Users, Emotions and meaningful things
- Capturing and integrating subjective user requirements in New Product Development

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Background:

Involved parties

I am a PhD-student at the division of Design at Chalmers University of Technology, Gothenburg, Sweden. I am employed at the University of Skövde, Sweden, where I also teach a course on Design methods.

My main supervisor is Elsa Rosenblad (professor of Consumer Technology). I also have two assisting supervisors; MariAnne Karlsson (professor of Human Factors Engineering) and Leo de Vin (professor of Automation Engineering)

Design and Emotion

The relation between users and artefacts go beyond technical functionality. Products elicit emotions. As children we tear off the wrapping of our Christmas presents. A computer that malfunctions makes us frustrated. We may find ourselves attracted to a beautiful piece of furniture or clothing.

If knowledge on how products elicit emotions can be integrated into the product development process it may lead to benefits from a commercial perspective and is also respectful to the user. We hence need to be able to describe how specific products elicit specific emotional experiences, and what it is that influences a user's emotional response to a product.

Lately there has been an increased interest in how products elicit affective reactions (Jordan 2000, Norman 2004, Blythe, et al. 2003). I am interested in how products elicit emotions. The overall objective of my research is to support the handling of these aspects at different stages of the design process. The work this far is been descriptive, trying to establish a framework for how products elicit emotions.

Although there may be some inherent qualities of some stimuli (Berlyne 1971) I believe that in order to address the experiential qualities of a product we must look at the significance it has to its user, i.e. the meaning ascribed to it. One of the challenges lie in understanding how aspects such as user concerns, artefacts, and beliefs interplay in causing emotions and from this trying to establish what we can address in/through design

Objectives

The objective of this research is to (1) identify and suggest tools and methods for supporting different design activities in addressing the experiential qualities. To do this we must describe; (2) what influences users emotional relation to products, (3) how products elicit certain emotional experiences, and (4) what implications this has for the development of new products.

The aim this far has been to describe and define the emotional relation between users and products. How do products elicit emotions? What are the underlying "mechanisms"? What are the causal factors? The goal of this initial phase has been to suggest a framework for describing how different aspects interplay in eliciting an emotion in relation to a product. Future research concerns validation of the suggested framework, and addressing methodological issues in capturing information related to it.

We also need to address how to apply the framework in relation to design. Can we design for certain emotions or affect and in that case how? One objective is to

identify and methods that support this in different design activities (requirements specification, concept generation, concept evaluation and selection etc.).

Further, in order to explain emotions to products we must clarify what in products the user's react to. We must clarify what role products fill in users' lives, what is the meaning of products?

Theoretical framework

Emotions may be characterised by subjective experiences, expressive reactions (e.g. frowns and smiles), physiological reactions (e.g. changes in heart rate, production of tears), instrumental and coping behaviour (e.g. fight or flight), and cognitions (Cornelius 1996). Emotions are differentiated from other affective phenomena (e.g. mood and sentiments) in that they are directed towards something and last a relatively short period of time (seconds to days). Emotions can be classified either as categories or as dimensions. In its simplest form emotions can be reduced to core affect in terms of two dimensions; valence and arousal (Russell 1980). Researchers promoting categories typically argue that this reduces emotions too much and does not capture the various qualities of different emotions. Those promoting a categorical stance typically argue that there are a few emotions that seem to be common to every person, the so called basic emotions. These are: Desire, happiness, interest, surprise, wonder, sorrow (Frijda 1986).

I draw on cognitive theories of emotion (Frijda 1986, Lazarus 1991, Ortony, et al. 1988) applied to design by Desmet (2002). According to these theories emotions result from a subject's appraisal of the relation between his her concerns (sentiments, goals, needs, motives etc.) and the meaning of a situation (including the meaning carried through and embodied in artefacts). Specific emotions are tied to specific appraisal patterns. As an example anger results from "A demeaning offence against oneself" (Smith and Lazarus 1993) and sadness from "Experiencing an irrevocable loss" (Smith and Lazarus 1993).

In order to address emotions in design we need to look at match/mismatch between the users concerns on the one hand, and the meaning the user ascribe to the product on the other. This meaning is in itself a complex issue. People use things for a wide range of reasons. Products provide a wide range benefits, e.g. (Lai 1995), people cherish things for a variety of reason including the role they play in mediating activities (Nardi 1996) and the information they convey (Csikszentmihalyi and Rochberg-Halton 1981) . In order for this to be useful in design we must also look at the relation between meaning and something we have control over in design, i.e. the relation between design parameters and meaning.

Approach, methods and expected results

If we are to design for emotions there are several different issues that interplay; e.g. the emotion, appraisal, concerns, the perceived meaning of the product, and the "objective" product properties. Verbal statements may account for a variety of these but the some information may be captured also in other ways, e.g. self report instruments for emotion (Jämting 2001, Desmet 2002), affect (Lang 1985, Västfjäll, et al. 2001), appraisal (Scherer 2002), and semantic differentials (Osgood, et al. 1957) for evaluating the meaning a subject assigns to a product.

Future research will include individual interviews accompanied by self-report instruments. This will initially be tried in a lab environment with existing products. A potential future development is conducting more controlled

experiments, e.g. elaborating with different product representations and variation of different product properties.

In order to capture some of the goals a user has with a product it, and a wider part of the use context would be interesting to use some experience sampling method (Csikszentmihalyi and Hunter. 2003), potentially combined with some sort of cultural probes in the vein of (Gaver, et al. 1999).

Spring 2003 – Present: Describing and Defining the emotional relation between users and artefacts

RQ: How do products elicit emotions?

Theoretical framework: Emotion theory

Approach and methods: The results this far has come from a literature survey and focus group interviews in which feelings evoked by different products were discussed. The participants made relatively few comments on products' expression, but many comments the usage of products. We used visual stimuli but the participants commented also on other senses. When showing a picture of an ashtray we got comments on the stench. When showing an alarm clock, comments were made on the noise, etc. The meaning of the products as discussed by participants goes beyond the stimuli we used and in many cases concern situations. We cannot attribute the experienced qualities to the product alone. We need to consider the product as such, but also the activities in which the product is encountered and used as well as associations with it.

Expected results: This initial phase is expected to result in a framework that links product properties and user concerns to emotions.

Tentative framework
Based on results from explorative focus groups and literature survey a tentative framework has been developed that links emotions to product properties.
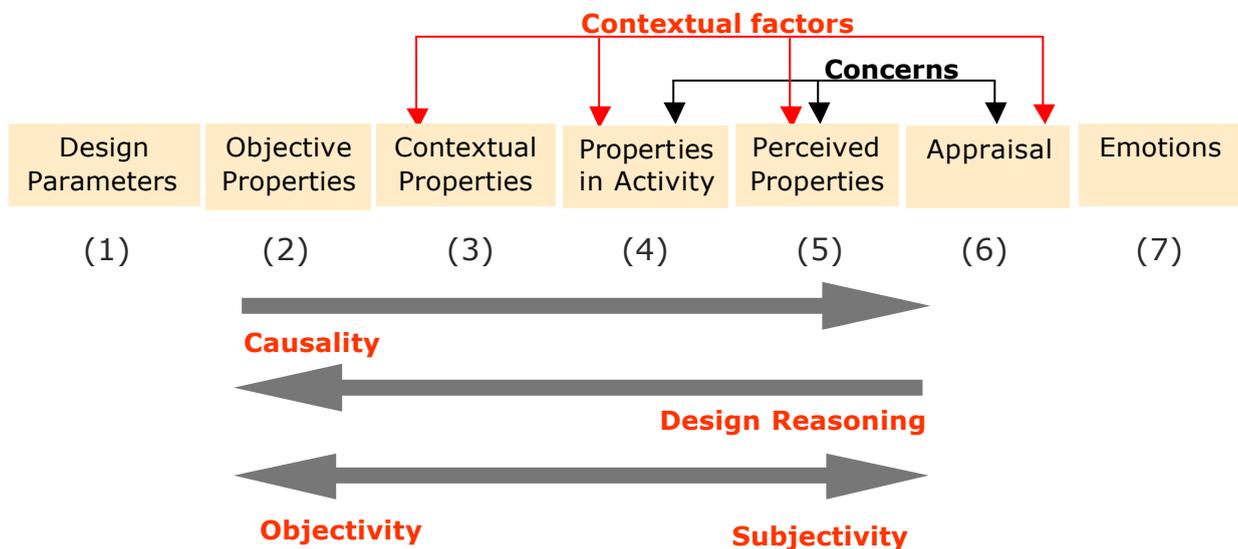
Design parameters (1) are what we can influence directly when designing a product (e.g. shapes, dimensions, colour). When these interact they give a product some properties (2) that are objective, they are an actual part of the product. In a certain cultural context we may however agree that these properties are useful for a specific purpose and label them "chair", "knife" etc. We can hence talk about properties displayed in a cultural context (3). We can also look at the properties that occur when a product interacts with other

systems in a narrower, situational context. We are no longer talking about properties that can be completely assigned to the product, but functions and behaviour, or "properties in activity" (4). When a person encounters the product, he/she will form an idea about what the product "is" that is also coloured by knowledge and prior experiences. The product may also trigger memories and associations. We may call this meaning a subject assigns to a product "perceived product" or "perceived properties" (5). The meaning assigned to a product may be beneficial or negative to the person, depending on his/her concerns. This is determined by an appraisal (6) of amongst other things the impact the product will have on the person's goals and his/her ability to deal with the consequences. When a product is appraised a certain way, emotions (7) are elicited. Specific emotions are tied to specific appraisal patterns.

In order to explain the emotion we need to gain knowledge on at least the second part of the chain of factors resulting in an emotion. In order to design for an emotion we must also link these backwards to design parameters. In addition to the product we have various other causal parameters; a cultural context, an immediate context, user's prior experiences and knowledge, and the users concerns. Some persons are also more prone to experiencing certain emotions than others due to personality traits, something that may colour the meaning assigned to a product as well as its appraisal.

Present – Spring 06: Refining and validating the suggested framework
The first objective of the future research is to refine and validate the tentative framework suggested in above, and investigate its explanatory power. To do this we need to study several links along the chain. This involves combining different tools and methods to capture information along the spectrum.

Study 1.

Background: The framework is still tentative. In order to investigate its explanatory power we want to analyse whether it can explain emotions with products. In order to do so we need to capture information on different stages of the product experience spectrum.

RQ: How well does the framework explain emotions in relation to products?

Theoretical framework: Emotion theory

Approach and methods: 21 undergraduate students were asked to document three to five emotional experiences with products during a day. Subjects were asked to describe the emotion, the situation in which it occurred, and the role the product played in that situation. In a classroom exercise students were later asked to fill out two forms; The Geneva appraisal questionnaire (Scherer 2002) and SCAS, an affect measurement instrument (Västfjäll, et al. 2001). The purpose of using several different data collection methods was to evaluate what information was collected through the different instruments, as well as getting richer descriptions on the different stages of the product experience spectrum.

Expected results: The study is expected to give some indications on what in products elicit emotions. Negative emotions are expected to occur in relation to mismatch between some product aspect and the users concerns, and positive emotions are expected to occur in relation to the opposite. The appraisal questionnaire may hopefully help to explain why a specific positive or negative emotion is elicited. Emotions and affect as reported in the different instruments is expected to match.

Study 2: The difference between the objective and the experienced product

Background: According to cognitive theories emotions are elicited by a subject's appraisal of the relation between a subjects concerns and the situation. However, what is appraised is not an "objective" product in terms of e.g. properties of materials, but the meaning a subject ascribes to it. If we are to design for certain emotional responses we must clarify the users concerns as well as the meaning. This is also a central part of the experience a subject has with a product; e.g. a "sporty" car.

RQ: What is the relation between objective product properties and the product as it is perceived by the user? How does this influence the emotions it elicits?

Theoretical frameworks: Emotion theory, product semiotics

Approach and methods: This would involve using quantitative and qualitative tools and methods for capturing the relation between design parameters and meaning, e.g. semantic differentials (Osgood, et al. 1957) and Semiotic Product Analysis (Opperud 2002).

Expected results: What elicits an emotion is match between a belief state and a person's concerns. Design methods that are based purely on correlation between objective properties and feelings, e.g. Kansei Engineering (Nagamachi 1995), cannot fully describe emotions with products.

Fall 2006 – Fall 2007: Supporting designing for the emotional relation
Future research is expected to result in a categorisation of product benefits and improved methods for addressing emotions in design.

Study 3: Product benefits
Background: Cognitive theories of emotion and the tentative framework states that emotions are elicited by appraisal of the relation between the user's goals and his/her beliefs about a situation including a product. While the technical functionality of products has beenwidely discussed in product development literature several authors have suggested that users' value products also for other goals, products provide users with a range of different benefits. Examples include social benefits (Csikszentmihalyi and Rochberg-Halton 1981, Dittmar 1992) and Hedonic benefits (Jordan 2000, Lai 1995).

RQ: What activities do (specific) products mediate? What are the benefits users derive from products? Can we somehow categorise product benefits?

Theoretical frameworks: Activity theory

Approach and methods: Participants will be asked to register experiences with products in diaries and take photos of the context in which they live their lives etc. The diaries will be complemented by some material triggering thoughts in the vein of cultural probes (Gaver, et al. 1999) and followed up by personal interviews. This approach may also capture information on emotions to products with higher ecological validity than what is possible in a lab environment.

Expected results: Framework categorising different product benefits.

Studies n-m: Designing for emotions
Background: Although describing the relation between products and user emotions may contribute to an understanding that is useful in design it is not the end goal in itself. The end is to be able to support various design activities in addressing emotive user requirements.

RQ: How can we support requirements elicitation in relation to experiential requirements? How can we support concept generation with experiential requirements in mind? How can we support concept evaluation and selection with respect to experiential user requirements?

Theoretical frameworks: Design Theory, Activity theory

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