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The experimentation of matrix for product emotion

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Abstract

This study dealt with emotional responses elicited by certain products, which helped to understand the attributes of the product leading to emotional responses. Emotional Design is a way of design that is using emotions generated by people as reference and measurement. Making good use of emotional design could let the user discover resonance in the interaction between user and product, which could help the product to be more attractive to users. This research proposes to apply qualitative research method to uncover the secrets of emotional bonds between users and products This study also offered an useful tool to examine the strength and weakness of a certain product from perspective of emotion, and the insights could help designers to refine the product to become emotional attractive, thus create better user experience and bigger opportunity for the product on the market in the future.

*Keywords:*Emotion; Emotional design; Product; Qualitative research; Inteview

1. Introduction

Consumers always face the fact that there are more than enough kinds of products in the market for them to choose. The reason why a customer chooses a certain product primarily depends on whether the performance (or the content) of the product could fulfil their needs, since it is an important task for designers to create benefits (in terms of time, money and human resource) for users through products. While the usability that a product has may satisfy users' functional needs, they still may select one product over another even though those products may offer very similar performance. When users are satisfied with a product's performance, they tend to seek a stronger emotional

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involvement with them, which means that users would be more likely to choose products that satisfy their psychological needs when facing the alternatives among products with the same functional performance. Some products are more exciting and pleasurable than others, and this experience of excitement and pleasure is often seen as something that should be strived for because it motivates consumers to prefer one product over another[1]. Therefore, it is important for design researchers, design practitioners and the design community to understand the role of emotion in the interaction process between users and products, and strategies to evoke positive emotions through that interaction process. These discussions were initiated by the trend of the market that it is the emotional aspects of products and their distribution systems that will be the key difference between consumers' ultimate choice and the price that they will pay in this hypercompetitive marketplace[2].

As D.Norman[3] mentioned, traditional cognitive approaches to product usability tend to underestimate the value of emotion from the understanding of user experience. However, consumer researchers have argued that those products that excite customers will be more successful than those products that do not bring the excitement out of the user[4]. Thus, the relation between product and users has become a central theme of design discourse.

2. Emotion and emotional design

Emotions seem to rule people's daily lives, since we make our decisions based on our moods: happy, sad, angry, bored, or frustrated. Commonly, most people would believe that they understand what an emotion is, yet there is still no certain agreement upon the definition of emotion. Emotions are often intertwined with a range of psychological phenomena including mood, temperament, personality disposition, and motivation. On some theories, cognition and mental processes are important aspects of emotion, though those acting primarily on emotion seem as if they are not actually thinking. In psychology, emotion is usually defined as a complex state of feeling that results in physical and psychological changes that influence thought and behavior. H. Hockenbury&E. Hockenbury[5] defined emotion as following:

"An emotion is a complex psychological state that involves three distinct components: a subjective experience, a physiological response, and a behavioral or expressive response."

In order to understand what exactly emotions are, researchers have also tried to identify and classify different types of emotions. Psychologist P.Eckman[6] pointed out that there are six basic emotions which are universal throughout human cultures: fear, disgust, anger, surprise, happiness and sadness. Later, he expanded the list to add a number of other basic emotions including embarrassment, excitement, contempt, shame, pride, satisfaction, and amusement. R. Plutchik[7] developed another emotion classification system, known as the "wheel of emotions," which demonstrated how different emotions could be combined or mixed together. He suggested that there are eight primary emotional dimensions: happiness vs. sadness, anger vs. fear, trust vs. disgust, and surprise vs. anticipation. Then Plutchik identified more advanced emotions, based on the intensities of emotion itself. Many psychologists have claimed that certain emotions are more basic than others for very different reasons. Various theories by psychologists on basic emotion types are as below:

Table 1.Basic Theory on Emotions.[8]

Theory by:	Basic Emotions
Plutchik	Acceptance, anger, anticipation, disgust, joy, fear, sadness, surprise
Arnold	Anger, aversion, courage, dejection, desire, despair, fear, hate, hope, love, sadness
Ekman, Friesen & Ellsworth	Anger, disgust, fear, joy, sadness, surprise
Frijda	Desire, happiness, interest, surprise, wonder, sorrow
Gray	Rage, terror, anxiety, joy
Izard	Anger, contempt, disgust, distress, fear, guilt, interest, joy, shame, surprise
James	Fear, grief, love, rage
McDougall	Anger,disgust, elation, fear, subjection, tender-emotion, wonder
Mowrer	Pain, Pleasure

Theory by:	Basic Emotions
Oatley& Johnson-Laird	Anger, disgust, anxiety, happiness, sadness
Panksepp	Expectancy, fear, rage, panic
Tomkins	Anger, interest, contempt, disgust, distress, fear, joy, shame, surprise
Watson	Fear, love, rage
Weiner &Graham	Happiness, sadness

All emotional reactions result from an appraisal process in which the individual appraises the product as potentially harming or favoring or several of his or her concerns[9]. The process of signaling the relational meaning of an event is commonly conceptualized as "a process of appraisal". An appraisal is a "direct, non-reflective, on-intellectual automatic judgment of the meaning of a situation" [10]. In the components processing model of emotion, developed by Klaus Scherer[11], there are five essential elements of emotion: first element is cognitive appraisal, which provides an evaluation of events and objects; secondly, bodily symptoms refer to the physiological component of emotional experience; thirdly, action tendencies is defined as a motivational component for the preparation and direction of motor responses; furthermore, expression means that facial and vocal expression almost always accompaniesan emotional state to communicate reaction and intention of actions; lastly, feelings refers to the subjective experience of emotional state once it as occurred. Frijda[12] argued that when people appraise a stimulus as beneficial to their concerns, they will experience positive emotions and try to approach this particular stimulus; and when they appraise a stimulus as colliding with their concerns, they will experience negative emotions and try to keep away from it. Most contemporary researchers in the cognitive tradition of emotion believe that particular types of emotions are associated with particular types of appraisals, and that emotions can be predicted from the nature of the underlying appraisal and concern [1].

People encounter and interact with products on daily basis, and every interaction with a product would lead to a using experience. An experience is always what it is because of a transaction taking place between an individual and what constitute the environment at the time [13]. Yet not all the encounters will result in an experience. An experience must have a narrative logical understanding that carries with its own individualizing quality and self-sufficiency. It has a discrete identity with its own qualities, and its identity gives using experience a meaning. The condition may derive from people or products, and experience embraces the totality of the whole lived experience but also can be broken up into a variety of separate experiences or situations[14]. The product experience includes a product's perception and identification, associations, memories that it evokes, feelings and emotions that it elicits, and the evaluation judgment it brings about. People experience products primarily through direct interaction, so the
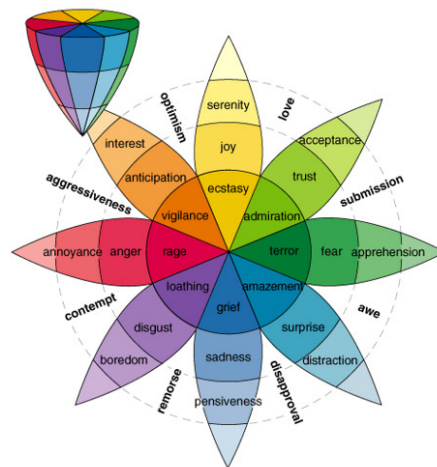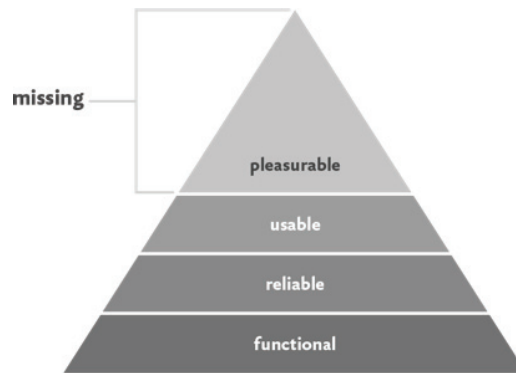

Fig. 1.Wheel of Emotions by Robert Plutchik.

Fig. 2.Hierarchy of needs of users by Aarron Walter.

initial experiences are related to the material artifact directly; then, people would tend to recall their interaction with products in the past and compare them with current experience. At this point, the interaction or experience with the product is the sum of various interactions or experiences that people might have accumulated. Thus people tend to elicit various emotions simultaneously based on their experience on a particular product. Those emotions are not only elicited by product's aesthetics features, but also by some other aspects it owns, such as function, ergonomic, brand, background stories that associated with, etc..

AarronWalter's theory[15] illustrated the hierarchical structure of an attractive product that it should always has a pleasurable layer when it is functional, reliable and usable, and emotional design is the pleasure layer that designer put on the top, which means a product needs to be functional, reliable and usable first before it becomes pleasurable to be a successful emotional designed product. Emotional design enhances user experience as core position in the design process (Figure 2). In its process, it is of vital importance to deal with the relationship between people and product, and the key is to review the product from the view of people, or the user. Emotional design not only helps to connect with users, but also evokes positive emotions. The inessential process of emotional design is to create "emotional bonds" between user and product, which could mainly be built in three ways: to solve the critical issue; to create unique experience; to Evoke memories, and to reflect emotions and self-image. Overall, they are related to three levels of processing in human brain: visceral, behavioral, and reflective [3]. The visceral level of brain makes rapid judgments of what is good and bad, safe and dangerous. It is the beginning of affective processing. So visceral design is associated with the initial impact of a product, derived from its appearance, touch and feel. It evokes instant emotions, such as safe, luxury, cozy, etc. The behavioral level related to usage, experience (function, performance and usability) with a product. Reflective level, where the full impact of both thought and emotions are experienced, consist of self-image, personal satisfaction and memories.

In general, emotions elicited as the result of interaction between user and product could be mapped in order to form a comprehensive matrix that describes features of product, emotions generated during the interaction process and reasons why those emotions are elicited.

3. Research methodology

This research deployed qualitative research with flexible research strategy, and the processes of study include searching sources of information, data collection, data categorization and data analysis. This methodology helped the study to generate various research based insights and design suggestions. The research questions are:

- What emotions are people experiencing while they are interacting with objects?
- How do people associate their emotions with objects (through aesthetics appearance / brand / using experience / background story / etc.)?
- How could design element interfere the emotional bonding process between users and objects?

In the phase of data collection, semi structured interviews were conducted for a select user group to help in understanding how and why products elicit emotions and what kinds of emotions could be elicited by products. Due to the character of in-depth qualitative research analysis process the number of interviews was limited to 10. The participants were recruited with snowball sampling method. Interview started with a short briefing to interviewees about general goals of this study, following by open questions about "emotional encounters" with products that they own. Participants were asked to talk about products owned by them that they were fond of the most or the least (see Appendix 1 Interview Guide for interview questions). After that they were also asked to fill out a questionnaires of matrix for each of products they mentioned in interviews. Each interview took 20 to 40 minutes and was audio recorded. Then each interview data was transcribed in detail, which was the basis of analysis.

A matrix based on information from literature review was created for the interviews (see Appendix 2 Questionnaire Matrix). This matrix was used to map out users' responses for each product that they talked about in interviews. It helped to code and categorize emotional responses that interviewees experienced for a particular product that they own. The matrix was primarily divided into two categories: sensory perception (basic senses such as vision, hearing, smell, touch, etc.) and cognitive perception (thinking based on sensory perception). The second level include three major product attributes: aesthetic, function and symbolic, which refer to three different layer to apply emotional design strategy: visceral, behavioral, and reflective. All three product attributes categories consist of several subcategories. All matrices were compared and analyzed, and the results led to insights about user experience and emotional responses during interaction process with products.

4. Findings

It was found that 80% of the participants decided to talk about personal accessories, such as necklace, ring, bracelet, watch, etc., 30% of them chose household appliance products, like wine cup, teapot, Swiss knife, as the product they cared about, and 20% of them mentioned mobile devices like cellphone and music player. Emotions were generated from both sensory perception of product and cognitiveinteraction with product, yet emotions generated and situations where emotions were elicited differed between sensory and cognitive perception.

Strong emotional responses due to aesthetic product attributes were observed in interviews, and the data collected proved that emotional responses mostly triggered by a group of product features from different product attributes dimensions at the same time, such as aesthetic features grouping with functional features, or with symbolic features. Interviewees usually exhibited direct and unambiguous emotions towards aesthetic product attributes quickly, hence emotions generated by aesthetic features were usually perceived by users first, as an immediate response to current situation.

Emotional responses triggered by function attributes were based on understandability, ergonomic, usability and performance of the product. Function attributes, unlike aesthetic attributes, was able to generate related emotions alone. Data showed that most of emotions generated by function attributes were because of ergonomic and usability of products. Thus it is clear that people's preferences usually depends on the service that a product could offer. It was a trend that negative emotions related to function features showed up in terms of frequency, as negative experiences such as frustrated, disappointed, and annoyed were mentioned far more often than positive emotions.

The symbolic attributesrefers to features as brand, memory, history, culture, etc.. Based on data collected from interviews, all of the participants loved to mention memory and history feature as a very important part of products, which sometimes could have influence on purchase decisions. Positive emotions like happiness, joy, love were elicited when participants talked about their memories, stories in the past and products associated with those memories or stories.

Table 2.Emotions triggered by aesthetic attributes of the product.

Subcategories	Positive emotions	Negative emotions
Form	Attracted, amused, excited happy, impressed, pleased	Disgust, repulsive, sad, unwanted
Texture	Impressed, pleased	Uncomfortable
Color	Happy, impressed, pleased	Disgust, repulsive, unwanted

Table 3.Emotions triggered by functional attributes of the product.

Subcategories	Positive emotions	Negative emotions
Understandability	Attracted, amused, excited happy, impressed, pleased, surprised	Confused, frustration
Ergonomic	Content, impressed, pleased	Confused, irritation, uncomfortable
Usability	Content, enjoyment, excited, impressed, joy,	Frustration, usability, frustration
Performance	Joy, excited, surprised	Anger, frustration

Table 4.Emotions triggered by symbolic attributes of the product.

Subcategories	Positive emotions	Negative emotions
Brand	Excited, desire, content, pleased, pride	Deceit, disgust
Memory	Calm, content, pleased, peaceful, pride, love, excited, warm, happy, hope, moved	Sad, hate
Art form	Content, peaceful, excited	Frustration, usability, frustration
Marketing	Excited, surprise	Anger, deceit, disappointed
History	Happy, relaxed	Sad
Culture	Pride, excited	
Intellectual response	Peaceful, calm, happy, moved	
Personalization	Excited, love	
Customization	Love	
Advertisement	Excited, surprised	Deceit, disappointed
Status symbol	Content, desire, pride	
Other		

5. Conclusion

This research dealt with the emotions elicited during user-product interaction process and the causes led to certain emotions. These emotional responses experienced by participants could be used to define and compare the products mentioned in the interviews. The matrix used in this research could be used to examine the strength and weakness of a certain product from perspective of emotion, and the insights could help designers to refine the product to become emotional attractive, thus create better user experience and bigger opportunity for the product on the market in the future.

Appendix A. Interview Questions

Warm Ups:
1. Is there any item / product possessed by you that you like / dislike very much?
2. How do you acquire it?
3. Do you use it / take it with you every day or by any other regular based routine?
4. What are the reasons that you like / dislike it?

Follow Ups:
5. How do you feel about this item / product?
6. (If the item is brought) What are the reasons that you brought this particular product instead of choosing other similar products?
7. What was your expectation from it when you brought it / received it?

8. How does it meet you expectation? (Aesthetic, brand, function, etc.)
9. Is there any particular experience that you could relate to this item?
10. Do you think that there is an emotional bond between you and this item?
11. If this item is given away to others, what would you think or do?
12. If this item fail to function as before, what would you do?
13. Is there anything from this item that you wish could be better?
    (If Q10 is a Yes) If this item is replaced by an identical one, do you think that emotional bond still exists?

Appendix B. Questionnaire Matrix

Sensory Perception ⬜ Cognitive Perception ⬜

Example: 1. If you think that a positive emotion is caused by Form of this item, judging by your sensory
            perception, put a plus mark (+) in the orange square after the Form.
         2. If you think that a negative emotion is caused by Performance of this item, judging by your cognitive
            perception, put a minus mark (-) in the blue square after the Performance.

Product Attributes:

Aesthetic			Function			Symbolic		
Emotions: Positive: Negative:			Emotions: Positive: Negative:			Emotions: Positive: Negative:		
Due to:	S	C		S	C		S	C
Form			Understandability			Brand		
Texture			Ergonomic			Memory		
Color			Usability			Art form		
			Performance			Marketing		
						History		
						Culture		
						Intellectual response		
						Personalization		
						Customization		
						Advertisement		
						Status symbol		
						Other		

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