Emotional Design of Cultural and Creative Products for Rural Tourism Based on AHP Hierarchical Analysis

Chengjun Zhou[1, a], *Lian Chen[1, b], Lian Cheng[2,c]

[a]635532939@qq.com
[*b]1770376918@qq.com
[c]chengliana1997@163.com

[1]School of Arts & Design, Hubei University of Technology
[2]Dongfeng Commercial Vehicle Technology Center

Abstract. In recent years, the development of the rural tourism industry has been rapid, but the design of rural tourism culture and creativity has been stagnant, and it is difficult to meet the spiritual needs and cultural identity of tourists. Based on the three layers of emotional design: instinctive layer, behavioral layer, and reflective layer, this paper analyzes the important indicators of emotional design through AHP hierarchical analysis, summarizes the design ideas of emotional rural tourism cultural and creative products, and verifies them through example applications, to create emotional rural tourism cultural and creative products to enhance rural The design of the product will be validated by example application, to create emotional rural tourism products to enhance the charm of the countryside and improve product design.

Keywords: Rural tourism; cultural and creative products; AHP hierarchical analysis; Emotional design

1 Introduction

China's rural tourism has been developing for more than 30 years since its emergence in the 1990s. In recent years, many rural areas in China have undergone radical changes, and the development of rural tourism has ushered in new opportunities. Some regions have begun to integrate cultural and creative industries into rural tourism, striving to promote the unique local culture and creating rural tourism products that meet people's inner spiritual and cultural demands. The combination of rural tourism and cultural and creative industries is the trend [1], and the creation of rural tourism cultural and creative products that resonate with tourists' emotions is of great practical significance to promote the development of the rural tourism industry in China.

2 Overview of cultural and creative products of rural tourism

Cultural and creative products are products with spiritual attributes that are reinterpreted and created by applying an innovative approach to a certain cultural theme and are generally presented in the form of physical carriers such as products [2]. As an indispensable part of tourism

culture, they are cultural, economic, functional, and aesthetic in nature. In recent years, there has been a "local culture fever" in China, and the number of rural tourists has soared. According to a survey, in 2020, more than 50% of tourists go to the countryside for cultural experiences, as shown in Figure 1. The cultural products of rural tourism have become part of the cultural consumption of tourists.
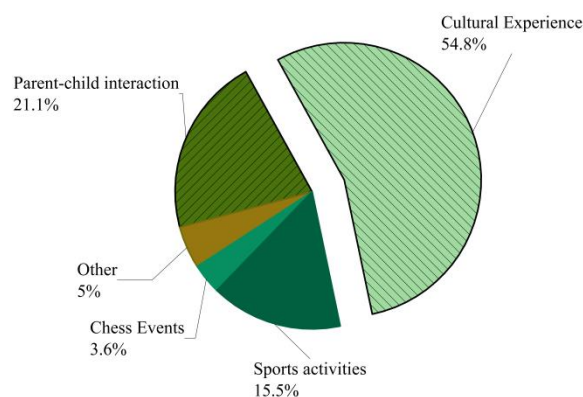
Fig. 1. Proportion of China's rural tourism in 2020（Self-drawn by the author）

In order to make the cultural and creative products effectively spread the culture of rural tourism and thus promote the development of the rural tourism industry, some scholars have also proposed a series of feasible strategies, such as: grinding to study the design strategy of tourism cultural and creative products from the strategic level and practical level respectively, pointing out that refining the appropriate cultural symbols and implanting them into the appropriate product carrier is the key to ensure that the tourism cultural and creative products do not make mistakes [3]. Xiao, You et al. proposed that extracting local cultural elements and integrating them into tourism cultural and creative products can effectively inherit the local culture [4]. Chen Hui proposed integrating rural cultural materials as design inspiration and using product design to open the market [5]. Zhao Hua et al. explored the way of integrated development of rural tourism cultural and creative industries in China from the perspective of industrial integration [6]. As an indispensable part of the rural tourism industry, most of the scholars' research on rural tourism industry has been limited to exploring the surface status of industrial integration, summarizing the development mode, and analyzing the regional cultural symbols, but relatively little attention has been paid to the user's psychological and emotional demands, and rural cultural tourism products lack emotional dispatching, which makes it difficult to meet the users' spiritual and cultural needs. In this paper, we will discuss the ideas of rural tourism product design based on consumers' emotional demands, which will deepen users' image and emotion for the countryside and play a crucial role in the dissemination of rural culture and the development of the rural tourism industry.

3 Emotional design ideas of cultural and creative products for rural tourism

Emotions are innate to human beings and are easily stimulated by the outside world to produce different psychological reactions, such as joy, anger, sadness, and happiness. Therefore, emotion is a subjective feeling, reflecting not the objective thing itself, but the relationship between the human and the object. Emotional design refers to giving the user's emotional needs into the design so that the user can satisfy the emotional pursuit in the process of use, which is essentially a return to humanized design and user-centered rather than product-centered [7]. Donald A. Norman, an American cognitive psychologist, proposed three levels of affective design: the instinctive level, the behavioral level, and the reflective level [8].

3.1 Design Ideas

The three levels of emotional design theory have their characteristics and are related to each other in a progressive relationship. According to the different design purposes and user needs, the three levels of emotional design can work individually and together for the cultural and creative products of rural tourism.

3.2 Instinctive layer: the intuitive feeling of appearance

The design of cultural and creative products for rural tourism should first consider the aesthetic interest of people. The pursuit of beauty is a human instinct, and the main reason why people are keen on rural tourism is that there is picturesque scenery such as gurgling streams, long white clouds, and curling smoke in the countryside, which is very different from the hard steel and concrete in the city. The first stimulus that users receive when they are confronted with creative products is visual perception, which in turn mobilizes associations and emotions. The instinctive layer includes materials, colors, forms, and other basic elements that are visible in appearance.

3.2.1 Material selection

As the first Chinese craft book, "KaoGongJi" puts forward the design idea of "the sky has time, the earth has air, the material has beauty, and the work has the skill, combining these four can be good", which shows that the selection and application of materials for cultural and creative products is also very important. The villages in different regions have their natural environment and living customs and build up their own distinctive rural culture. In the selection of materials for cultural and creative products for rural tourism, we can use local materials that match the local folk crafts, such as ceramics, jade, wood, etc. We can also consider modern materials that meet the market demand, such as acrylic, artificial fiber, etc. combined with traditional natural materials. In short, the choice of materials for cultural and creative products of rural tourism should be combined with local cultural resources, balancing local characteristics and market prospects.

3.2.2 Color matching

The greatest visual impact is the color, and different colors bring different feelings, for example, red makes people energetic and enthusiastic; green makes people quiet and mild; gray makes

people depressed and empty. In the design process of rural tourism products, designers should respect and choose the colors that fit the rural regional culture, and use modern design techniques to make users feel the real sense of being there while enjoying the traditional folk culture in the modern aesthetic.

3.2.3 Morphological design

The definition of morphology in the Dictionary of Contemporary Chinese refers to the shape or expression of things, and the design of cultural and creative products is divided into two main categories. The other type is to extract the characteristic natural forms for bionic design or analyze its spiritual core to interpret the traditional modeling concept from a modern perspective. The form of rural tourism cultural and creative products depends on the selection and refinement of the realistic elements of the countryside, combined with the modern development background to create a new form that not only conveys the local culture but also meets the aesthetics of the public.

3.3   Behavioral layer: mental mapping of use

3.3.1 Functional requirements

As early as the pre-Qin period, "Gongshu for magpie" in Mozi proposed: "Therefore, the work for the benefit of people is called clever, not conducive to say people's clumsy." That is, from the design point of view, the most important thing is to be able to meet the needs of people, based on meeting the needs to make people convenient is "smart", only the appearance of good-looking but no practical is "clumsy". The more frequently a product is used, the higher the value of the product. The prosperity of the cultural and creative market in recent years has also proven that functional cultural and creative products are more likely to be successful in the market.

3.3.2 Pleasant to use

The more convenient and easy to use a product is, the easier it will be accepted by users. A good product can be easily used by users with different knowledge backgrounds, cognitive abilities, and physical conditions. The size and weight of the carrier of the rural tourism product also affect the feeling of use. For tourists who travel long distances, the best choice is a lightweight and easy-to-carry rural tourism product. Secondly, the operation of rural tourism products should not be designed to be too complicated, usually with one or two functions that are the easiest for users to accept.

In short, the behavioral layer design of rural tourism products is to let users have the expectation of using and have a good and comfortable experience in the process of using, to ensure the pleasure of using.

3.4   Reflective layer: emotional cues of the psyche

The reflective level of design is the superposition of the instinctive and behavioral layers, the cultural core, and the user's psychological connection so that users produce memories and emotional images. It is not only to let users feel the historical background and cultural connotation behind the cultural and creative products but also to let users evoke their own memories of the past through elaborate design and create emotions for the products. The reflective layer design of rural tourism cultural and creative products uses scenario construction and narrative space

design to convey feelings through the reshaping of rural scenery, attracting users' understanding of rural culture and strengthening their emotional experience.

3.4.1 Use narrative design to convey emotion

The narrative design of cultural and creative products is designed with a certain event or object, and the design focuses on transforming the "thing" into an "event", using the product as a carrier for users to generate story memories and achieve emotional resonance [9]. The narrative design transforms events into concrete symbols of cultural and creative products, and uses the symbols to arouse users' association and imagination, so that users can feel the deep cultural connotation of the products in the process of using them, and cause them to have emotional resonance. Rural tourism cultural and creative products can also transform the classic events of the rural past into symbols, translate them, and evoke the emotional resonance of users.

3.4.2 Use scenarios to build emotional connections

"Scenario" is different from "scene", which is generally realistic and figurative, such as the restoration of iconic architectural scenes in the design of cultural and creative products, which is more straightforward and limited, and not enough to reflect the full connotation of cultural and creative products. Scenes include scenes, and can also convey real feelings through virtual scenes, presenting a highly generalized spiritual context through scenes and conveying real emotions to users. For example, the recreation of pleasant natural scenery in the countryside, and the use of products commonly used in daily life as a carrier, can evoke memories of the leisurely life in the past for people who work in busy cities.

4   Design Practice

Wuyunshan Village is located in a small mountain village in Huanggang, with a thousand-year history and a deep cultural heritage, which has cultivated many Such as Chu Bei and a large number of benevolent scholars. Although the village is visited by a lot of people but the corresponding industrial chain is not perfect, but also the lack of interaction and emotional connection with tourists, results in tourism is not developed. The author wants to integrate the concept of emotional design into the village's cultural and creative products to create a charming rural tourist attraction that makes visitors want to come back from time to time after leaving.

4.1   Analysis of Cultural Factors in Wuyunshan Village

Through field research and literature study, the cultural factors of Wuyunshan Village were extracted and roughly divided into material and immaterial cultural factors as shown in Table 1.

Table 1. Cultural factors of Wuyunshan Village (Self-drawn by the author)

Type	Classification	Cultural Elements
Material cultural factors	Natural Culture	Leigong Rock Terraces, Wuyunshan Brand Tea
	Ecological Culture	Tea tree, horsetail pine, oil tea, heather bamboo, etc.

| | Red Culture | Chen Shi, a famous Confucian of Chu Bei, Zhan Dabei, a pioneer of the old democratic revolution, and Cha Guozhen, the first general of the Republic of Herb, etc. |
| Intangible Cultural Factors | Folk Culture | Various production techniques, traditional crafts, performing arts, handicrafts and mountain songs, drum books, Lianxiang dances, lion and dragon dances, etc. |

4.2 Analysis of the structure of cultural and creative products in Wuyunshan Village based on hierarchical analysis

4.2.1 Hierarchy model and determination of indicators

Hierarchical analysis (AHP for short) was proposed by Saaty, an operations researcher, to analyze complex problems in layers one by one, and to obtain the decision analysis method of element priority through certain methods. The establishment of scientific and perfect emotional design indexes for Wuyunshan Village can improve the quality of product design and promote the development of the tourism industry in Wuyunshan Village. Now the emotional design of the rural tourism cultural and creative products is the goal for decision-making, emotional three-level design features are set as the criterion layer, through the tourist questionnaire and review of the literature and other methods to determine the design factors based on the criterion layer as the indicator layer, thus building out the emotional design structure of the Wuyunshan Village hierarchical model shown in Figure 2.
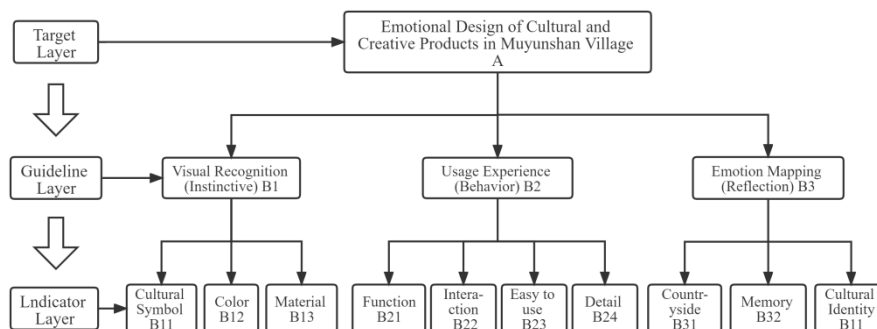

Fig. 2. Hierarchical model of emotional design structure of Wuyunshan Village (Self-drawn by the author)

4.2.2 Establishment of judgment matrix and weight calculation

Hierarchical analysis of each hierarchical structure does not have the same weight in the minds of different decision makers, so a questionnaire survey was conducted on the visitors of Muyunshan Village, and the respondents were designed for school students, adult workers, and older people with independent aesthetics of different ages of visitors. The scaled scoring used in the study is a 1-9 scale theory as shown in Table 2, the three criteria layers and 10 demand factors in the minds of tourists to compare the importance of two by two, one-by-one scoring, to deter-

mine the importance of design elements between, and to be scaled quantified to form the judgment matrix between the layers. Different scales of scoring will have various effects on the judgment matrix.

Table 2. Importance Level Evaluation (Self-drawn by the author)

Scale	Meaning
1	2 elements have the same importance compared
3	Compared to the 2 elements, the former is slightly more important than the latter
5	Compared to the 2 elements, the former is significantly more important than the latter
7	Compared to the 2 elements, the former is strongly more important than the latter
9	Compared to the 2 elements, the former is more extremely important than the latter
2, 4, 6, 8	Denote the intermediate values of the above adjacent judgments
Countdown	If the importance of element i and j is a_{ij}, then the ratio of the importance of element j to i is $a_{ji}=1/a_{ij}$

The above judgment matrix is normalized by column vectors and row vectors, and then the characteristic roots and eigenvectors are obtained by calculation, where the largest characteristic root λ_{max} corresponds to the eigenvector w. The calculation formula is as in equation (1).

$$A \cdot w = \lambda_{max} * w \qquad (1)$$

Where A is the judgment matrix, and the derived w is the weight of each evaluation factor, which is also the ranking of importance. After deriving the index weights of the emotional design of Wuyunshan Village, further consistency tests are required to ensure the reasonableness of the weight assignment. Among them, the judgment matrix feature vector and the weights of each of its index factors are shown in Table 3-Table 6.

Table 3. Target layer A judgment matrix and weight (Self-drawn by the author)

A	B_1	B_2	B_3	Eigenvector	Weight w (%)
B_1	1	6	1/2	1.442	34.836
B_2	1/6	1	1/7	0.288	6.947
B_3	2	7	1	2.41	58.215

Table 4. Criteria Level B_1 Visual Recognition Judgment Matrix and Weight (Self-drawn by the author)

B_1	B_{11}	B_{12}	B_{13}	Eigenvector	Weight w_1 (%)
B_{11}	1	2	6	2.289	57.69
B_{12}	1/2	1	5	1.357	34.2
B_{13}	1/6	1/5	1	0.322	8.11

Table 5. Criteria Level B_2 Use Experience Judgment Matrix and Weight (Self-drawn by the author)

B_2	B_{21}	B_{22}	B_{23}	B_{24}	Eigenvector	Weight w_2 (%)
B_{21}	1	5	7	5	3.637	63.229
B_{22}	1/5	1	3	1	0.88	15.3
B_{23}	1/7	1/3	1	1/3	0.355	6.171
B_{24}	1/5	1	3	1	0.88	15.3

Table 6. Judgment Matrix and Weight of B_3 Emotion Mapping in Criteria Layer (Self-drawn by the author)

B_3	B_{31}	B_{32}	B_{33}	Eigenvector	Weight w_3 (%)
B_{31}	1	7	5	3.271	73.959
B_{32}	1/7	1	1/2	0.415	9.381
B_{33}	1/5	2	1	0.737	16.659

4.2.3 Consistency Verification

The inconsistency may occur when two comparisons of importance are made, so it is necessary to test the above results for consistency. When the test result CR≤0.1, it indicates that the inconsistency of the data is within the acceptable range and passes the one-time test, otherwise it does not pass, and the smaller the CR value, the stronger the consistency. The formula for calculating its CR value is shown in equation (2).

$$CR = \frac{\lambda_{max} - n}{(n-1) * RI}$$

(2)

Where λ_{max} is the maximum characteristic number of the matrix, n is the order of the matrix, and RI is the test index of the average consistency with the matrix order given by Saaty is shown in Table 7. According to equation (2) for the target layer A, criterion layer B_1, B_2, and B_3 for a one-time test, the test results are shown in Table 8, the results are less than 0.1, through the one-time test, from which the comprehensive weight of each indicator element is calculated as Table 9, to facilitate the selection of design indicators.

Table 7. Average Consistency Test Indicators (Self-drawn by the author)

Order of the matrix (n)	1	2	3	4	5	6
RI	0	0	0.52	0.89	1.12	1.26

Table 8. Consistency Inspection Results (Self-drawn by the author)

Parameters	A	B_1	B_2	B_3
λ_{max}	3.032	3.029	4.073	3.014
RI	0.52	0.52	0.89	0.52
CR	0.031	0.028	0.028	0.013

Table 9. Comprehensive Weight Value of Design Index Elements (Self-drawn by the author)

Indicators	Visual Identity B_1	Use experience B_2	Emotion Mapping B_3	Subjective weight	Sort
Product Design A	0.34836	0.06949	0.58215		
Cultural Symbol B_{11}	0.5769			0.200969	2
Color B_{12}	0.342			0.119139	3
Material B_{13}	0.0811			0.028252	7
Function B_{21}		0.63229		0.043938	6
Interaction B_{22}		0.153		0.010632	8
Easy to use B_{23}		0.06171		0.004288	10
Detail B_{24}		0.153		0.010632	8
Countryside B_{31}			0.73959	0.430552	1
Memory B_{32}			0.09381	0.054611	5
Cultural Identity B_{33}			0.16659	0.09698	4

From Table 9, it can be seen that when using the hierarchical analysis method to analyze the indicators of cultural and creative product design in Wuyunshan Village, priority should be given to the five design indicators of Countryside B_{31}, Cultural Symbol B_{11}, Color B_{12}, and Cultural Identity B_{33}, and Memory B_{32}.

4.3 Instinctive level design

A random questionnaire survey was conducted among the target group aged 18 to 60 who had visited Wuyunshan Village. 500 questionnaires were sent out and 476 valid questionnaires were returned, involving 176 university students (including college students, undergraduates, and postgraduates), 169 adult workers, and 131 middle-aged and elderly people who were close to retirement or had retired.

The analysis of 476 questionnaires shows that 161 students, 158 adult workers, 113 elderly people, and 432 tourists in total like the Leigong Rock Terraces in Wuyunshan Village the most, accounting for 90.76%, as shown in Figure 3, and the percentage of college students, adult workers and middle-aged and elderly people who like the Leigong Rock Terraces is around 90%.
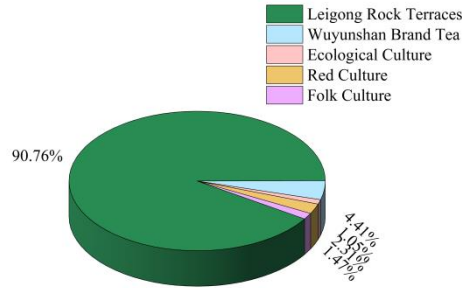
Fig. 3. The proportion of the elements most reflected by visitors（Self-drawn by the author）

Based on the above research results, Leigong Rock Terraces was chosen as the main visual symbol of the design. On the one hand, the most popular cultural factor of tourists is more likely to cause emotional resonance, On the other hand, Leigong Rock terraces have a thousand-year history and are a model of Chinese farming civilization, both in terms of their meticulous cultivation and their water conservancy facilities.

For the color extraction, the color images of the Leigong Rock terraces were searched and the representative color images were pixelated. The main colors were extracted and stored (added to the color palette) using Photoshop processing software. The extracted main colors were added to the color palette, and it was found that there were mostly green color pictures. Therefore, the color selection of this cultural and creative product is mainly green.

The extracted colors were filtered and finally determined to be four colors as shown in Figure 4, with greenish representing the beginning of life, youth, and hope; spring green representing lushness, vitality, and nature; and dark green representing calmness, security, and growth. The green tone can play a role in relieving stress, while the direct visual stimulation can further deepen the image of the user of the Leigong Rock terraces, prompting the user to form a neat and regular natural image of the Leigong Rock terraces in his mind.
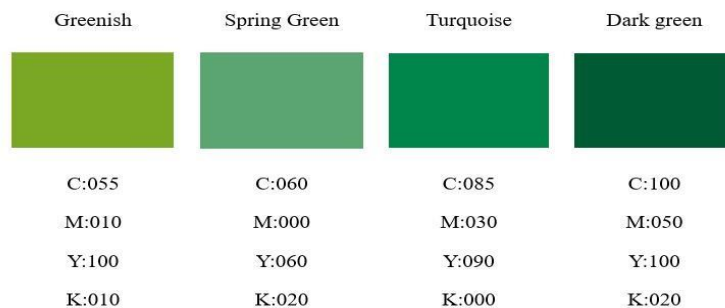
Fig. 4. Leigong Rock terrace color selection（Self-drawn by the author）

4.4 Behavior level design

The behavioral layer design of rural tourism cultural and creative products mainly lies in the design of functions, focusing on the user's pleasure in using them. According to the user's consumption motive, the products can be divided into functional and hedonic, with functional products satisfying basic requirements and hedonic products bringing high-level satisfaction, triggering feelings of pleasure, mobilizing emotions, and satisfying users' curiosity and other emotions [10]. After an in-depth analysis of the cultural factors of Wuyunshan Village, the household humidifier was selected as a carrier for the relevant cultural and creative product design. On the one hand, the humidifier, as a practical product, can be used to increase the humidity of the room air, and the terraces in the middle are designed as small night lights, and the soft lights can be used for the role of night lighting as shown in Figure 5. On the other hand, the mist of the humidifier is similar to the morning mist mood of the mist cloud mountain village, users relax and subtly relieve stress. In the details of the design, the user can fill the water without opening the lid, and the convenient design fully mobilizes the user's sense of pleasure, integrating function and enjoyment.

Fig. 5. Wuyunshan humidifier cultural and creative product（Self-drawn by the author）

4.5 Reflective Level Design

Nowadays, the fast-paced life wraps people constantly busy, and leisure and relaxation become the deepest desire of people. Through the scene of using a humidifier, it recalls the beautiful life of the past and the ideal state of longing for the future, soothing the pressure of the present life. At the same time, the terraces are a miracle of Chinese farming civilization, not only having ecological value but also reflecting the spirit of hard work and unique wisdom of the Chinese people. No matter where you are in the process of using, you can recall the beautiful scenery and natural culture of Wuyunshan Village, review the traditional culture through the terraces in the humidifier, miss the farming culture that is increasingly difficult to feel in modern urban people and recall the terraces culture as a world cultural heritage.

5   Conclusion

In this paper, we investigate the design of cultural and creative products for rural tourism based on emotional design, and explore the design of cultural and creative products for rural tourism that meet the needs of tourists from three different levels: instinctive level, behavioral level, and reflective level, and use the hierarchical analysis method to derive design indexes in case practice to effectively design for the multi-dimensional needs of tourists, to design cultural and creative products for rural tourism that satisfy tourists, convey local culture, and improve their emotional identity.

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