

THE FIELD OF DESIGN AND EMOTION: CONCEPTS, ARGUMENTS, TOOLS, AND CURRENT ISSUES

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INTRODUCTION: EMERGENCE OF EMOTIONS IN DESIGN DISCOURSE

User emotions have been an integral element of product design discourse since the late 1980s, far earlier than the time when a design argument focusing on emotions was made explicit in the domain (Overbeeke and Hekkert, 1999). In Buchanan (1989), design is identified as a practice that holds similarities with the art of rhetoric. The main objective of product design, according to Buchanan, is creating products that persuade users to accept them in their lives and that increase the quality of their users in return. Emotions, in this persuasion process, act as one of the three integral elements of the design argument, next to the technological element, which is basically the promise of a practical utility, and to the element of character, which portrays the values embedded in the product. Since this early statement, the emotional impact of an object, product, or a system has been a basic element in the arguments of the different actors of the design (and in particular industrial design) field. For example, the design museums such as Museum of Modern Art, where even mundane products have been regarded as intellectual and cultural entities, started to re-shape their permanent and temporary collections with a primary emphasis on emotional aspects of the products (Antonelli, 2003). **Figure 1** illustrates the difference between the products exhibited in the 1940s and in the 2000s.

In a recent issue of *I.D.* magazine, a list of the forty most influential actors of the design world was presented. At the top of the list resided the Architecture and Design curators of the Museum of Modern Arts in New York. The curator group was deemed significant in shaping the perspectives in design, and in particular, they were acknowledged to expand the meaning of 'good design' with inclusion of "...emotion, wit and cultural imprint of popular culture" (Laskey, 2005, 55). The first runner up of the list, the chief executive officer of the Apple Company, Steve Jobs, was also found noteworthy for the inclusion of emotional aspects in the

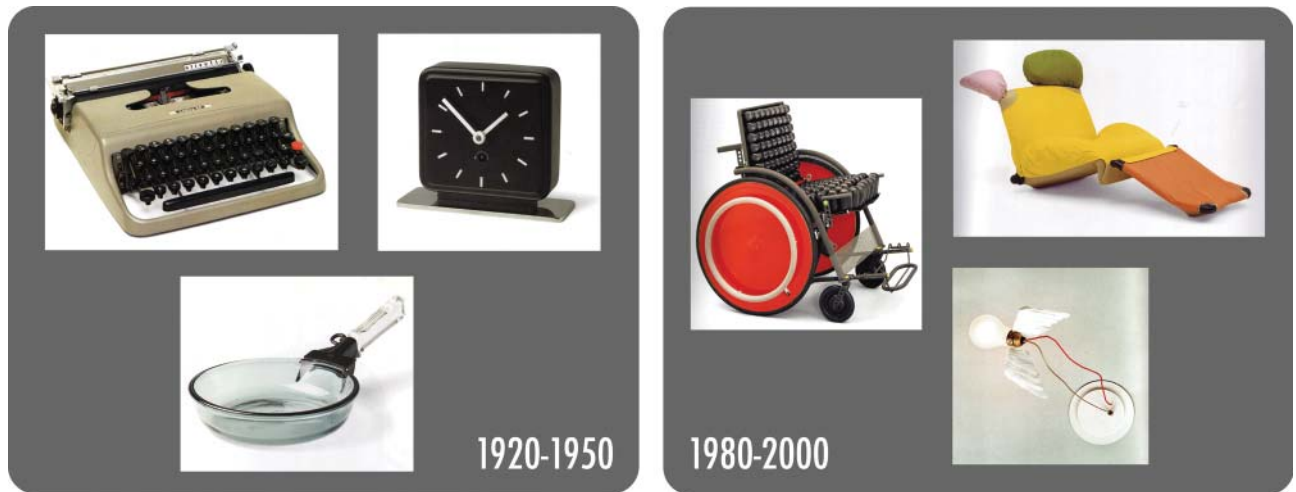


Figure 1. The products exhibited in MoMA during the 1940s and the 2000s (Antonelli, 2003).

designs of his firm. Jobs was considered to be significant for his ability to create electronic consumer products that “...capture people’s hearts and change their lives” (Scanlon, 2005, 56).

The outlook of several firms presented a more explicit emotional intent. The design activities of one of the world’s famous product design companies, Frog design, took the motto ‘form follows emotion’ as a basis of their designs. The founder of the company, Hartmut Esslinger, stated “... even if a design is elegant and functional, it will not have a place in our lives unless it can appeal at a deeper level, to our emotions” (Esslinger in Sweet, 1999, 9). In case of Alessi, an Italian product design firm, the aim of evoking positive emotional experiences was clearer. The firm’s main goal was to design to evoke happiness, laughter, humor and enjoyment (Gabra-Liddell, 1994). A tea strainer, ‘Te ò’ (**Figure 2**), which represents a ‘cheerful’ character with a humorous storyline of interaction, typifies the general outlook of the firm to the design and illustrates their way of designing for emotional experiences.



Figure 2. ‘Te ò’ by Alessi.

In a line parallel to product design practice, other research disciplines that are in close interplay with design also put emotions into their professional agenda. In the ergonomics domain, the influence of emotions in effective and efficient operations has been investigated (Helander and Tham, 2003). Marketing and consumer behavior researchers have focused on consumer emotions and its effect on purchase decisions, post-consumption evaluation and brand loyalty (Schmitt, 1999; Creusen, 1998; Oliver, 1993; see Richins, 1997 for an introduction to consumption emotions). In computer science, under the domain of affective computing, the emotions of human interactions with computational agents were taken as the starting point of the design of the agents (see Picard, 1997 for a basic reference in affective computing).

The emergence of the emotional aspects of design as an explicit research area took place in 1999, with the first Design and Emotion conference (Overbeeke and Hekkert, 1999). Since then, several books discussing emotional design, putting the emphasis on creating products that offer pleasant experiences, have been published (e.g. McDonagh et al., 2004; Norman, 2004), several experiential concepts have been discussed (for a brief overview of the concepts see Demir et al., 2006), different objectives have been set, and different tools and methods to attain those objectives have been proposed.

This paper attempts to provide a clear overview of these different concepts, arguments, and tools. In the following sections, firstly different concepts that are referred to as emotion or emotional are identified, then the different perspectives about the role of the emotion in design are discussed. Each is grounded in the general objectives of the field. The tools and methods that have been recently introduced in the field are then described, and their affinity for the identified perspectives is discussed. Lastly, topics gaining special popularity in the domain are outlined.

MAIN EMOTION CONCEPTS

Most of the concepts that are discussed in the field of design and emotion have been borrowed from various other disciplines. The richness in terminology emerging from this broadness, however, leads to a communication gap between different parties attaching different meanings to the same word. For example, the term named as 'color emotions' by Ou and Luo, (2004) refers to identification of color meanings (e.g. 'feminine' and 'modern'). 'Color emotions' are clearly different from the emotional experiences as defined and applied by psychology oriented design researchers. According to a psychology perspective, emotions are subjective affective experiences and several discrete emotions can be identified, such as happiness and fascination. Following a psychological account, one may argue against the emotion term used by Ou and Luo (2004), one can also identify a color's meaning without being emotionally aroused. Therefore, it is necessary to start with identifying different emotion related concepts and their relation to each other from different perspectives, in order to direct the discussion to a more efficient and fruitful ground.

In the field of design and emotion, the main concept that lies at the core of the domain, 'experience' is elaborated based on two prominent disciplines: psychology and philosophy. While psychological accounts structure the concept in a more definite and determinate way, philosophical accounts follow a more relational and holistic approach.

As a psychological account, Desmet and Hekkert (2007) propose a product experience framework where the experience is taken as equivalent to affect. The framework utilizes the affect definition of Russell (2003) as "a neurophysiologic state that is consciously accessible as a simple, non-reflective feeling that is an integral blend of hedonic (pleasure-displeasure) and arousal (sleepy-activated) values" (Russell, 2003, 147). Through this perspective, Desmet and Hekkert define product experience as any change in the affect that is attributed to human-product interaction, covering instrumental, non-instrumental and even non-physical interactions. In this framework, three levels of affect generation are identified: i) the aesthetic level, covering affect generated by sensorial stimulation; ii) the meaning level, referring to affect induced by expressive characteristics of products; and iii) the emotional level, including affect attributed to an object and combined with appraisals, commonly expressed as labels, such as anger, fascination, joy, contempt and so on.

Albeit from a different background, Jordan (1999) discusses positive affect generated in user-product relationships. In other words, he focuses on pleasure in product use, and particularly focuses on different sources of positive affect based on theories coming from anthropology. Jordan identifies four main categories of pleasure sources in human-product interaction as physiological, psychological, sociological and ideological

pleasures: i) the *physio-pleasures* are those received through sensory organs; ii) the *socio-pleasures* are the pleasures due to social contact in product usage; iii) the *psycho-pleasures* are those that are gained from accomplishing a task with the product; and iv) the *ideo-pleasures* are gained through the values embedded in and reflected by the products, as well as the artistic pleasures.

Norman (2004) also focuses on affect and the levels of affective processing in his book on emotional design. According to his framework, affect may arise due to three levels differing in cognitive involvement: visceral, behavioral and reflective levels. In the *visceral level*, mostly automatic and universal affective responses are produced, such as pleasure in response to smooth curves or smiling faces. The *behavioral level* is responsible for affect generated by everyday behavior, such as satisfactory completion of a task. The *reflective level* is the most sophisticated level and controls the pleasure due to intellectual processes, such as the pleasure in decoding the hidden meanings of a poem. Norman (2004) translates these different levels to different strategies for emotional design. Visceral design focuses on the automatic responses to the appearance of a product, behavioral design essentially deals with the ease and efficiency of use, and reflective design primarily focuses on the personal and cultural meanings of products.

Desmet (2002) shifts the focus of the experiential discussions to particular emotions from basic affect by stating that products do not merely evoke basic affective responses such as liking and disliking, but also highly differentiated emotions such as anger, disgust, boredom and amusement. Seeing the novel form of a chair, perceiving the humorous feature of a can opener, or receiving a false feedback from a mobile phone, may constitute remarkable changes that can evoke an emotional response. Desmet (2002) defines the product emotions as those elicited by the product's appearance. The emotional experiences can be evoked either directly (e.g. fascination with the beauty of the product itself) or indirectly through some other things that the product represents. The basic distinction of an emotion from core affect, according to a cognitive psychology perspective, is the involvement of an automatic or conscious appraisal process which involves evaluation of the different aspects of the situation encountered with respect to personal concerns (Frijda, 1988; Lazarus, 1991; Smith and Kirby, 2001; Scherer, 2001).

An important concept that is borrowed from the discipline of philosophy is 'an experience', which is central to the aesthetics of Dewey (1980). 'An experience' is a process of doings (the things are transformed in the context of the self), and undergoings (and the self is transformed by these transformations) until the self and the object are mutually adapted through a feeling of harmony. According to Dewey, 'an experience' does not necessarily belong to the art domain; seemingly practical occasions such as having a dinner in a restaurant, or walking along people in a busy street can also have an aesthetic quality and can also evoke 'an experience'. The aesthetic quality comes from the fusion of separate elements into a unity revealing a deep meaning. This aesthetic quality is basically emotionally evocative, as well. However, this emotional evocation is not separate from the intellectual or practical aspects of 'an experience' but it is an integral part of the experienced unity of all these aspects. In contrast to perspectives proposing 'disinterested' contemplation of an art object, which constitutes the basis of various philosophical and psychological aesthetics perspectives (Cupchik and Winston, 1996), Dewey defines the aesthetic experience as an involved experience where the individual is engaged in the experience

not only through bodily sensation and direct perception but also through analytic mind and inferential thinking.

The product experience framework of Forlizzi et al. (2003) is structured upon the experience and emotion conceptions of Dewey (1980). Two different types of emotional phenomenon are identified in Dewey: emotional statements, being short and reflexive responses, and emotional expressions, which are sustained and reflective. Emotional statements are momentary descriptive responses to situations that do not involve an act of forming an expression (e.g. when a needle is pierced in someone's finger, the reaction can be classified as an emotional statement). In contrast, emotional expressions involve reflection and recall of the previous experiences. Forlizzi et al. (2003) illustrate the emotional expression with an example of a veteran weeping at a memorial of a war that he had fought for. The experience of the veteran is not merely an emotional response to a biological reaction, but it rather builds upon a more meaningful frame. According to Forlizzi et al. (2003) only the second type of responses qualify as emotionally evocative experiences, and these types of reflective experiences should constitute the subject matter of the design and emotion domain. In addition, Forlizzi et al. (2003), based on Dewey's conception of emotion as a holistic quality of experience, assert that emotional quality is linked to overall experience. It is not the singular emotional responses labeled with words that are frequently used in our daily language, such as anger, contentment, and surprise, but rather it is the affective tone of the overall effects of all meaningful doings and undergoings during the experience.

Apart from the emotion and experience concepts discussed in the context of psychology and philosophy domains, there are some other concepts of note that originate in the design domain itself: emotional relationships or emotional bonds being one of them. Discussed in the works elaborating on product attachment (Savaş, 2004; Mugge et al., 2007), this concept does not refer to a 'single' episode of an affective process or 'an experience' but rather it appears as a particular kind of user-product relationship, which builds itself upon a deep and sustained meaning. The emotionality of the relationship implies the power of the product to evoke meaningful moments during the course of the relationship and may give rise to mostly pleasant experiences. The behavioral aspects of this relationship include the tendency to care for and caress the product and keep the product as long as possible (Savaş, 2004). Due to these behavioral tendencies involved in the relationship, the concept is commonly referred as 'a bond' between the user and the product. In the first conference on Design and Emotion in 1999, a chief aim of the then emerging domain was to support designers with tools and methods to create a valuable product-user relationship (Overbeeke and Hekkert, 1999). The term 'relationship', with its secondary meanings of "...a state of affairs existing between those having relations or dealings ... a romantic or passionate attachment" (Merriam-Webster Online Dictionary, 2008), implies a sustained connection between the product and the user beyond ephemeral pleasurable moments. Therefore, an emotional bond seems to be the ultimate aim of the emotional discourse.

The three concepts of affective/emotional responses, emotional experiences, and emotional relationships can relate to each other within a hierarchical structure, where the single emotional moments may accumulate into an experience, and where the accumulation of those experiences yield an emotional relationship. This perspective of the accumulative transitions between responses, to experiences, and to a

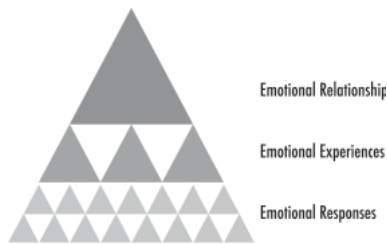


Figure 3. Emotional concepts in the field of design and emotion.

relationship is in line with the script theory focusing on magnification of affects and transformation to static structures such as attitudes (Tomkins, 1978). **Figure 3** gives a visual representation of the objectives of the works in the design and emotion domain and the relationship of these objectives.

‘Emotional needs’ and ‘affective needs’ are other terms with a design origin. These are basically the ‘needs’ of users of products, services, systems and so forth, satisfaction of which may evoke affective responses. McDonagh and Lebbon (2000) refer to the needs related to soft functionality issues, i.e. those needs beyond the basic functionality and utility issues, such as sentimentality, aesthetics, personal taste, touch, smell, feel and personality. Although these terms imply a hedonic focus, as apposed to a pragmatic focus (as Hassenzahl, 2003 would put the distinction), the examples of McDonagh and Lebbon include affective responses to basic usability problems as well (e.g. elderly emotions in response to not being able to lift themselves up out of the bathtub after a pleasant soak). Khalid (2006) points to the diversity of the affective needs referring to the affect levels of Norman (2004) outlined previously in this paper. This entails the inclusion of usability related affective responses within affective needs, however elsewhere (Khalid and Helander, 2004) affective needs are differentiated from utility related needs, pointing to a conceptual obscurity. To sum up, it is not theoretically clear when a need of the customer can be attributed to the affective domain.

THE MAIN ARGUMENTS ABOUT EMOTIONS IN DESIGN

This section summarizes the main arguments of the field of design and emotion. The first issue to be discussed is the influence of products on the experiences of users, and the possibility of experience design. The second issue to be examined is the objectives underlying research activity in the field of design and emotion.

Can Experiences Be Designed?

One of the fundamental issues that has been discussed in the design and emotion field is the possibility of the design of experiences or emotions. The marketing oriented mottos expressing increased demands of consumers commonly state that in current market conditions, it is not sufficient to design products or services, but the objective should be designing experiences (Schmitt, 1999). Obviously, it would be far-fetched to adopt a rather deterministic view and treat user experiences as physical phenomenon that can be predicted and shaped in everyday lives of users. Designers have limited power to influence the particular activities of users; they cannot (and should not) dictate a particular experience, just as they cannot dictate a particular behavior. Each product is designed to serve a particular function and the product, assuming that the intention is genuine, is mastered to convey its intended function and the ways of using it through its semantics (Monö, 1997; Crilly et al., 2004). Nevertheless, in the end, the products are adopted into the daily lives of users, in resonance with their daily expectancies and wishes, in diverse and different ways, adding different functions and unforeseen usage to the product. For example, Orel (1995) illustrates how users behave in ways that are not anticipated by the manufacturers in the context of medical devices. Here, users with medical problems appropriate medical devices, originally designed for medical facilities, into their personal lives. In addition, Siu (2003), based on ideas borrowed from ‘reader response-theory’ form literature, discusses the creativity of user reactions in ‘reading’ the purpose

of a design. Siu (2003) displays the extent to which user responses can differ from designers' intended reactions, giving examples of public space projects.

A similar challenge is confronted in designing for emotional and affective responses. The emotional and affective responses are situated, meaning that they are dependent on situational and contextual variables and on users' active and latent concerns (Frijda, 1986; Ortony et al., 1988). Although the works on affect and emotions identify underlying universal processes such as appraisal processes (Scherer, 2001), the basic input of these processes are user concerns, some of which are innate and some of which are acquired and subject to cultural and temporal influences (Desmet, 2002). Within a context of rapid technological advances and quickly adapting user needs and values, a product that aims to satisfy or conform to particular user concerns may cease to deliver the initial experience in the later stages of the relationship. In this ever-changing context, emotions remain too ephemeral to design for. Hassenzahl (2004, 47) states "things loved for one reason in a particular situation, can be hated for the same reason in another". McCarthy (2004) carries this argument to the general concept of experience, and states that it is not possible to design an experience but to design *for* an experience, which means shaping the product to maximize the possibility of evoking the intended experience.

Design and Emotion Ideals: Really Humanistic or Market Oriented?

In the design and emotion field, we can identify two main arguments that justify the recent focus on emotion and experiences. The first of the basic arguments carries a rather humanistic tone: user emotions should be integrated back to the design domain in order to satisfy users' emotionality needs with an ultimate aim of improving their 'quality of life' (McDonagh and Lebbon, 2000). Desmet (2002) referring to psychology literature states: "...emotions have a strong influence on our general experience of well being, i.e. people's own evaluations of their lives..." (Desmet, 2002, ix). This argument is also parallel to the argument of the significance of meaningful experiential relationships between users and products (Kurtgözü, 2003). These arguments treat emotions and experiences as means to reach an ultimate aim of wellbeing within users.

The other prominent argument that is important for shaping research activities in design and emotion is market success. It is commonly stated that consumers are asking for more (e.g. Demirbilek and Şener, 2003) and that consumer emotions are influential factors in the context of purchases (e.g. Seva et al., 2007). As consequence, some of the research activities in design and emotion focus on emotional responses that may have an impact on purchasing decisions, and which may bring market success. For example, 'wow effect', an experiential phenomenon discussed in the design research domain (Hazlett and Benedek, 2005), aims to evoke an intense pleasant response such as fascination, and in so doing create an attraction towards the product at first sight.

The point that has to be made clear is that the argument of market success may contradict with the humanistic view of designing products with an emotional meaning and sustained relationship. Kurtgözü (2003), referring to Slater, states that products calling for consumer emotions can be "... manufactured and calculated in relation to profit rather than arising originally from authentic individual and communal life." (Kurtgözü, 2003, 57). Kurtgözü also points to the danger of focusing on consumer passions

through adding superficial glitters on products, and states that marketing those glitters as emotional 'needs' is essentially a commoditization of emotions and experiences. That is to say, market-oriented approaches can see the emotion as an end, to be chased on its own. Kurtgözü (2003) asserts that this process of commoditization of emotions and experiences reinforces the consumption culture where new experiences must be generated to replace old ones that have lost their charm, and therefore is far from the intended objective of delivering meaningful and evocative relationships. The glitters may evoke pleasant moments during the purchase stage or in the early phases of the relationship. However, it is a question that remains to be addressed in the design and emotion domain, as to what extent these pleasant moments become transformed into a meaningful and evocative relationship.

TOOLS AND TECHNIQUES IN DESIGN FOR EMOTION

The significance of user emotions and experiences in the design domain have led to the introduction of various tools and techniques aimed at gathering information about users' emotional interaction with products and thus shaping the products in the light of this information. These tools can be grouped into two: i) tools and techniques used to gather information and knowledge about users' emotional experiences; and ii) tools used to measure the affective influence of products. In this section, the prominent tools in both groups will be summarized. Additionally, the implicit or obvious objectives of these tools will be discussed in connection to the design and emotion arguments outlined in the previous section, i.e. quality of life versus marketing push.

Tools and Techniques to Understand User Concerns and Experiences

The tools and techniques in this group are commonly used to gather information about particular user experiences, user contexts and dynamics that shape those contexts. Through a point of view called 'empathic design', these tools are used to understand users' needs, aspirations and feelings, and as the name implies, to design in empathy with intended users (McDonagh and Lebbon, 2000). Empathic design is generally presented as a user-centered design approach that puts special emphasis to the emotional aspects of user-product relationships (McDonagh and Lebbon, 2000; Fulton-Suri, 2003; Crossley 2003).

However, in these texts, there is not a clear distinction between emotional aspects and other aspects of the user-product relationship. That is to say, it is not clear what makes the data gathered in research to be labeled as 'emotional'. The terminology used to define information gathering for empathic design includes terms such as feelings, aspirations, and emotional needs of users. From a theoretical point of view, these concepts are not emotional phenomena themselves, but instead are user concerns based on constructs including goals, standards, and attitudes, for which conformance or violation may evoke affective and emotional responses.

The techniques used in empathic design are based on common user research techniques such as in-depth interviews, focus groups, and observation. These techniques are mostly adapted with additional features that aim to gather 'emotional' information (Crossley, 2003). Interviews and focus groups, where users are asked to answer particular questions, are the most basic ways of understanding users' opinions about their own previous experiences, and their concerns that shape those experiences (see Langford and McDonagh-Philip, 2003 for an overview of focus

group techniques). Diary study (Visser et al., 2005) is a technique where users report their particular experiences over a fairly long period of time. This technique is helpful to generate experience information that could otherwise become distorted owing to memory biases, or which could be forgotten if not reported during the experience itself.

As it has been referred to in various texts, user concerns, or affective / emotional responses to particular products, are not easy to articulate. To overcome or to reduce the severity of this problem, researchers have proposed the use of a variety of tools. Mood boards as discussed by McDonagh, Brueseberg and Haslam (2002), and inspirational activity cards by Crossley (2003), basically serve the purpose of facilitating the expression of affective and emotional issues. These are toolkits of words, images, and activities that facilitate introspection and encourage people to express emotional responses and concerns in a visually rich medium.

Contextual observation is a basic technique that design researchers have utilized since the early interest in user-centered design. This technique aims to find out what goes unnoticed in users' daily life contexts (Crossley, 2003). While this technique produces highly valuable information, it also requires deciphering of the meaning embedded in the observed behaviors. Therefore, this technique is usually used in combination self-confrontation interviews.

Another increasingly popular group of techniques is based on getting users to undertake reporting or making activities that reveal their concerns and experiences. In cultural probes (Gaver, Dunne and Pacenti, 1999) and photo diaries (Mattelmäki, 2005) users are asked to carry out the task of creative reporting, which involves making photo collages, or basic creative acts such as compiling a compendium of objects, words or images that alludes to the characteristics of a particular experience (Sanders, 2000).

IDEO, an international design and human factors consulting company, recently launched Method Cards, which provide a refined compilation of several user research techniques, on which the company base its own research activities (IDEO Method Cards, n.d.). Most of the techniques described by Method Cards can also be used in illuminating the emotional domain of user-product relationships.

The basic argument that shapes the tools and techniques used in empathic design approaches is to achieve an 'emotional fit' between users and products. However, research articles focusing on empathic design and researching the emotional needs of users rarely comment on the success of the outputs of empathic design. The research domain currently is in need of evaluation criteria for the success of its techniques. It is meaningful to investigate whether the products that are shaped through empathic design approaches really deliver intended emotional responses, experiences, or bonds. Only after such an investigation can these techniques be improved in line with the genuine aims of the design and emotion field.

Tools and Techniques to Understand the Affective Influences of Products

Tools and techniques intended to measure affective influences of products can be grouped according to the three-leveled product experience framework proposed by Desmet and Hekkert (2007), i.e. sensorial, meaning and emotional level.

The Sensorial Quality Assessment Method (SEQUAM) of Bonapace (2002) is one of the methods that can be mentioned under the sensorial level. With

this method, users are involved in exploring, assessing and verifying how pleasurable the product under investigation is. In each phase the visual and tactual pleasure evoked by mock-ups or actual products are measured using Likert scales.

To design for the meaning level, the most common method is the Kansei engineering method of Nagamachi (1997). This method investigates the influence of physical qualities of the product on abstract expressive qualities, such as 'luxurious', 'elegant' and 'sophisticated'. This technique has been used extensively in different design applications. The usual meaning measurement is semantic differential labels and Likert scales.

Desmet's (2002) 'Premo' is the most significant tool among the tools proposed for the emotional level of product affectation. The basic aim of this tool is to measure the emotional influence of the appearance of a product. Fourteen different emotional states are represented by animated characters that express the universal behaviors of those emotions. In an experimental situation, users rate the extent to which they feel each of these emotions in response to seeing a particular product stimulus. Although Premo is designed to measure emotions in response to product appearance, there are examples of the tool being used in other contexts, for example in measuring emotions in response to interaction scenarios (e.g. Desmet et al., 2005).

The tools summarized in this group differ from the ones mentioned in the previous group in application. In contrast with the techniques summarized in the previous group, the tools presented here are commonly used to understand the affective influence of first-time encounters with products. As a second distinction from the previous group, these tools are usually used in experimental settings and in laboratory environments instead of users' daily life contexts. With these qualities, the tools outlined here carry an implicit aim of creating pleasant moments during first-time encounters, instead of creating pleasant moments in users' daily life contexts. This aim carries a correspondence to create pleasant moments prior to actual possession and use of the product, and in that sense, these tools are helpful in creating pleasant moments that may affect purchase decisions. Through this perspective, the tools presented here are helpful in developing products with increased likelihood of market success. However, in order to reach the authentic objective of the field, research efforts should be expanded to emotional bonds between products and their users, which transcend people's initial encounters with product surfaces.

CURRENT ISSUES IN THE EMOTIONAL DESIGN DOMAIN

Aesthetics of Interaction

In the modern bourgeois culture, arts and technology have been separated with clear boundaries: arts denoting the intuitive and subjective, and science and technology denoting the quantifiable and objective. Design, with its burden of instrumental purposes, has been regarded to have affinity to the technology end of the continuum (Coles, 2005). Since the 1990s this distinction between art and technology is questioned by various design theorists referring to the distinction as unfortunate and fruitless for design (Borgmann, 1995; Zaccai, 1995). Coles (2005), having summarized the contrasting opinions about the relationship between art and design since the late 1800s, expresses the confluence of these two domains in recent years. The significant point in this confluence for the field of design and emotion is the potential of arts to evoke aesthetic (and therefore

emotional) experiences. Dunne (1999) exploits this potential of arts in the context of electronic objects. The basic notion in his work is to create objects that provoke contemplation and aesthetic experiences through not-so-user-friendly interfaces, at expense of user comfort and convenience. Sengers (2003), in a similar vein, puts forward a design argument aiming to create computing systems that make cultural comments in the form of interactive artworks. Here the computing system is devised to evoke a sense-making experience, which requires users' reflection about new ways to experience the world.

An important issue for the field of design and emotion is the possibility of evoking aesthetic and artistic experiences in the goal-oriented context of modern daily life. Dewey (1980) states that the aesthetic experiences are not disinterested experiences that are confined to the domain of art: even the most mundane activities may have an aesthetic quality. It is a research question of its own, whether it is possible to surpass the works of Dunne (1999) and deliver an aesthetic quality with a product still staying in the boundaries of a heavy instrumental context.

Another main challenge in the confluence between the instrumental and the aesthetic involves production conditions. Dewey (1980) does not set clear boundaries between artistic production and the experience of the artistic product: aesthetic quality of the experience depends heavily upon the aesthetic quality of the production. That is why craftsmanship can also be artistic as long as it cares deeply about the subject matter. From this perspective it seems possible to create genuine aesthetic experiences through instrumental products. However, whether it is really possible to evoke deep aesthetic experiences in the current production environment with a primary focus on profit is another important research question that can illuminate the field and give direction to further research.

Particular Emotions

Designing products and interfaces for fun and enjoyment is one of the main tendencies nowadays. The issue is discussed in the human computer interactions domain under the name of funology (Blythe et al., 2003). Several frameworks and guidelines are proposed for fun and enjoyment. For example, Shneiderman (2004) proposes metaphors, attractive graphics, appealing animations, satisfying sounds, appealing splashes of color, and so on, to evoke fun and enjoyment from human computer interfaces. In addition, Hummels (2005) refers to product qualities such as simplicity of interfaces as one of the two factors that influence prolongation of positive emotions. Playfulness is proposed as an objective for creating interfaces that facilitate an imaginative and creative interaction between computers and people (Noyes and Littledale, 2002).

Evoking surprise is another recent tendency in the domain of design. Ludden et al. (2008) use sensorial incongruity as a means to create surprising products. It has been argued that incongruent sensorial experiences may evoke surprise and amusement. Visual information, which is gathered in the early phases of interaction, can shape the expectations about the information to be retrieved in later stages of interaction. The violation of these expectations may evoke an arousal accompanied with pleasantness. The 'Ta-Da' series of Grimaldi (2006) manipulates the expectations of users through the use of archetypical forms and mechanisms. The 'on-edge lamp' is a plastic tabletop lamp that has a form similar to glass lamp archetypes (**Figure 4**). The lamp can give light only when its base does not contact the table. This opens the way



Figure 4. Interaction storyline of an on-edge lamp.

for accidents, increasing user tension and evoking expectations about a prospective breakage. However, the lamp's elastic body resists the impact of the fall and delivers a happy ending.

Other Sensorial Experiences

One of the contemporary topics in the field concerns the evocation of pleasure through sensorial stimulation. Designing for a pleasurable appearance has historically been at the core of design activities (e.g. 'design is aesthetic' by Dieter Rams). The main trend nowadays is to understand the influence of the other senses. Van Egmond (2008) investigates the auditory experience in product interaction, in particular perceptual and cognitive processes that relate to pleasure in auditory experiences. Sonneveld and Schifferstein (2008) identify the dimensions of tactual experiences in order to produce guidelines for designing products that evoke pleasurable tactual experiences. Schifferstein and Spence (2008) investigate the interaction of different sensory modalities in product experience. Certain sensorial modalities giving the same message are found to be more pleasurable by users, according to Schifferstein and Spence (2008).

Attachment

As briefly referred to previously, product attachment is a core issue in the field of design and emotion. Lately attachment itself is considered as a design strategy within a sustainable research agenda. For example, Mugge et al. (2008) set particular design strategies forth in order to create product attachment. Personalization is proposed as a strategy to build a meaningful relationship between users and their products. Furthermore, Chapman (2005) states the significance of creating a narrative between the product and the user, in which the user can generate new meanings through the relationship, to keep the relationship alive. In all these studies of attachment there is a tendency to create an emotionally evocative bond between the user and the product. However, it is premature to comment

on the success of these strategies, as the concept of attachment requires longitudinal studies over long periods of times.

CONCLUSIONS

Design and emotion is a relatively new and increasingly flourishing research area within the discipline of design. It is underpinned by a variety of emotional phenomena, with tools and techniques proposed to deliver those emotional phenomena through designed products. This overview points to three interrelated emotional concepts in users' interaction with products: emotional responses, emotional experiences, and emotional relationships. Apart from research techniques that focus on eliciting user concerns, the tools and techniques in the field of design and emotion generally aim to measure people's immediate emotional response to a product or some particular feature across several products. It cannot be denied that these tools contribute a great step in illuminating affective relationships between users and products.

However, partly due to the nature of these tools aiming to elicit affective responses in a controlled environment, it is not known for sure whether products designed through such an emotional engineering activity will create the foreseen response in real life situations and over repeated encounters. The research agenda of the design and emotion field should therefore expand to include relationships between laboratory experiments and daily life experiences of users, so that tools and methods that foresee the daily life responses of users most correctly may be developed.

Future research should also answer the question of how immediate responses to a product relate to deeper emotional experiences and ultimately to an emotional bond. Only then can the genuine objective of the design and emotion domain, which is to improve the quality of life of users through creating emotionally evocative experiences and relationships, be achieved. An important step towards this objective is to i) understand the effect of immediate pleasant responses on the inducement of deeper experiences, ii) create or foster emotional relationships, and iii) devise methodological techniques to assist research into the nature of meaningful, evocative, and artistic experiences, and for sustained emotional relationships.

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'TASARIM VE DUYGULAR' ALANI: KAVRAMLAR, ARGÜMANLAR, ARAÇLAR VE GÜNCEL SORUNLAR

Ürün tasarımı araştırmaları son yıllarda 'tasarım ve duygular' alanının ortaya çıkışına tanıklık etti. Çeşitli yazarlar değişik disiplinlerden ödünç aldıkları duygularla ilgili farklı kavramları alana tanıttılar ve tasarımda duyguların rolü konusunda farklı perspektifler geliştirdiler. Aynı anda tasarım araştırmacıları da ürün-kullanıcı ilişkisinin duygusal yönünü aydınlatmak ve buna seslenen tasarımlar yapmak amacıyla farklı araç ve teknikler geliştirdiler. Bunlar sonucunda ortaya çıkan ve her an zenginleşmekte olan resim farklı argümanların ve çeşitli tekniklerin zengin bir karışımını bize sunmaktadır. Bu aşamada, şimdiye dek ortaya konmuş olan bu kavram, argüman ve araçların özetlenmesi daha ileri çalışmalara temel sağlayarak, alanın gelişimine katkıda bulunacaktır. Bu makale, şimdiye dek alana sunulmuş olan duygusal olguların aralarındaki benzerlik ve farklılıkları belirleyerek sözü edilen temeli oluşturmaya çalışmaktadır. Tasarım ve duygular alanına ait farklı hedef ve argümanlar tespit edilmekte, araç ve teknikler ise bu hedeflere erişmedeki rolleri açısından tartışılmaktadır. Son olarak, alanın koyduğu hedeflere ulaşması için gerekli itici gücü sağlayabilecek çeşitli güncel konular özetlenmekte ve tartışılmaktadır.

ABSTRACT

In recent years, research in the field of product design has witnessed the emergence of the field of design and emotion. Several authors have introduced different emotion related concepts borrowed from different disciplines and adopted different perspectives for the role of emotions in design. Simultaneously, design researchers have developed different tools and techniques, to illuminate the emotional side of the user-product relationship and to design for this emotional side. The resulting picture is a rich blend of different arguments and various techniques, which is getting even richer. At this point, it is beneficial for the domain to summarize those concepts, arguments, and tools in order to provide a clear discussion basis for the further studies. This paper attempts to provide this basis by pointing out the similarities and differences among the emotional phenomena that have been introduced in the field. The different objectives and arguments of the design and emotion field are identified and the tools and techniques are discussed regarding their help in attaining these objectives. Lastly, current issues in the area that may provide the field with a boost towards achieving its objectives are briefly summarized and discussed.