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Guest editorial: Conceptualizing affective human factors design

A nascent research perspective in Human Factors and Ergonomics, *Affective Human Factors Design* implies a gradual shift in research paradigm from human performance (time and error) and physical or psychological pain to the study of pleasure (Helander 2001). This requires a reflective look at classical theories in psychophysiology, motivation, emotions and arousal. Measurement of affect is particularly important in assessing consumer preferences for products and services. For Human Factors, it is a new perspective: It is how the user evaluates rather than how to evaluate the user. Measuring user's real experience and integrating the outcome into design is the bottom line for affective design of products, work systems and user interfaces. Conceptualizing affective human factors design requires uncovering the past research in terms of appropriate concepts and theories and interpreting their relevance to design.

This special issue features select articles from the International Conference on Affective Human Factors Design (CAHD 2001) that took place in Singapore in June 2001. A main goal of the conference was to register the mixed perspectives of Human Factors and Industrial Design. A full integration may not be easily forthcoming. There are many scientific and methodological obstacles, but the prospect is indeed encouraging.

In this light, Affective Human Factors Design has a great future. The development is also opportune for the advancement of disciplines—Human Factors needs a broader perspective to consider affective issues in Human

Performance, while Industrial Design needs methods for assessment and prediction of design. The integration of science and experience affords optimization of knowledge and experiences for better design outcome.

This volume presents pertinent methodological and theoretical issues in Affective Design. There are 6 papers, from the Industrial Design tradition and Human Factors. They are ordered from Pleasure-based Design to Aesthetics concerns. Incidentally, this coincides with the alphabetic order of the first authors, suggesting a perfect organizational construct!

In the first paper, Aboulafia and Bannon note that understanding of affect and emotion is necessary to address the many questions in the design of consumer products. There is a need to develop methods that can (1) evoke affect and (2) predict user emotions. On the basis of an HCI framework, they discussed emotional interfaces and hedonic and affective designs. Ideas from Activity Theory were incorporated to elucidate the concept of "feeling". Feelings can be described on a time scale using three classes; affect, emotion and sentiment. Affects are short and often unconscious, while sentiments are long lasting and conscious reactions (like attitudes). Emotions are in between—lasting for maybe a day. Although Activity Theory has received minimal attention within the mainstream cognitive frame, these distinctions involve important psychological processes.

To gain industrial competitive advantage, differentiation in design

seems warranted. Cayol and Bonhoure observed that the notion of 'pleasure' can be taken into account in design as added value to products and create a sense of differentiation between products. In the past, pleasure in product design was based primarily on user/usability evaluations. The validity of such approaches is questionable. The authors proposed a new methodology that combines trends and forecasts within a context of a realistic user scenario in order to create a vision of the future. Such scenarios can be explored by a multidisciplinary group of experts to generate design concepts that are truly pleasurable.

Conceptualizing customer needs is deemed important in product design. Khalid and Helander proposed a systematic framework for identifying affective customer needs based on current and future electronic devices in automobiles. Although there are both functional and affective needs, customers tend to analyse functional (or cognitive) customer needs differently from affective needs. Functional needs are typically derived top-down using the available product design features. Affective customer needs are difficult to derive top-down—typically they are evaluated by looking at several design propositions. Such affective analysis reflects situated cognition. Preferences for product attributes were scored on semantic differential scales and analysed using factor analysis. The aim was to extract generic factors pertaining to holistic attributes, styling and functional design. The authors concluded that customer preferences are caused by product design parameters that operate directly either through their perceptual attributes or from the knowledge and experience users have acquired in using the products.

Krippendorff addressed motivation and human-centred design, with the purpose of clarifying the paradigm shift

from object-centred to human-centred research and design. He proposed models of human-machine interaction that are based on use of language, conversation and play. Users accounts of their involvement with artifacts in terms of intrinsic motivation can give a true user perspective. They escape the traditional object-centred scientific research methods. Design of intrinsically motivating artifacts requires a different epistemological path that acknowledges the crucial use of language.

Integrating aesthetics within an evolutionary and psychological framework encourages human factors researchers to think about aesthetics in design. Traditionally, HF has concerned itself with usability, effectiveness and efficiency without regard for the impact that the 'look and feel' of products and services might have on human performance. Lindgaard and Whitfield remarked categorically that aesthetics clearly matters. It is ubiquitous, powerful and permeates the design of products and services, but often ignored in a consumer driven industrial society, at the peril of the manufacturer or service provider. The authors proposed an integrative model of Aesthetics and Collative-Motivation within Barnard's Interacting Cognitive Sub-systems framework. Whitfield's model of aesthetics is able to account for preferences, while Barnard's architecture allows smooth integration of cognition and emotion.

On the basis of qualitative data gathered from three groups of professionals who assessed the green colour of a public transportation bus, Rafaeli and Vilnai-Yavetz developed a model on the relationship between physical artifacts and emotions, according to three conceptually distinct aspects: instrumentality, aesthetics and symbolism. The three concepts aroused emotion through different mechanisms: hygiene, a sensory and an associative mechanism. The model opens

a vista for extensive future research on the role and influence of physical artifacts in general and on emotions in particular.

In sum, this special issue opens a minefield of conceptual issues where the conference left off. Conceptualizing affective human factors design shall continue to evolve as we place ourselves on an interdisciplinary learning curve, sharing and reflecting within and between Human Factors, Industrial Design and related disciplines. The most urgent in research says Helander (2001) is how to address the measurement issue and theory formation.

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Special Issue Editor

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