The Design Method for Traditional Wood Lamp to Regain the Sense of Childhood Rural Life Experience

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Abstract. In order to solve the perceptual needs of consumers for products, it has a deeper spiritual connotation while satisfying the functions of products. By observing user behavior, analyzing the user's specific motives and operation methods for using the product, discovering the experience touch points during the interaction between the user and the product; combining context analysis to construct a user behavior map, obtaining design requirements and summarizing design clues; operating the product The combination of touch points and context assists in discovering the main influencing factors of emotion-oriented product design, and helps designers to observe the direction and ideas of emotional product design from a macro perspective. According to the final design plan, it has a certain significance to the design method of traditional wood art lamps by improving the user experience and satisfying users' requirements for product operation functions and emotional experience.

Keywords: Demand Extraction · Kano model · Emotional Experience · User Behavior Map · Traditional Wooden Lamps

1 Introduction

As a shelter for people to shelter from the wind and rain, the design of the home has gradually attracted people's attention. And lamps and lanterns are indispensable products in decoration, enriching indoor space and creating a warm and comfortable family atmosphere. With the steady growth of the national economy and the gradual improvement of people's living standards, people's consumption concept has undergone earth-shaking changes. Consumption behavior has changed from pure purposeful consumption to multiple experience consumption and emotional consumption. With consumers' pursuit of personal needs and self-awareness, the demand for emotional and experience factors is also increasing, and they are emphasizing their own personality and taste in all aspects of daily life [1]. Therefore, major lighting brands such as Philips, Op, NVC, etc. are also seeking innovation in lighting. The design of modern lamps no longer only focuses on the ease of use and aesthetics of the product, but also emphasizes the establishment of emotional interaction between the target user and the product through design, so that

A. Luqman et al. (Eds.): PMIS 2022, AHCS 6, pp. 46–55, 2023.
https://doi.org/10.2991/978-94-6463-016-9_7

users can obtain emotional feedback through the product to form emotional memory and help users understand products to enhance the user experience. In order to effectively improve the user experience, this paper divides the demand attribute categories through the Kano model, obtains the main functional factors that affect the user's satisfaction with the lighting products, clarifies the design direction based on the user's emotional experience, and studies and explores the Kano model. Application in the design of wooden lamps and lanterns.

1.1 The Feasibility of Applying Kano Model to the Design of Traditional Wooden Art Lamps

In 1959, Noriaki Kano, a professor at the University of Tokyo in Japan, first proposed the Kano model, which is mainly used to analyze the impact of user needs on their satisfaction. It is a practical tool widely used in user needs classification and prioritization. This paper takes traditional wooden lamps as the research object, and uses the Kano model method to analyze and identify user needs, so as to enrich the design connotation of lamps and lanterns and meet the changing needs of consumers.

Before this, some scholars have applied the Kano model to product design. Li He [2] et al. set up user survey questionnaires based on the Kano model, and used text mining methods to analyze user needs for real online reviews, effectively overcoming the problems of lagging demand sources and insufficient reliability in traditional user demand survey methods; Ren Jing [3] The smart refrigerator designed for the people who are happy to be single comprehensively applied the advantages of the RDS and Kano model integration of the respondent-driven sampling method, and initially verified the feasibility of using the integrated innovation method to study the needs of niche groups and their users. The single-use smart refrigerator design provides a basis and design reference for the research of similar subjects; Han Wei [4] and others conducted an empirical study on the content and method of public health emergency information disclosure from the perspective of public demand based on the Kano model Analyze the characteristics of the impact of various information disclosure content and methods on public demand satisfaction, and propose public health emergency information disclosure governance strategies, to provide decision-making support for government departments to improve the quality and efficiency of public health emergency information disclosure; Tu Haili [5] et al. used the basic theory of the Kano model to analyze the functional requirements of WeChat, and finally proposed that WeChat should pay more attention to user experience, grasp the hidden needs of users, streamline functions, and provide optimized and improved suggestions for differentiated services. In addition, some scholars apply the Kano model to the analysis and evaluation of user needs in different fields such as the medical industry [6], the education industry [7], wearable smart products [8], and the logistics industry [9].

In summary, the Kano model applied to the traditional wood art lamp design for emotional experience is feasible and scientific. The previous design lacked more personalized and emotional humanistic development for home lighting, and could not meet the current user needs. This research uses the Kano model to analyze user needs for home lighting products, constructs a user behavior map of furniture lighting products, reasonably divides demand attribute categories, and sorts out the main characteristics of users'

needs for furniture lighting, which is conducive to clarifying the design positioning of furniture lighting. Propose a suitable design plan.

2 Research Methods of User Behavior

2.1 Analysis of User Behavior and Needs

Studying user behavior can help designers identify the potential needs of users to explore more design possibilities [10]. Based on the Kano model, this article analyzes users' satisfaction with product functions. First, ask extreme questions about each attribute. If the product does not have a certain functional attribute, the answer is from "like", "as it should be", and "doesn't matter." The five-level options consisting of "tolerable" and "dislike" are used to measure the user's response when facing with or without a certain function. The Kano model needs classification assessment is shown in Table 1.

Through questionnaire surveys, target users are invited to evaluate the functional attributes of the product, and the survey data are collected to determine the specific attributes of each function. The factor value is calculated based on the user demand information obtained from the user satisfaction questionnaire. Among them, S represents the impact of users' satisfaction when the product has a certain functional attribute, and D represents the impact of users' satisfaction when the product does not have a certain functional attribute. The average value of the two can be calculated to obtain the comprehensive factor value, the formula is as follows:

$$S = \frac{A + O}{A + O + M + I} \tag{1}$$

Note: M is a necessary attribute; O is an expected attribute; A is a charm attribute; I is an indifference attribute; R is a reverse attribute; Q is a problem attribute

$$D = \frac{M + O}{A + O + M + I} \tag{2}$$

Table 1. Kano model requirements classification assessment

User needs		The product does not have a certain functional attribute				
		Well	Reasonable	Indifferent	Tolerable	Unreasonable
Product	Well	Q	A	A	A	O
	Reasonable	R	I	I	I	M
	Indifferent	R	I	I	I	M
	Tolerable	R	I	I	I	M
	Unreasonable	R	R	R	R	Q

Table 2. Usage scenarios and contact points of lamps

lamps	Table-lamp	Bedside-lamp	Chandelier	Wall- lamp	Floor- lamp
Illustration					
Usage-scenario	Study room, desk	bedroom	bedroom, living-room, table	bedroom, living-room	bedroom, living-room
Contact-point	switch button	Small wooden ball	switch button	Infrared induction	switch button

2.2 User Experience Analysis

1) Operational experience analysis. Operating products is a way for users to achieve behavioral goals. For emotional products, it is only a simple realization of surface functions, while the deep-level purpose is to achieve ideological precipitation through the behavior of emotional products. Therefore, this article takes household lamps as an example to study their operating behaviors and analyze the relationship between each operating behavior and product contact points. Among them, lamps that often have operating behaviors with users include: table lamps, bedside lamps, chandeliers, wall lamps, Floor lamps, etc. By obtaining the user's operation behavior and contact points of these lamps, we can provide clues and basis for the design of lamps, as shown in Table 2.
2) Emotional experience analysis. Through the use of lamps and lanterns, the user obtains the satisfaction of practical functional needs, and then rises to the pursuit of emotional and aesthetic spiritual needs. Through the contact of the product's form, color, and quality through its own perception system, the experience of the "five senses" is formed, which is mapped to the experience on the spiritual level, so it can provide design clues for the emotional experience of the lamps by analyzing the morphological characteristics, color and texture performance of the lamps.

3 User Behavior Map Construction and Demand Analysis of Household Lighting Products

3.1 User Context Analysis of Household Lighting Products

By locating the target users of household lighting fixtures and conducting interviews, it is found that the use behavior of household lighting fixtures is regular, and the usage scenarios of household lighting fixtures will change due to changes in the user's lifestyle. In addition, the emotions expressed by different color temperatures are also different, and the scene lighting as an important part of the soft decoration of the family space cannot be ignored. Therefore, first subdivide user scenes, and divide them into three scenes according to the user's lifestyle and different color temperatures. They are low color

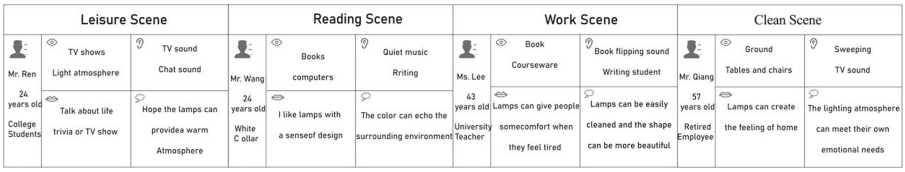

Fig. 1. Analysis of user empathy in four situations

Table 3. Analysis of User Empathy Map

Scene	Pain point	Demand	Focus on lamp types	Opportunity point
Leisure-scene	No aesthetic highlights in modeling	Aesthetic needs	Table lamps, floor lamps, wall lamps, chandeliers	Give the product a higher aesthetic level
Reading-scene	Monotonous color and lack of interest	Interactive requirements	Table lamp, bedside lamp	Enhance interactive fun
Work-scene	Shallow cultural connotation of modeling	Humanistic emotional needs	Table lamp, chandeliers	Increase the humanistic and emotional elements
Clean-scene	Fixed color temperature, not easy to clean	Style needs	Chandeliers, floor lamps, wall lamps	Simple style, adjustable mode

temperature scenes (suitable for watching TV, chatting, etc.), medium color temperature (suitable for dining, reading, etc.), and high color temperature. (Suitable for work, housework, etc.) Through user empathy analysis, observe the changes in user behavior in each scene, determine the user's behavioral purpose and needs in the current scene, and find the pain points between the user and the product, as shown in Fig. 1. Through the analysis of user empathy maps in these situations, the main needs and pain points are sorted out according to user needs and products of concern, and opportunities are sorted out, as shown in Table 3.

3.2 Construction of User Behavior Map of Household Lamps

By summarizing and analyzing the research information and the design clues obtained from the operation experience, emotional experience, and empathy map analysis of furniture and lamps, a user behavior map is constructed to describe the specific behavior process in the use of lamps and lanterns. Observe the complete process of using the product from a macro perspective, record the user's behavior changes at each stage, find the main touch points and visual points of interest, and summarize the design

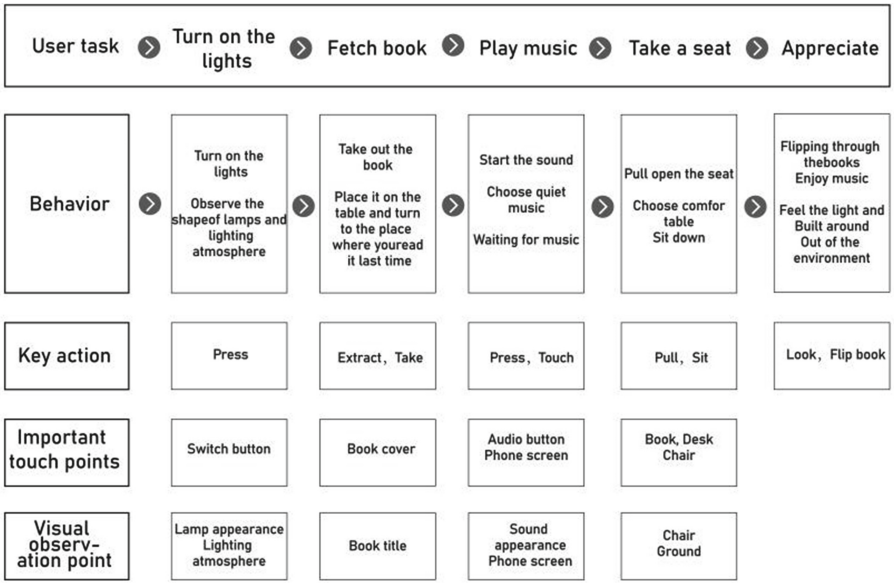

Fig. 2. Behavior map of household lighting products

opportunities. This article uses the reading scenario as an example to construct a user behavior map, as shown in Fig. 2.

Analyzing the user map, it is found that the current household lighting fixtures on the market do not pay attention to the user's emotional needs, and cannot meet the user's humanistic emotional needs; the modeling structure cannot provide users with some interesting interactions, and it is difficult for the target users to interact with the product. Establish an emotional connection; at the same time, the aesthetic level of the lamp modeling needs to be improved.

3.3 User Demand Analysis Based on Kano Model

First, make a survey questionnaire for home lighting, invite 50 target users to judge the functional attributes of home lighting, and then classify based on the attributes of the Kano model to determine the specific attributes of each function, including workmanship quality, ease of cleaning, modeling semantics, and installation Maintenance, use functions, and emotional needs are the main needs of the target users of home lighting; modeling semantics and use functions are expected attributes; workmanship, installation and maintenance are essential attributes; emotional needs are attractive attributes; easy to clean is indifferent. According to formula (1–2), judge the degree of impact of functional requirements, and after calculating the factor values, divide the numerical points into four quadrants: expected attribute O, attractive attribute A, indifference attribute I, and necessary attribute M. User needs analysis See Fig. 3, which provides a basis for product innovation design elements and improvement of existing pain points (Table 4).

Confirm that modeling semantics, emotional needs and use functions are important needs of users. According to users' needs for functional attributes in the survey, the

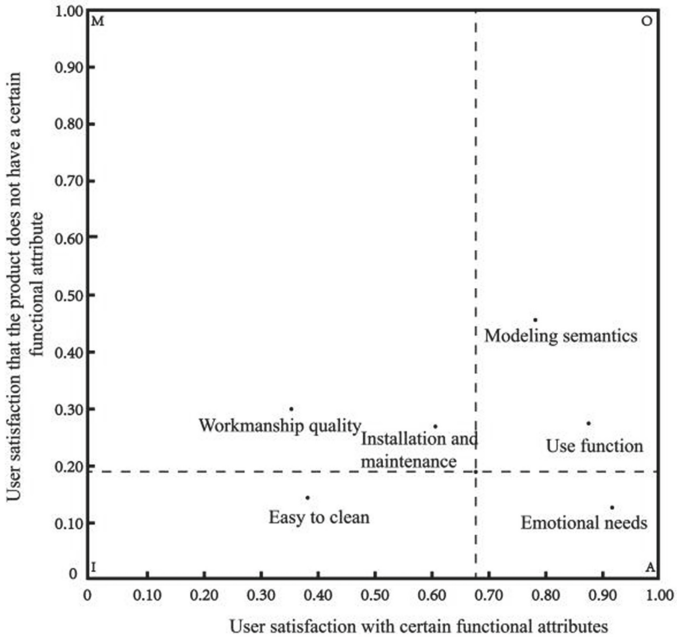

Fig. 3. Analysis of user needs

Table 4. Kano model classification based on user needs of household lighting products

User needs	Modeling-semantics		Emotional needs		Use function		
	Color matching	Tenon and tenon structure	Childhood affection	Rural cultural experience	Basic lighting function	Atmosphere rendering	Human-computer interaction
Kano classification	O	A	O	O	M	A	O
Comprehensive factors/%	43.1	37.2	60.8	54.7	52.9	56.7	61.3

important needs are subdivided again, and more specific functional needs of users for home lighting can be derived from this. After detailed evaluation, it can be positioned to meet the four most important needs of human-computer interaction, atmosphere rendering, childhood sentiment, and rural cultural experience, as the main factor and design direction of the innovative design of home lighting. Confirm that modeling semantics, emotional needs, and use functions are important needs of users. According to user needs for functional attributes in the survey, the important needs are subdivided again, and more specific functional needs of users for home lighting can be derived from this.

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4 Design Plan

According to the needs of the rural context, the first extracted rural cultural image vocabulary "old water well", "wooden fence", and "small stone bridge" are the key elements of the situation design, and the graphic elements a1, a3 and color elements b1 related to the elements are selected. According to the aesthetic requirements, it is extracted and deformed and designed, as shown in Fig. 4. The plan design includes table lamps, night lamps, and bedside lamps, which are designed as a series of traditional wooden lamps with a unified style. The artistic conception contained in each item is related to each other, creating a strong sense of childhood country life for users.

The lamp adopts a tenon-and-mortise structure as a whole. Through the abstraction of childhood rural cultural elements, the simple appearance of the lamp is determined, so that the lamp not only presents the artistic conception of rural beauty, but also facilitates cleaning and cleaning in daily life. The table lamp a1, the grille in the night lamp a2, and the bedside lamp a3 can be toggled, which can produce different light and shadow effects while providing users with interaction, allowing users to experience the fun of hide and seek with light and shadow; the material is black walnut, Can ensure the good performance of the structure; the color element selection b2, the primary color of black walnut and the warm color light can help the lamp to create a relaxing and warm color atmosphere. See Fig. 5.

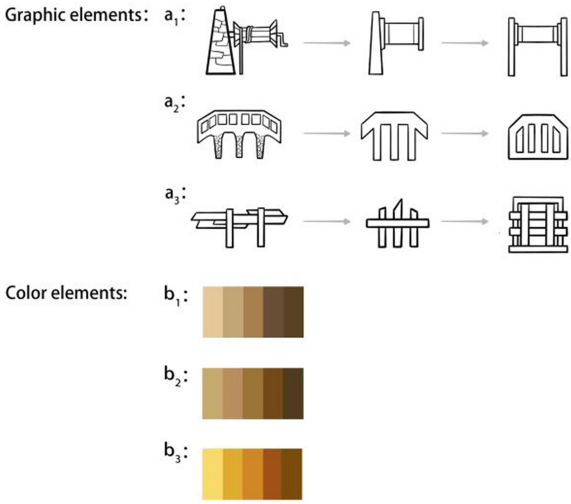

Fig. 4. Extraction and deformation of rural cultural elements

Fig. 5. Design of traditional wooden lamps and lanterns

5 Conclusion

By observing user behavior, it is found that there are needs and problems between users and emotional products. Designers should consciously pay attention to the emotional needs of users in the design process, and design from the perspective of users. This article explores a design method that meets the user's operational experience and emotional experience. First, it studies user behavior in different situations, discovers the contact points and points of interest between the user and the home lighting, and obtains the user's explicit needs and hidden needs. Sexual needs; by constructing a user behavior map, we can accurately discover the contact points in user behavior that can be improved; finally, after data analysis, we can get the main functional factors that affect the user's satisfaction with home lighting products, so as to determine the direction of innovative design. The shape, function and way of use evoke a deeper emotional resonance.

Acknowledgments. Financial support provided by the Research Project on Major Theoretical and Practical Problems of Philosophy and Social Sciences in Shaanxi Province (2021ND0247).

References

1. Liu G, Guo H (2018) Research on the application of emotional design in modern home lighting design. Popul Literat Art 2:115–116
2. Li H, Cao Y, Shen W, Li Y, Tu M (2021) Research on user needs based on LDA topic recognition and Kano model analysis. Inf Sci 39(8): 3–11+36
3. Ren J, Yu S (2021) RDS sampling and design of smart refrigerator for the people who are happy to be single under KANO model. Mech Design Res 37(3):16–21
4. Han W, Chen Y, Chen A (2020) Research on public demand for public health emergency information disclosure based on KANO model. Inf Theory Pract 43(5):9–16
5. Tu H, Tang X (2015) KANO model analysis of WeChat functional requirements. Inf Magaz 34(5):174–179
6. Yin S, Gu P (2005) Analysis of the influencing factors of customer satisfaction in the medical industry based on the Kano model. J Jiangsu Univ Sci Technol (Soc Sci Edn), 2: 52–55.

7. Chen D, Zhou J (2011) Research on customer satisfaction of chinese higher education—the application of KANO model in higher education. J Changchun Univ Sci Technol (Soc Sci Edn) 24(2):99–102
8. Yu Z (2018) Research on the design of wearable smart products and services for the elderly based on Kano model. East China Univ Sci Technol
9. Meng Q, Zou N, Li X, An L, Jiang X (2012) Logistics service quality improvement decision-making method based on analytical KANO model. Oper Res Manag 21(2):64–73
10. Wang W, Liu Y, Yang X, Liao K (2019) Research on cultural and creative product design based on user behavior and context. Packag Eng 40(24):27–32