

# **KANSEI ENGINEERING: A STUDY ON PERCEPTION OF ONLINE CLOTHING WEBSITES**

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## **Abstract**

In the early days of e-Commerce, web designers follow their intuition of how the website should look like. Further development of web design have seen for instance Nielsen's heuristic, which resulted designers to focus mainly on cognitive functionality and usability. However, as technology advances and e-Commerce matures, there is a growing concern to improve the consumer interface of e-Commerce to improve the persuasive power of e-Commerce websites by engineering affective appeal in website design. This paper presents a study in progress involving the adoption of Kansei Engineering in e-Commerce websites as a systematic method to engineer consumer's affective appeal and incorporate them into new formulae of web design. Principal Component Analysis was performed to analyse structure of Kansei Words, and investigates relations between Kansei and website designs.

## **1.0 INTRODUCTION**

Qualities of usefulness, usability and desirability play a central role in the good design of all digital products and digital environments such as websites (Buchanan, 2000). In the literature of e-Commerce website development, qualities of usability and usefulness have received the main attention of researchers, which were mainly based on the work pioneered by Nielsen and his associates since mid 1990s. Since then, web designers compete to provide higher functionality and features to simulate the physical shopping environment. However, as e-Commerce sites intensify their effort to provide persuasive shopping experience for their users, it is then necessary to look beyond usefulness and functional usability. As evident from previous literatures, the element of product desirability (Norman, 2004; Spillers, 2004; Desmet & Hekkert, 2002) has been shown to have an important decisive role in the product selection. Similarly, product desirability can offer an emotional connectivity in e-Commerce websites to portray positive experience in the digital shopping environment. For example, in the physical world, retailing businesses concentrate on store design and layout to portray

positive experience to attract consumers. It is unlikely for a potential consumer to go into a dark and messy store, to look for a product no matter how good the quality of the product offered. Correspondingly, e-Commerce businesses should stress on how to deliver the best experience at first glance to potential consumer by providing a desirable digital shopping environment. An e-Commerce website that embeds affective appeal is seen to offer consumer a positive experience visiting the website.

The idea is supported by the pragmatism in e-Commerce existence up to date. As technology advances and e-Commerce rapidly matures, most e-Commerce websites are demonstrating equally good design features in terms of functionality and usability. Consequently, with all other factors being equal, what may allow an e-Commerce to stand out is its ability to engender favourable consumer experiences and affect (Li & Zhang, 2005). Moreover, due to the luxury they get in cyberspace, today's e-Commerce websites users have become sophisticated and sceptical. They are now looking for emotional connectivity in everything they see. Norman (Norman, 2002) and Desmet (Desmet & Hekkert, 2002) have also supported that it has now become more and more important to include experiential and emotional quality in designs. Therefore, e-Commerce websites should induce desirable consumer experience and affect that influences its user's perception of the website. This is ultimately seen to enhance the success and outreach potential of their online business.

## **1.1 KANSEI ENGINEERING (KE)**

The study of website evaluation focuses on the second set of emotion, which is called secondary emotions (Anitawati & Nor Laila, 2006; Li & Zhang, 2005). Secondary emotions are multidimensional, domain specific emotions and elicited by external stimuli (Griffiths, 2002). This is inline with the study of consumer perception as external stimuli of domain website, which is expected to be subjective and domain specific.

On the other hand, consumer's evaluation of a website is based on its affective and cognitive quality (Li & Zhang, 2005). In this context, a concept that is closely related to the secondary emotion in the context of website evaluation is the affective responses. Website evaluation has been focused to cognitive quality (Li & Zhang, 2005). However, nowadays since consumers are flooded with hundreds of thousands of e-stores, consumer's first impression might influence their cognitive judgment, and determine their success (Anitawati and Nor Laila, 2006). Hence, in the aspect of e-Commerce, the factor of visitor's primary affective responses have become more important than ever.

Discussing the context of feelings and emotion, the term that refers to them in Japanese is Kansei. Realizing the importance of Kansei in new product development technologies, Kansei Engineering was established as a method of designing new product that enables the assimilation of human feeling and emotion into product (Nagamachi, 1999). The paper suggested that including human feelings and emotion into product design enables emotional connectivity between consumer and the product. KE is a technology that combines Kansei and Engineering realms to assimilate human Kansei into product design targeting to engineer the production of goods that consumer will enjoy and satisfy with (Anitawati & Nor Laila, 2006; Nagamachi, 1999).

Kansei Engineering is designed to capture subjective consumer insights, synthesize them with the actual product design element, which is to map what Kansei is associated to which

element, so that the new product design embeds the consumer insights. As a result, a product that can predict a consumer will feel connected to them can be designed.

Even though most of the Kansei engineered product developments are undertaken by Japanese based company, there seems to be an emergence of interest in Kansei Engineering in the other part of the world among business practitioners and academic researchers (Schütte et al., 2005; Guerin, 2004; Childs et al., 2003; Bouchard et al., 2003). Application of Kansei Engineering were initially in electronic home appliances, computer systems, automobile industries, cosmetic products, apparel product, community design and so forth (Childs et al., 2003). Furthermore, due to its cultural and indigenous characteristics, it seems likely that Kansei Engineering can be applied to other applications that require the incorporation of affective appeal to reflect or increase element of product desirability.

### **1.3 AIM OF THE STUDY**

The study attempts to explore consumer's emotional responses to e-commerce website and investigate its relationships with website designs. Ultimately, the discovery of this relationship will enable the research to strategize a guideline to the design of affective e-Commerce website. This aim is inline with the idea of Kansei Engineering, that is to incorporate consumer's emotion into website design.

## **2.0 METHODS**

### **2.1 PRELIMINARY INVESTIGATION**

163 e-Clothing websites were initially selected according to their visible differences in designs. They were then analysed following sets of predefined rules on colours, design elements, layouts, page orientations, and typography. A set of control was also followed during the data collection. The result has enabled the study to identify detail design elements in each websites, and thus enabled to analyse differences and similarities as to conform rules in selecting specimens for the research.

### **2.2 SUBJECTS AND STUDY DESIGN**

Further analysis was done to the selected website, the 163 initial websites, to identify valid websites for the evaluation, resulting 35 specimens in to be finally used. The specimens selected were website selling youngster genre clothing.

60 subjects were recruited based on their IT background, previous online experience, age and academic background. The specimens were young targeted, and so the subjects were selected among young age group, as this is the target group for the selected e-Clothing genre.

A set of checklist consisting of 40 Kansei Words (KW) were structured. KW were chosen from frequently appeared words on web design guidebooks, websites, research papers and journals added with general KW which are considered relative to describe website. The Kansei Words were organized in 5-point Semantic Differential (SD) scale to form the checklist.

35 specimens were shown one by one to all subjects in a systematic and controlled manner. They were asked to rate their feelings into the checklist according to the given scale. Subjects were given 3 minutes to rate their feelings towards each specimen. The whole session takes approximately 2 hours to complete.

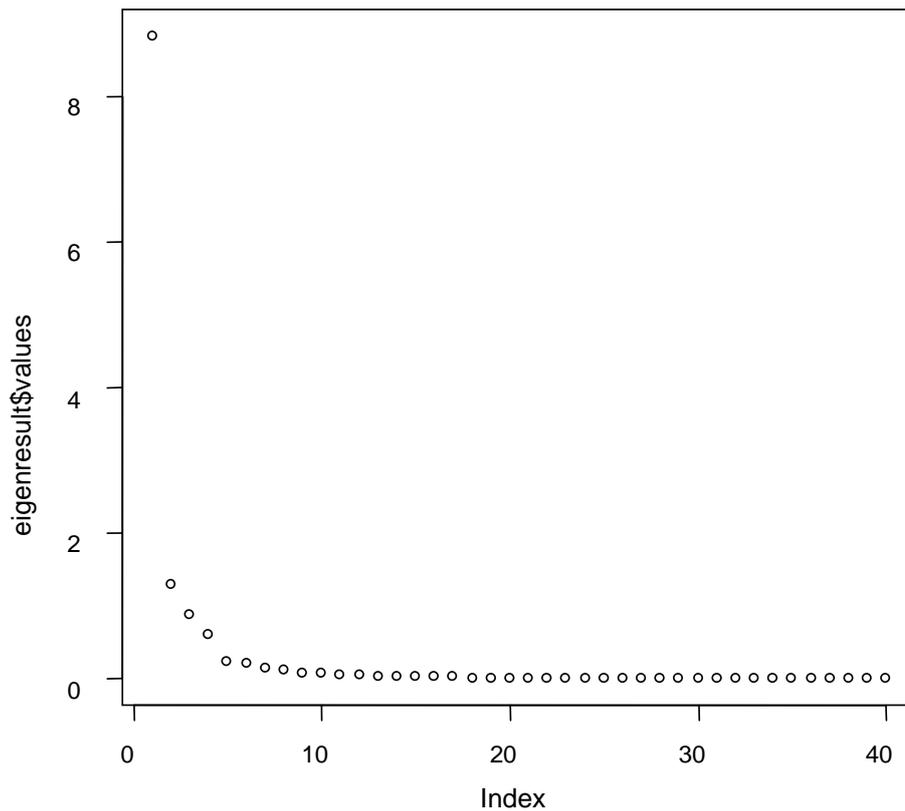
Principal Component Analysis (PCA) was used to discover the implicit relations between KW and website designs.

### **3.0 RESULTS & DISCUSSIONS**

We performed Principal Component Analysis using the averaged value between subjects from the evaluation results of each specimen (sample website). This is to compress information to a smaller number of synthesized variables, which contains most of the information in the original data set, and for finding axes of semantic space. This greatly simplifies the task of understanding the structure of Kansei Words, since it is much easier to interpret two or three uncorrelated KW than 40 KW that may have correlations to each other.

In order to translate this objective into a practical method, we need to be more precise about what it is to retain most of the information. When choosing the number of components, the aim is to retain as small a set as possible, but at the same time to have sufficient number to provide a good representation of the original data. The variance of component is called the eigenvalue. There are a number of criteria that may be used to decide how many components should be retained.

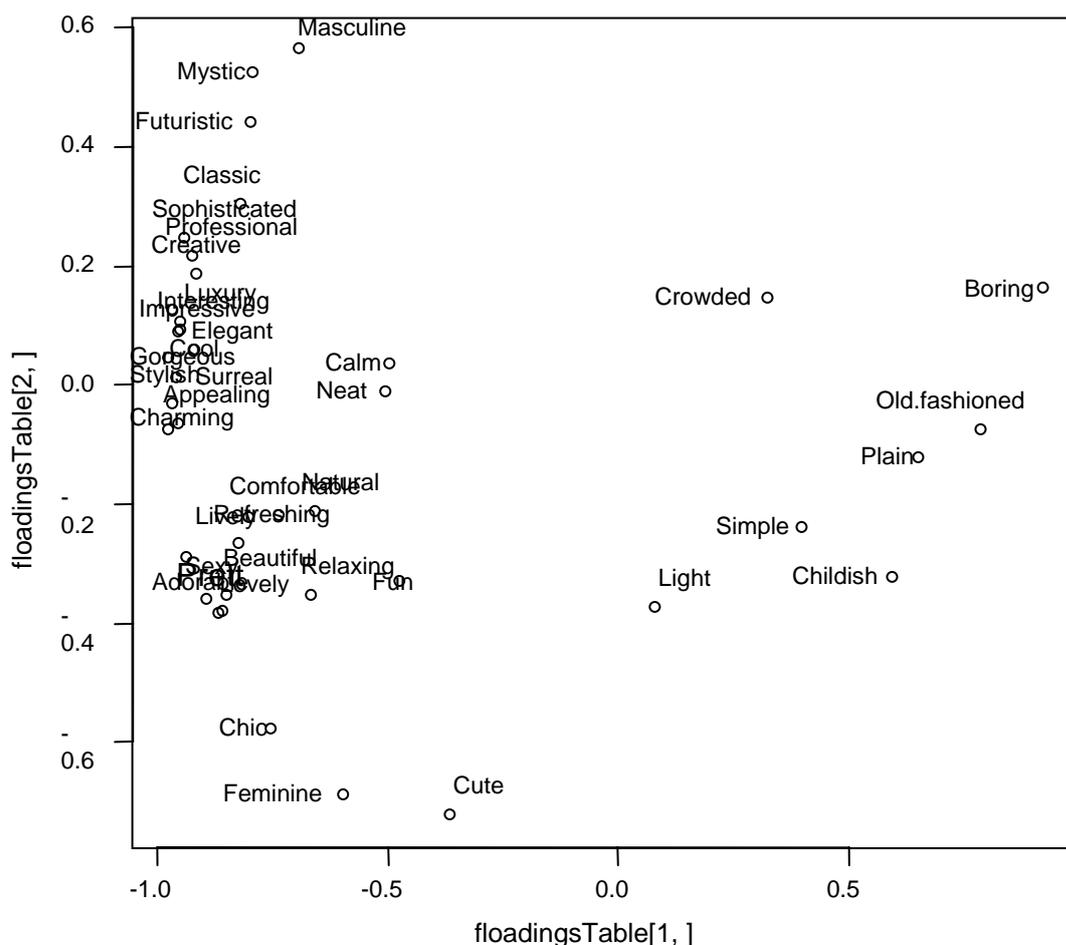
We plot the eigenvector to help identify how many components to retain.



**Figure 1: Eigenvector plot.**

From the eigenvalues, we would conclude that the first two components should provide an adequate representation of the KWs. We can see that only the first two eigenvalues are greater than one. We have decided this two major principal component (PC) as suggested by Kaiser (Bartholomew et al., 2002), which is to take components with eigenvalues greater than one. The logic behind this rule is that component with an eigenvalue of one explains the same amount of variation as one of the original variable. The third and subsequent components have relatively similar eigenvalues, which means that they each explain a similar but small proportion of the total variance.

The following shows PC score and PC loadings for both components. The PC loadings show how much the evaluation on a Kansei affects variables, which we use to obtain structure of KW.



**Figure 2: PC Loadings for first and second PC.**

The KW that produced large negative first PC loadings (x-axis) are “Charming”, “Gorgeous”, “Stylish”, and so on. The dense area of the left hand side of the chart is corresponding to such KW. On the other hand, KW that produced large positive PC loadings are “Boring” and “Old-fashioned”. We can represent this PC as the axis of “Attractiveness”. We can expect that websites with a lower score on this component is likely to have higher sense of attraction and conversely.

In the second PC loadings (y-axis), KW that have positive large loadings are “Masculine”, and KW that have negative PC loadings are “Cute”, “Feminine”, and “Chic”. We can represent this PC as the axis of “Masculine-Feminine”. We can expect that websites with a high score on this component will tend to have high characteristic of masculinity and conversely.

We can conclude that Kansei structure on website design has two components, which are attractive and masculine-feminine. In addition, blending and balancing these two components are determinants of new website design.

The following shows PC score of each websites. PC score shows what kind of Kansei has relation with websites samples.

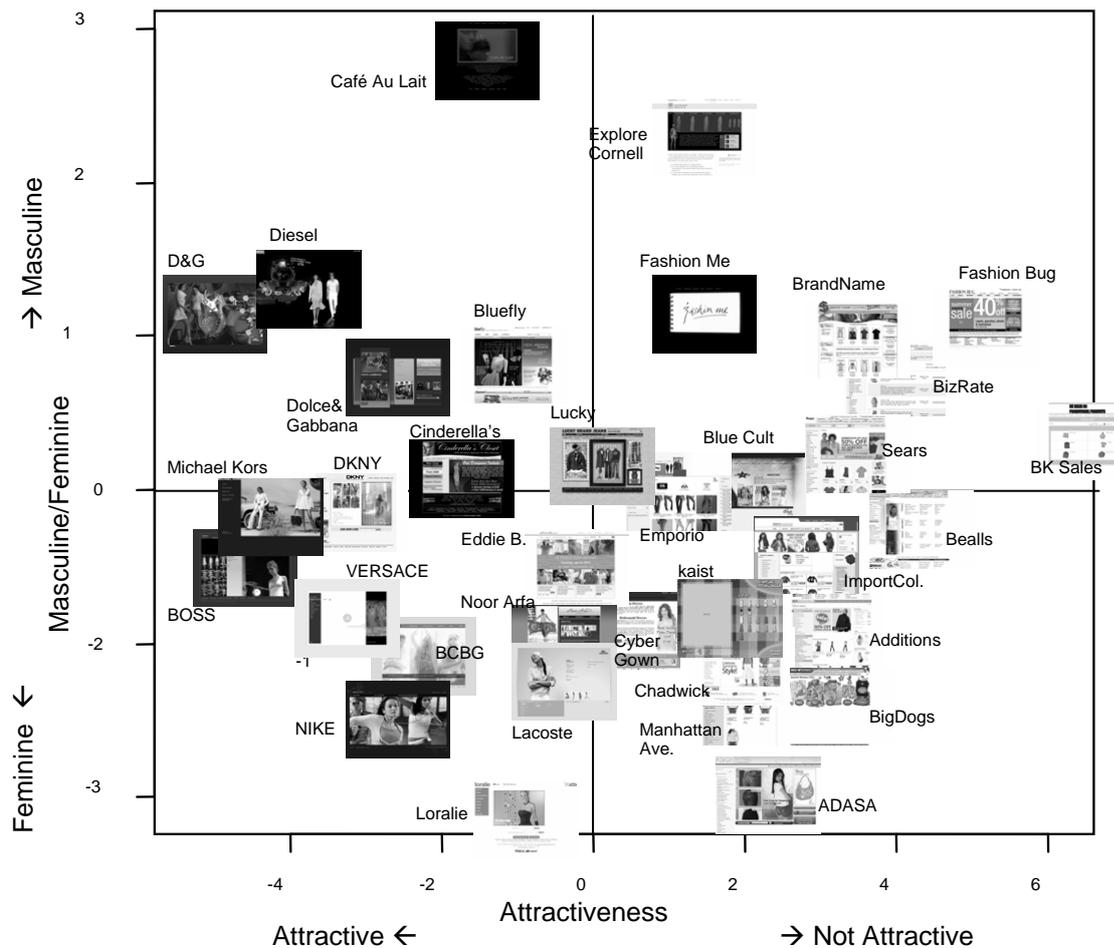


Figure 3: Principal Component Score for each websites.

From the figure, we can see which websites holds strong Kansei. Those located at the edge of the corresponding Kansei space, have strong meanings.

For example, we can conclude that BK Sales website which is located at the very right edge, indicates “not attractive”; Explore Cornell, at the upper-right, is “not attractive” and “masculine”. Boss, D&G and Michael Kors are at the left edge, which indicates “attractive”; NIKE and Loralie, at the bottom-left, are “attractive” and “feminine”.

Websites in “not attractive” category, for instance BK Sales seems to have small size pictures, consist of more text, observable empty spaces, and no modelling on clothing. On the contrary, website like Boss, D&G and Michael Kors are having large size picture, very less empty space, less text and model is used to demonstrate clothing. Websites with darker backgrounds are mostly considered as “attractive” but “masculine”.

#### 4.0 CONCLUSION & FUTURE WORKS

The study presents initial Kansei structure, which were analysed by Principal Component Analysis. Results of the study have identified semantic space of KW representing human Kansei responses to websites. The relations of Kansei and website designs were also visible.

Further analysis will be performed, as to find associations between these Kansei Words and detail website designs. This is to achieve the research target, which is to formulate guideline that translates human Kansei to website design.

#### **4.1 LIMITATIONS**

The study was performed focusing on young consumers as target market group. Subjects used in the study were youngster, aged 20-25 years old. Samples selected were also limited to e-Commerce targeting young consumers. Thus, the result may not produce globally applicable features. Consideration on the universal and localized Kansei features will be included in our future work.

#### **4.2 SIGNIFICANCE**

The study provides systematic method of evaluating consumer's emotional responses to e-Commerce websites and presents correlations within Kansei responses to e-Commerce website. The result will contribute to the formulation of guideline to the design of affective quality website. The translation of consumer's emotion to the design elements will enable e-retailers, researchers, web designers and other stakeholders to understand which design element elicits what kind of affective responses to website users. Thus, enable them to devise strategies to improve website affective qualities, whereas positive affective qualities are proven to influence visitor's affective and eventually cognitive judgment. Ultimately, the design of affective quality website will result in a paradigm shift from WYSIWYG (What You See Is What You Get) to WYSIWYD (What You See Is What You Desire).

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