

Kansei Engineering: A Case Study on Form of an Assistive Device for Elderly People

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Abstract: The aim of this study is to design an assistive device for elderly people with emotional aspects. For this aim Kansei Engineering method, which is an appropriate methodology for linking users' emotions and product properties, was used. Firstly Kansei Engineering was investigated. Then the role of Kansei words for describing users' emotions was considered. Finally Kansei Engineering was employed to design the assistive device. Therefore, after gathering information regarding the physical and emotional needs of users, many concepts were generated. Due to the design limitations four concepts have been selected and evaluated by Kansei method with 52 people. As a result of the evaluation, the specifications of the final product were obtained and the new concept was developed. In order to evaluate the users' satisfaction regarding the final concept, 25 people were questioned and it was concluded that the concept could meet the majority of emotional needs of the users.

Key words: *Kansei Engineering, Emotional Design, Assistive Device*

1. Introduction

Emotional design is a knowledge that relates to the users' emotions and the effects of products on the users. Some designers use emotional design to persuade users to buy more. While other designers apply emotional design to elicit different sense in users in different fields such as taste, sight, smell, and hearing or touch [4]. Product design is directly related to the users' experience. Therefore, product should be designed to bring a pleasant experience to the users. Obviously the interaction between user and product is very important and it can make the product successful in market [5]. Today designers try to make balance in objective and subjective matters in product design. Design based on "Kansei Engineering" is a new approach which tries to make this balance [7]. The real power of design is to embody concepts [10]. In product design, in addition to the main function, aesthetic and emotional aspects should be considered, which play a major role in commercial competes and challenges [2]. Realizing emotional and experimental users' aspect is difficult and eliciting users' emotion is even more difficult. Nowadays, designers are more concern about the users' experience rather than to focus on the appearance of the product. They also try to make scenarios based on users' experience [3]. In the decade that all the products have a reliable function, successful product is a product that aims user's interests [1]. For this aim, emotional and personal experiences must be translated and measured with qualitative tools [8].

2. Kansei Engineering

This methodology makes connection between appearance and experimental properties. In Kansei Engineering impressive elements with emotional aspect are recognized, and applied in design of a product [9]. In design based on Kansei, qualitative information which is gained by interview and observation will be translated to quantitative information. Words are useful tools in understanding users' desire in Kansei Engineering. In this methodology, emotion can be expressed by psychological function such as behavior, facial and body language, physiological response such as heart rate, EMG, EEG. There are different methods to measure Kansei [6]. In the most published studies on Kansei Engineering, words are used to measure Kansei (emotion).

3. Case Study

3.1. Methods

In this study Kansei Engineering was applied to design an assistive device for elderly people. For this aim the users' needs were recognized and the specifications of target group were analyzed (step 1). Then all the words, which may explain the product, were collected with no decisive evaluation. Interviewing with users was one of the good sources for collecting Kansei words. At first 105 words were collected. These collected words were analyzed and categorized. Then from each category a word or a group of words were chosen as a representative. So the number of the words reduced to 58 words. These words were investigated again and finally 24 words were selected (step 2). The selected Kansei words were: Self confidence, mobile, ergonomics, comfortable, performance, balance, control, impressive, enthusiasm, agility, lovely, organized, good experience, harmony, attractive, grandeur, unique, beautiful, independence, I like to have it, joyful, powerful, reliable, interactive.

In third step according to the product domain many concepts were generated. Due to the design limitations such as users' ability and technical considerations ten concepts have been selected. Four concepts, which could be appropriate representative for all concepts, were compiled. These four selected concepts were evaluated by Kansei Engineering method. This study was performed to decide regarding the visual specifications of the product. Therefore, it carried out via two dimension pictures. Fifty two people, 23 men and 29 women between 55-82 years old were selected randomly. Four concepts with final Kansei words were studied to investigate the visual properties of final product. All four concepts were developed in three different colors, including yellow-orange, blue-purple and dark gray on an A3 paper. All concepts were presented in isometric perspective on a mild gray background (Figures no.1 to 4).



Figure No. 1



Figure No. 2

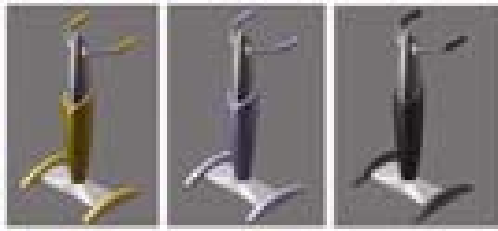


Figure No. 3

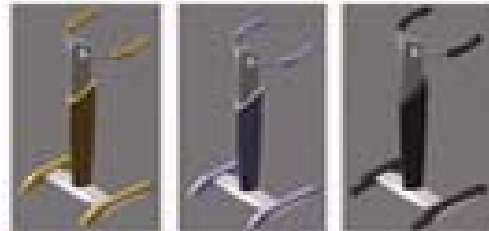


Figure No. 4

Questionnaires were given to participants and they were asked to explain their feelings regarding the attractiveness of the product through its color, form and comfort of use by means of the selected Kansei words. The facial and body reaction of the users were also closely observed (step 4). The data were analyzed by SPSS software. By analyzing gathered data, the specifications of the final product were determined. The results are presented in table 4 (step 5).

3.2. Result

The result of the analysis of the extracted data from questionnaire and interview is summarized in table 1.

Table No. 1: The result of the study

Concept No.	Words																							
	Self confidence	mobility	ergonomic	comfortabl	performan	Balance	Control	Agility	joyful	lovely	enthusias	good	harmony	attractive	Grandeur	Impressive	unique	power	I like to	reliable	interactive	beautiful	organized	life quality
1	42%	43.1	53.8	50%	52.9	50%	51.9	46%	30.8	34.6	32.7	34.6	37.3	37.3	51.9	35.5	34.6	54.9	44.23	53.8	42.3	37.3	41.2	45.1
2	10%	13.7%	7.7%	9.7%	9.8%	9.6%	11.5%	8%	9.6%	9.6%	7.7%	7.7%	7.8%	7.8%	5.4%	11.8%	11.5%	9.8%	3.85%	9.6%	9.6%	7.8%	15.7%	9.8%
3	34%	31.4%	25%	28.8%	25.5%	30.8%	25%	34%	51.9%	48.1%	51.9%	50%	45.1%	45.1%	25%	43.1%	46.2%	25.5%	42.3%	28.8%	36.5%	45.1%	33.3%	35.3%
4	14%	11.8%	13.5%	11.5%	11.8%	9.6%	11.5	12%	7.7%	7.7%	7.7%	7.7%	9.8%	9.8%	7.7%	9.8%	7.7%	9.8%	9.62%	7.7%	11.5%	9.8%	9.8%	9.8%
Total	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%

As the results show, Concept 1 got the highest score in self confidence, mobility, ergonomics, performance, balance, control, organized, power, reliable, interactive, organized, agility, grandeur, powerful and I like to have it. However, concept 3 got the highest score in joyful experience, harmony, attractive, impressive, enthusiasm, lovely, unique and beautiful. Concepts number 2 and 4 did not get any high score. Regarding the color, yellow-orange was chosen as the most popular one.

4. Final study

The new concept was designed based on the specifications that obtained as the results of the study. In order to evaluate the final concept, twenty five people were interviewed. The result of this study proved that the concept could meet the majority of emotional needs of the users. Therefore, it was concluded that the Kansei engineering method was effective to design a product due to the users' emotions.

5. Discussion and Conclusion

In this study Kansei Engineering was used to recognize users' emotional needs and applying these needs to product properties. The result of the study showed that concept no. 1 was more popular in some factors. One of the reasons which made concepts 1 the most popular in self confidence, performance, balance and independence, among other concepts is related to repetitive vertical lines that were used in this concept and bigger base. In some factors such as beautiful, lovely, attractive, enthusiasm and joyful experience most of the participants has been chosen concept 3. It shows that although concept number 3 is more beautiful and joyful from participants' point of view, but concept 1 was chosen. Therefore, it seems that factors such as self confidence, power, balance, independence and performance are more important and users make their final decision on these factors. This study showed that Kansei Engineering can be used as an applied methodology and the words can play a significant role in expressing users' emotions. Words can guide designers to discover users' emotions regarding the products. The study also showed the real desires of the users and the main factors which influence their purchasing decision.

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