04.
Designing for user experiences: contributions from contextmapping

Authors
Rick Schifferstein, Froukje Sleeswijk Visser

Introduction

In saturated consumer markets, consumer choices often depend on subtle product differences that contribute positively to their user experiences. Hence, it is important for designers to be able to create products that elicit different experiences. In this chapter we discuss a design approach that takes the creation of specific user experience as a starting point. The approach aims for improvement beyond product functionality and user friendliness in order to make products that really fulfil important, often latent needs in people's lives. Experience-driven design involves determining what experience to aim for and, subsequently, to design something that will evoke that experience.

In order to design for experiences, designers need thorough insights in everyday user experiences. Therefore, we also discuss a procedure that can be used to obtain this type of rich user data: contextmapping. Contextmapping was developed to obtain tacit knowledge about the everyday context of product use. The basic principle of contextmapping is that everyone is an expert of his/her personal experiences. Users are encouraged to document parts of their lives, and their experiences serve to inform and inspire the design team.

In this chapter, we provide a more detailed discussion of the theoretical background behind user experiences, the way in which experiences can be studied through contextmapping, the principles underlying the experience-driven design approach, and we present a design case in which these approaches were used to develop a modular rest unit for a hospital room.

Challenge

In today's consumer markets where many products offer similar functionalities, product usage and purchase are increasingly dependent on whether a product or service offering is able to elicit a distinctive and desirable experience. For instance, when

consumers want to buy a chair, they can choose from an almost infinite number of chairs with different purposes and in different price ranges. Hence, it is important for designers to make chairs that stand out against their competitors in order to get noticed. In addition, the chairs should clearly communicate what they have to offer: whether they want you to relax, whether they want

you to feel comfortable, or whether they want to support you during your work. Even within these categories, designers can try to create different experiences that appeal to different audiences: Do you want users to relax in a cocoon that makes them feel totally protected, so that they can fall asleep? Or, do you want them to feel supported during relaxation, so that they feel refreshed after sitting for a while? Or, do you want them to relax so that they get closer to their partner? Each of these relaxation experiences asks for a different type of chair.

What is an experience?

Although a person's experiences are personal and subjective and cannot be observed directly, we can obtain information on experiences from people's actions, behaviour, facial and bodily expressions, and their verbal accounts. This has taught us that people's experiences are complex and multifaceted phenomena. For instance, several qualitative dimensions can be distinguished in experiences, such as (e.g., Brakus, Schmitt & Zarantonello, 2009; Hekkert & Schifferstein, 2008; Vyas and van der Veer, 2006):

- a sensory dimension with visual, tactual, olfactory, gustatory, and auditory perceptions and aesthetic evaluations
- an affective dimension including emotions, feelings, and moods that are evoked
- an intellectual dimension containing cognitive associations, thoughts evoked and meanings activated
- a behavioural dimension consisting of actions towards, with, or evoked by a design

Although these dimensions may be distinguished theoretically, in practice they are highly interdependent and tend to occur simultaneously.

Besides these qualitatively different aspects, experiences also vary on the intensity dimension, implying that some experiences may be perceived as more or less intense, weaker or stronger, and may vary in the impact they have on someone (Brakus, Schmitt & Zarantonello, 2009). Furthermore, experiences of user-product interactions are known to be dynamic: typically multiple stages can be distinguished in these interactions. In addition, the time before and after an event may change the experience of the event. For instance, prior experience with a product may change its experience at subsequent encounters. In addition, after a person has stopped interacting with a product, reflecting on the event may still change its experience (e.g., Law et al., 2009).

In addition to the different components that can be distinguished in an experience, the user experience is also likely to depend on a person's internal state (e.g., needs, motivation, mental and physical resources) and the context in which the product is used (Law et al., 2009). This context can involve the physical environment, the task setting, the technical and information context (e.g., availability of network services), or the presence of other people (Roto et al., 2011). For instance, the interactions with people during the acquisition or use of a product are likely to have an impact on the subjective experience (e.g., Brakus et al., 2009).

Studying user experiences

Experience-driven design typically involves extensive analysis of user behaviour and underlying motivations. Ideally, the designer would like to get under the user's skin as much as

possible in order to predict future users' responses to the design. A designer should not just focus on the physical aspects of the product, but should be able to understand how the user will react to these aspects and which types of responses the product is likely to evoke in the existing usage situation. Hence, a deep understanding of the psychology of the potential user and detailed knowledge of the context in which a product or service is presented is required. In many cases, everyday experiences are not general or uni-dimensional, but need to be carefully tailored for a specific context and may subtly vary in character over time.

In a contextmapping study, contact with the participating users is intensive and personal. Contextmapping studies tend to focus on everyday situations, where the product only plays a minor role. Instead, the majority of attention goes to the physical, social and cultural context and the user's state of mind (Sleeswijk Visser, 2009). By gaining deep insights into these contextualized experiences, designers can create products and services that fit into and enhance peoples' daily lives. The metaphor of using a route map can be used to highlight the way that designers navigate through the terrain of user experience: the map does not provide a fixed route, but encourages discovery (Sleeswijk Visser et al., 2005).

Because people are often unaware of many aspects that influence their experience, contextmapping uses generative techniques to encourage them to document parts of their lives and experiences. Participants explain their creations to designers or researchers and these data are then shared with the design team. Contextmapping aims to inform and inspire design teams to ensure a good fit between the design and the use of a product in people's everyday lives. Typically, users will not be involved in the

creative stages of the experience-driven design process, because involving users at this stage may decrease the innovativeness of design solutions (e.g., Candi et al., 2010). However, users may once more be involved during the evaluation stage, in order to evaluate the outcomes of the creative processes and to fine-tune the details of the final design.

Method

Designing for an experience

Experience-driven design or 'design for experience' intends to evoke a particular user experience in a specific usage context. Although user experience may be considered to some extent in most design projects, in experience-driven design the user experience is the focal point. Envisioning what experience to design for and understanding how design can evoke that desired experience requires a thorough understanding of the intended user and the context in which he or she operates, as well as appropriate techniques to generate and test concepts. This design approach opens up new ways for radical innovations that go way beyond the obvious: Designing new and innovative products that nevertheless capture a sense of authenticity.

Designing for user experiences involves at least two important challenges. The first challenge is to determine what experience to aim for, and the second is to design something that is expected to evoke that experience. Desmet, Hekkert & Schifferstein (2011) have identified 14 ingredients that characterise many experience-driven design processes on the basis of their experience in research and design projects. These 14 ingredients have been
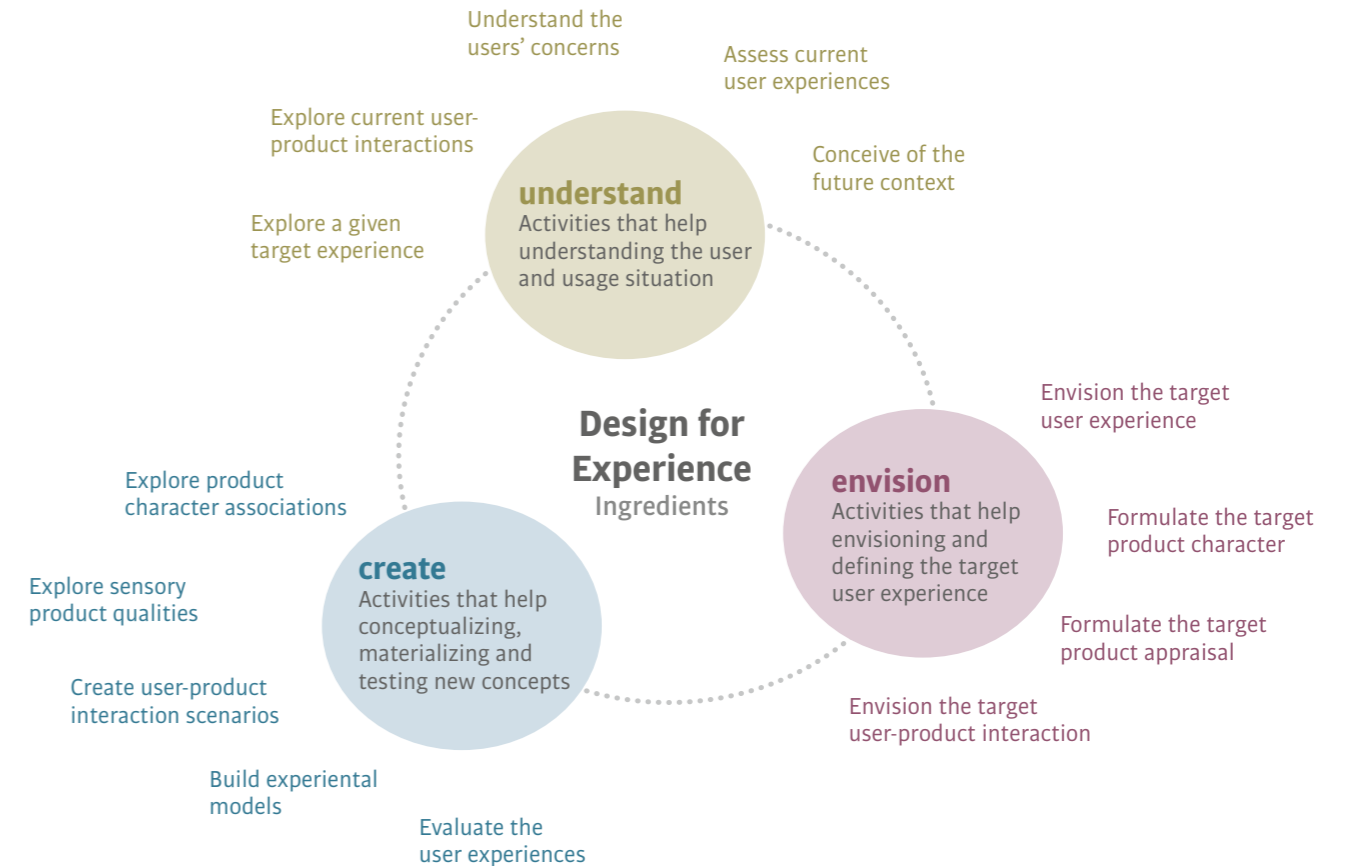

FIGURE 1 *ingredients of experience-driven design processes (adapted from Desmet and Schifferstein, 2011; copyright Eleven International)*

loosely divided into three categories. The 'understand' category represents activities that help designers understand the current situation and empathize with the intended users. The 'envision' category represents activities that help designers to envision and define the design intention. The 'create' category represents activities that help designers make the transition from design intention to product design. Some of these ingredients focus on the users and their experiences, some on the interaction between user and product, some on the context in which these interactions take place, and some focus mainly on the product properties (*figure 1*).

The 14 ingredients should be regarded as options: Which ingredients are used, the order in which they are used, and how they are combined into a coherent design project differs between projects, depending on the needs of the designer and the design challenge at hand. The three categories do not presume any order of activities in the design process: The process can start with any of the ingredients, and ingredients from all three categories can be used in an infinite number of combinations.

Contextmapping

Contextmapping is one of several possible methods that can be used to investigate user experiences in design processes. Contextmapping focuses on the 'understand' and 'envision' categories in *figure 1*, but does not necessarily cover the 'create' category. It can help provide understanding of the user in the current usage context and this information can be used to identify the desired user experience. The basic principle of contextmapping is that everyone is an expert of his/her personal experiences and, in that role, can contribute to the design process.
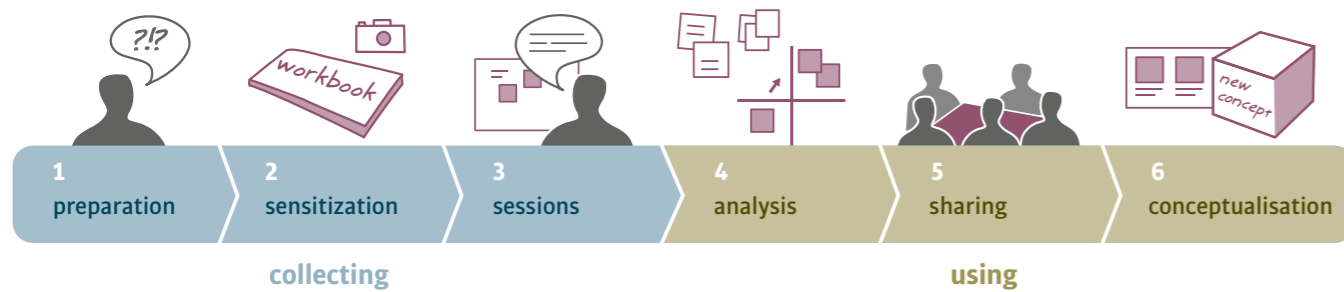
Contextmapping combines several research methods (interviews, observations, generative techniques and elements from probes) in order to generate rich experience information. Generative techniques and probes rely on self-expression of the explicit and implicit knowledge that people have about their everyday experiences. The resulting information consists of stories on how they experience specific situations in their everyday lives. Contextmapping focuses on holistic, general experiences and does not necessarily focus directly on experiences with products or services. For example, in a contextmapping study about contact with relatives, stories about users' mobile phones will not only involve phones that are in use. The stories may also describe having the phone in your pocket or not having it around.

The number of participating users is relatively small (about 10 participants) in order to establish personal contact and to value the personal stories. Contact with the participating users is often quite intensive and personal. With generative techniques, people are invited, encouraged and stimulated to document parts of their own lives and experiences. People are often unaware of many aspects that influence their experience, and through these techniques they are stimulated to reflect in order to become aware of them. Participants make things (e.g., collages) and explain why they made them that way. By giving them tools to express themselves, they generate information about their individual experiences.

Procedure
The contextmapping procedure consists of six stages (*figure 2*). The preparation stage involves setting a well-defined goal, indicating how results will be used for conceptualization, and pinpointing the organisational aspects of the study, such as finding participants and time planning. The sensitization stage is the period before the actual sessions take place with users. Users receive a package with, for instance, a photo camera and a diary, to record some of their daily routines. This supports them in becoming more aware of daily habits and what these routines mean to them, so that they have more knowledge at hand when they participate in a subsequent session.

FIGURE 2 *procedure of a contextmapping study, involving designers, researchers and users*

FIGURE 3 *participants create a collage by selecting words and images from a prepared set*

Then, in 1-to-1 interviews or in group sessions (stage 3), participants are asked to explain their creations to the designers and/or researchers and other users and stakeholders, if present. In addition, during the sessions users make things, such as collages (*figure 3*), storylines, and 3D models in which they express their experiences and they present their created artefacts to the group and to the researchers.

In stage 4, the designers and/or researchers analyse the data, and form categories and models which they document for the sharing phase (stage 5), in which these are given to the design team. Data generated with contextmapping can have a number of forms. It typically contains rich and diverse, often very personal, fragments about the participants' everyday experiences (*figure 4*). In the conceptualization stage (stage 6), the results are used as input for creating new concepts.

FIGURE 4 *data from a contextmapping study about retirement. Top: a sensitising package. Middle: observation in the user's home. Bottom: various data sources, including probe materials, collages, and transcripts of interviews*

Healing hospital environment

Although traditional hospitals with white walls and angular shapes may be perceived as clean, efficient, and professional, they do not necessarily provide an environment in which patients feel comfortable. The goal of this project was to create a design that would contribute to patients' healing processes and their feeling of well-being. For the VU medical centre in Amsterdam, Koen Vorst designed a modular rest unit in a short-stay hospital recovery room. Patients stay in the recovery room after they have received heart catheterisation treatment. Hospital intake, including preparation, treatment and recovery, together take no more than one day.

To learn about how people experience recovering in the hospital, the designer performed field research in the existing recovery rooms and interviewed medical staff. Patients in the recovery room only stay there for one day and it is quite intrusive to ask them to participate in a generative session. Hence, in order to learn more about patients' personal experiences, the designer decided to conduct a contextmapping study with other patients who were in hospital for a longer period.

Study

The participants in the contextmapping study received a sensitizing package consisting of various assignments in the form of a booklet and a camera a few days before they were interviewed. They were asked to make pictures and describe their room, what they like/dislike about it, how they feel about it, what they do during the day and how they experience the contact with medical staff and visitors. In the interviews with the participants, the designer first discussed the filled-in booklet and photos with the participant and then asked them to make a collage 'What makes this room MY room'. By using both visual and written material, it was easier for the participant to express him/herself and to evoke personal anecdotes and the perception of their stay in the hospital. After the collage was made, the participant and the designer discussed it. All interviews were recorded and analysed, resulting in four design considerations:

- **Stimulate desirable interaction:** The presence of the nurse and visitors is very important for patients. Nurses and visitors offer social support which can reduce stress. The feeling of being supported is also increased by receiving personal telephone calls, postcards and flowers. In the design of the rest unit, interaction between the visitors and the patients, as well as between the nurses and the patients, should be stimulated.

- **Make the unfamiliar familiar:** Personal objects such as books, postcards, clothes and flowers create a sense of familiarity in the patient's room. Familiarity is hard to achieve in the recovery room as these patients only stay for a single day and do not bring many personal belongings with them. Familiarity might be improved by creating a more home-like environment.

- **Stimulate pleasant distraction:** Pleasant distraction can be achieved by environmental distractions, such as an interesting view, the presence of magazines, a television or a computer, or activities like taking a walk around the hospital and communicating with other patients.

- **Give patients a sense of control:** Giving the patient a sense of control of his/her own physical environment (e.g., temperature, privacy, light, music) is likely to reduce stress and contribute to the healing process. In multi-occupancy rooms, the possibilities of controlling the environment are limited because patients have to consider the wishes of other patients in the room.

Design process

The conclusions from the contextmapping study were used as guidelines in the design phase. In addition, several ingredients from the experience-driven design approach were used in the design process, including the understanding of users' concerns, the exploration of sensory qualities, and the building of experiential models; these are discussed below. The final design consists of a modular rest unit that can encompass a standard size hospital bed. The design includes the ceiling with lighting and curtain, the floor area, and a curved back wall with an integrated closet. As the rest unit is modular, multiple units can be placed in a single room (*figure 5*).

An important starting point in the design process is to select an intended user experience. Because a relaxed patient is easier to treat for a surgeon and is more likely to make a quicker recovery, it was decided to create a relaxing experience for the patients. In addition, the units should communicate the quality of the hospital: patients should have the feeling that they are in good hands and that they are being treated by high-quality professionals.

The contextmapping study provided valuable insights into a number of patient concerns. For instance, the patient's need to feel familiar in an unfamiliar environment was used in the design of the closet: the closet's door is transparent so

that the patient can see his/her clothes. As clothes are the only belongings these patients bring to the hospital, it gives them a more familiar feeling. Another concern involved the need to have a sense of control: the patients' private area was determined by the rounded shape of the floor covering, the curtain rail and the ceiling.

Another outcome of the contextmapping study involved the need for pleasant stimulation. As a result, the possible sensory product qualities of the design were explored extensively. For instance, music was found to create desirable distraction as long as it did not annoy other patients. In the final design, music was provided through a sound pillow, which can

FIGURE 5 *modular rest units designed for VU Medical centre (Vorst, 2008)*

only be heard by the patient in the rest unit, and therefore does not annoy surrounding patients (*figure* 6). In this way, each patient can choose their own type of music without disturbing others. In addition, the effects of light colour, temperature and intensity on the human hormone system were used to help patients relax. Colour temperature reflects the qualitative properties of the light and varies from warm, reddish light to cool, bluish light. Colour temperature and intensity of the lighting system were dynamic and changed during the patient's stay. Hospital staff need the light to have a cool temperature and a high intensity in order to perform their tasks. However, when no tasks are being performed, the system automatically changes to warmer colour temperatures

and the light intensity decreases gradually over time to allow the patient to relax.

Experiential models were also developed: full size prototypes were built to test whether the intended design goals were met. User tests with these prototypes showed that the design was indeed experienced as relaxing. Especially the music, the bright colours and the curved shape of the back wall were aspects mentioned by patients as being very comforting and relaxing. However, not all patients enjoyed the privacy: some would rather have had more contact with the other patients in the room. In addition, some practical issues arose, for example the lack of space around the bed,

which hindered hospital staff during their work.

This project shows an experience-driven design process - including contextmapping and prototyping – that focuses on understanding current experiences and creating desirable experiences. The VU medical centre was enthusiastic about the design and recognised the added value of the design solutions. Unfortunately, the modular rest unit has not been developed further due to changes in the hospital building plans. Nonetheless, the project demonstrates that the experience-driven approach can result in original and engaging designs that help support important life processes, such as improving the healing of patients.

FIGURE 6 *loudspeakers in the pillow allow the patient to listen to his preferred music (Vorst, 2008)*

Benefits and limitations

Both contextmapping and experience-driven design are based on scientific insights and empirical studies, and they have been improved over the years in academic and design practice. It is often difficult to find empirical evidence that demonstrates the benefits of applying methods at the fuzzy front end of product development. These methods are used for inspiration, fuelling the design process and it is sometimes difficult to trace exactly where key insights came from. Benefits often mentioned include changing the mindset of the employees within the company. Managers use success stories from other projects in which user research led to successful products on the market as evidence for their contribution. Another way to show their value is not to aim for directly visible results in financial terms at the end of a design process, but to cut the process up into a set of smaller stages, and evaluate parts of the process separately with a combination of qualitative and quantitative measures (Manschot & Sleeswijk Visser, 2011).

At first sight, the outcomes of contextmapping studies may not seem earth-shattering. Clients may have the idea that some results are quite obvious, but this is also the strength of the method: by carefully studying every aspect of day-to-day user-product interactions, all aspects that are relevant to the user are noted. Although they may seem quite obvious, our experience teaches us that companies tend to overlook some of these basic qualities of their product offerings and, thereby, tend to have blind spots to their customers' needs. Covering all user needs in their new design often gives them competitive advantage in the consumer markets.

Using contextmapping is most advantageous if a project is in the pre-conceptual or conceptual stage, where there is still a great deal of room for finding new opportunities. Apart from insights for the target project, contextmapping can yield a diverse range of outcomes, including personas, strategies for innovation, new views on market segmentation, and original insights for other innovation projects. In order to make optimal use of these possibilities, it is important that the project is broadly supported within the client's organisation. In addition, the outcomes have the greatest impact if they can be linked to other available (e.g., quantitative) user data and can be directly applied in the design process.

Although only a limited number of users are typically involved in contextmapping studies, carefully selecting the respondents for the study makes sure that their responses are largely representative for the target group. Involving more users typically does not lead to a wider variety of insights. By carefully addressing user needs and wishes, contextmapping devotes research attention to understanding the deeper needs of the user. This requires substantial investment in relationships with research participants. Also, throughout the 'understanding', 'envision', and 'create' stages of experience-driven design, this careful consideration of user needs and wishes requires the designer to make careful, precise considerations. This asks for precision, accuracy, an eye for detail, nuance, and user empathy, often resulting in a time consuming and abstract process.

As a consequence, it can take quite some time before a final result can be presented, and partners in a project may become anxious as they miss concrete results. Nonetheless, experience-driven design does not need to result in lengthier development processes than other approaches, because the formulation of a clear design statement incorporating the targeted user experience focuses the remainder of the development process, facilitates decision making and typically requires less ideation cycles.

Usually professional support is recommended for these types of projects as the skills to conduct this type of research and these design projects develop through practice. It is often not the resulting general picture, but the nuances that determine the success of a project.

Key insights

- User experiences can form the starting point for innovative design processes.
- Experiences are multifaceted, dynamic, and they depend on a person's internal state and on context.
- Contextmapping can provide the user insights that are needed as a basis for experience-driven design.
- Contextmapping focuses on investigating holistic, general experiences, whereas the experience-driven design approach focuses on creating a desired experience.
- Experience-driven design projects may differ in the number and types of ingredients.
- User input is not necessarily beneficial at all stages of a design project.

How to continue?

Further reading

- Desmet, P., Schifferstein, R. (Eds.) (2011). *From floating wheelchairs to mobile car parks: A collection of 35 experience-driven design projects*. The Hague: Eleven International.
- Hekkert, P., van Dijk, M.B. (2011). *Vision in design: Handbook for innovators*. Amsterdam: BIS publishers.
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- Sleeswijk Visser, F. (2009). *Bringing the everyday life of people into design*. Doctoral thesis Delft: Sleeswijk Visser Press. See www.studiolab.io.tudelft.nl/manila/gems/sleeswijkvisser/sleeswijkthesis.pdf

Websites

- Experience-driven innovation: www.expdi.org
- Contextmapping: www.contextmapping.com
- Delft Institute of Positive Design: studiolab.ide.tudelft.nl/diopd/
- Encyclopaedia on interaction design: www.interaction-design.org/