

# Encyclopedia of Human Computer Interaction

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Printed at: Yurchak Printing Inc.

Published in the United States of America by  
Idea Group Reference (an imprint of Idea Group Inc.)  
701 E. Chocolate Avenue, Suite 200  
Hershey PA 17033  
Tel: 717-533-8845  
Fax: 717-533-8661  
E-mail: [cust@idea-group.com](mailto:cust@idea-group.com)  
Web site: <http://www.idea-group-ref.com>

and in the United Kingdom by  
Idea Group Reference (an imprint of Idea Group Inc.)  
3 Henrietta Street  
Covent Garden  
London WC2E 8LU  
Tel: 44 20 7240 0856  
Fax: 44 20 7379 0609  
Web site: <http://www.eurospanonline.com>

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#### Library of Congress Cataloging-in-Publication Data

Encyclopedia of human computer interaction / Claude Ghaoui, Editor.  
p. cm.

Summary: "This encyclopedia presents numerous experiences and insights, of professional from around the world, on human computer interaction issues and perspectives"--Provided by publisher.

Includes bibliographical references and index.

ISBN 1-59140-562-9 (hardcover) -- ISBN 1-59140-798-2 (ebook)

1. Human-computer interaction--Encyclopedias. I. Ghaoui, Claude.  
QA76.9.H85E S2 2006  
004'.019--dc22

2005031640

#### British Cataloguing in Publication Data

A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this encyclopedia set is new, previously-unpublished material. The views expressed in this encyclopedia set are those of the authors, but not necessarily of the publisher.

## Hedonic, Emotional, and Experiential Perspectives on Product Quality

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### QUALITY OF INTERACTIVE PRODUCTS

Human-computer interaction (HCI) can be defined as a discipline, which is concerned with the design, evaluation and implementation of interactive computing systems [products] for human use (Hewett et al, 1996). Evaluation and design require a definition of what constitutes a good or bad product and, thus, a definition of interactive product quality (IPQ). *Usability* is such a widely accepted definition. ISO 9241 Part 11 (ISO, 1998) defines it as the "extent to which a product can be used by specified users to achieve specified goals with effectiveness, efficiency and satisfaction in a specified context of use."

Although widely accepted, this definition's focus on tasks and goals, their efficient achievement and the involved cognitive information processes repeatedly caused criticism, as far back as Carroll and Thomas' (1988) emphatic plea not to forget the "fun" over simplicity and efficiency (see also Carroll, 2004).

Since then, several attempts have been made to broaden and enrich HCI's narrow, work-related view on IPQ (see, for example, Blythe, Overbeeke, Monk, & Wright, 2003; Green & Jordan, 2002; Helander & Tham, 2004). The objective of this article is to provide an overview of HCI current theoretical approaches to an enriched IPQ. Specifically, needs that go beyond the instrumental and the role of emotions, affect, and experiences are discussed.

### BACKGROUND

Driven by the requirements of the consumer's product market, Logan (1994) was first to formulate a notion of *emotional usability*, which complements

traditional, "behavioral" usability. He defined emotional usability as "the degree to which a product is desirable or serves a need beyond the [...] functional objective" (p. 61). It is to be understood as "an expanded definition of needs and requirements, such as fun, excitement and appeal" (Logan, Augaitis, & Renk, 1994, p. 369). Specifically, Logan and colleagues suggested a human need for novelty, change, and to express oneself through objects.

Other authors proposed alternative lists of needs to be addressed by an appealing and enjoyable interactive product. In an early attempt, Malone (1981, 1984) suggested a need for challenge, for curiosity, and for being emotionally bound by an appealing fantasy (metaphor). Jordan (2000) distinguished four groups of needs: physiological (e.g., touch, taste, smell), social (e.g., relationship with others, status), psychological (e.g., cognitive and emotional reactions), and *Id-needs* (e.g., aesthetics, embodied values). Gaver and Martin (2000) compiled a list of non-instrumental needs, such as novelty, surprise, diversion, mystery, influencing the environment, intimacy, and to understand and change one's self. Taken together, these approaches have at least two aspects in common: (a) they argue for a more holistic understanding of the human in HCI and (b) they seek to enrich HCI's narrow view on IPQ with non-instrumental needs to *complement* the traditional, task-oriented approach.

Although, the particular lists of needs differ from author to author, two broad categories—widely supported by psychological research and theory—can be identified, namely *competence/personal growth*, for example, the desire to perfect one's knowledge and skills, and *relatedness/self-expression*, for example, the desire to communicate a favorable identity to relevant others (see Hassenzahl, 2003).

A sense of *competence*, for example, to take on and master hard challenges, is one of the core needs in Ryan and Deci's (2000) *self-determination*

theory, which formulates antecedents of personal well-being. Similarly, Csikszentmihalyi's (1997) flow theory, which became especially popular in the context of analyzing Internet use (see Chen, Wigand, & Nilan, 1999; Novak, Hoffman, & Yung, 2000), suggests that individuals will experience a positive psychological state (flow) as long as the challenge such an activity poses is met by the individuals' skills. Interactive products could tackle these challenges by opening up for novel and creative uses while, at the same time, providing appropriate means to master these challenges.

A second need identified by Ryan and Deci (2000) is *relatedness*—a sense of closeness with others. To experience relatedness requires social interaction and as Robinson (1993, cited in Leventhal, Teasley, Blumenthal, Instone, Stone, & Donskoy, 1996) noted, products are inevitably statements in the on-going interaction with relevant others. A product can be understood as an extension of an individual's self (Belk, 1988)—its possession and use serves self-expressive functions beyond the mere instrumental (e.g., Wicklund & Gollwitzer, 1982).

To summarize, an appealing interactive product may support needs beyond the mere instrumental. Needs that are likely to be important in the context of design and evaluation are *competence/personal growth*, which requires a balance between challenge and ability and *relatedness/self-expression*, which requires a product to communicate favorable messages to relevant others.

## NEEDS BEYOND THE INSTRUMENTAL

In this article, the terms *instrumental* and *non-instrumental* are used to distinguish between HCI's traditional view on IPQ and newer additions. Repeatedly, authors refer to instrumental aspects of products as *utilitarian* (e.g., Batra & Ahtola, 1990), *functional* (e.g., Kempf, 1999) or *pragmatic* (e.g., Hassenzahl, 2003), and to non-instrumental as *hedonic*. However, hedonic can have two different meanings: some authors understand it as the affective quality (see section below) of a product, for example, pleasure, enjoyment, fun derived from possession or usage (e.g., Batra & Ahtola, 1990;

Huang, 2003), while others see it as non-task related attributes, such as novelty or a product's ability to evoke memories (e.g., Hassenzahl, 2003). Beside these slight differences in meaning, instrumental and non-instrumental aspects are mostly viewed as separate but complementing constructs. Studies, for example, showed instrumental as well as non-instrumental aspects to be equally important predictors of product appeal (e.g., Hassenzahl, 2002a; Huang, 2003). A noteworthy exception to the general notion of ideally addressing instrumental and non-instrumental needs simultaneously is Gaver's et al. (2004b) concept of *ludic* products. According to them, a ludic product promotes curiosity, exploration and *de-emphasizes* the pursuit of external (instrumental) goals. Or as Gaver (personal communication) put it: Ludic products "... aren't clearly useful, nor are they concerned with entertainment alone. Their usefulness is rather in prompting awareness and insight than in completing a given task." Gaver et al. (2004b) argue, then, for a new product category aimed at solely supporting *personal growth/competence* by providing a context for new, challenging and intrinsically interesting experiences and by deliberately turning the user's focus *away* from functionality.

A question closely related to instrumental and non-instrumental needs is their relative importance. Jordan (2000) argued for a hierarchical organization of needs (based on Maslow's [1954] hierarchical concept of human needs): The first level is product functionality, the second level is usability and the third level is "pleasure," which consists of his four non-instrumental aspects already presented earlier. Such a model assumes that the satisfaction of instrumental needs is a necessary precondition for valuing non-instrumental needs. A product must, thus, provide functionality, before, for example, being appreciated for its self-expressive quality.

This strict assumption can be questioned. Souvenirs, for example, are products, which satisfy a non-instrumental need (keeping a memory alive, see Hassenzahl, 2003) without providing functionality. However, for many products, functionality can be seen as a necessary precondition for acceptance. A mobile phone, for instance, which does not work will definitely fail on the market, regardless of its non-instrumental qualities.

One may, thus, understand a hierarchy as a *particular, context-dependent* prioritization of needs (Sheldon, Elliott, Kim, & Kasser, 2001). The relative importance of needs may vary with product categories (e.g., consumers' versus producers' goods), individuals (e.g., early versus late adopters) or specific usage situations. Hassenzahl, Kreck, and Burmester (2002), for example, found instrumental aspects of Web sites to be of value, only if participants were given explicit tasks to achieve. Instrumental aspects lost their importance for individuals with the instruction "to just have fun" with the Web site.

### EMOTIONS, AFFECT, AND EXPERIENCE

Recently, the term *emotional design* (Norman, 2004) gained significant attention in the context of HCI. Many researchers and practitioners advocate the consideration of emotions in the design of interactive products—an interest probably triggered by science's general, newly aroused attention to emotions and their interplay with cognition (e.g., Damasio, 1994). In the context of HCI, Djajadiningrat, Overbecke, and Wensveen (2000), for instance, argued for explicitly taking both into account, knowing *and* feeling. Desmet and Hekkert (2002) went a step further by presenting an explicit model of product emotions based on Ortony, Clore, and Collins' (1988) emotion theory.

In general, emotions in design are treated in two ways: some authors stress their importance as *consequences* of product use (e.g., Desmet & Hekkert, 2002; Hassenzahl, 2003; Kim & Moon, 1998; Tractinsky & Zmiri, in press), whereas others stress their importance as *antecedents* of product use and evaluative judgments (e.g., Singh & Dalal, 1999), *visceral level* in Norman (2004).

The "Emotions as consequences"—perspective views particular emotions as the result of a cognitive appraisal process (see Scherer, 2003). Initial affective reactions to objects, persons, or events are further elaborated by combining them with expectations or other cognitive content. Surprise, for example, may be felt, if an event deviates from expectations. In the case of a positive deviation, surprise may then give way to joy. An important aspect of emotions is their situatedness. They are the result of

the complex interplay of an individual's psychological state (e.g., expectations, moods, saturation level) and the situation (product and particular context of use). Slight differences in one of the elements can lead to a different emotion. Another important aspect is that emotions are transient. They occur, are felt, and last only a relatively short period of time. Nevertheless, they are an important element of experience.

The ephemeral nature of emotions and the complexity of eliciting conditions may make it difficult to explicitly *design* them (Hassenzahl, 2004). Designers would need control over as many elements of an experience as possible. Good examples for environments with a high level of control from the designer's perspective are theme parks or movies. In product design, however, control is not as high and, thus, designers may have to be content with creating the possibility of an emotional reaction, for example, the context for an experience rather than the experience itself (Djajadiningrat et al., 2000; Wright, McCarthy, & Meekison, 2003).

In 1980, Zajonc (1980) questioned the view of emotions as consequences of a cognitive appraisal. He showed that emotional reactions could be instantaneous, automatic without cognitive processing. And indeed, neurophysiology discovered a neural shortcut that takes information from the senses directly to the part of the brain responsible for emotional reactions (amygdala) before higher order cognitive systems have had a chance to intervene (e.g., LeDoux, 1994). However, these instantaneous emotional reactions differ from complex emotions like hate, love, disappointment, or satisfaction. They are more diffuse, mainly representing a good/bad feeling of various intensities about an object, person, or event. To distinguish this type of emotional reaction from the more complex discussed earlier, they are often called *affective reactions* in contrast to *emotions*. Norman (2004) labeled the immediate reaction "visceral" (bodily) as opposed to the more "reflective."

Importantly, one's own immediate, unmediated affective reactions are often used as information (*feelings-as-information*, Schwarz & Clore, 1983), influencing and guiding future behavior. Damasio (1994) developed the notion of somatic markers attached to objects, persons, or events, which influence the way we make choices by signaling "good"

or "bad". Research on persuasion, for example, has identified two ways of information processing: systematic (central) and heuristic (peripheral). Individuals not capable or motivated to process argument-related information, rely more strongly on peripheral cues, such as their own immediate affective reactions towards an argument (e.g., Petty & Cacioppo, 1986). These results emphasize the importance of a careful consideration of immediate, product-driven emotional reactions for HCI.

### FUTURE TRENDS

To design a "hedonic" interactive product requires an understanding of the link between designable product features (e.g., functionality, presentational and interactional style, content), resulting product attributes (e.g., simple, sober, exciting, friendly) and the fulfillment of particular needs. In the same vein as a particular user interface layout may imply simplicity, which in turn promises fulfillment of the need to achieve behavioral goals, additional attributes able to signal and promote fulfillment of competency or self-expression needs (and ways to create these) have to be identified. We may, then, witness the emergence of principles for designing hedonic products comparable to existing principles for designing usable products.

As long as HCI strongly advocates a systematic, user-centered design process (*usability engineering*, e.g., Mayhew, 1999; Nielsen, 1993), tools and techniques will be developed to support the inclusion of non-instrumental needs and emotions. Some techniques have already emerged: measuring emotions in product development (e.g., Desmet, 2003), gathering holistic product perceptions (Hassenzahl, 2002b), assessing the fulfillment of non-instrumental needs (e.g., Hassenzahl, in press) or eliciting non-instrumental, "inspirational" data (e.g., Gaver, Boucher, Pennington, & Walker, 2004a). Others will surely follow.

### CONCLUSION

Individuals have general needs, and products can play a role in their fulfillment. The actual fulfillment

of needs (when attributed to the product) is perceived as quality. Certainly, individuals have instrumental goals and functional requirements that a product may fulfill; however, additional non-instrumental, hedonic needs are important, too. Two needs seem to be of particular relevance: *personal growth/competence* and *self-expression/relatedness*. Product attributes have to be identified, which signal and fulfill instrumental as well as non-instrumental needs. A beautiful product, for example, may be especially good for self-expression (Hassenzahl, in press; Tractinsky & Zmiri, in press); a product that balances simplicity/ease (usability) and novelty/stimulation may fulfill the need for personal growth.

Human needs are important, and individuals can certainly reach general conclusions about their relative importance (see Sheldon et al., 2001). However, quality is also rooted in the actual experience of a product. Experience consists of numerous elements (e.g., the product, the user's psychological states, their goals, other individuals, etc.) and their interplay (see Wright et al., 2003). The complexity of an experience makes it a unique event—hard to repeat and even harder to create deliberately. But experience nevertheless matters. Experiences are highly valued (Boven & Gilovich, 2003), and, consequently, many products are now marketed as experiences rather than products (e.g., Schmitt, 1999). From an HCI perspective, it seems especially important to better understand experiences in the context of product use.

Definitions of quality have an enormous impact on the success of interactive products. Addressing human needs as a whole and providing rich experiences would enhance the role of interactive products in the future.

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## KEY TERMS

**Affect:** An umbrella term used to refer to mood, emotion, and other processes, which address related phenomena. The present article more specifically uses the term "affective reaction" to distinguish an individual's initial, spontaneous, undifferentiated, and largely physiologically-driven response to an event, person, or object from the more cognitively differentiated "emotion."

**Emotion:** A transient psychological state, such as joy, sadness, anger. Most emotions are the consequence of a cognitive appraisal process, which links an initial affective reaction (see "Affect" term definition) to momentarily available "information", such as one's expectations, beliefs, situational cues, other individuals, and so forth.

**Experience:** A holistic account of a particular episode, which stretches over time, often with a definite beginning and ending. Examples of (positive) experiences are: visiting a theme park or consuming a bottle of wine. An experience consists of numerous elements (e.g., product, user's psychological states, beliefs, expectations, goals, other individuals, etc.) and their relation. It is assumed that humans constantly monitor their internal, psychological state. They are able to access their current state during an experience and to report it (i.e., experience sampling). Individuals are further able to form a summary, retrospective assessment of an experience. However, this retrospective assessment is not a one-to-one summary of everything that happened during the experience, but rather overemphasizes single outstanding moments and the end of the experience.

**Instrumental Needs:** Particular, momentarily relevant behavioral goals, such as making a telephone call, withdrawing money from one's bank account, or ordering a book in an online shop. Product attributes related to the achievement of behavioral goals are often referred to as "utilitarian," "pragmatic," or "functional."

**Non-Instrumental Needs:** Go beyond the mere achievement of behavioral goals, such as self-expression or personal growth. Product attributes related to the fulfillment of non-instrumental needs are often referred to as "hedonic." A more specific use of the term "hedonic" stresses the product's "affective" quality, for example, its ability to evoke positive affective reactions (mood, emotions, see "Affect" term definition).