A framework for enhancing emotion and usability perception in design

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ABSTRACT: The study proposes a design framework that may be used in the conceptualization stage. The Usability Perception and Emotion Enhancement Model (UPEEM) combine the concepts of emotional quality and apparent usability in promoting the desirability of the product. The model posits that the perception of selected product attributes influence the perception of apparent usability and emotional quality of the product that are important in determining the product’s desirability. Furthermore, the model proposes that apparent usability also affects the emotional quality of the product. The model was conceptualized from earlier studies on apparent usability and affective design. Previous research has identified the connection between product attributes and emotional quality but usability was not considered. These two are important aspects of product design and it is deemed important to know the relationship of these two in promoting the desirability of the product. The model may be used in identifying product attributes that are important in design.

Keywords: affective product design, mobile phone design, product design

1. INTRODUCTION

Design frameworks are developed in order to guide designers in conceptualizing new products. They guide designers in identifying various customer needs and integrate these needs into the technological development of the product. In recent years, designers have focused on three requirements, namely; functionality, usability, and pleasurable appeal [1, 2]. Several design frameworks catered to the need for functionality. However, the aspect of designing for usability and pleasure is relatively a new area of research.

Usability of the product pertains to the actual ease of use experienced by consumers upon usage. This is contrasted with apparent usability, which is the prior perception of consumers on the ease of use of products. This represents the appeal of a product for consumers to select the product for purchase and usage [3-6]. Pelzer, Jong, and Kanis [6] reiterated the importance of apparent usability as aesthetic aspects (apparent usability) have significantly influenced consumer preferences in comparison to inherent usability aspects. Such being the case, it represents a significant determinant in the consumers’ selection of products including a product’s desirability. In addition to this, apparent usability also affects emotional quality as per consumers’ emotional response to a product’s perceived usefulness.

The product’s emotional quality also influences its desirability. People are said to make judgments or decisions based on affect [7]. Affective responses play considerable role in product selection given that product attributes are capable of engendering affective responses [8]. These affective responses encompass feelings, moods, and emotions [9]. However, affective response in the context of emotions was considered in this particular study given that emotions are said to lead to behavioral actions including potential purchase of the product [10].

Considering the importance of apparent usability and emotional quality in design, this study integrated the two in a design framework called the Usability Perception and Emotion Enhancement Model (UPEEM) shown in Figure 1. The model posits three hypotheses:

H1: Selected product attributes influences its emotional quality and apparent usability.
H2: The apparent usability of a product also affects its emotional quality.
H3: A product’s emotional quality and apparent usability influence its desirability.

This model is proposed for products of high involvement such as cellphone, car, and fashion clothing.
2. MODEL DEVELOPMENT

2.1. Product Attributes

The model proposes that a product’s emotional quality. Consumers have direct interaction with the products they acquire [8, 11]. The combination setting of product attribute specifications extracts varying consumer responses with regards to its formed cognition, affect and behavioral actions [8]. This supports the idea that consumer satisfaction is highly dependent on the features that a product may offer in relation to the user thereby suggesting that user satisfaction is defined by the product’s design elements or attributes [12].

Since product attributes are taken as factors influencing the responses of consumers, it is important to investigate these features. These attributes, pertaining to the visual aesthetics or visual form, directly affect the perception of consumers during product selection [13, 14]. Specifically, the product’s visual appearance forms impressions by providing consumers a judgment related to satisfaction and purchase decision criteria.

Responses to product appearance can be characterized into three, namely, by aesthetic impression, semantic interpretation, and symbolic association. Aesthetic impression refers to the product’s appeal to consumers or simply the consumer’s response to a product’s attractiveness [15, 16]. Most designers rely on their skills, training, and experience in designing for the visual aesthetics of a product [17]. However, design attributes do not necessarily have the same relationship to customer satisfaction across all products and end-users. Individuals may have different interpretations depending on their intuitions, feelings, and aesthetic preferences [8, 17]. Semantic interpretation describes what a product conveys by its function or mode of use. This relates product attributes with what it appears to communicate about itself or with its context of use. In developing designs for product semantics, the purpose of the object as well as how objects are referred to are carefully observed by relating it with consumers’ perception [18]. Symbolic association draws on what a product says about its owner rather than about itself. This includes the attachment of individuals to the product in terms of its personal and social significance. Accounting for this makes products pleasurable and meaningful to consumers [8, 19]. As such, the model developed is recommended for high-involvement products.

Product design attributes may be categorized into three major classifications, namely, as distinctive, integrative, or interactive features [20, 21]. Distinctive features refer to those that can be evaluated independent of the other features. These include product features such as color, size, and shape. These features are said to convey varying responses accordingly. Integrative features refer to those that are evaluated relative to other product features. As such, it generally pertains to effects of the interaction of the attributes. Among the integrative features are structure, layout, and order of attributes. Interactive features refer to those that relates to the functional aspects of the product. This pertains to the response or feedback of the product feature to the action of its end-users. In this study, emphasis is on the cognitive and affective responses as per the perceived usability and emotions evoked from a product.

Figure 1 Usability Perception and Emotion Enhancement Model (UPEEM)
2.2. Emotional Quality

People are said to make judgments or decisions based on affect [7]. As such, affective responses are deemed to play considerable role in product selection given that product attributes are capable of engendering affective responses[8]. These affective responses encompass feelings, moods, and emotions [9]. However, affective response in the context of emotions was considered in this particular study given that emotions are said to lead to behavioral actions including potential purchase of the product [10].

In relation to this, Davidson [22] proposed that emotions modulate or bias individual actions such that it alters an individual’s assessment of an object [10]. Heekert [23] further suggests that emotions imply a one-to-one correspondence with a particular object as against feelings, which are less intense and cannot effect to any contact between the person and a definite object [10]. Similar argument can be drawn as per selection of emotions in contrast to moods as these are generalized affective state influenced by situational factors and not directed at specific objects [24].

The model developed features emotional quality as per aforementioned discussion and adopting the research of Seva, Duh, and Helander [21]. Grounded on the theories presented in the pre-purchase affect model suggesting that product attributes lead to emotions evoked consequently affecting purchase decision of consumers, the Usability Perception and Emotion Enhancement Model developed in this study considers emotional [11] quality as a mediating variable of a product’s desirability as influenced by the combination of product attribute settings.

The emotional quality may be assessed be rating the intensity of experience. The Consumption Emotion Set proposed by Richins [25] may be used for this purpose or the Pre-purchase Emotion Set (PES) proposed by Seva, Duh, and Helander [26] shown in Table 1. This emotion set had been used in previous studies where consumers rated the intensity of experiencing these emotions while inspecting a product about to be bought.

<table>
<thead>
<tr>
<th>Amazed</th>
<th>Glad</th>
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<tbody>
<tr>
<td>Cheerful</td>
<td>Good</td>
</tr>
<tr>
<td>Concerned</td>
<td>Happy</td>
</tr>
<tr>
<td>Contented</td>
<td>Hopeful</td>
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<tr>
<td>Delighted</td>
<td>Interested</td>
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<tr>
<td>Encouraged</td>
<td>Joyful</td>
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<tr>
<td>Enthusiastic</td>
<td>Pleased</td>
</tr>
<tr>
<td>Excited</td>
<td>Surprised</td>
</tr>
<tr>
<td>Fulfilled</td>
<td>Thrilled</td>
</tr>
</tbody>
</table>

2.3. Apparent Usability

Usability assessment of products occurs in both pre-purchase and post-purchase consumption experience [6]. These usability contexts were investigated by Kurosu and Kashimura [5] and Tractinsky [3] as per the apparent and inherent usability of products. Apparent usability refers to the prior perception of consumers on the ease of use of products. This represents the appeal of a product for consumers to select the product for purchase and usage [3-6]. On the other hand; inherent usability pertains to the actual ease of use experienced by consumers upon usage of a product.

The focus of the model is on apparent usability of products based on the cognitive response induced by the product attribute settings. Pelzer, Jong, and Kanis [6] asserted that apparent usability that can be gleaned from the aesthetic characteristics of the product influence consumer preference. Even if the product is in fact easy to use, the perception rules the decision making process. Such being the case, it represents a significant determinant in the consumers’ selection of products including a product’s desirability. In addition to this, apparent usability also affects emotional quality as per consumers’ emotional response to a product’s perceived usefulness.

The integration of apparent usability in the development of the Usability Perception and Emotion Enhancement Model entailed in this study is theoretically based on the research of Kurosu and Kashimura [5]. The principal determinants of apparent usability presented in their study included cognitive and operational efficiency strategies. The cognitive efficiency strategies refer to the glance sequence, familiarity, and grouping. On the other hand, the operational efficiency strategies encompass the order of operation, hand
dominance, and safety strategy. The approach considered in usability measurement of their study was adopted as per the development of a methodology to assess apparent usability entailed in the model.

The usability dimension presented in Ryu and Smith-Jackson’s [27] research using the mobile phone usability questionnaire may be used to measure the latent variable of apparent usability. The dimensions considered are shown in Table 2.

<table>
<thead>
<tr>
<th>Table 2: Measures of Apparent Usability</th>
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<tbody>
<tr>
<td>User-friendly</td>
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<tr>
<td>Learnability</td>
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<tr>
<td>Temporal Efficiency</td>
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<tr>
<td>Understandability</td>
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<tr>
<td>Operability</td>
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<tr>
<td>Attractiveness</td>
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<td>Mental Effort</td>
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2.4. Desirability

Desirability is the final measure of the goodness of a design. A desirable product is one that consumers patronize by actually making a purchase. This means that the product has complied with the needs of the consumer in terms of aesthetics, functionality, and pleasure. The UPEEM did not consider the influence of price because the objective is to find product attributes that affects perception of apparent usability and enhance emotional quality assuming that they are offered at the same price.

3. CONCLUSION

The model developed may be incorporated in the concept development stage given that consumer needs, alternative concepts to cater these needs, and set of specifications are identified in this particular phase.

Current methods by which designers often conduct conceptualization processes entailed in this stage include application of Quality Function Deployment (QFD), Axiomatic Design (AD), and Theory of Inventive Machines (TRIZ) [28]. QFD and axiomatic design primarily focus on the functional requirements of products while TRIZ generally present design solutions to design contradictions. However, these do not address consumers’ need for usability and pleasure. As such, the model developed integrates the emotional needs of customers and apparent usability in the concept development stage as user’s needs are identified during this phase. This would particularly cater the need for pleasure and usability in the consumers’ hierarchy of needs.

The output from this stage can account for the selection of the best alternative design considering both emotional quality and perceived usability. This would serve as a guiding principle in the development of a more satisfying product as succeeding phases in the development process follow the specifications suggested under the conceptualization stage. By considering emotional quality and apparent usability of a product’s design, the pleasure-based needs of customers shall be accounted for. Furthermore, justification of the concepts selected is entailed in the conceptualization phase. As such, the appropriateness of the chosen alternative design is supported and ensured and serves as a starting point for the next phase of product development, specifically, system level design.

REFERENCES


