Dagstuhl Seminar 08292

The Study of Visual Aesthetics in Human-Computer Interaction

Executive Summary

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Goals

This seminar intended "to gather a group of about 25-30 participants who will exchange ideas, views, and case study results that address the seminar's themes." We aimed at discussing methodologies and measures in the study of visual aesthetics in HCI, to explore design antecedents of aesthetic interactive systems, as well as consequences of aesthetic design or aesthetic experience in HCI. We anticipated that the outcome of the seminar "will contribute to clarifying the concept, provide an overview of existing practical resources such as measurement scales, solidify the body of knowledge in this area, and generally spark interest in aesthetics in the HCI community."

Outcomes

21 people participated in the seminar. This seminar explored various aspects of the study of visual aesthetics in human-computer interaction (HCI). The growing attention that this field is gaining from the HCI community is manifested by the increasing rate of published-, and in-progress research, and by the emphasis espoused by usability- and Usability Experience (UX) practitioners on the importance aesthetic design.

We identified a set of research challenges that this emerging field needs to discuss. These can be broadly classified into four categories, which can be depicted as belonging to two major axes. The first deals with theory building vs. measurement. It includes the development of theoretical and conceptual foundations of the field on the one hand, and the identification and development of measures and research methods that are appropriate for studying it on the other hand. The second axis contrasts antecedents of aesthetic design with its consequences. The context of the aesthetic experience and the contingencies that affect reactions to aesthetic interactive products and applications fall between those two axes.

The major contributors for each category are presented in Figure 1. A summary of major positions within each category are summarized below.

1. *Conceptual clarification*. The seminar did not attempt to agree upon a definition of "aesthetics." Rather, it was conceded that various definitions and approaches exist to the study of aesthetics. However, most participants have adapted the interactionsit approach (Nake) asserting that the aesthetic experience consists of people's reactions to objects as opposed to aesthetics that are inherent in the object per se. It was also considered that aesthetic evaluations exhibit both individual idiosyncracies (Jacobsen) and considerable agreement between individuals. Most participants appeared to feel that our topic concerns a sense of pleasure and harmony that human beings are capable of experiencing, although other views were also considered. Finally, a discussion on

the duration of the response remained unresolved. Some argued that the concept refers exclusively to relatively quick perceptual/sensory impressions (an opinion lead by Hekkert), others maintained that it also encompasses more elaborated cognitive contemplation and valuation (Nake).

Concepts, Ideas
Jacobsen
Löwgren
Nake
Vyas

Context and Antecedents
De Angeli
Hekkert
Sen

Consequences
Diefenbach
Dudek
Mahlke
Purchase
Sutcliffe
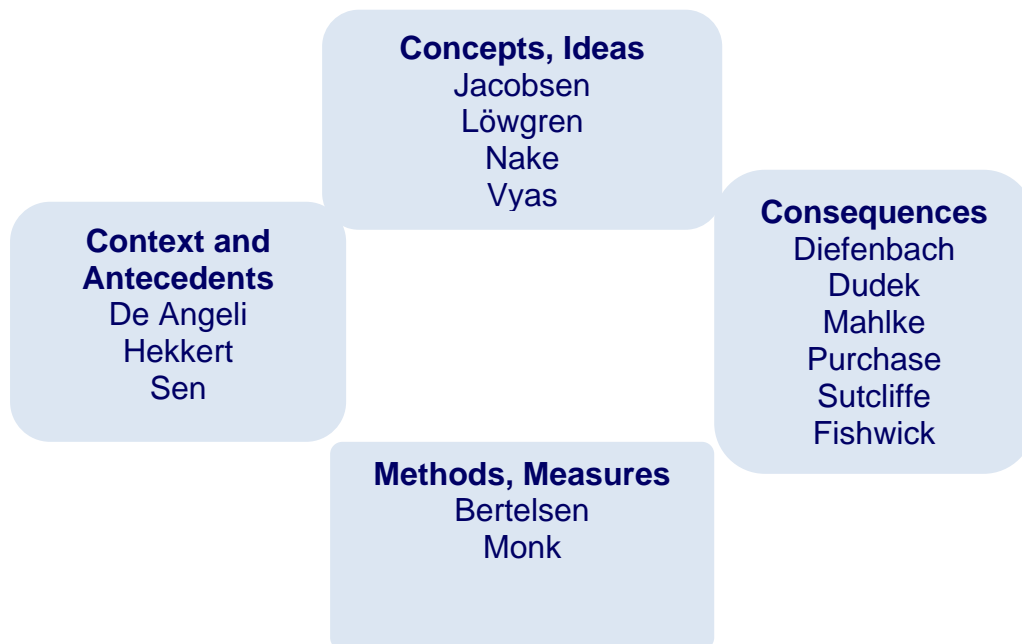Fishwick

Methods, Measures
Bertelsen
Monk

Figure 1: Major contributions along the seminar's main axes of interest

2. *Method/Measurement.* In the seminar description we indicated that some models stress subjective measures, representing the user's point of view, while others explore objective properties of the design, representing the system's perspective. Monk and Hassenzahl suggested that both viewpoints are possible as well as being necessary if we wish to understand various phenomena related to response to aesthetic systems. Bertelsen, Löwgren and Vyas (among others) argued that aesthetics should only be studied wholistically in context and that it cannot be decomposed. Bertelsen suggested critical inquiry as the preferred research method, whereas Vyas used observations, contextual interviews and cultural probe methods to elicit aesthetic experiences. A lively debate ensued on this issue in which many of the experimentalists in the audience disagreed with that claim. While this debate also remained unresolved, participants seemed to get a better appreciation for the other point of view. Jakobsen presented his work on neurobiological measures of aesthetic evaluations. His results indicate that first aesthetic impressions start forming within 300 milliseconds and are crystallized after about 600 milliseconds. These results appear to corroborate findings in the studies by Lindgaard, Tractinsky and their associates on the immediacy of aesthetic impressions.

3. *Consequences of aesthetics.* This aspect appears currently to be the most researched of all. We may attribute the relatively quick acceptance of the aesthetics stream of research by the HCI community to some intriguing findings in this aspect of the seminar. Evidently, more new research is being pursued in this area. Several presentations reported research still in progress with some interesting findings (Purchase, Diefenbach, Dudek). Most of the young researchers' work appears to relate to this aspect (Diefenbach, Dudek, Mahlke). Based on his previous studies, Sutcliffe suggested a predictive theory that specifies how people make quality judgments about IT-related products, including

the role of the relationships between aesthetics and other perceived attributes of the system, and how those relationships change over time. Other researchers have suggested that aesthetic perceptions are related to overall user satisfaction, and to trusting (or distrusting) the system (e.g., Dudek).

4. *Antecedents and context effects*. Several presenters dealt with contributors to aesthetic HCI and the conditions under which systems aesthetics play a greater or lesser role in influencing users' attitudes and decisions (DeAngeli, Mahlke). The concept of genre was proposed as a major contextual concept in the design and study of aesthetics in HCI (Löwgren). Aesthetics as information processing was proposed as a general research framework within which familiarity was hypothesized to affect aesthetic appeal (Sen).

One of the seminar's goals was to collect examples and case studies of visual aesthetics in interactive systems. Some participants have discussed the implications of aesthetics for the design of interactive systems and demonstrated the applications of aesthetic principles to design (Löwgren). Fishwick places aesthetics within the context of ubiquitous computing. He demonstrated the application of aesthetics to software representation (e.g., in Second Life) with the ultimate intent of popularizing software engineering.

Major debates and future directions
The seminar concluded with discussions of research topics that need to be addressed further. These include the following:

- Considering visual aesthetics as a dynamic process:
    - The importance of studying spatio-temporal aesthetics (Löwgren)
    - Building and testing models of dynamic judgment that include visual aesthetics as a prominent construct (Sutcliffe).
- Considering the transition of computing from an interaction paradigm to the computing-as-medium paradigm and the consequences of such a transition (Nake).
- The educational implications of the importance of visual aesthetics in HCI (Sutcliffe). Only very few in the HCI community are "visual designers". Who will teach aesthetics to most of the community and how (educational programs)?
- Is the aesthetic experience and resulting evaluation cognitive or emotional? Perceptual and sensory or reflective and intellectual? Necessarily wholistic or also decomposable?

Finally, it was recommended that in order to facilitate further research efforts and improve communication among group members, we should develop a web site and/or a wiki allowing people to share resources and ideas.