Studying user experience with digital audio players

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Abstract. Several attempts have been made to broaden the traditional focus on the efficient achievement of goals and incorporate a fuller understanding of additional aspects of the user experience. These approaches are especially interesting for the area of entertainment computing, where the efficient completion of tasks is not the main focus. The presented research project investigates the role of non-instrumental aspects as hedonics and aesthetics and their interplay with emotions in shaping the user experience. After introducing an integrative model, a first application of the approach in a study of user experience with digital audio players is described. The findings show that this approach offers a wealth of insights that can be used to improve product design from a user perspective.

Introduction

Definitions of usability [1] focus on tasks and goals, their efficient achievement, and the cognitive information processing involved. Up to now, these premises have formed the basis for most evaluation methodologies. To go beyond these traditional perspectives and for a better understanding of how people experience technology, various approaches have been suggested that take other aspects of the interaction into account, e. g. non-instrumental quality aspects and the role of emotions [2, 3, 4, 5].

We define the processing of information about the quality of use in relevant experience dimensions as an important component that shapes the user's experience (Figure 1). Furthermore, we differentiate between the perception of instrumental and non-instrumental quality aspects that come into play here. These are differentiated to better understand the importance of each group of quality aspects for the user's experience. On the one hand, qualities of the interactive system that are perceived by the user while interacting with the system influence how the user experiences product use. On the other hand, the way the user processes information about this experience has various consequences for the user's behaviour and judgments [7].

The emotional experience plays another important role as element of the whole user experience, and shows a complex interplay with the perception of quality aspects. We assume that the perceived qualities of the interactive system play a role in the appraisal process of emotional consequences. Overall judgments of products,

decision for an alternative or the usage behaviour, are influenced by the perception of quality aspects and the emotional experience.

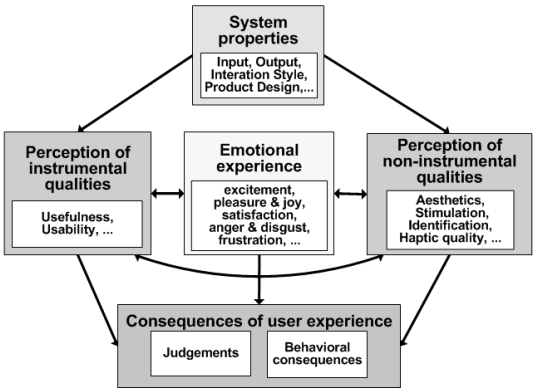

Fig. 1. User experience research framework

User experience with digital audio players

We conducted a first explorative study using our research framework as the basis for assessing user experiences with interactive systems. We chose four digital audio players 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. Our main question was whether we could gain more insights into users' assessments of the products by collecting data on many different aspects of the user experience than by simply asking the users for a preference judgment.

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. Four players were chosen for 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. Four short tasks were given to the participants for each product. After accomplishing the tasks, participants filled out a questionnaire that assessed ratings in different experience dimensions. Usefulness and ease of use were operationalized based on Davis [8]. Two dimensions to measure visual aesthetics (classical and expressive visual aesthetics) were taken form Lavie & Tractinsky [3]. Hassenzahl defines the two concepts of stimulation and identification in his approach to hedonic quality that were measured in this study [2]. Additionally, physio-pleasure was surveyed based on the suggestions by Jordan [9]. To measure user's emotional experience we used the self-assessment manikin [10]. After using each of the players, participants made a ranking list of the players.

In the overall ranking, Player C was rated best, followed by Players B and A, while Player D was ranked worst. The data regarding the different quality dimensions and emotional experience give a detailed picture of the users' experiences with the digital audio players. We cannot describe the results in detail but will show a selection concentrating on Players B and D to demonstrate the diversity of insights the approach delivers for improving product design and understanding user experience.

Figure 2 presents the results in those dimensions of experience where we identified significant differences. Regarding ease of use, Player D is rated much better than Player B. But especially in the dimension of physio-pleasure, which relates to sensory aspects of product use, Player B is rated best. It is also rated highest in hedonic quality stimulation, which could be interpreted to mean that the individual striving for personal development, for example by improving one's knowledge and skills, is met best by Player B. No differences between Players B and D were found in the dimension of classic visual aesthetics, but as shown in Figure 3, Player B is rated best in the visual aesthetics expressive dimension, which could be interpreted to mean that users perceived the design of Player B as the most creative and inventive.

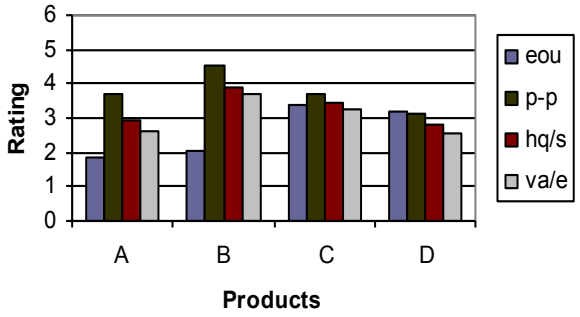

Fig. 2. Assessments of ease of use (eou), physio-pleasure (p-p), hedonic quality / stimulation (hq/s) and visual aesthetics / expressive (va/e) for the four digital audio players (higher ratings represent a better assessment)

The emotional state of the users was displayed on two dimensions: valence (pleasure – displeasure) and arousal (arousal – sleepiness). Emotional user reactions were similar for all the players. Descriptively, after use of player C users rated their emotional state as most pleasurable and arousing. Results were less positive for Players B and D, but not significantly.

Discussion and future research

The user experience research framework guided the user-experience-based evaluation process in the study on digital audio players. Following the assumptions of the model, relevant aspects of the user experience were operationalized with questionnaires. After data collection, the user experience process model also helped

interpret the data and gave hints for conclusions. The analysis of the user experience data on B and D was able to explain why Player D was ranked worst overall although ease of use was experienced as better. In particular, Player B's significantly better ratings in the dimensions of sensory pleasure, stimulation, and expressive design compensated for its less positive results in perceived ease of use. No significant differences were found with respect to the emotional experience.

Many questions remain open for future research. First, we chose a sample of possibly relevant experience dimensions for the domain investigated. It is unclear whether we have studied all of the dimensions of experience that are relevant [11]. Furthermore, our approach to study emotional aspects of the user experience was a first attempt based on a questionnaire approach. The use of other methods and theories may lead to more useful results [12].

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