Research on Design Strategy of Fashion Display Space 
Based on Kansei Engineering
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Abstract. With the green transformation and upgrading of the fashion industry and the pursuit of consumers for personalized experience, the design of clothing display space, as an important part of the retail pipeline, plays a crucial role in the communication of brand image and consumer experience. However, traditional spatial design methods are often limited to visual and functional considerations, ignoring the sensory experience and sustainability of consumers. Therefore, this paper, based on Kansei engineering theory, combined with case analysis and questionnaire survey and other methods, takes clothing display space as a sample and re-examines the spatial principle from the perspective of Kansei Engineering, providing theoretical support and practical value for the optimal design of space.

Keywords: Kansei Engineering; Clothing display; Space design; Design strategy.

1. Introduction

Clothing display space refers to the place or space used to display clothing products. Its main features include reasonable display, comfortable and easy to browse and shop. Clothing display space is generally divided into two forms: physical stores and online e-commerce platforms. Its history can be traced back to the ancient Roman times, when there were places similar to markets and stores for displaying and selling clothing, with the development of social economy and the increase of people's demand for fashion, clothing display space has gradually evolved into specialized clothing stores and specialty stores. At present, the clothing display space has been widely used worldwide, not only the physical stores of various brands, but also various online shopping platforms and social media platforms for displaying and selling clothing products. With the increase in consumer demand for personalization and customization, some innovative clothing display Spaces have also begun to appear, such as concept stores, experience stores, pop-up stores, etc., to provide consumers with a more diversified shopping experience. In the future, with the development of science and technology and the change of people's consumption concept, the clothing display space may further develop to sustainable, intelligent and personalized.

Clothing display space directly affects the actual interests of the store brand and the development of the brand, the successful space design should be able to create brand positioning, and the design taste to pass to the consumers of the concept of life and cultural concepts. Therefore, in the face of consumer groups with different occupational backgrounds and age groups, how to scientifically and effectively quantify the emotional evaluation of consumer sensibility and social responsibility has become an important topic of current research. Based on the theory of Kansei engineering and combined with the characteristics of fashion display space design, this study discusses the application strategy of Kansei engineering in fashion display space design.

2. Kansei Engineering and fashion exhibition space design

2.1 Overview of Kansei Engineering

Systematic research on sensibility was formally proposed by Mitsuki Nagamachi in Japan in
1970, and has now formed a relatively complete research method and theoretical system [1]. Kansei engineering is a discipline that studies human perception and emotional experience, and its development history can be traced back to the early 20th century. The role of Kansei engineering is to gain insight into the mechanisms of human perception and emotional experience in order to improve the quality of product and environmental design. Compared with other disciplines, Kansei Engineering has unique advantages, including direct attention to human subjective experience, comprehensive research on perception and emotion, and in-depth understanding of human behavior and decision-making. As one of the important methods of product emotional design, Kansei engineering can help researchers design and develop products or services that can meet customers' emotional and psychological feelings as well as their needs [2]. In space design, the value of Kansei engineering is reflected in three aspects: providing an objective basis for design decisions, enhancing users' emotional experience and satisfaction, and promoting design innovation and differentiation. Therefore, the application of Kansei engineering in space design can help designers better meet the needs of users and create more personalized and functional Spaces.

2.2 Research on perceptual image of fashion display space design strategy

At present, with the progress of Chat GPT, AIGC, cloud computing and other technologies, the design industry has greatly promoted the development toward automation, personalized customization, and multi-scenario application [3]. Clothing exhibition space involves many fields, including visual communication, spatial layout, environmental aesthetics, etc., but also includes channel design, booth layout, display wall design, props and display equipment design. In his book Analysis of Spatial Characteristics of Fashion Display Design, scholar Ma Fei emphasized that making good use of limited physical space and online virtual space will become one of the core issues in the future development of display design [4]. As the space experience is mainly based on people's subjective impression, some scholars also mentioned that the traditional static fashion display has been transformed into experiential display. When conveying information to the audience, designers and brands should take into account the psychological experience of visitors, guide them to participate in it, and stimulate better visiting experience [5]. Therefore, how to better study people's subjective feelings and rationally express them needs to use the design method of Kansei engineering. Kansei engineering can quantify sensibility into a rational scientific expression through a scientific way, and more accurately explore and analyze people's subjective needs for clothing display space from the perspective of specific experiments and data research.

First of all, perceptual image words were used as comprehensively as possible to express the feelings and emotional characteristics of consumer groups, and the selection samples were collected and sorted into perceptual image word pairs. The screening method was based on semantic difference method and expert argument method. Secondly, with 18-35 year old consumer group as the test object, relevant research shows that this group pays attention to fashion and personality, has high requirements on the style and quality of clothing, is willing to try new trends and designs, and is relatively sensitive to brand and price. At the same time, it also pays attention to the practicality and comfort of clothing, and has a large demand for clothing products, and pays more attention to the social responsibility of the brand and the durability of clothing. The samples were evaluated by scoring perceptual images, and the Likert psychological scale was used as the evaluation standard. Data analysis will be expressed in combination with perceptual image scale drawing. Based on the analysis of the key perceptual terms of consumer group clothing display space, the sustainable design strategy of clothing display space is proposed.

2.2.1 Sample screening

Through online and offline channels, this paper collects design cases of clothing display space as samples to ensure the typicality of samples in similar cases. A total of 50 sets of clothing display space pictures with different styles and relatively different positioning have been collected (covering display Spaces of different clothing brands, styles and positioning in the market). Then
compare and screen similar sample types from the aspects of design style, color design, space form and so on. Finally, 24 samples are selected, and the questionnaire content is collected with the title of "Your favorite 5 types of clothing display space". After sending questionnaires and recovering, a total of 40 valid questionnaires are collected. Among them, 20 men accounted for 50%, and 20 women accounted for 50%. The survey age range was between 18 and 35 years old. After statistical integration of the questionnaire results, 10 clothing display space samples favored by this consumer group were selected by comparison, numbered 2, 5, 6, 9, 11, 15, 17, 18, 20, 23, respectively, as the 10 typical samples of this study (see Figure 1).

![Figure 1. Typical sample cases of clothing](image)

2.2.2 Collection and arrangement of perceptual image words

According to the selected typical sample cases of clothing, the author first collected perceptual image words from 20 consumer groups (10 men and women each) by means of questionnaire. The consumer group who completed the questionnaire should meet the following two conditions: (1) Aged 18-35 years old, keen on clothing shopping; (2) Agree with the theory of sustainable development, support the sustainable transformation of the fashion industry, and hope to obtain a better experience of clothing display space. This study requires each subject to describe perceptual image words from 5 aspects of style, design, color, function and experience, combined with 10 typical sample cases, and describe no less than 20 words in each aspect. Secondly, we invite industry experts, space designers, clothing designers, brand marketing and other professionals to classify the collected perceptual image words. This paper mainly selects and merges ambiguous, similar and unrelated words, and divides the final typical words into five categories to form two pairs of perceptual image words, which are marked with x and y respectively (see Table 1).

<table>
<thead>
<tr>
<th>sort</th>
<th>category</th>
<th>Perceptual image vocabulary pair</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>style</td>
<td>X1: popular-luxurious, y1: traditional-fashionable.</td>
</tr>
<tr>
<td>2</td>
<td>design</td>
<td>X2: common-strong sense of science and technology, y2: conventional-unique.</td>
</tr>
<tr>
<td>3</td>
<td>colour</td>
<td>X3: simple-bright, y3: simple-rich.</td>
</tr>
<tr>
<td>5</td>
<td>experience</td>
<td>X5: boring-novel, y5: zero interaction-interactive.</td>
</tr>
</tbody>
</table>

2.2.3 Image scale analysis

With the Likert five-step scale as the evaluation standard and consumer groups aged 18 to 35 as the test objects, the positive and negative questions were used to conduct the survey and evaluation of perceptual image scale for the screened samples, and the data were analyzed and expressed in combination with the perceptual image scale map. In order to facilitate statistics, the original samples were numbered as follows: Ten typical samples (2, 5, 6, 9, 11, 15, 17, 18, 20, 23) were renumbered and numbered as samples 1-10 successively. Based on the renumbered 10 sample cases and 10 pairs of perceptual image words as the questionnaire content, a questionnaire survey was...
conducted on 30 consumer groups meeting the conditions of this study. A total of 30 questionnaires were collected, and 30 valid questionnaires were obtained, so as to obtain the perceptual preferences and needs of young consumer groups for clothing display space: Likert level was set at level 5 (1 to 5 points); Take "ordinary - strong sense of science and technology" as an example: 1 point represents very ordinary, 2 points represents relatively ordinary, 3 points represents a compromise state, 4 points indicates a strong sense of science and technology, 5 points indicates a strong sense of science and technology. The score value can basically reflect the perceptual cognition of the group to the sample cases, and provide effective data support for the study of perceptual image vocabulary of clothing display space. According to the scores of this consumer group on the sample cases, the average scores were calculated and the average scores of 10 groups of perceptual image words were calculated (see Table 2).

<table>
<thead>
<tr>
<th>Perceptual vocabulary pair</th>
<th>sample</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
<th>7</th>
<th>8</th>
<th>9</th>
<th>10</th>
</tr>
</thead>
<tbody>
<tr>
<td>Popular-extravagant</td>
<td></td>
<td>3.5</td>
<td>3.8</td>
<td>3.1</td>
<td>2.8</td>
<td>4.3</td>
<td>4.1</td>
<td>3.6</td>
<td>3.</td>
<td>3.5</td>
<td>4</td>
</tr>
<tr>
<td>Traditional-fashionable</td>
<td></td>
<td>4.1</td>
<td>3.3</td>
<td>3</td>
<td>2.3</td>
<td>3.4</td>
<td>3</td>
<td>4</td>
<td>4.5</td>
<td>4.3</td>
<td>4.2</td>
</tr>
<tr>
<td>Ordinary-strong in science and technology</td>
<td></td>
<td>1.2</td>
<td>1</td>
<td>2.2</td>
<td>1.2</td>
<td>1.3</td>
<td>4.2</td>
<td>4.5</td>
<td>2.2</td>
<td>1</td>
<td>3.1</td>
</tr>
<tr>
<td>Conventional-unique</td>
<td></td>
<td>3.1</td>
<td>3.2</td>
<td>4.3</td>
<td>1.3</td>
<td>1.2</td>
<td>3.5</td>
<td>4.2</td>
<td>4.3</td>
<td>4.1</td>
<td>2.8</td>
</tr>
<tr>
<td>Plain-bright</td>
<td></td>
<td>1.7</td>
<td>1</td>
<td>2.4</td>
<td>1.2</td>
<td>1.5</td>
<td>4.2</td>
<td>3.8</td>
<td>1.3</td>
<td>1</td>
<td>3.2</td>
</tr>
<tr>
<td>Single-rich</td>
<td></td>
<td>2.5</td>
<td>1.4</td>
<td>4.2</td>
<td>2.3</td>
<td>1.8</td>
<td>3.5</td>
<td>2.8</td>
<td>3.1</td>
<td>2.6</td>
<td>4.2</td>
</tr>
<tr>
<td>Single function-compound function</td>
<td></td>
<td>3.7</td>
<td>1.5</td>
<td>4.2</td>
<td>1.3</td>
<td>1.7</td>
<td>3.4</td>
<td>2.8</td>
<td>2.5</td>
<td>2.9</td>
<td>3.2</td>
</tr>
<tr>
<td>Inconvenient-convenient</td>
<td></td>
<td>3.1</td>
<td>2.3</td>
<td>4.3</td>
<td>2</td>
<td>2.4</td>
<td>3.4</td>
<td>3.1</td>
<td>2.7</td>
<td>3.2</td>
<td>3.8</td>
</tr>
<tr>
<td>Dull-novel</td>
<td></td>
<td>4.2</td>
<td>2.5</td>
<td>4.3</td>
<td>1.8</td>
<td>1.4</td>
<td>2.4</td>
<td>3.2</td>
<td>3.3</td>
<td>2.1</td>
<td>2.6</td>
</tr>
<tr>
<td>Zero interaction-interactive</td>
<td></td>
<td>4.2</td>
<td>1.3</td>
<td>4.3</td>
<td>1.4</td>
<td>1.1</td>
<td>2.6</td>
<td>3.2</td>
<td>3.5</td>
<td>3.1</td>
<td>1.2</td>
</tr>
</tbody>
</table>

According to the values, image scale drawings are formed in five aspects: design, style, color, function and experience (see Figure 2-6). Take style image scale drawings as an example, for example, in terms of style, "popular" and "luxury" respectively represent x1 axis, and "fashion" and "traditional" respectively represent y1 axis. In terms of style, 7 samples were distributed at 3-4 points of x1 axis coordinate scores, and 9 samples were distributed at coordinates above 3 points of y1 axis (see Figure 2). It shows that this kind of consumer group has a strong sense of fashion and prefers to have a certain taste of clothing display space. The space design should pay attention to the overall brand sense, emphasize the unique style positioning, combine the current fashion elements, highlight the trend sense and avant-garde space characteristics. In addition, it is necessary for brands and designers to enhance innovative and creative thinking, emphasize social responsibility, break the traditional space design mode, and create a unique and novel feeling.

Figure 2. Style image scale drawing
In terms of design, the distribution of $x_2$ axis 1 is more concentrated, and the distribution of $y_2$ axis is more average, and there are 5 samples with a 3-point compromise attitude as the dividing line (see Figure 3). This indicates that this type of consumer group prefers unique space design with strong sense of science and technology, and generally gives low scores to the samples, which cannot meet their demands for sense of science and technology and personalization. Therefore, while considering the integration of fashion trends, the clothing display space can add some scientific and technological interaction, such as intelligent guidance system, automated shopping or consumption platform, and intelligent service system. As well as personalized, highly marked VI design, etc., help to enhance consumers' shopping experience.

![Figure 3. Design image scale drawing](image)

In terms of color, most of the sample scores are distributed between 1 and 2 points of $x_3$ axis and $y_3$ axis. The overall score for the color of the samples is low, and the highest score is given to the two groups of red spatial samples (see Figure 4), indicating that this type of consumer group prefers the color space with rich and bright colors. Because the current clothing space is mostly the copy of the same space style, the lack of the brand's iconic color, mainly to simple and generous highlight the clothing products. Therefore, different color combinations can be considered in the space design to enhance the vitality and attractiveness of the space. Bright and bright colors with strong contrast can be used to highlight the individuality of the space, and the monotony of black, white and gray space can be abandoned.

![Figure 4. Color image scale drawing](image)

Functional aspect. The scores of $X_4$-axis and $Y_4$-axis samples are mainly around 3 points, indicating that this type of consumer group has relatively consistent functional demands (see Figure 5). In space design, attention should be paid to rational utilization of space, enhancement of the composite concept of functions, coordination of space proportions, and dynamic line design, so as to avoid overcrowding or high vacancy rate. Since the samples are in the form of pictures, it is impossible to show the complete situation of each sample, so the score of consumer groups in terms of function is affected, and the results of the questionnaire have certain limitations.
In terms of experience, the sample scores on x5 axis and y5 axis are relatively average, and the consumer group shows a certain demand for spatial novelty and interactivity (see Figure 6). In the era of experience economy, people's spiritual needs continue to grow, and experience design is applied to all aspects of life [6]. Similarly, under the impact of multiple shopping channels, user experience is a factor worth considering in current space design. Strengthening the link between users and Spaces helps to increase brand attraction and shopping convenience. For example, the results show that the samples with virtual fitting technology have a higher score, indicating that the interaction and participation of consumers can be respected by most consumer groups. In addition, it can also be combined with 3D scanning technology to achieve personalized customization, the store visual design system can help consumers view the real-time situation of the space, the number of waiting in the fitting room, etc., to help consumers reasonably plan shopping time, it is suggested that from the user experience to think about space design can meet the diversified needs of consumers.

Based on the analysis of image scale diagram of five categories of samples, the perceptual preferences and demands of this type of consumer group for clothing display space are analyzed, and the image scale diagram of 10 typical samples is drawn by integrating the image scale of all perceptual words (see Figure 7), indicating that the perceptual demands of this type of consumer group for clothing technology mainly include individuation, sense of science and technology, functionality, and sense of experience. Therefore, it is necessary to combine the current fashion trend and technology to provide rich visual effects and diversified shopping experience.
3. Fashion display space design strategy

According to the results of questionnaire analysis, the author believes that the Kansei engineering clothing display space needs to be strengthened in the following three aspects: interactive experience, spatial function layout, and brand personalization. Then the specific optimization design strategy is derived.

3.1 Integration of display space and technology

The emergence of various emerging technologies provides unlimited possibilities for fashion display design. Currently, the application of new media in fashion display design is mainly reflected in three aspects: virtual reality technology, augmented reality technology and video technology application [7]. By introducing advanced technology elements to create a cutting-edge and modern display space. For example, virtual reality (VR) or augmented reality (AR) technology can be used to allow customers to preview the effect of clothing without actually trying it on, stimulating interest in trying it on and increasing consumer interaction with the brand. In addition, smart mirror is also a very creative technology application, it can simulate different light conditions, help customers to virtual try on, save the time and cost of choosing and actually trying on, large-scale feel different types of clothing products, compare different types of design in their own matching degree. In addition, the intelligent shopping guide system can also be used to increase the convenient experience of customers in the store, providing personalized shopping guidance and recommendations.

3.2 Display space and function compound

Clothing display Spaces need to ensure that the layout and function meet the needs and expectations of customers. Scholar He Cheng mentioned in the exhibition space of the museum that the relationship between viewers and exhibits has changed from the traditional and simple subject-object relationship of seeing and being seen to a more flexible and communicative interactive relationship, and the way audiences receive information has also changed from a one-way form from objects to people to a multi-directional association form from objects, Spaces, scenes to people [8]. Therefore, in the clothing display, it is necessary to ensure that the regional division of the display space is reasonable to accommodate different types and styles of clothing, so that consumers can quickly find the type of clothing they need. In addition, the comfort of customers should be taken into account, such as providing comfortable dressing rooms and seats for customers to try on and rest. Special display areas can also be set up to display new products or specially recommended styles, such as the design of the window or the middle island, in order to attract customers' attention and improve the rate of entry. In terms of layout, it can adopt a streamlined layout, so that customers can easily browse each display area and improve shopping efficiency. In addition, through scientific lighting design and decorative style, create a comfortable and fashionable shopping atmosphere, thereby enhancing the shopping experience and satisfaction.
of customers. Finally, you can also set up different display methods according to different product characteristics, such as matching display, theme display, separate display, etc., in order to highlight the diversity of goods in the space and the beauty of the match, to attract customers' attention. It can also provide customers with comprehensive shopping guidance through reasonable price tags, product introduction and shopping guide services to help customers better understand the product information, improve shopping experience and satisfaction. The above layout and functional design considerations will help enhance customer satisfaction and brand loyalty to the display space.

3.3 Display space and personalization

The personalized design of the display space can not only reflect the characteristics and style of the brand, but also improve the communication power and attractiveness of the brand in the social era. The brand's logo color and logo pattern can be cleverly integrated into the space decoration, the use of color to enhance the vitality of the space, combined with the current popular elements, so that consumers in the invisible emotional identity of the brand. In addition, special display stands and display methods are also effective means to highlight brand characteristics. For example, by using a special display rack to display clothes or using a unique matching scheme, the goods are hung in the window or placed on a special display platform, which can make consumers have a deep impression on the brand. These design details are not only to attract the eye of consumers, but more importantly to convey the uniqueness of the brand, thus enriching the shopping experience of consumers.

4. Conclusion

Based on the premise of sustainable development of fashion industry and supported by Kansei engineering theory, this study extracts perceptual image word pairs in 5 aspects from 10 typical samples, and combines semantic difference method, image scale drawing and questionnaire survey to summarize consumer groups' different needs and preferences for clothing display space. Explore the application strategy of Kansei engineering theory in fashion display space design. The results of related perceptual image analysis show that the optimization of clothing display space has higher requirements for appearance modeling, functional experience and space atmosphere. The personalized, intelligent, functional space composite and other elements of clothing display space help to provide consumers with a good offline shopping experience and enhance the competitiveness and influence of brands. This paper also provides theoretical reference for the design and improvement of clothing display space under the transformation of fashion industry.

References


