

KANSEI DESIGN METHOD AND ITS APPLICATION ON INDUSTRIAL DESIGN OF MASSAGE CHAIR

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ABSTRACT

With the development of product design, perceptual and emotional experience slowly becomes the focus of the design. What the designers concern about is how to transform people's perception into the design factors. Based on the close relation between Kansei Engineering and cognition science, we have proposed a method of the perceptual localization from the angle of cognition and psychology. In this paper, a feasible and integrity design procedure is proposed, as follow: to do the perceptual localization using the perceptual survey experiment, to do the form design using Gestalt psychology, to do the detail design using Semantic Difference Method, and so on. Finally, an application example on massage armchair's design has been hold up to show how this design procedure works.

Keywords: product design method, Kansei engineering, Gestalt psychology, Semantic Difference

1. BACKGROUND

Kansei Engineering was developed in the early 1970s at the University of Hiroshima, through the work of Mitsuo Nagamachi, since then many companies and universities in Japan have adopted the methodology. It has since been adapted to be used much earlier in the design process, essentially exploring the feelings consumers have about different products and then translate this information into tangible results to enable the application of data into the development and build of a new product ^[1,2].

Kansei Engineering is a methodology for systematically exploring peoples feelings about a product and translating them into design parameters ^[3,4]. Along with Japan's perceptual design development, it extends from the technology application to the human brain functions, perception and other aspects of cognition research.

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Emotion has been referred to the scope of the cognitive science study – emotion is the inherent qualities of human, the cognizing is incomplete without emotion involved such development trend that is bound to create an inseparable marriage between Kansei engineering and cognitive science^[5].

Taking the close relation between Kansei engineering and cognitive science as a foundation, we try to seek the location method from cognitive psychology, and then use Kansei engineering to translate Kansei into design parameters which is to guide product design ,combing the normal product design procedure , propose a complete and feasible Kansei design method.

With the development of the living standard of the people and the updating of consumer spending ways, the economic attributes of today's consumption has become weak, and its social psychological attributes has become more evident. Consumers have attached greater importance to sentimental value and other added value which the products can give. On the one hand products can show the purchaser's identity, economic status, life style, values and other personal characteristics and quality; The other hand, the growing differentiation, diversity, individuality, emotional of consumer demand forces modern society into an era when people regard "emotional value" more than "functional value". In this economic context, the consumer demand has been changed from the amount and quality of consumption to the "emotional spending".

2. KANSEI DESIGN PSYCHOLOGY ANALYSIS

The perceptual factor accurate localization's prerequisite is the clarification of the feeling and consciousness. The psychology method in fact is to study people's feeling and the cognition in a scientific and rational way, and to make it clear and be followed. Consciousness has Selective perception, comprehension, constancy and integrity features. The integrity refers to the formation of many parts of the object compound to stimulate the cerebral cortex of the complex stimuli of the various components and their mutual relations, analysis, synthesis, and thus reflect the objective relationship between the various properties of the object formed on the integrity of the object image. Integrity is that people perceive things, understanding things in the process of important features.

Gestalt psychology thought: "the whole is bigger than sum of the part", thought that consciousness was not equal to the feeling element the simple set, consciousness arrives the thing must be bigger than the thing which the eye saw. In the vision brings "the overall esthetic sense" from this angle model of product outward appearance shape for the people, is not the independent modeling element adds together simply, but is one kind the feeling which the special organizational connections causes by the modeling element between .Regarding the product design, the associative perception is one of product modeling development directions. The Gestalt psychology argument is more orderly, has the widespread influence psychology esthetics school now, emphasized the whole discusses to the cognition psychology has the very tremendous influence.

Based on "shape gestalt" and "image gestalt", may provide rationale and design rules for product integrity design.

The shape gestalt which is the result of feeling's positive organization or the outcome of construction is the foundation of image gestalt, but it does not have itself; the image gestalt which has concise abstract symbol is the sublimation of shape gestalt. Arnheim thought that the real creative thought is carrying through image in any design area. The "Kansei" shape design which is the signification of product gestalt that is not existing as a objective physical form, but consist in awaking some kind of corresponding psychological feeling.

During the process of product shape design, firstly, a scene of the product should be set, and then find out the same scene in the nature and visualize this scene (namely image gestalt). Secondly, sketch the scene by using modeling gestalt. After applying figure in product 3-D shape based on Figure-ground and law of organization, work out the product primary shape and structure (namely shape gestalt).

The psychologist proposed many consciousness organization methods and rules. This article mainly discusses "the Relations between Paintings and Bottoms", "the organization gestalt law" and "the Heterogeneity isomorphism", from these three aspects does the analytical study, as shown in figure 1.

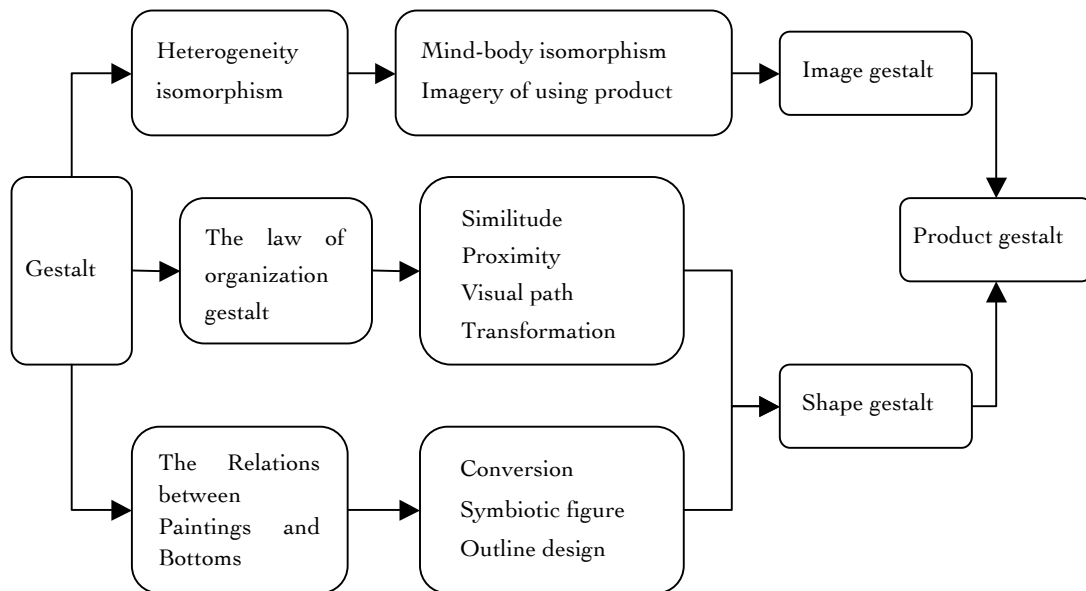


Figure 1: From Gestalt psychology to Product gestalt design

Gestalt psychology has the important instruction function on "the gestalt" in the perceptual design, it can design he basic shape for the product, and express the corresponding feeling.

3. KANSEI DESIGN PROCEDURE

Generally, the existing product design procedure can be divided into several stages: the market investigation, proposing the design orientation and design concept which is based on the market investigation, the primary design scheme (sketching), the deeply design scheme (refining sketch), deciding the last scheme, finishing 3-D model and then rendering .

In this paper, we present a new and complete Kansei design procedure which combine the market investigation, Kansei orientation, gestalt design and detail design.

3.1. Using Perceptual measurement method to investigate market

After determining the product type, collecting the product related Kansei words and product samples, which include all design characters of the product, through classifying, analyzing and streamlining the collected Kansei words and samples, Kansei vocabulary is established. At the same time, Kansei database is set up which includes all collected information, such as pictures, videos, virtual-reality or true product and so on. Generally, the more senses get involved, the clearer Kansei appears.

3.2. Orientating product design on the basis of Kansei vocabulary

Kansei Engineering Category Classification is based on Analysis Method, and to build tree hierarchies to obtain the design details.

A product can be exactly orientated by analyzing the Kansei vocabulary, which is the easiest and widest applied Kansei Engineering method.

3.3. Applying Gestalt Psychology in product gestalt design

The product gestalt design is divided into two parts: image gestalt and shape gestalt. Firstly, setting the scene of a product, and then applying Heterogeneity isomorphism to find out the same scene in the nature and shape gestalt, and visualizing this scene. Secondly, utilizing modeling gestalt to sketch the scene, then using Figure-ground and law of organization to apply figure in product 3-D shape and work out the product primary shape and structure.

3.4. Doing product detail design by using Semantic Differential

After Perceptual positioning, image gestalt and shape gestalt, the produce's main shape has been finished, but some detail design need to be carry on. The last step, which is very important, is to find out the relation between Kansei and the design elements, According to the data and figure of perceptual measure experiment, and then apply the relation into the final design.

4. KANSEI DESIGN METHOD APPLICATION

This article takes the massage armchair as an example, to show how to apply the Gestalt psychology method in the product design.

As a product which is able to relieve fatigue and relax nerves in a short time, Massage armchair has a broad market space. Massage armchair's basic principle is that, through motor control the massage head and airbag to achieve a variety of actions, basically, the structure and function are very much the same. But along with time development, people's living standard enhances day by day, massage armchair's outward appearance design on consumer purchasing decisions influence is growing.

Massage armchair's material quality by the leather primarily, in the color has the deep color, the tint and the colored leather. Arm rest's modeling is quite diverse, may divide into according to the connection mode “the hand foundation integration” and “the hand foundation separation formula” two kinds. In the modeling languages there is straight line modeling, curve modeling, geometric figure, organic graph, anomalous shape and so on. In the material quality, there is the plastic, the log, the cerebral cortex, the metal sense of reality as well as the different material quality matching combination.

4.1. Kansei survey experiment

First we had taken massage armchair's outward appearance modeling as object of study, collected more than 80 color pictures through the network searching and on-site photographing, beside the help of the manufacturers, to form the experimental material library. Then, we screened 15 pictures according to the experimental design as the official experiment material. During the selection, removed the ones whose shape are close and pay attention to different materials (leather, wood, plastic), shape, color (dark, light-colored,) of the distribution, guaranteed the quality of picture, and the detail are clear. Finally, each image was processed, in addition to the trademark and some may interfere with the evaluation of the clues were tested.

After screening, take 10 pairs of emotional adjectives and 15 samples to establish 7 levels of semantic differential scale, as shown in Table 1.

Table 1: Samples Sensibility SD Rating Scale excerpt

fashionable	3	2	1	0	-1	-2	-3	Conservative
simple	3	2	1	0	-1	-2	-3	Complex
rigid	3	2	1	0	-1	-2	-3	Soft
warm	3	2	1	0	-1	-2	-3	Cool
steady	3	2	1	0	-1	-2	-3	Light
safe	3	2	1	0	-1	-2	-3	Dangerous

Input all effective questionnaires' data into statistics software, then carry on qualitative and quantitative analysis to the data according to the graph.

4.2. Kansei orientation

As shown in Figure 2, select two pairs of emotional vocabulary, the “light-steady” and the “soft-rigid” to analyze. These two groups of data distribution is quite even, analyzing from the figure, massage chair with arc-shaped handles, handles and foundation separate modeling succinct gives a light feeling.

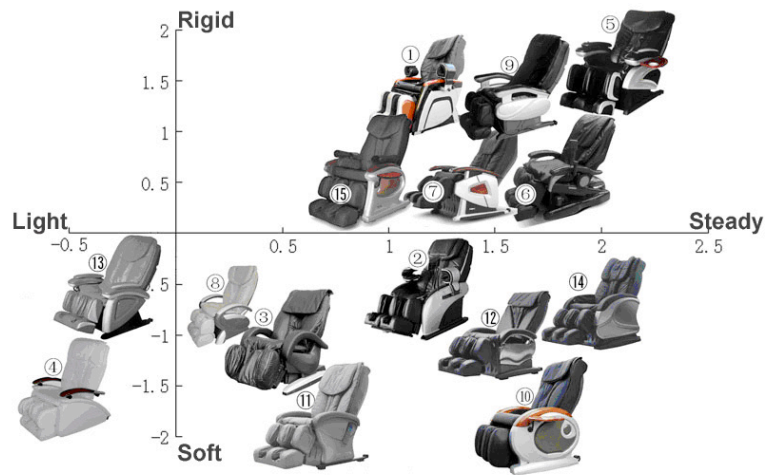


Figure 2: Kansei analyze to 15 massage chairs

According to the perceptual analysis, designing portable massage armchair is set to be the project objective. First put forward kansei word "light" as a design task, brainstorm, propose that "sitting on the clouds," "falling leaves" "floating to fly" and other ideas.

Finally the "spray and ripples of the water splashes "is adopted, because the scene is dynamic, full of power, and suitable for carrying on deeply design by using Gestalt. Moreover "the water splash splashes" is an instantaneous scene, and visualizing the short scene is easier to the leave human a deep impression.

4.3. Product gestalt design



Figure 3: Image gestalt

Using "the Relations between Paintings and Bottoms" of Gestalt to ensure the ubiety of water-drippings, and amend it, finally retain the image shape which is shown in Figure 3, then apply this image gestalt in massage chair's shape design. Readjust the shape and color on the basis of similarity theory of Gestalt psychology, the result is shown as figure 4.



Figure 4: Shape gestalt

4.4. Semantic Differential

Semantic Differential is constituted by concept and several scaled rules. The “concept” is the object that will be evaluated by the testee; the “scaled rule” consists of a pair of antonym. SD request testee to evaluate the product sample perceptually in such even-degree questionnaire, in order to find out the significance of product. Not only this method can control the testee’s imaging, but also can quantize the feeling. Through Semantic Differential, obtain the analysis result as shown in figure 5.

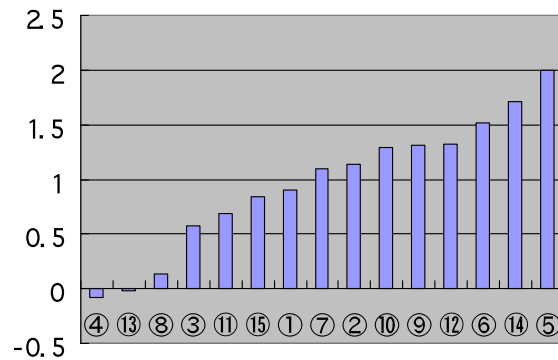


Figure 5: Semantic Differential: from light to steady

After Perceptual positioning, image gestalt and shape gestalt, the produce’s main shape has been finished, but some detail design need to be carry on. The last step, which is very important , is to find out the relation between Kansei and the design elements, According to the data and figure of perceptual measure experiment ,and then apply the relation in the massage chair design. The final complete shape of the massage chair is shown as figure 6.



Figure 6: The final shape of massage chair

5. CONCLUSION

At the end of last century, Japanese product designer Nagashima proposed such a slogan “The material age has finished, the feeling age is coming”, and that made the "people-oriented" design concept deeply branded into people's minds.

Today, product function is not the only thing which customers care about, on the contrary, the emotional element attached to the products draw more and more attention. Under such tendency, Kansei Engineering which bases on consumer's perceptual factor will have broader prospects.

This article lays stress on researching the concrete methods and implementation procedures of Kansei Engineering in the product design, taking the development tendency of Kansei Engineering as a guide, to find out the locating methods for Kansei factors from the angle of cognitive psychology, and transform Kansei factors into concrete factors of product design to guide specific product design, together with normal product design.

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