

The role of context in perceptions of the aesthetics of web pages over time

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Abstract

An important aspect of the empirical study of user experience is the process by which users form aesthetic and other judgements of interactive products. The current study extends previous research by presenting test users with a context (mode of use) in which to make their judgements, using sets of web pages from specific domains rather than unrelated pages, studying the congruence of perceptions of aesthetic value over time, including judgements after use of a web site, manipulating the aesthetic design of web pages and studying the relationship between usability and aesthetic value. The results from two experiments demonstrate that context increases the stability of judgements from perceptions after brief exposure to those after self-paced exposure and from perceptions after self-paced exposure to those of after site use. Experiment 1 shows that relatively attractive pages are preferred over relatively unattractive pages after brief exposure, but only if no context is provided. Experiment 2 shows that after brief exposure, classically aesthetic pages that are information oriented are rated as more attractive than expressively aesthetic pages. Perceptions are not correlated with measures of task performance or mental effort. We conclude that context is a pivotal factor influencing the stability of users' perceptions, which must be explicitly addressed in the study of users' product experience. Furthermore, the type of aesthetics that is relevant to users' perceptions appears to depend on the application domain. The principle 'what is beautiful is usable' is not confirmed.

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1. Introduction

The empirical study of 'user experience' is increasingly recognised as an important aspect of human–computer interaction (HCI) (Hassenzahl and Tractinsky, 2006). The process by which users form aesthetic and other judgements of interactive products is an important aspect of this research (Hassenzahl and Tractinsky, 2006; Hassenzahl, 2003, 2004). Naturally, this process is important for the success of web sites in attracting potential users' attention in the first place, where they make an immediate judgement of the attractiveness (within half a second; Lindgaard et al., 2006) of the first page of a site that they encounter—frequently the homepage—and if this judgement is

unfavourable then the web site in question may not be considered further. Next, following an immediate positive judgement, users must then make a further, more considered, positive initial deliberate judgement (within about 10 s; Tractinsky et al., 2006) of this first page before they start interacting with the site. This stage is also an essential condition for success; otherwise users will again turn away from the site before actually using it. Finally, positive perceptions of a web site after use are crucial to ensure that users will consider returning to the site in the future.

Some research has investigated the very early stages of the process by which users form aesthetic judgements. Lindgaard et al. (2006) and Tractinsky et al. (2006) investigated the congruence of perceptions of web pages after a brief exposure and after self-paced exposure or a fixed exposure of 10 s. Lindgaard et al. found that

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perceptions after a brief exposure (aesthetic impressions), when web pages were presented for 500 or 50 ms, were stable. They also found that perceptions after a brief exposure were positively correlated with deliberate perceptions (after viewing web pages without a time limit). The stability of perceptions after a brief exposure (i.e. ratings after 500 ms exposure were positively correlated with those made after 10 s), was confirmed by Tractinsky et al. (2006). However, both studies presented web pages from a wide range of unrelated domains without presenting a context of use and did not include a test of users' use of web sites and, consequently, did not examine their perceptions after use. Lindgaard et al.'s and Tractinsky et al.'s results may be explained by Schwarz and Clore's (1983) 'affect-as-information' approach (see Hassenzahl, 2008): judgements of aesthetics are immediate affect-driven responses to the visual Gestalt of an object and other judgements may use this as further input. In this approach, the size of correlation between judgements after brief exposure and those after longer exposure depends on the amount of additional processing taking place and the less additional processing the higher the correlation. As the pages displayed in these two studies were unrelated and (consequently) presented without a context, little additional processing would be expected and therefore a high correlation would be predicted.

Regarding context of use, previous work (Hassenzahl, 2003; Hassenzahl and Ullrich, 2007) has introduced the concept of *mode of use* to describe the mental state of a user in relation to a product or system. According to Hassenzahl (2003, p. 39), "usage *always* (emphasis in original) consists of behavioural goals and actions to fulfil these goals". When human–system interaction occurs in goal mode, users focus on the accomplishment of goals and the product is just 'a means to an end' (Hassenzahl, 2003, p. 39). In action mode, users focus on actions and the product can be 'an end in itself' (Hassenzahl, 2003, p. 40). The particular mode of use is triggered by the situation in which the product is used and users' perceptions of the system are expected to depend on the mode in which they approach the system. In particular, users' perceptions may be influenced by their judgement of the extent to which the system will support their goals or actions and may be more consistent when judgements are made in a particular mode of use. If users have no information about their goals or actions and are not even contemplating system use, their perceptions could be very different.

In relation to the stability of perceptions over time, Tractinsky et al. (2006) found that users' perceptions were stable from a 500 ms exposure to 10 s exposure. Yet, how stable these perceptions continue to be beyond such exposure times and in particular after system use remains uncertain. Previous work (Hassenzahl, 2004) suggests that judgements of aesthetic value rather than of ease of use should remain stable because use of a web site does not add further information about the aesthetic value of the homepage. However, use could provide more information

about the aesthetic value of the site as a whole, depending on the similarity of the homepage and the remaining pages and, according to Hassenzahl, should provide additional information about its ease of use.

Lavie and Tractinsky (2004) distinguished between two main types of aesthetic design and aesthetic perception—classical and expressive, based on their extensive analysis of existing research and their own empirical investigation of people's perceptions of web pages. Classical aesthetics is characterised by order (regular or harmonious arrangement) and familiarity, increases understanding and sense making, and reduces ambiguity. Expressive aesthetics, on the other hand, is characterised by complexity, and increases arousal and involvement. Because of the presumed correspondence of design and users' perceptions, differently designed web pages should produce different aesthetic responses. For example, classical design should produce a strong classical-aesthetic response rather than a strong expressive-aesthetic response. However, this congruence of design and perceptions may depend on the appropriateness of the type of design for the content of a particular web site (e.g. users may consider classical aesthetics, but not expressive aesthetics, an appropriate dimension for judging information-oriented pages).

There is a fundamental difference in presumed causality between Hassenzahl and Tractinsky, and the relationship between usability and aesthetic value remains unresolved (see e.g. Tractinsky et al., 2000; Hassenzahl, 2004, 2008). Tractinsky et al. assume that good aesthetic design will influence perceived usability positively, based on the principle 'What is beautiful is good' (Dion et al., 1972). However, the research that claimed support for this principle (Tractinsky et al., 2000) suffered from methodological problems (e.g., see Hassenzahl, 2004). Others (e.g. Hassenzahl, 2003, 2004) believe that aesthetics and usability are independent and that they both contribute to a user's perception of the overall quality of an interactive system. At the level of an individual user, products can produce pleasure-inducing arousal fluctuations (stimulation); fluctuations are mainly determined by comparison of stimulus elements, such as complexity, or aspects of experience, such as novelty (Berlyne, 1971). At a social level, product use operates to confirm (aspects of) a user's identity to the user and others (Hassenzahl, 2004). Other mechanisms of the aesthetic effect of products on a user's experience of aesthetic value include the following. First, preferences can depend on the categories to which a stimulus belongs as judged by the perceiver and therefore preferences for particular prototypical artefact characteristics develop (McManus and Weatherby, 1997) that can presumably be independent of usability (given a minimum required level of usability). Second, an artefact can evoke memories in its users that produce an experience of aesthetic value (Hassenzahl, 2003; Norman, 2004).

To sum up, Lindgaard et al. (2006) and Tractinsky et al. (2006) studied test users' perceptions of homepages after a brief exposure (500 ms or less) and after exposure over

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