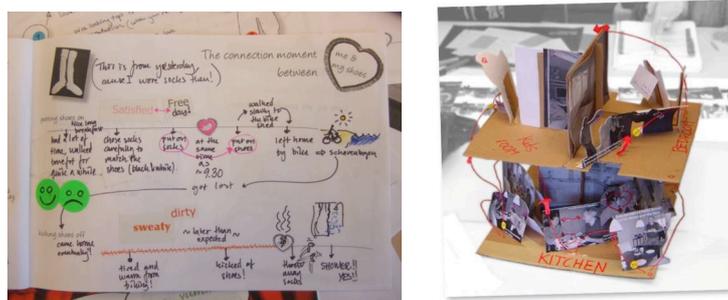

Figure 5 Rich evocative visualizations in data gathering (user workbook about shoe experiences, from [9]; 3D storyboard about a family's morning rituals; from [11])

5 CONCLUSIONS

Participatory design techniques are becoming an increasingly important element in new product design. Teaching it requires not just handing over theory or practicing research skills, but also establishing a mindshift and fostering an understanding of the changing roles in design. This requires appropriate ways of teaching, and can be done, also in large-scale education. In our view, all students of product design should all have encountered these techniques and understand how they can be of value, and what are its limitations; a smaller number of students have the motivation and aptitude to develop these skills further (10%-40%, at various levels of sophistication). These will be equipped to infuse new product with the wealth of experience that users can offer, so that these products can positively contribute to the experiences of those users.

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