

# Influence of User Experience on Affectiveness

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**Abstract.** Affectiveness is frequently discussed based on the first impression to the appearance of a product. However, experience in use of that product can also influence affectiveness. In order to clarify the influence of user experience on affectiveness, user perception of products should be investigated in several phases of using a product. In this paper, two experiments were presented, which compared user perception between before and after using products and investigated user perception during repeated use of products. The results suggested that user experience can affect affectiveness in several forms.

**Keywords:** user experience, affectiveness, attachment.

## 1 Affective Design and User Perception

Norman [1] suggested three levels of design: visceral, behavioral, and reflective. In his phrase, visceral design is all about immediate emotional impact. Behavioral design is all about use. Reflective design is all about message, about culture, and about the meaning of a product or its use. For one, it is about the meaning of things, the personal remembrances something evokes. For another, very different thing, it is about self-image and the message a product sends to others.

Which level of design, and which phase in purchase of a product is related to affectiveness? “Seemingly” affective is visceral design perceived in the initial phase. Actually, behavioral design and reflective design can also be affective. If a product offer the functions just needed and their usability are perfect, behavioral design can be perceived after using products. If use of a product brings a special meaning for a user, he/she can perceive reflective design by his/her experience gradually for longer period after its purchase.

Therefore, user perception of products should be investigated in several phases of using a product, in order to clarify the influence of user experience on affectiveness. Conventional researches investigated mainly perception at the first sight or after using them, but most of them regarded only one of these two phases and did not compare them. Perception of products during repeated use of products should also be studied. In the early phase in use of a certain product, the perception of it is rather unstable. As we repeatedly use the product, its perception becomes stable. On which point of time does the perception the product become definite? What is the key factor for the “final” perception? These points were not frequently studied so far.

In this paper, two experiments will be presented, which compared user perception between before and after using products and investigated user perception during repeated use of products.

## 2 Comparison of User Perception between before and after Using Products

In our former study [2], influence of user experience on affectiveness was analyzed with regard to calculators. 20 university students evaluated appearance of four different calculators at first. Consequently, participants accomplished numerical calculation tasks by using these calculators and evaluated them again based on the same criteria as in the first evaluation.

37 criteria were applied for the evaluation: 20 criteria for Semantic Differential (SD) analysis in order to determine the factors in impression evaluation, seven criteria to evaluate usability of each calculator, three criteria to evaluate subjects' attitude toward use of each calculator, six criteria to evaluate degree of basic emotions (joy, surprise, sadness, anger, fear, and disgust), and last criterion to evaluate comfort. All the criteria were evaluated in a seven-point scale. With regard to the evaluation of basic emotions, which will be focused in this paper, evaluation value "1" meant "feel that emotion not at all" and "7" meant "feel fully that emotion".

### 2.1 User Perception before Using Calculators

At the first sight, joy and surprise were felt by some participants, whereas sadness and anger were rarely felt and fear and disgust were elicited only by Calculator B (Figure 1). Joy is regarded as "positive" emotion and was related to appearance of the calculators. Participants commented the reason for feeling joy, for instance, "the forms of buttons and display are unusual and very stylish" (Calculator C) or "blue and translucent calculator looks nice" (Calculator D). The appearance was evaluated rather "generally". On the other hand, Calculator B elicited surprise, fear, and disgust. Calculator B was a scientific calculator and several participants have argued that they had bad experiences with it. Other participants had no experience with a scientific

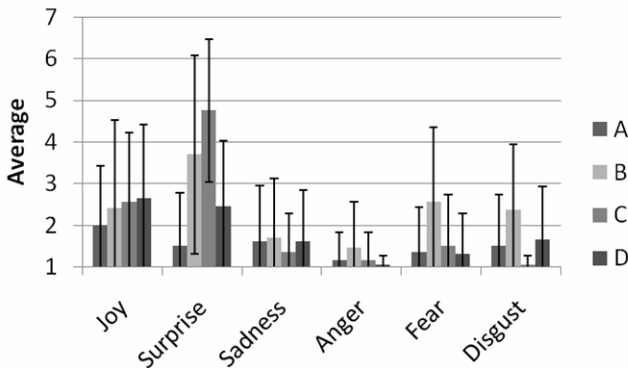


Fig. 1. Evaluation of basic emotion before using calculators

calculator and it was unfamiliar for them. In this case, the evaluation was related with a personal experience and/or sense of value.

Overall, the participants felt basically neutral at the first sight of the calculators. If the appearance of a calculator was good, positive emotion was elicited.

### 2.2 User Perception after Using Calculators

Emotions of the participants after use of calculators were different from those before use of calculators (Figure 2). Especially Calculator C elicited anger and disgust, which were not elicited by its appearance. It was strongly related with the performance of the numerical calculation task. The arrangement of Calculator C was different from other calculators, so that most of the participants had great difficulty to operate them. In addition, the transparent display placed almost vertical to the body impaired its visibility. Due to these factors, most of the participants showed a bad performance in task accomplishment and felt anger and disgust. In the cases of Calculator B, most of the participants felt joy and were positively surprised after they understood that Calculator B was not difficult to operate and some functions were useful for the task accomplishment. At the same time, the feeling of fear and disgust was diminished.

Use of products elicited emotion such as joy, surprise, anger, or disgust. Negative emotions were related with the difficulties in use which were not expected by appearance of products. If the usability was unexpectedly good, it lead to the feeling of happiness or “positive” surprise.

### 2.3 Cases Where User Experience Influences Affectiveness

As mentioned above, it was confirmed that user experience could elicit some kinds of emotion. However, the interview data showed further interesting points.

After trials, the participants were asked some related questions. One of them was, of which they take more account for the evaluation of a product, its appearance or usability. With regard to calculators, the answer of most of the participants was usability. On the other hand, it was not always true. For instance, many participants commented that they selected a cellular phone based on its appearance and regarded

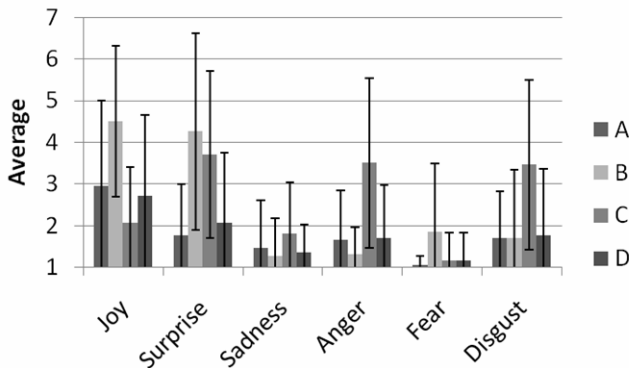


Fig. 2. Evaluation of basic emotion after using calculators

not necessarily its usability. A good-looking cellular phone is preferred, even if its usability is bad.

This difference is related to the difference in the situation of use. A calculator is used rather in the workplace or at home and the user is rarely observed by other people. In contrast, a cellular phone is used frequently in a public space, so that it can be observed by other people. Actually, several participants said that they cared how other people thought about the design of their own cellular phone. They even think that people evaluate them based on the appearance of the cellular phone they use. In such cases, usability is not regarded and user experience with regard to the task performance does not influence affectiveness. Instead, user experience with regard to impression of other people on users themselves has some influence affectiveness.

### **3 Investigation of User Perception during Repeated Use of Products**

The above mentioned study analyzed the change in emotion for a short time by comparing user perception between before and after using products. Another example of our study focused on the process of product use in a longer period. Skin lotion was employed as stimulus in this study, because it should be evaluated whether it is suitable for users' skin type by its daily application and it takes certain time till a judgment can be made. 40 female university students evaluated four types of skin lotion at first and selected the best one of them. Then they applied and evaluated it everyday for two weeks. After two weeks, they evaluated four types of skin lotion again.

20 criteria were applied for the evaluation. Change in evaluation values for these criteria was investigated. With regard to the data of the first day and the last day, Semantic Differential (SD) analysis was also accomplished to clarify evaluation structure.

#### **3.1 Change in Evaluation Structure**

The results of SD analysis showed a difference in the extracted evaluation factors between the first day and the last day. Based on the data of the first day, six factors were extracted: evaluation, feeling of refresh, feeling of moisture, feeling of absorption, feature, and stickiness. Based on the data of the last day, five factors were extracted: effect, attachment, feeling of refresh, sharpness, and thickness.

The first factor "evaluation" on the first day consisted of preference or willingness to use. These criteria are related to a higher level in evaluation. In other words, the first factor is rather abstract. Other five factors evaluated individual characteristics of skin lotions, which were related to rather a lower level in evaluation. In contrast, the first factor on the last day was "effect" (of skin lotions). It means that the evaluation structure got concreter than before through user experience. After two weeks use, most important was whether the selected skin lotion had some effects on the users' skin.

#### **3.2 Change in User Perception**

The impression of skin lotion changed through daily application, especially with regard to evaluation of texture, absorption, and moisture retention. Participants became aware of change in own impression at various points of time: most frequently five to

seven days after starting to use the selected skin lotion. However, patterns in change were very different among participants (see Figure 3 and 4).

Actually, it was strongly influenced by users' skin condition and also air condition. Some participants therefore evaluated feeling of use everyday differently, whereas other participants changed hardly their evaluation. Exceptionally, the evaluation value of thickness became stable in relatively early phase or remained stable for a longer period. The reason for that is assumed that thickness is one of the physical characteristics of skin lotions and not influenced by users' skin condition.

Other criteria such as reliability, trust, satisfaction, and willingness to use were evaluated based not only one characteristic of the skin lotion, but regarding several characteristics of the skin lotion and also own feeling. Therefore, change was observed less frequently than in the evaluation of individual aspects of feeling in use.

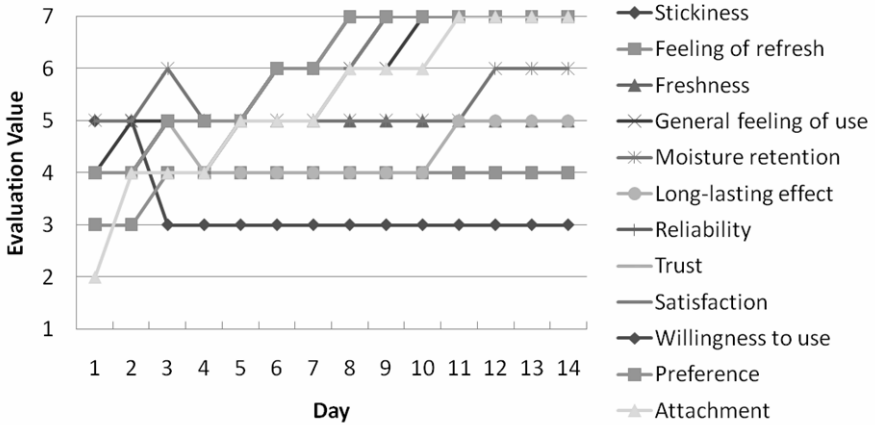


Fig. 3. Example of change in evaluation value (1)

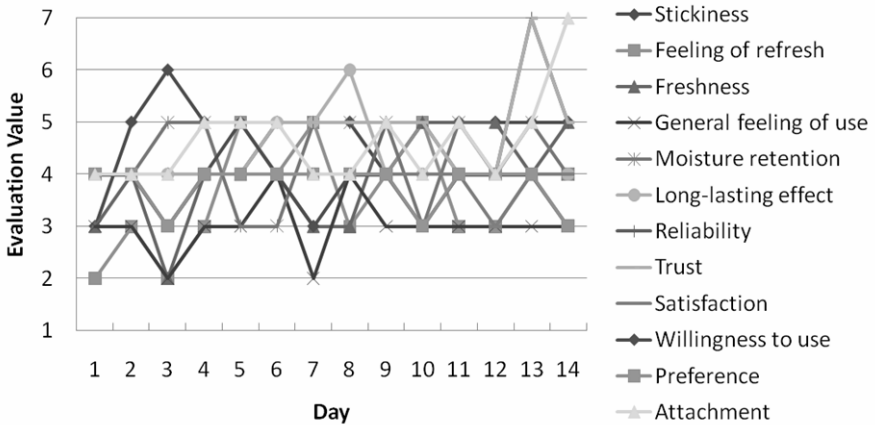


Fig. 4. Example of change in evaluation value (2)

### 3.3 Attachment and Affectiveness

Different from the experiment mentioned in “0. 2 Comparison of User Perception between Before and After Using Products”, degree of emotion was not evaluated in this experiment. The evaluation value for preference is supposed to be more or less related with emotion. After two weeks, it was improved for 18 participants, unchanged for eleven participants, and deteriorated for eleven participants. Each participant applied the skin lotion, which she regarded as the “best” one on the first day. Above mentioned result showed that the first impression was not always correct. In addition, it takes some time until the effect of a skin lotion becomes apparent. In the case of such product, change in emotion occurs slowly as the participants became aware of the effect of the product. Influence of user experience on preference - some kind of emotion - was observed also in this experiment.

Attachment is also assumed to reflect one aspect of emotion. After two weeks, 26 of 40 participants answered that they became attached to their selected skin lotion. The keywords in the reasons for that were “experience”, “adjustment”, or “accustomedness”. Through experience in daily application, the participants got used to characteristics (scent, texture, etc.) of the skin lotions and got to know the essential features. Even characteristics which impressed not much or rather badly could elicit attachment.

This result implies the importance of user experience in affective design.

## 4 Future Perspective

Above two studies suggested that user experience influences on affectiveness. The way to influence was different according to types of products and preference of users. Sometimes the experience in use itself influences affectiveness directly. In another case, the perception of belongings by other people can have some influence on affectiveness. Anyway, the relationship between user experience and affectiveness should be investigated in more detail, in order to clarify what kind of experience can strongly influence affectiveness. In addition, change in emotion should be studied for longer period – not two weeks, but one month, or several months – with regard to various products.

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