

Emotional design of traditional Chinese cultural creative products based on user demand

ABSTRACT

Mortice-tenons are the main structural forms of ancient buildings, furniture, and woodwork in China. They are the inheritance of China's craft and cultural spirit, follow the principles of mechanics and have strong practicability. However, mortice-tenons have gradually disappeared from modern life, mainly because they cannot meet the specific needs of users. The purpose of this study is to establish a set of mortice-tenons structure innovation and product design for modern people. By analyzing the types and structural characteristics of mortice-tenon structure, based on the user's needs, using modern creative design methods, and combining with practice, we can verify how to further improve the market acceptance of mortice-tenon structure innovation products, constantly explore the combination of modern technology and material experiments, and explore the emotional design of China traditional cultural creative products. Finally, it is proposed that further research is needed in this field to fully understand the user's behavior of using mortice-tenon structure innovation products, and at the same time, mortice-tenon structure innovation is applied to daily necessities and furniture products to meet the needs of a wider range of user scenarios.

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Introduction

Connotation category and values of traditional Chinese culture

Chinese traditional culture is a kind of national culture that reflects the national characteristics and humanistic features of the evolution and integration of Chinese civilization. Excellent traditional cultural symbols are the treasures of our country. The "craftsman spirit" and "cultural creativity policy" proposed by our country hope that traditional cultural symbol elements can be protected and utilized, and a group of craftsmen who are loyal to traditional culture and committed to inheriting culture can be created (Zhao, 2010). The scope of Chinese traditional culture is very broad.

1. From a historical point of view, Chinese traditional culture, based on the farming culture of the Han nationality, has been formed with the development of history and the continuous absorption of various ethnic groups and different regional cultures on the basis of the culture of the Han nationality. It has rich connotations and forms, and the fusion and cohesion of traditional Chinese culture is the connotation basis of its strong vitality.
2. From the perspective of social structure, Chinese traditional culture is a patriarchal culture based on family. Focus on family, light on individuals, focus on groups, light on individuals. In ancient China, the family system was formed according to the patriarchal relationship, and formed the foundation of the country, providing a social basis for the formation of patriarchal culture.

- From the perspective of social consciousness, Chinese traditional culture is an ethical culture that emphasizes the respect for heaven, the importance of man, and the unity of heaven and man, advocates the accession to the world, and opposes the idea of birth. In Chinese traditional culture, we respect the will of heaven, but pay more attention to ethics, and believe that the principle of heaven and humanity are unified.
- Chinese youth's recognition of the value of Chinese traditional culture, through Chinese cultural creative products, are more likely to obtain "Chinese cultural identity". China is experiencing the background of product consumption upgrading and rapid media transmission. Products with Chinese traditional cultural characteristics that integrate contemporary fashion, oriental aesthetics and craftsman quality are being pursued by more and more young people. "Creative products of Chinese traditional culture" has become a phenomenon of consumer culture, and has affected people's clothing, food, housing, transportation, and use.

The importance of the research on the bucket arch structure and *mortice tenon* structure of Chinese ancient buildings

- The design of ancient Chinese architecture has incorporated the traditional Chinese cultural thoughts, and the ancients have adhered to the idea of the unity of heaven and man. Ancient Chinese architecture is a building system based on wood structure. It has a long history, the largest number, and extremely rich scientific and cultural connotations. It is known as the representative of the Oriental architecture system. The Chinese ancient building system has the seismic effect of elastic frame structure. According to the needs, the change of indoor space, the flexibility of door and window setting, the convenience of construction, maintenance and disassembly, and various roof changes are reasonably arranged.
- Bucket arch is a special art that combines material and spiritual functions. It has a unique style in aesthetics and structure, with ingenious conception and meticulous system, decorative beauty, and formal beauty.
- From the perspective of art or technology, the Dou gong symbolizes and represents the spirit and temperament of Chinese classical architecture. The basic function of bucket arch is load-bearing and anti-seismic. The traditional wooden structure building can stand still, and the bucket arch has played a great role. Bucket arch is a standard component of *mortice-tenon* combination and is the medium of force transmission. The bucket arch holds the

weight of the eaves evenly, plays a role of balance and stability, and is the key to earthquake resistance.

Research Objectives

Study the bucket arch structure in Chinese architecture and the needs of users, conduct analysis, formulate the design guide for bucket arch structure creative products, and design product prototypes.

Through interviews and surveys, the target consumer satisfaction of emotional design creative products of bucket arch structure is studied.

Research Assumptions

In the creative design method of Chinese cultural and creative products based on user needs, the use of emotional design can maximize the satisfaction of target consumers. Based on this, paper analyzes the emotional design of *mortice-tenon* products from the perspective of user needs through literature research and field research, as shown in Figure 1, which is the main research framework of this paper.

Literature Review

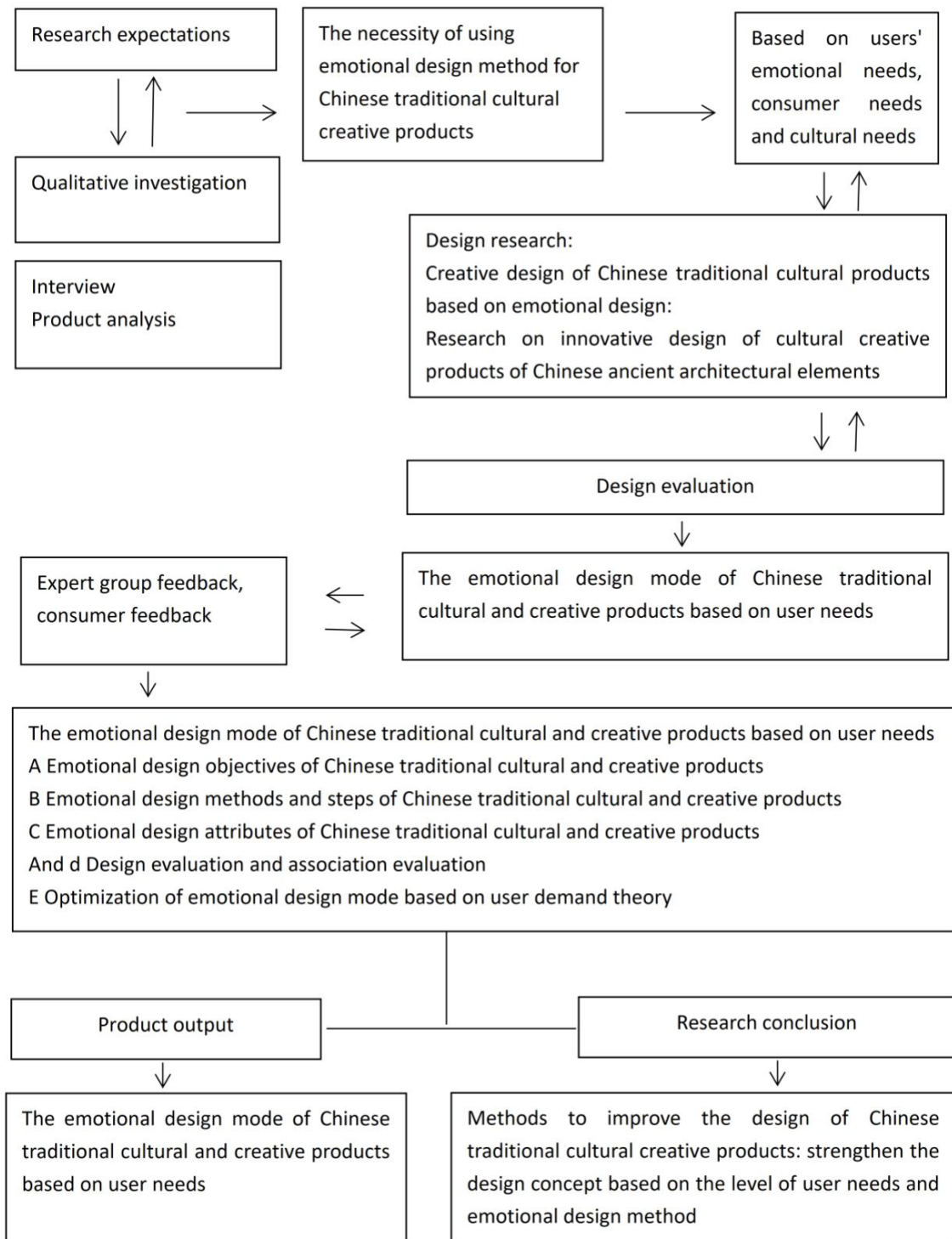
The definition of traditional mortise and tenon in China

In the long history of cultural development in China, *mortice-tenons* first appeared in wooden building structures, such as *mortice-tenon* structures, beams, and beams in ancient buildings, etc.

The building structures connected by *mortice-tenons* are more resilient, which not only has the ability of bearing strong loads, but also allows appropriate deformation, thus having a certain earthquake-resistant effect (Lin et al., 2022).

The *mortice-tenon* structure has also been sublimated and developed in wooden furniture. The *mortice-tenon* structure is recognized as the "soul" of mahogany furniture, especially Ming-style furniture. In short, the *mortice-tenon* structure is the connection mode of engaging and connecting wooden components in the form of concave and convex.

"*Tenon*" refers to the protruding part of the structure, which is also called "*tenon*", and "*mortice*" is the groove of the concave part, which can also be called "*mortice*" or "*mortise*". The way that the two are connected through their own structure and scientific mechanical principles is called "*mortice-tenon*".



» **Figure 1:** Research framework of emotional design of Chinese traditional cultural creative products

There are many ways to classify *mortice-tenon* structures.

If they are divided according to the plane, they can be classified into face-to-face connection, face-to-line connection, face-to-point connection, line-to-line connection, line-to-point connection and point-to-point connection (Guo & Wang, 2018).

There are dozens of tenons such as straight tenon, round tenon, hoop tenon, hook-hanging cushion tenon, pin tenon, hidden tenon, through tenon, tongue-and-groove tenon, running horse tenon, palm tenon, mantis tenon, dovetail joint, buckle tenon, cross tenon, step tenon, shoulder cutting tenon, lattice tenon, wedge tenon, shoulder inserting tenon and so on.



» **Figure 2:** *Chinese traditional building tenon eaves structure*

The concept of cultural and creative products

Culture is the sum of all the social phenomena of the intelligent group and the inherent spirit of the group (Shao, 2019). Cultural and creative products are creative products (referred to as cultural and creative products for short). Through the investigation of the existing market, it is found that most cultural and creative products come from permanent exhibitions such as museums and memorials, and these products are generally active in tourist attractions and museums, so the design of cultural and creative products should pay attention to emotion, "when people buy products, they are actually looking for the feeling, identity and story in the product. And they are actually buying emotion and value identification" (Li & Zhang, 2012).

Which are based on culture, adding, and deleting some parts, and conform to the direction of modern consumption. Through the investigation of the existing market, most of the cultural and creative products come from permanent exhibitions such as museums and memorial halls, and these products are generally active in tourist attractions and museums.

The cultural and creative products in tourist attractions have the characteristics of culture, regionality, practicality and marketability. At first, the sales of domestic cultural creations mainly depended on museums, but with more and more regions attaching importance to cultural industries, cultural and creative products with regional characteristics are also deeply loved by tourists.

China's cultural and creative industries began to sprout with the reform and opening up at the end of the 20th century and were advocated in the development of market economy. At the stage when the government promoted the development of the tertiary industry, cultural and creative industries also began to develop gradually.

The field of product design covers a lot of products. Cultural and creative design is to transform culture into products by means of design, so that cultural value can be visualized. Cultural and creative product is to make an existing physical product, add cultural and artistic features, improve the value of the product itself, and make consumers pay for it, to generate purchasing behavior. Such cultural creative product design can be regarded as a successful case.

The definition of emotional design

Han Feizi said: "Although there is a thousand pieces of jade, to the most expensive and not when, the leak can not hold water." Who is the man to do that?" Even if it is a Baoyu wine vessel, if it leaks and cannot hold wine, it will lose its basic function and have no use value (Wang & Fan, 2016). The same is true of cultural and creative products. A good cultural and creative product should be functional, practical, user-friendly and convenient to meet the material or spiritual needs of consumers in many ways.

Donald Arthur Norman, a famous American cognitive psychologist who once held functionalism and pragmatism, also put forward such a new view in his book *Emotional Design*: whether a product is successful or not, the emotional elements of design may be more critical than the practical elements. Integrating emotion into product design will solve the long-term puzzle of designers, that is, the main contradiction between practicality and vision of products [18]. Emotional design requires designers to take users' emotions and emotions as the starting point of design and take them as the overall development and design ideas. Donald. A. Norman classified emotional elements into three different levels, namely "instinct, behavior and reflection".

The instinctive level is to design from the appearance of the product (Lan, 2019). People's observation and understanding of appearance is the result of their own visual nervous system and brain analysis. If the shape of the product is more in line with the user's own instinctive cognitive feelings, the more likely it is for users to accept and like it. The birth and sale of products are inseparable from the designer's understanding and mobilization of consumers' instinct, so high-quality modeling, color and material will often impress users first.

The behavioral level is to design from the function and use of the product (Deng, Chen & Zhou, 2020). The use of products is a series of human operational behaviors on products. If the high-quality appearance is the first impression, then the operation determines whether the user will continue to use them. The purpose of behavior level is to effectively complete functional tasks and have interesting operation experience on the premise of satisfying users' cognition.

The reflection level starts from the conception and story of the product (Wang & Yang, 2022). It is based on a theme idea, so that every product has a story behind it, creating a scene, and then arousing users' subconscious feelings and needs. Based on meeting the functional needs, we will further meet people's spiritual needs. Through the cultural output of the product itself, users' cognition and recognition of the brand are formed, which makes the product have deep-seated value.

In a word, the key point of emotional design lies in moving and impressing, so that the product can meet certain functionality and create an emotional bond with users, resulting in emotional deduction and thinking.

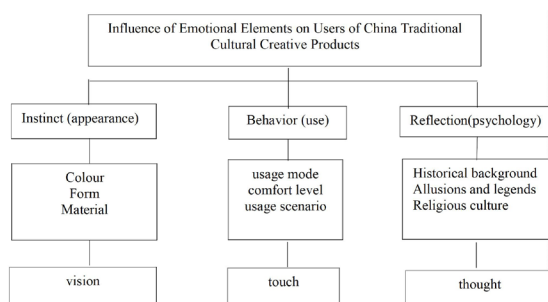
Research on the application of emotional design in product design

Based on the emotional design theory, the three levels of "instinct, behavior and reflection" are regarded as three emotional elements, which correspond to the design of traditional cultural creative products. Starting from the influence of emotional elements on users of traditional cultural creative products, they can be summarized as "appearance, behavior and psychology" (Zhu, Ma & Deng, 2022). Corresponding to the level of human perception interaction, the three influences are subdivided into the level of "vision, touch and thought" of users.

"Vision" refers to the representation design part of traditional cultural creative products, which mainly includes color, shape, and material.

"Touch" refers to the human perception part of traditional cultural and creative products, which mainly includes the user's habitual use, comfort considerations and the judgment of the use scene.

"Thought" refers to the inner feelings and thoughts brought by traditional cultural and creative products to users, which mainly includes historical background, allusions and legends and religious culture. As shown in Figure 3, Cultural and Creative Industry products produce short-term perceptual factors by perceptual stimulation of specific people's vision, touch, and thoughts, which makes users feel emotional about the products.



» **Figure 3:** Influence of emotional elements on users of traditional cultural and creative products in China

The extraction of emotional design elements of China traditional culture starts from three levels:

1. External layer: visual symbols

External image presentation is the most intuitive and commonly used form of expression (Han & Deng, 2022). The external image includes color, modeling, characters, decorative patterns, material texture and other elements.

Giving the most prominent part of the outer layer of culture to the product, such as directly printing local characteristic graphics and patterns on handbooks and canvas bags, the presentation of symbolic elements can quickly convey cultural elements to the main body through the senses, so that consumers can get material satisfaction.

Commonly used design expression methods include material mapping, pattern innovation, three-dimensional plane elements, etc., modern elements and decorative shapes are used more, and cultural elements are more concrete.

2. Middle layer: behavior function

The presentation of cultural behavior process refers to the epitome of a region's long-term lifestyle. It is to deeply understand the skills, functions, operability, convenience of use, safety, combination relationship and other attributes contained in cultural elements and apply them to products.

Usually, it is necessary to recombine with a variety of concrete cultural elements, so that the functions of products can be integrated with the cultural connotations and emotions expressed by behavioral culture. The combination of these skills and creativity makes products more interesting and operational, and consumers can feel the charm of regional culture through participating in the experience.

3. Inner layer: emotional connotation

Emotional connotation is the internal level of culture, including cultural connotation of products, story characteristics of products, emotional characteristics of products and other attributes (Xu & Guo, 2020).

Taking the deepest level of culture as the design point, we use reasonable design techniques to add cultural images, such as cultural legends, ideology, and the concept of praying for blessings, which can resonate with consumers' emotions into the design and creation process, and transform them into products, which convey cultural connotations.

Users can gain associations with regional culture through products, and let users fully understand the rich cultural content of the region.

Research methods and design

Research method

1. Literature research method

Literature research method mainly analyzes the research results of previous scholars, summarizes relevant conclusions, and applies them to existing research. This paper mainly analyzes scholars' information about *mortice-tenon* products and emotional design through literature research, summarizes the theories used in this paper, and lays the theoretical research foundation of this paper.

2. Interview method

Interview method mainly communicates with relevant personnel by means of questionnaire and investigation and obtains the essence of the problem and the strategy to solve it. In this paper, the innovative courtyard lighting design of traditional *mortice-tenon* structural elements in China is the main research object, and field interviews are conducted to analyze the emotional design of *mortice-tenon* products from the user's point of view, and finally constructive suggestions are obtained.

3. Model analysis method

Model analysis mainly refers to a scientific method to realize the prototype by constructing and analyzing research models. This paper mainly uses innovative thinking model to analyze and solve problems.

Research design

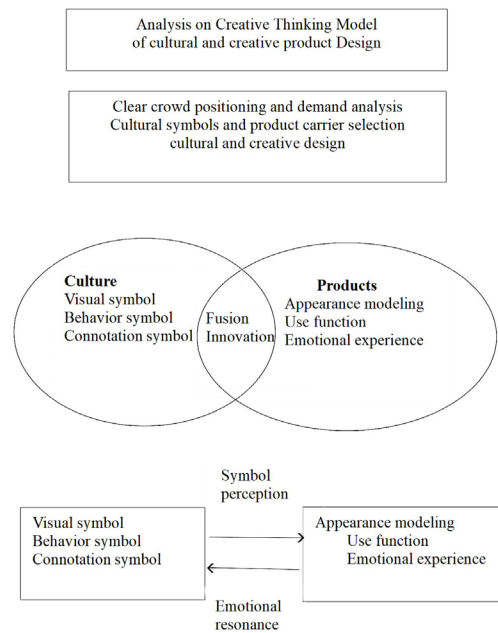
1. Introduction of innovative thinking model of cultural and creative products.

The first point to pay attention to in product design is product positioning. Product positioning is the direction of product design, who is the user of the product, what their use scenarios are, and the main features of the product (that is, selling points, such as functions and emotional attributes). In the design and positioning of products, the choice of target users must be a target consumer group, and special individuals have no reference value. We must have an insight into the common needs of a target consumer group of an order of magnitude, and the development of products will have specific commercial value.

Before product development, you can ask yourself three questions: the first dimension is the target consumer group, which mainly includes target customers, scenarios, channels, prices, and frequency; The second dimension is the product carrier, which mainly includes opportunities, growth points,

functions, materials, processes, and costs; The third dimension is the appeal of product culture.

Based on the three dimensions of culture, such as "visual presentation, use process and emotional appeal", it highlights the innovation of cultural elements such as aesthetics, interaction, experience, and communication. As shown in the figure 4, the innovative thinking model of cultural creative products used in this paper is as follows.



» **Figure 4:** Framework of innovative thinking model for cultural and creative products

2. Expert interviews and user surveys

On the basis of the above model, this paper takes *mortice-tenon* structure cultural creative products as an example to investigate the emotional design of China traditional cultural creative products for users' needs, and the final results are as follows:

First, the basic situation analysis of users.

There are 269 valid data on the mapping data of user demand and emotional design of *mortice-tenon* structural cultural creative products.

As can be seen from Table 1, the proportion of men and women participating in this questionnaire is equal, with the main age ranging from 36 to 45 years old, college education and undergraduate education as the mainstay, and the income is mostly between 5,000 and 10,000 yuan.

It can be seen that grasping the needs of such users is the key to emotional design of *mortice-tenon* structural cultural creative products.

Table 1

Analysis Results of User Basic Information

Name	Option	Frequency	%
Gender	Man	134	49.81
	Woman	135	50.19
Age	25 years old and under	5	1.86
	26 ~ 35 years old	49	18.22
	36 ~ 45 years old	157	58.36
	45 years old and above	58	21.56
Academic degree	High school and below	36	13.38
	Universities and colleges	108	40.15
	Undergraduate course	95	35.32
	Master's degree or above	30	11.15
Income	3000 yuan and below	17	6.32
	3,000-5,000 yuan	80	29.74
	5000-10000 yuan	135	50.19
	10,000 yuan and above	37	13.76
Total		269	100.00

Secondly, the emotional design of *mortice-tenon* structural cultural creative products is analyzed. Specific to the emotional design, the survey results are as follows:

Table 2 (part 1)

Analysis of specific survey results

	Average value	Standard deviation	Number of cases
You pay attention to the appearance (size, shape, lines) of <i>mortice-tenon</i> structure cultural and creative products.	3.33	0.960	269
You pay attention to the color matching of <i>mortice-tenon</i> structure, culture, and creative products.	3.10	0.970	269
You pay attention to the diversity of <i>mortice-tenon</i> structure, culture, and creative products.	3.26	0.877	269
You pay attention to the traditional cultural patterns of <i>mortice-tenon</i> structural cultural creative products.	3.10	0.989	269
You hope that different <i>mortice-tenon</i> structural cultural and creative products can produce different sound effects.	3.19	1.111	269
You want the <i>mortice-tenon</i> structure cultural creative products to be silent.	3.33	1.120	269

Table 2 (part 2)

Analysis of specific survey results

	Average value	Standard deviation	Number of cases
You pay attention to the touch (texture) of <i>mortice-tenon</i> structure, culture, and creative products.	3.30	1.150	269
You pay attention to the material of the product.	3.51	1.042	269
You want the <i>mortice-tenon</i> structure cultural and creative products to have a soft smell, instead of annoying garbage or plastic smell.	3.26	0.885	269
You want <i>mortice-tenon</i> structure cultural and creative products to be able to touch and interact with each other.	3.66	0.860	269

As can be seen from the above table, you hope that the creative products of *mortice-tenon* structure culture can interact with each other by touch, and the material score of the products you care about is high, which shows that the subjects are more recognized;

You pay attention to the color matching of *mortice-tenon* structural cultural creative products, and you pay attention to the self-realization score of traditional cultural patterns of *mortice-tenon* structural cultural creative products, which shows that the consent of the subjects is weak.

Thirdly, the analysis of the integration and innovation of *mortice-tenon* structural cultural and creative products.

Regarding integrated innovation, our conclusions are shown in Table 3.

As can be seen from the table 3, you hope that the *mortice-tenon* structure cultural creative product has a high practical score, which shows that the subjects are more recognized;

You hope that *mortice-tenon* structure cultural and creative products can be used in cultural and educational activities, but the score is relatively low, indicating that the consent of the subjects is weak.

Fourthly, the analysis of emotional resonance of *mortice-tenon* structure, culture and creative product design. Specific to emotional resonance, the research results obtained in this paper are shown in Table 4.

Table 3

Statistics on Integration and Innovation of Cultural and Creative Products

	Average value	Standard deviation	Number of cases
You want the <i>mortice-tenon</i> structure cultural creative products to be practical.	3.46	1.163	269
You want the creative products of <i>mortice-tenon</i> structure culture to be ornamental (such as sculptures, sketches, ornaments, seals, etc.)	3.29	1.111	269
You want the <i>mortice-tenon</i> structure cultural and creative products to be large and used in daily life (such as furniture, lamps, space ornaments).	3.32	1.205	269
You want the <i>mortice-tenon</i> structure cultural creative products to be small "tools" that can be used.	3.36	0.860	269
You hope that the creative products of <i>mortice-tenon</i> structure culture can have commemorative significance.	3.33	0.800	269
You hope <i>mortice-tenon</i> structure cultural creative products can be used in social activities.	3.42	0.888	269
You hope that <i>mortice-tenon</i> structure cultural and creative products can be used in cultural and educational activities.	3.23	0.741	269
You want <i>mortice-tenon</i> structure cultural creative products to be used in your work.	3.27	0.671	269

Table 4 (part 1)

Statistics of emotional resonance of *mortice-tenon* structural cultural and creative

	Average value	Standard deviation	Number of cases
You hope that the creative products of <i>mortice-tenon</i> structure culture can increase your thinking and identity with traditional culture.	3.34	0.902	269
You hope that the <i>mortice-tenon</i> structure cultural creative products can have strong traditional cultural feelings.	3.36	1.037	269
You hope that the creative products of <i>mortice-tenon</i> structure culture can help you get out of the negative state.	3.51	1.021	269

Table 4 (part 1)

Statistics of emotional resonance of *mortice-tenon* structural cultural and creative

	Average value	Standard deviation	Number of cases
You hope that the <i>tenon-mortise</i> structure cultural creative products can make you remember and associate with a certain culture.	3.28	0.811	269
You hope that the <i>mortice-tenon</i> structure cultural and creative products can enhance your sense of self-identity.	3.45	0.774	269
You hope that the creative products of <i>mortice-tenon</i> structure culture can enhance the social recognition of you.	3.57	0.824	269
You hope that the <i>mortice-tenon</i> structure cultural and creative products can enhance your sense of belonging.	3.30	0.676	269

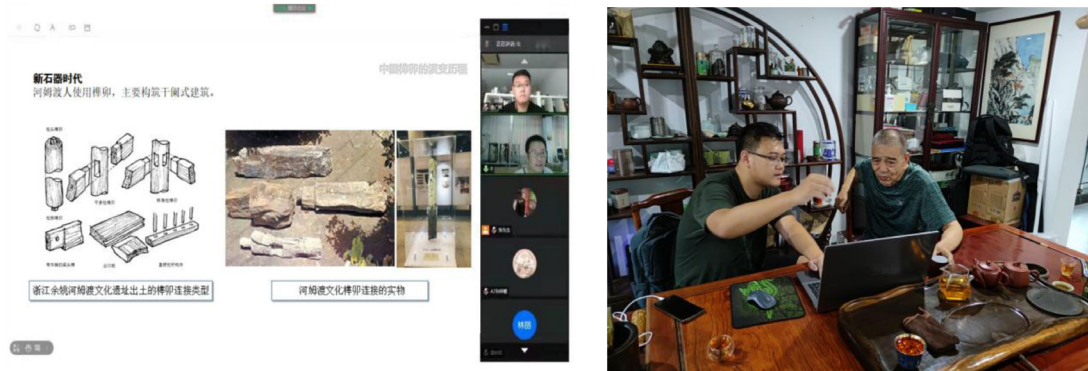
As can be seen from the above table, you hope that the creative products of *mortice-tenon* structure culture can enhance the social recognition of you, which means that the subjects are more recognized;

You hope that the *mortice-tenon* structure cultural creative products can make you remember and associate with a certain culture, but the score is relatively low, indicating that the subject's consent is weak.

3. Design the research process

Professor Pu Anguo, a famous furniture scholar in Ming and Qing Dynasties, said that it is necessary to study deeply the rules of Chinese furniture shape modeling, structural innovation, mass production demand, material selection, wood color, texture, smell, origin and so on. Modern Chinese furniture has a history of more than 20 years. It is necessary to fully investigate domestic Chinese furniture enterprises, especially those in Jiangnan, Suzhou, and Nan-tong, as well as Shunde and Dongguan in Guangdong, which have their own characteristics in recent years.

Dr. Feng Xianwei, a senior interior designer of China Interior Decoration Association, said, "If you want to have in-depth communication with wood processing plants and furniture manufacturing plants, you must go to the factories to understand the technological process (Figure 5); Taking Suzhou-style garden architecture as an example, how to extract effective expression techniques and form-shaping features from it is conducive to the in-depth development of products. For example, simplify and evolve the traditional furniture structure.



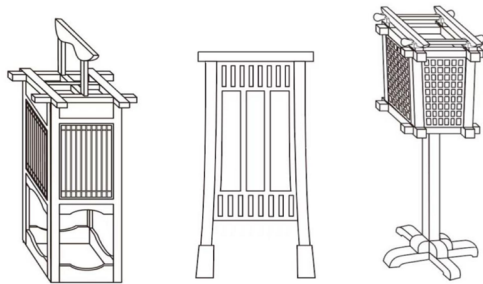
» **Figure 5:** Interview and communication between the author and experts

Extract and abstract some characteristic elements or typical elements. All these have an important impact on the development of this topic.

4. *Design and research process*

Based on the above data analysis and results, we can see that the design of cultural and creative products based on user needs should consider the income of the middle humanities, product practicability, social recognition, and other aspects. First of all, attention should be paid to the design rationality in the process of the first stage design demonstration.

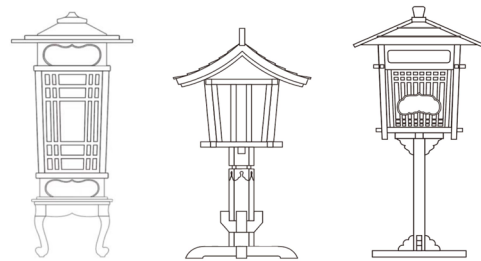
As shown in Figure 6, a detailed analysis of the product's characteristics should be performed prior to the design. Including: 1. Easy to assemble, carry; 2. Indoor and outdoor multi-scene application; 3. Diversified combination styles to meet different needs.



» **Figure 6:** Sketch of mortice-tenon structure innovative luminaire products

Secondly, the second stage of the design study is to deepen the design according to the opinions of experts. As shown in Figure 7, the cultural creative products of deepening mortice-tenon structure have the following characteristics: 1. & 2. Design outdoor lamps for the courtyard scene; 3. Diversified combination styles to meet different needs.

Based on this, combined with expert advice, we should pay attention to the practical design, cultural principles. To increase the structure of the roof of the ancient building.



» **Figure 7:** Design sketch of mortice-tenon innovative garden lamps in the second stage

Finally, the third stage chooses a product for further study according to expert advice and user survey. As shown in Figure 8, after analyzing the specific situation of the product characteristics, we can see: 1. Open the roof and replace the internal light source; 2. & 3. easy to operate, the hexagonal structure of the base is very strong; You can choose from a variety of light sources, either rechargeable or plug-in. Because the design carrier of garden lamps is the main one at this stage, the product can continue to be transformed according to the same parts in the later stage. This will be more conducive to the use and choice of consumers, can be transformed according to different uses; In addition, the appearance of spraying can also be customized, according to the needs of consumers spraying, this will be more modern, strengthen the role of emotional design method.

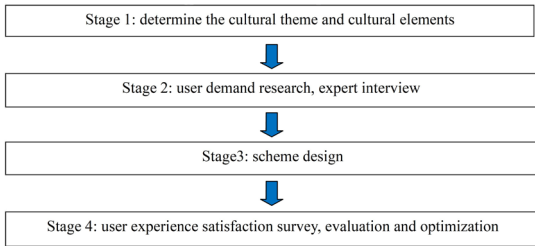
Design conclusion

Emotional design process of Chinese cultural creative products

The emotional design of Chinese cultural creative products is to combine the emotional needs of users in household products and express the emotional information of users in the design stage. Therefore, in the whole process of the application, we should pay attention to the collection of users' emotional information and the integration of emotional design.



» **Figure 8:** Final design of garden mortice-tenon innovative luminaire design



» **Figure 9:** The emotional design process of lighting products based on Chinese traditional culture

As shown in the figure above, the process of emotional design of lighting products based on Chinese traditional culture is divided into four stages: cultural theme determination, user experience research, program design, evaluation, and optimization. Choose a perspective from the traditional culture for in-depth theoretical research, so that the ideas conveyed can be in line with modern

aesthetic orientation and values. After determining the design theme, the target users are surveyed and interviewed to understand the users' inner functional and emotional needs for lighting products.

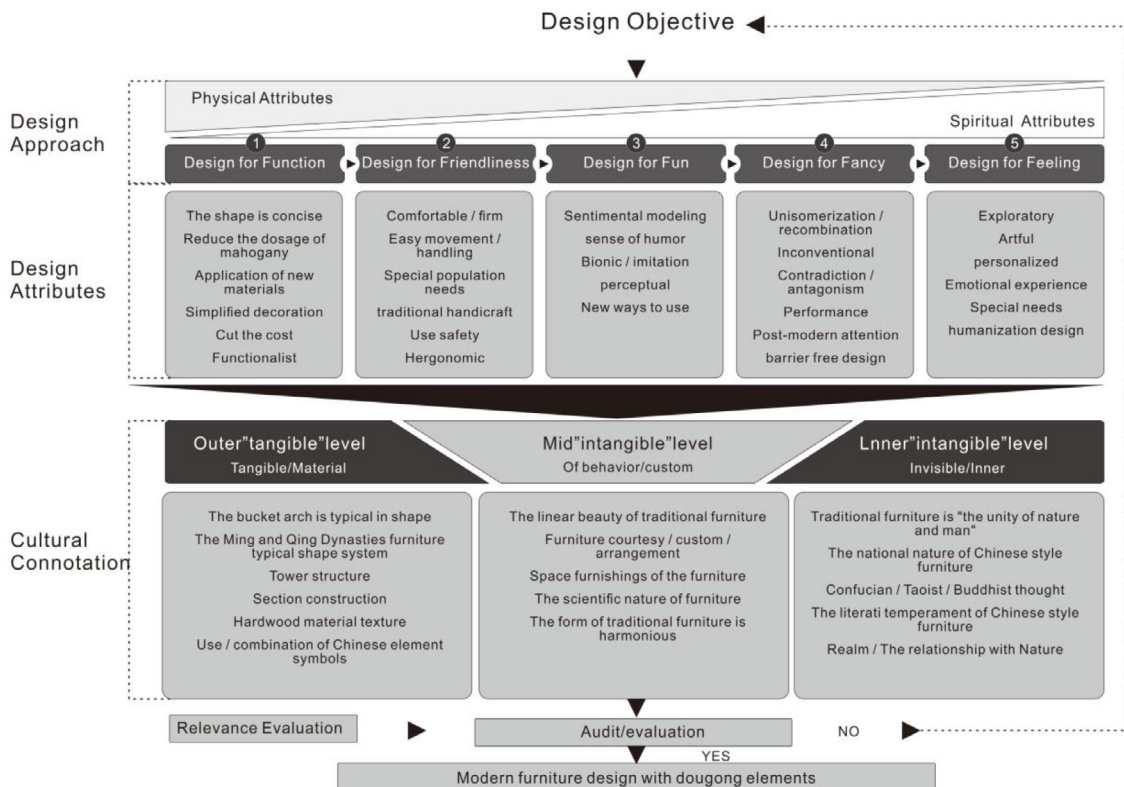
Through brainstorming and many sketches, the innovative design of emotional household lighting is carried out.

Starting from the aspects of shape, function, and cultural connotation, we designed a lamp product that is both interesting and does not lose cultural connotation, so as to bring users a new emotional interaction experience and cause users to identify with traditional Chinese culture. In addition, to bring better experience to users and make the product more perfect, initial interviews are still selected to evaluate the experience of the product to target users after the initial plan is completed.

According to the evaluation results, the poor user experience should be further improved and perfected.

Principles of emotional design of Chinese cultural creative products

1. The principle of rationality
2. The principle of creativity
3. The principle of culture
4. Economic principles



» **Figure 10:** Emotional thinking of China traditional cultural creative products based on hierarchy of needs theory

Emotional design model of traditional Chinese cultural creative products based on hierarchy of needs theory

After studying the emotional design of traditional Chinese cultural creative products based on user needs, the author summarizes the emotional design model of traditional Chinese cultural creative products based on the hierarchy of needs theory. The design conclusion of this paper is shown in the figure 9.

Conclusion

This paper studies its innovative design path in modern cultural and creative products, reconstructs device design, develops functional mortise and tenon and tenon products, and outputs mortise and tenon and tenon cultural connotations to the outside world. Based on maintaining the traditional wisdom of mortise and tenon structure, emotional design method can be used to open new ideas for the design of modern cultural products in China.

The application of *mortice-tenon* structure in the design of cultural and creative products mentioned in this paper only provides a feasible scheme for the design of cultural and creative products in the future. Of course, there are more possibilities to be discussed. It is hoped that this study can contribute to the development of traditional Chinese cultural and creative products. In 2023, there will be many new situations and more new possibilities for cultural and creative design.

The author hopes that through this way, China's traditional culture and traditional craft can have new market and new vitality. In the future, we will continue to search for the innovation points of *mortice-tenon* joints, combine them with modern times, put inheritance and innovative development into the primary consideration, and make *mortice-tenon* joints skills show their unique advantages in the development of modern society.

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