

User Sensory Oriented Product Form Design Using KANSEI Engineering and Its Methodology for Laptop Design

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ABSTRACT

Success in a certain market segment does not only require knowledge about the competitors and their products' performance, but also about the impressions the products make on the customer. With the aim of explaining the emotional process and to design products so that they can cause certain emotions in customers, a field of research called Emotional Design has been created. The emotional design studies the complex emotional relationships which connect objects to individuals; these feelings can be of unconscious kind, since we often have difficulties rationalizing our feelings. To understand the emotional design various methods were developed over the years. One of the techniques is Kansei Engineering. In this paper we have explain concept kansei Engineering and how its methodology can be apply to links consumers emotions to laptop.

Keywords: Kansei Engineering, Emotional Design, Affective Computing

I. INTRODUCTION

Success in a certain market segment does not only require knowledge about the competitors and their products' performance, but also about the impressions the products make on the customer. Companies that are able to stimulate a certain emotion (e.g. prestige, luxurious etc.) through the appearance of a product design can create a competitive advantage in the market and increase the product's chance of success (Lewalski, 1988; Bloch, 1995; Hertenstein, Platt, &Veryzer, 2005; Yamamoto & Lambert, 1994; Chang & Wu, 2007).

With the aim of explaining the emotional process and to design products so that they can cause certain emotions in customers, a field of research called Emotional Design has been created. The emotional design studies the complex emotional relationships that connect objects to individuals; these feelings can be of unconscious kind, since we often have difficulties rationalizing our feelings.

To understand the emotional design various methods were developed over the years. One of these techniques is Kansei Engineering, which was developed in Japan starting from the year 1970. In this paper we have explain concept kansei Engineering and how its methodology can be apply to links consumers emotions to laptop.

II. Kansei Engineering

Parametrically links customer's emotional responses (i.e. physical and psychological) to a product or service with their properties and characteristics (Nagamachi, 1995). In Japanese the feelings or impressions that the customer wants the product to convey are called 'kansei'.

A. History of Kansei Engineering

In 1974 Nagamachi presented an affective product development method which he called 'Emotional Engineering'. Before Kansei Engineering was coined the term Sensory or Sensitivity Engineering was used (JSKE, 2004). Mazda Motor Company manager K. Yamamoto

used the term Kansei Engineering for the first time when he delivered a speech at Michigan University in 1986 (Yamamoto, 1992). Since then the term has been used by many researchers within the area. However, the research field is much older. Nagamachi pioneered research of Kansei Engineering in an academic context. His approach was to develop Kansei Engineering as an 'ergonomic consumer-oriented technology for new product development aiming at implementation of a consumer's demand in the product. He defined Kansei Engineering as a 'technique for translating the human emotion/kansei into product design elements' (Nagamachi, 1989). Today Kansei Engineering is an inter-disciplinary product design methodology that extends over the humanities, social sciences and natural sciences.

B. Measuring the Kansei

Since Kansei is an internal sensation, it can at present only be measured using external methods as such

1. People's behaviours and actions
2. Words
3. Body Expressions
4. Physiological Signals (HR, EMG, EEG& EDA)

III. Methodology

In Japanese publications, different types of Kansei Engineering are identified and applied in various contexts. Schütte, 2002 inspected various types of Kansei Engineering and developed a general model covering the contents of Kansei Engineering.. This methodology can be used to evaluating Consumer Emotion about Laptop .

A. Choice of Domain

Choice of domain includes the selection of a target group of people, market niche and specification of the new product. Based on this information, various laptops samples can be collected, and target group can be identified. In case laptops target group will be can be 18 to 40. Designer also have make decision with age group he want to target for example design for younger generation and professional designer (working on Cad/Cam) require graphic card and heavy system configuration on the other hand for female they require slim design with good aesthetics.

B. Span the Semantic Space

The expression 'Semantic Space' was addressed for the first time by Osgood et al.(1968). In semantic differential techniques, adjective pairs of opposite meanings are created. The respondent is asked to choose where his or her position lies, on a scale between two bipolar adjectives (for example: "dull-cool", "traditional-modern" or "Valuable-Worthless")



Figure 1: Various Laptop

On likert scale it can be 5 point ,7 point or any depending on the designer .in this step large number of words which are used to product or its properties i.e laptop in this case can be collected via data mining from Magazine ,newspaper or internet. The number of the words gathered typically varies, depending on the product between 10 and 250 words. These words are called Kansei words or Kansei Engineering words. Also these words should be in language that target group of people can understand easily .For Examples in case of laptop Dull-cool, traditional –Modern , Female-Male, Slow-Fast, Causal-Business, Cheap-Luxuriousness, Complex-Simplicity, Ugly-Attractiveness, Smooth-Rough etc. These word can further reduced by using manual (e.g. Affinity diagram, compare: Bergman and Klefsjö, 1994) or mathematical methods (e.g. factor and/or cluster analysis, compare: Ishihara et al., 1998). Finally a few representing words are selected from this spanning the Semantic Space. Figure 2 shows semantic space for laptop.

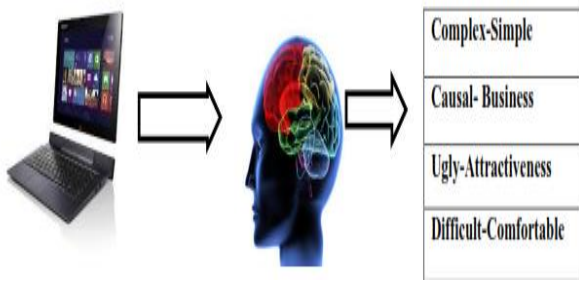


Figure 2 : Semantic Space for laptop

C. Span the Space of Properties

The next step is to span the Space of Product Properties, which is similar to the Semantic Space. The Space of Product Properties collects products representing the domain, identifies key features and selects laptop properties for further evaluation. In case of laptop it can be screen size, keyboard design, texture, fan position, colour etc.



Figure 3 : Laptop Properties Example

A. Synthesis

The probably most important step, which links the product form specification to the words.. The data are gathered using semantic scales and evaluated by statistical methods.

1. User rating of the products

The data collection is carried out by assembling a number of voluntary participants of target group and asking them to rate the product on semantic scales

(Osgood, 1969).For example on 5 point likert scale as shown in figure 4.

2.Connecting the Semantic Space to the Space of Product Properties

A number of different statistical procedures using different mathematical have been developed (Nagamachi, 2001).Mathematical methods are

- 1 .Linear regression (Ishihara, 2001)
2. General Linear Model.
3. QT1 (Komazawa and Hayashi, 1976)
4. Conjoint analysis
5. Quality function deployment



	1	2	3	4	5	
Complex	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Simple
Causal	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Business
Ugly	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Attractiveness
Difficult	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	Comfortable

Figure 4 User rating of the Laptop

B. Test of Validity

Using (Weinreich, 1958) ideas about the Semantic Space it is possible to conduct a factor analysis from the data gathered and compare the results with the Kansei words delivered from the Semantic Space. By comparing the result from the first (after selecting the Kansei Words) and the second factor analysis (after the completed synthesis) it is now possible to spot the words which have no effect on the Kansei. This is fed back to the Semantic Space and if an iteration process is necessary only, when the new words are used.

C. Model Building

If validity tests give a satisfactory result, then gathered user from the synthesis can be used for model building

as a model. Model Building Involves linking customers emotions to Product properties using Mathematical methods shown in figure 5. These models are a function depending on the product properties and predict the Kansei score for a certain word. Model Building procedure for Laptop is shown in Figure 5 .

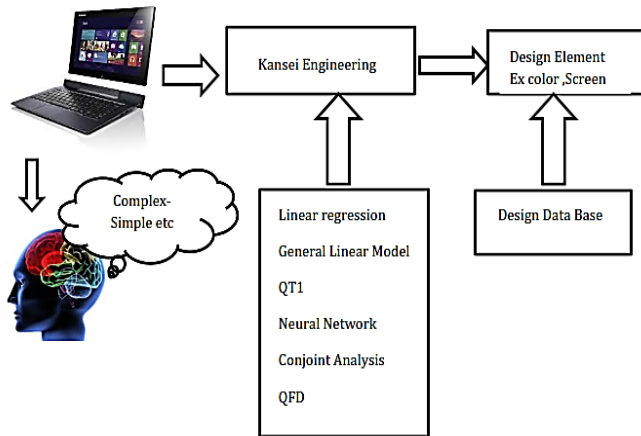


Figure 5: Translation consumer Emotions (Perception) about Laptop to Design Elements

III.CONCLUSION

Kansei Engineering can provide valuable knowledge to assist designer in understanding consumer’s perception about product form. By using this information ahead of design process designer can convey desired Emotion such as luxurious, classic, color etc about the product which can enhance its sell. Kansei Engineering can only provide consumer perception about the product properties other factors price, brand name and product specification also effect product sells so they should also be considered during Design process.

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