EXPLORING KANSEI ATTRIBUTES OF THE EMOTIONAL DESIGN PREFERENCES ON CHILDREN'S WEAR IN MALAYSIA

Emma Nuraihan Mior Ibrahim [a], Anitawati Mohd Lokman [a °], Mitsuo Nagamachi [b]

[a] *Universiti Teknologi MARA (UiTM) Malaysia, 40450 Shah Alam, Selangor, Malaysia.*
[b] *Hiroshima University, Japan*

ABSTRACT

When designers begin to create new product, they need to explore on new shapes or elements that represent the consumer preferences which will account not only the tangible demands but also the subjective preferences. In this study, attention is given to the design of female children's clothing in the context of urban wear from the age of 1 till 6 years old in Malaysia by using Kansei Engineering to investigate the emotional design preferences of the perceived images or objects of children's clothing and study how these personal preferences work to the desirable products. This paper reports the initial investigation of the factor of Kansei as part of our objective to develop a web based intelligent system that account for emotional acquisition on the clothing design attributes. We contend that the emotional desire elicited by the consumer is believed to influence what constitute quality design and the decision to purchase a product thus become loyal to the products. The paper presents the results of an exploratory study to identify the significant Kansei words, which influence the emotional preferences on the design of children's clothing from the consumers. With the use of Factor Analysis, this study have found 5 significant factors of Kansei, which consists of well-design, active & modern, energetic, appealing and exclusive, that structure from consumer's Kansei responses. This study concludes that these factors become the important concept to the design of children's wear that evoke consumer's sensibility and psychological feelings of pleasurable and desirable.

Keywords: *Children's clothing, Kansei Engineering, Factor Analysis, Kansei Words, Intelligent Web based Systems, Emotional Design*

Anitawati Mohd Lokman : Department of Systems Sciences, Faculty of Computer and Mathematical Sciences, Universiti Teknologi MARA (UiTM) Malaysia, 40450, Shah Alam, Selangor, Malaysia.
anita@tmsk.uitm.edu.my

1. INTRODUCTION

Customers in general, and consumers of children's clothing in particular, appear to be guided in clothing source selection by different concerns such as price, quality, design, appearance and brand [1-2]. This is because different consumer has different preferences and feelings to the same garment due to his/ her own background and taste. Nevertheless, beyond providing protection and modesty for children, clothing is also a means of self-definition and identification; even for young school-age children, clothing is a vehicle for the development of self-perceptions but also the perceptions of others [3]. In addition, the fashion phenomena among young people have shown examples of group pressure and social influence on children's behavior [4]. Children reckon that appearance performs an important role in their lives whereby their sense of appearance are affected by a particular social and reference group that establish a sense of identity with the most popular peers [3-4]. Stones [4], found out that children prefer comfortable clothing and wish to have clothes similar to the ones their peers wear and thus parents are worried about finding attractive, comfortable and lasting clothes.

In recent years more and more clothing company have adopted consumer oriented design and development approach to meet and enhance consumer satisfaction. Organizations are becoming aware that an optimal balance of product standardization and customization is the key for staying ahead of competitors in the globalize marketplace [5-6]. Although, generally clothing design is regarded as a creative task based on the designer's imagination and inspiration, however in order to improve the competitiveness this research proposed the needs for designing quality clothing which relies on the consumer sensory personalization, an elicitation of the customer desirability. The research contends that well-designed clothing should not only meet the basic functionality requirements but also to satisfy consumer's psychological needs and feelings conception of clothing products which place its emphasis to quality.

The research then proposed the need for an intelligent web-based system that is based on consumer's emotion and act as a tool to facilitate the retailers, designers, producers and consumers in finding or strategizing the desired styles and design preferences suitable for the children as part of our long term objective. Therefore, in this research, attention is given to the design of children's clothing with the adoption of Kansei Engineering to investigate the emotional stimuli of the perceived images or objects of children's clothing and study how these personal preferences based on one's cultural perceptions work to the desirable products.

Hence, this paper presents an initial study of design conception on the female children's clothing in Malaysia, ranging from the age of 1 till 6 years old in the context of urban wear by investigating the significant Kansei words which influence the emotional preferences from the consumer's point of view. In deriving the Kansei words, it is believed through the designer's wisdom which they can tell through their experiences are absolutely necessary in how the design of the clothes should be expressed and how these expressions become value added elements into a new design.

2. EMOTIONAL DESIGN

The concept of emotion responsiveness is a multi-dimension phenomenon that encompasses a diversity of processes at different level of analysis – individual, agent, object or situation [7-8]. It is often refers to a psychological state, a mechanism that signal when a situation is favorable or harmful to one's concern such as anger, dissatisfaction, glamour, joy, self-esteem and so on. These notions befit one's everyday experience and interaction. Nevertheless, the distinction between emotions elements can be subtle and can be changed for example by one's cultural influence or personality traits. Although varies from its conceptions, a comprehensive discussions is done by Desmet in [7-8] on the foundational theoretical basis for the process that underlies all emotional responses to consumer products. Furthermore, a conceptual model for the process underlying emotional responses is proposed on the basis of their eliciting conditions and discussed how it can be applied as a tool for the designers in co-operating emotional responses in product design. This model described the various ways in which products can act as instrumental, social and aesthetic emotional stimuli and the relevant attributes that correspond or collide with these stimuli.

In the literature, the notion of emotional responses or known as affective elements have received significant attention and interest from the researchers [9-11] varies in its domain and dimensions in co-operating the values into the design conception that is elicited mostly by "cultural products" such as website design [11-12], clothing [13-14] and consumer products [15].

However in design practice, emotions are elicited by product appearance and often considered to be intangible, non-functional, non-rational or non-cognitive [8]. Some refer to the notion of aesthetic [11] although it does not restrict only to the beauty expression but the overall aesthetic impressions such as fashionable, ugly, tragic, and humorous. Some argued it can be applied to the theory of emotional processes as well as aesthetic responses [8-9].

Today, more and more producers are challenging designers to manipulate the emotional impact of their designs or to "design for emotion" [7-9]. The importance of stimulating appropriate emotions are growing because appropriate emotion has been found to increase the value ranging from physical products to interactive media [9, 11, 13, 14]. Due to the intangible nature of the emotional design conception, therefore sometimes it is impossible to predict or design for. The emotional conceptions can be broad and indefinite as products can evoke many kinds of emotions such as from individuals emotional responses to a given product and also products can elicit multiple emotions simultaneously because these emotions are elicited not only by the product's aesthetics but also by other aspects such as the product's function, brand, behavior and associated meanings. While admitting that emotion cannot be designed directly, it is asserted that a method for recognizing user's emotion from emotional evaluation procedures is essential. Therefore the producers or designers don't have to rely on their gut feelings in making design decisions.

3. RESEARCH METHODOLOGY

The research adopted the Kansei Engineering methodology to explore the subjective emotional responses from a target study group. The evaluation results were then analyzed to

identify the significant Kansei words of children's clothing. To begin with the exploratory study, the study developed its emotion assessment instruments, which involved the derivation of Kansei words by focus group, selection of specimen and evaluation subject, and development of checklist using SD-scale. The following sub-sections describe the process.

3.1. The Measurement Tool

For the purpose of this study, the first process is to identify the Kansei words to match the description of the children's clothing. This is done through a focus group interview session among the experienced children's clothing designers. The expertise has involved not only in the design process but also in terms of retailing purposes for many years. They talked about their feelings and ideas on the design elements and image of the different kinds of children's clothing. Some questions which were designed carefully before hand were asked during the interview and the detail answers were recorded for analysis. For instance, what is the composition of the clothing? What is the specification of the elements? What is the image/identity will the garment transfer? Due to the diversity and complication of the respective clothes, the interview was conducted on the basis of the different kinds so that the comprehensive descriptions and images of the children's wear can be obtained.

From the interview analysis and synthesized literature of the journals, magazines, and websites involving children's clothing, the research have identified 100 Kansei words that can be used in the measurement of consumer's emotional feelings (Kansei) towards children's clothing specimen. These words were organized into 5 point Likert Scale to form a checklist.

3.2. The Specimen

For this exploratory study, the research has chosen ten clothing specimen based on their visible differences in its design such as color, pattern, accessories, cutting and style. The study used the printed image of the specimen in order to avoid any biasness during the evaluation. These specimens were coded numerically from one to ten, and snapshot of the specimen can be found in Figure 1.

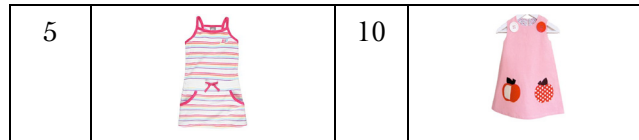| ID	Specimen	ID	Specimen
1		6	
2		7	
3		8	
4		9	

5		10	

Figure 1: The Specimen

3.3. Participants

In this initial study, the research has selected ten mothers from the researcher's university that have prior experience as consumers in purchasing children's clothing, particularly for the female's wear. This selection is supported by past literature, which indicated that parents have a big influence in the purchasing decision of the children's clothing preferences [18, 19].

3.4. Procedure

A single session for the Kansei evaluation was held in a conference room that is conducive to accommodate ten participants. A debrief session was given before the participants began their evaluation exercises. The specimens were given to all participants and they were allowed to examine the specimen. The participants were then asked to evaluate the ten clothing specimen based on the printed images and rate their emotional impression towards each specimen based on the given checklist. Participants were given a break after 45 minutes of the session to refresh their minds. The order of the checklist was also changed to avoid biasness. The evaluation was done in a single session that lasted for one and a half hours.

4. RESULTS

The study calculated the average evaluation results and performed Factor Analysis to investigate significant factors of Kansei that formed from the assessment procedure. The following section describes the analysis results.

4.1. The Significant Factor of Kansei in Children's Clothing

The study performed Factor Analysis in order to find significant factors of Kansei for the children's clothing using the average evaluation value between subjects. Factor Analysis is a statistical data reduction technique used to explain variability among observed random variables in terms of fewer unobserved random variables called factors. Factor Analysis using the Varimax rotation was performed to reduce the number of complex variables and improves interpretation. For the analysis purposes the study used the software package from XLStats.

Table 1: Contribution and cumulative contribution table

Factors	Contribution	Cumulative contribution
1	40.69%	40.69%
2	22.67%	63.36%
3	9.68%	73.03%

4	7.33%	80.37%
5	6.42%	86.79%
6	4.32%	91.10%
7	4.49%	95.59%
8	2.73%	98.32%

Table 1 shows the generated factor contribution table for eight factors. As evident from the table, the first two factors represent majority of factor contributions whereby the first factor explains 40.69% and the second factor explains 22.67% of the data. This shows that Factor1 and Factor2 have dominant effect on Kansei words. The first two factors together represent 63.36% of the variability while three factors explain 73.03% of the variability. Although small inclusion of the third factor is deemed considerable as it adds to the contribution rate in representing of most of the data. On the other hand, the proportion of variability explained by the fourth factor and above can be considered as minimal, and thus they can be eliminated as being insignificant.

Table 2 shows partial results of Factor Analysis after Varimax rotation. The table shows factor results sorted descending from its highest score.

Table 2: Partial Results of Factor Analysis for Kansei words

VAR	F1	VAR	F2	VAR	F3	VAR	F4	VAR	F5
Well design	0.977	Active	0.967	Striking	0.850	Warm	0.902	Naive	0.816
Nice	0.943	Casual	0.938	Stunning	0.813	Modest	0.637	Unique	0.750
Clean	0.943	Leisurely	0.919	Fancy	0.777	Ordinary	0.589	Loose	0.627
Cute	0.933	Sporty	0.914	Strong color	0.674	Heavy	0.450	Creative	0.623
Pretty	0.930	Informal	0.891	Crowded	0.602	Expansive	0.400	Well-deco	0.527
Good looking	0.923	Modern	0.890	Unique	0.576	Neat	0.350	Fresh	0.512
Lovely	0.922	Relaxed	0.855	Festive	0.555	Lasting	0.331	Dressy	0.475
Beautiful	0.920	Boyish	0.838	Fantasy	0.542	Familiar	0.315	Smart	0.428
Presentable	0.918	Easy to manage	0.834	Fabulous	0.525	Smart	0.313	Modest	0.399
Pure	0.916	Chic	0.819	Exaggerating	0.422	Adorable	0.311	Sophisticated	0.390
Pleasurable	0.908	High spirit	0.777	Lady-like	0.420	Formal	0.307	Decorative	0.379
Sweet	0.887	Cool	0.731	Glitter	0.416	Attractive	0.293	Exaggerating	0.358
Familiar	0.873	Fun	0.674	Comfortable	0.383	Feminine	0.283	Lady-like	0.347

It is evident from the table that the significant Kansei words for the clothing specimen could be structured by 5 factors. The first factor that consists of well-design, nice, clean, cute, pretty, good looking, lovely, beautiful, presentable, pure and pleasurable, could be represented as "well-design". The second factor that consists of active, casual, leisurely, sporty, informal, modern, easy to manage, relax and chic could be represented as "active &

modern". The third factor that consists of striking, stunning, fancy and strong color could be represented as "energetic". The fourth factor consists of warm which could be represented as "appealing" and the fifth factor consists of naïve and unique which could be represented as "exclusive". The inclusion of the fourth and fifth factors seems to be considerable although it falls on the lower contribution of the factors which are 7.33% and 6.42% respectively. They are considerably important concept of clothing design, thus could be used as supporting factors in addition to the dominant factors above which are represented by factor one, two and three. Hence, the first three factors that represent 73.03% of data could be concluded as very important Kansei, and it is suggested that the design of children's clothing for the females in the context of urban range should include these factors to be embedded into the design.

5. CONCLUSION/ FUTURE DIRECTIONS

The purpose of this paper is to explore on the concept of Kansei for children's clothing in the context of urban wear in Malaysia. The exploration is based on the acquisition of consumer's desirability towards clothing products based on one's own perceptions and emotional responses. The study adopted Kansei Engineering methodology to assess the end user's requirements (emotional responses) and product design specification by designers. In this research stage, the outcome has shown five significant factors that constitute as essential concepts of children's clothing design artifact that might evoke from the garment's functional, formal, structural and material aspects.

With the entire process it gives the creation of the design artifact as participation by its users and its designers that will not only account for the user preferences but also for the cultural elements to be embedded in the design process such as dimensions related to the religion, practice, norms and mood during the users emotion elicitation process. This will bring a strong emotional connection between the user and the designated artifact which reflect one's identity and meaning based on social standards and thus connotes the factors of value, identity and symbol associated with the artifact design. Hence, the results from this study are proposed to be utilized as a basis of understanding for our future investigation of emotion and design involving more diverse population and variables towards the development of intelligent web based systems that can facilitate designers in deciding design decisions and consumers in describing the intended design image or concept. In the next step, the research will explore the structure of Kansei in further comprehensive scale, investigate the detail design elements of the children's clothing artifacts, and analyze both relationships to understand how design elements affect consumer's Kansei as part of the requirements for the intended web based intelligent system. Hence, the research is optimistic to produce emotion design requirements that can be incorporated into the system. Nevertheless, a thorough investigation involving comprehensive evaluation and measurement of emotion are needed to expand the research findings and to extend more promising result is required. The research contend that the proposed system is possible for the use of the consumers in order to describe their clothing preferences and also of the children's clothing designers to produce clothing design that match consumer's preferences. It could also be of use for the clothing industry to strategize new concept of clothing design catered for different customer segmentation.

ACKNOWLEDGEMENT

REFERENCES

1. Cardoso, A., Araujo, M. and Coquet, E. Modeling Children's Choice Decision of Clothing, *Journal of Fashion Marketing and Management*, vol. 12, no.3, pp. 415-428, 2008.

2. Auty, S. and Elliot, R. "Fashion involvement, self-monitoring and the meaning of brands", *Journal of Product & Brand Management*, Vol. 7 No. 2, pp. 109-23, 1998.

3. Bachmann, G., John, D. and Rao, A. "Children's susceptibility to peer group influence: an exploratory investigation", *Advances in Consumer Research*, Vol. 20, pp. 463-8, 1993.

4. Stone, J. Consumer Choices, Selecting Clothes for School-age Children, Ages 6 to 9, *Iowa State University Extension*, Ames, IA, 1998.

5. Lu, H., Chen, Y. and Wang, Y., Knowledge based Customer's Desirability Acquisition of Clothing, 4th *International Conference on Natural Consumption*, IEEE, 2008.

6. Chen, C, H., Khoo, L.P and Yan, W. "PDCS –a product definition and customization system for product concept development", *Expert Systems with Applications* 28, 591-602, 2005.

7. Desmet, P.M.A. A Multilayered model of product emotions, *The Design Journal*, 2003.

8. Desmet, P.M.A, and Hekkert, P. The Basis of Product Emotions, In: W. Green and P. Jordan (eds.), Pleasure with Products, beyond usability, pg. 60-68, London; Taylor and Francis, 2002.

9. Norman, D.A. Emotional Design: *Attractive Things Work Better in Interactions: New Visions of Human Computer Interaction, IX*: pp. 36042, 2002.

10. Schütte, S. Engineering Emotional Values in Product Design – Kansei Engineering in Development, Linköpings, Sweden, 2005.

11. Kim, J., Lee, J. and Choi, D. Designing emotionally evocative homepages: an empirical study of the quantitative relations between design factors and emotional dimensions, *International Journal of Human Computer Studies*, Vol 59, pp. 899-940, 2003.

12. Lokman, A.M., Noor, N.M. and Nagamachi, M. Kansei Database System for Emotional Interface Design of E-commerce Website, 4th *International Cyberspace Conference on Ergonomics* (Cyberg 08), Online Conference, 2008.

13. Shimizu, Y., Sadoyama, T., Amijo, M., Hosoya, S., Hashimoto, M., Otani, T., Yokoi, K., Horiba, Y., Takatera, M., Honywood, M. and Inui, S. On demand production system of apparel on the basis of Kansei Engineering, *International Journal of Clothing Science and Technology*, 16., 32-42, 2004.

14. Ying, W and Yan. C. The Kansei Research on the Style of Women's Overcoats, *Computational Engineering in Systems Applications* (CESA), pp. 431-135, Beijing China, 2006.

15. Bouchard C., Camurri R., and Aoussat A. Nature and role of intermediate representation (IR) in the design process: case studies in car design, *International Journal of Vehicle Design*, Vol. 38, No. 1, ISSN 0143-3369, pp. 1-25, 2005.

16. Nagamachi, M. Kansei Engineering as a powerful consumer oriented technology for product development, *Applied Ergonomics* 33., 280-294, 2002.

17. Nagamachi, M., Kansei Engineering: The Framework and Methods. In; *M. Nagamachi (Ed.) Kansei Engineering 1*; Kaibundo Publishing Co., Ltd., Kure, 1-9, 1997.

18. Köksal, H. M. Consumer behavior and preferences regarding children's   clothing in Turkey, *Journal of Fashion and Marketing Management,* Vol. 11 No. 1,   pp. 69-81, 2007.

19. Harper, S.J.A., Dewar, P.-J. and Diack, B.A. "The purchase of children's clothing – who has the upper hand?", *Journal of Fashion Marketing and Management,*