Aesthetic and Symbolic Qualities as Antecedents of Overall Judgements of Interactive Products

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Quality aspects of an interactive system that address user needs that go beyond users' instrumental needs are one important area for user experience research. Two categories of non-instrumental qualities seem to be important: aesthetic and symbolic aspects. In an explorative study the role of different dimensions of non-instrumental quality and their influence on overall judgements, like beauty or goodness of an interactive product, were studied. Four digital audio players were used to get information on users' perception of instrumental and non-instrumental quality perceptions as well as overall judgements. The results show the importance of various non-instrumental quality aspects and point out the need for further research.

Keywords: user experience, aesthetics, hedonics, usability, evaluation.

1 Introduction

In their introduction to the recent special issue of Behaviour & Information Technology on 'Empirical Studies of the User Experience', Hassenzahl & Tractinsky [2006] mention three important areas for user experience research: non-instrumental quality aspects, the role of emotions and the experiential character of the user experience. In this paper, I will focus on non-instrumental qualities as one important aspect of the user experience. Non-instrumental qualities can be described as quality aspects of an interactive system that address user needs that go beyond tasks, goals and their efficient achievement. In an early attempt to define user experience of interactive products, Alben [1996], for example, identified beauty (i.e. aesthetics) as one important non-instrumental quality aspect of technology.

1.1 Dimensions of Non-instrumental Quality

Over the last years, various dimensions of non-instrumental quality aspects were discussed. Gaver & Martin [2000] argued for the importance of a whole range of specific non-instrumental needs, such as surprise, diversion, or intimacy, to be addressed by technology. Jordan [2000] argued for a hierarchical organization of user needs and claimed that along with the functionality and usability of the product, different aspects of pleasure, i.e. physio-, psycho-, socio- and ideo-pleasure are important to enhance the user's interaction with it.

Rafaeli & Vilnai-Yavetz [2004] presented a model that suggests that artefacts need to be analysed according to three conceptually distinct aspects: instrumentality, aesthetics and symbolism. Aesthetics and symbolism represent two categories of non-instrumental quality. Aesthetics refer to the sensual experience a product elicits, and the extent to which this experience fits individual goals and spirits. On the other hand, symbolism refers to the meanings and associations that are caused by the products. Tractinsky & Zmiri [2006] applied this approach to the domain of websites.

In another study, Lavie & Tractinsky [2004] focused on visual aesthetics of websites. They found that users' perceptions consist of two main dimensions, which they termed 'classical aesthetics' and 'expressive aesthetics'. The classical aesthetics dimension pertains to aesthetic notions that emphasize orderly and clear design and are closely related to many of the design rules advocated by usability experts. The expressive aesthetics dimension is manifested by the designers' creativity and originality and by the ability to break design conventions.

Hassenzahl [2001] introduced the concept of hedonic quality. He assumes that two distinct attribute groups, namely pragmatic and hedonic attributes, can describe product character. Therefore, a product can be perceived as pragmatic if it provides effective and efficient ways to achieve behavioural goals. On the other hand, it can be perceived as hedonic if it provides stimulation by its challenging and novel character or identification by communicating important personal values to relevant others [Hassenzahl 2004]. Summarizing he subdivides hedonic qualities into the two dimensions of stimulation and identification.

In the area of product design further interesting approaches exist. Veryzer [2000] summarized the broad literature on visual aspects of product design and their influence on consumer behaviour. He compared different models concerning the processing of product design and how users respond to it. Creusen & Schoormans [2005] claim several roles of product appearance. Next to the functional and ergonomic product values that are described as instrumental quality aspects, they discuss the aesthetic and symbolic product value as important quality dimensions. They define aesthetic value as pertained to the pleasure derived from seeing the product, without consideration of utility. Symbolic value can be described as the ability of a product's appearance to communicate messages, e.g. it may look cheerful, boring, friendly, expensive, rude, or childish.

Crilly et al. [2004] present an integrative approach to qualities of product design and summarized various aspects in three categories: semantic interpretation, aesthetic impression and symbolic association. This distinction relates to the aspects

of instrumentality, aesthetics and symbolism introduced by Rafaeli & Vilnai-Yavetz [2004] in some way, but they are described in more detail and are connected to product design features. Semantic interpretation describes the proportion of the product's value that is attributed to its utility. Contrast, novelty and order as well as subjective concinnity that may be regarded as the extent to which the design appears to make sense to the viewer in respect to the consumer's personal, cultural and visual experience are aspects of aesthetic impression. Self-expressive symbolism is described as associated with products that allow the expression of unique aspects of one's personality. Otherwise, categorical symbolism is associated with products that allow the expression of group membership, including social position and status

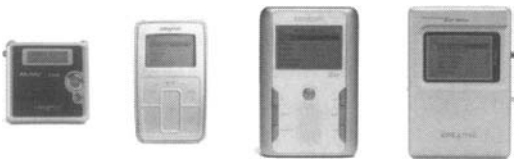
Recapitulating, in most of these approaches two distinct categories of non-instrumental qualities are differentiated. On the one hand, aesthetic aspects are discussed. These contain most of all visual aspects of product appearance, but can also imply other sensual experience like haptic or auditory aspects of product use, as for example discussed by Jordan [2000] in his definition of physio-pleasure. The other category refers to a symbolic dimension of product appearance. The concept of hedonic quality discussed by Hassenzahl [2001] or the aspects of socio- and ideo-pleasure introduced by Jordan [2000] fit into this category.

Although, there is a broad discussion of non-instrumental quality aspects and their application to design, only a few validated approaches for quantitatively measuring them exist [Hassenzahl 2001; Lavie & Tractinsky 2004]. This fact complicates further research on their importance and interplay with other aspects of the user experience.

1.2 Non-instrumental Qualities' Interplay with Further User Perceptions

In some experiments the interplay of non-instrumental quality perceptions with other dimensions was studied. Some authors focused on the relation to usability assessments and overall judgements. Tractinsky et al. [2000] studied the connection between aesthetics and usability and reason that users' aesthetic judgement before using an interactive system affects their perceived usability even after usage of the system. Lindgaard & Dudek [2003] found a more complex interplay between these two constructs.

Mahlke [2002] studied the influence of user's perceived usefulness, ease of use, hedonic quality and visual aesthetics on the intention to use specific websites. He found that the instrumental quality aspects, i.e. usefulness and ease of use, show a main contribution to the overall judgement, but that also the non-instrumental qualities of the system, i.e. hedonic quality and visual aesthetics, play an important role. Hassenzahl [2004] studied the interplay between usability and hedonic quality in forming overall judgements. He used two overall judgements, i.e. beauty and goodness. He found that judgements of beauty are more influenced by user's perception of hedonic quality, while judgements of goodness – as a more general evaluative construct – are affected by both hedonic quality and usability. In Tractinsky's [2004] published review to this paper, he argued that Hassenzahl views beauty as a high-level evaluative judgement that weights certain low-level product



A B C D

Figure 1: Digital audio players used in the study.

qualities, but only some of these product qualities were integrated in the study. Still the question remains, which influences further non-instrumental quality aspects have on forming high-level evaluative judgements of interactive products, like beauty or goodness.

To summarize the following research questions arise from these theoretical considerations:

- Which dimensions of non-instrumental qualities are important for interactive product experiences?
- What is their influence on overall judgements, like beauty or goodness of interactive products?

2 Method

An explorative study was conducted to answer these research questions. Four digital audio players were chosen for the study because we think this is a typical domain where the user's product experience is of great importance for product choice and usage behaviour. Thirty individuals (fifteen women and fifteen men) participated in the study. They were between 20 and 30 years old, most of them students at Berlin University of Technology. Experience with digital audio players in general was low. The four digital audio players presented in Figure 1 were used in the study. All were from the same manufacturer, so we did not have to deal with the influence of brand in this case. Nonetheless, players differed in terms of various design aspects.

All participants tested each product in the study. Presentation order was randomized. Four short tasks were given to the participants for each player. We combined some questionnaire methods to measure instrumental and non-instrumental qualities as well as overall judgements. Participants filled out a survey that assessed ratings on the quality dimensions after accomplishing the tasks for one player. Based on Davis et al. [1989] we investigated two instrumental qualities, i.e. usefulness and ease of use. Furthermore, we assessed non-instrumental quality perceptions on several dimensions. Hassenzahl's [2004] scales on stimulation and identification were used to represent the symbolic category. To gain information on the aesthetic category we used the two dimensions of classical and expressive aesthetics developed by Lavie & Tractinsky [2004] and the items proposed by Jordan

		Player				
		A	B	C	D	
Usefulness		2.7	3.1	3.9	3.6	$p < 0.001$
Ease of use		1.7	2.0	3.3	2.9	$p < 0.001$
Symbolic quality	Identification	2.8	3.6	3.3	3.0	$p < 0.01$
	Stimulation	2.8	3.9	3.5	2.8	$p < 0.001$
Aesthetic quality	Visual: classic	2.6	3.7	3.7	3.0	$p < 0.01$
	Visual: expressive	2.3	3.5	3.0	2.3	$p < 0.001$
	Haptic	3.3	4.1	3.6	2.7	$p < 0.001$
Goodness		2.6	3.1	3.7	3.0	$p < 0.01$
Beauty		2.8	4.3	3.9	2.6	$p < 0.001$

Table 1: Quality perceptions and overall judgements for the four players (mean values; ratings were between 6 as best and 0 as worst; significances on differences between the systems).

[2000] to measure physio-pleasure. Furthermore, participants rated beauty and goodness of the products overall on a one-item scale.

3 Results

First, results regarding the differences on instrumental and non-instrumental quality dimensions as well as overall judgements for the four conditions are presented. Thereafter, a regression analysis of the overall judgements of goodness and beauty based on the quality perceptions is described.

3.1 Quality Perceptions for the Four Players

Quality perceptions and overall judgements differed with respect to the four players (see Table 1). On all dimensions differences were significant for the four conditions. Player A was rated worst on most of the dimensions and obtained the worst overall ratings. Player B was rated highest on the non-instrumental quality dimensions, but received lower ratings for its instrumental qualities. Overall judgements for this player were the highest for beauty, but only medium for goodness. The opposite was found for Player D. Instrumental qualities were rated good to medium, while non-instrumental qualities were rated worse. Overall judgements are worst for beauty, but medium for goodness. Player C received good ratings for its instrumental and non-instrumental qualities. Therefore, the overall judgement regarding goodness is best.

3.2 Correlations of Quality Perceptions and Overall Judgements

The regression analysis of the overall judgements (see Table 2) shows that the overall judgement of goodness depends on most of the quality dimensions that were surveyed in this study. Ease of use has a main influence, but also identification, haptic and visual expressive quality as well as the usefulness of the system show significant influence. Moreover, the overall judgement of beauty only depends on non-instrumental qualities. First of all, the visual classical and haptic quality, but also identification are significant antecedents of the beauty of interactive products.

		Overall judgements	
		Goodness	Beauty
Usefulness		0.20 *	
Ease of use		0.33 **	
Symbolic quality	Identification	0.24 **	0.18 *
	Stimulation		
Aesthetic quality	Visual: classic		0.29 **
	Visual: expressive	0.20 *	
	Haptic	0.21 **	0.26 **
	R^2	0.67	0.45

Table 2: Regression analysis of overall judgements (β values and significances: ** $p < 0.01$, * $p > 0.05$).

4 Discussion

Only few empirical studies on the role of non-instrumental qualities in interactive system design exist. The results of this study demonstrate the importance of non-instrumental qualities for users' experience of technology. Especially, the cases of Player B and D show in which way instrumental and non-instrumental qualities interact. While Player B received poor ratings for its instrumental qualities, the higher ratings regarding aesthetic and hedonic aspects led to a medium overall judgement. The opposite was found for Player D. Here, poor non-instrumental qualities were compensated by better instrumental qualities.

Two categories of non-instrumental qualities were derived from the literature: aesthetic and symbolic aspects. The results on their importance for the overall judgements of goodness and beauty show, that both of them have significant influence. In detail, the concepts of identification and the three aspects of aesthetic quality showed significant importance. The concept of stimulation had no significant influence on neither of the overall judgements.

These results lead to one question that remains open. It is the question if the two categories and the dimensions used in this study are sufficient to assess non-instrumental quality perceptions as part of the user experience. In the literature, a lot of different conceptual approaches exist to structure the various possible aspects of non-instrumental quality, but no unified model exists. It also seems that it depends on the domain of an interactive product which dimensions are important. It is likely that haptic quality will be less important for a software tool than for a handheld product. Another problem concerns the measurement of these dimensions. As mentioned before only a few validated approaches exist to assess non-instrumental qualities. More work is needed on that topic.

Another issue for future research refers to the interplay of instrumental and non-instrumental qualities with emotions. First, there is a lot of literature that contradicts various new aspects of the user experience to instrumental quality aspects without differentiating between non-instrumental qualities and emotions. I think this distinction is important. The important reason is that emotions can be influenced

by non-instrumental qualities as well as by instrumental aspects [Mahlke 2005, in press]. Regarding the interplay of these three components of the user experience various questions are still unanswered.

In which way can practitioners profit from these results? One consideration that seems clear is to integrate non-instrumental qualities in the evaluation process of interactive products. As I showed, first methodological approaches are available to do so. More research is necessary to learn how to consider these aspects in the design phases. Although, the results of this study must be seen as preliminary, they gave first hints for the further study of non-instrumental qualities as one important part of the user experience.

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