

Research on Public Facilities of Willow Weaving in Huaihe River based on Interactive Relationship Design

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Abstract

Under the background of Huai River Wicker Handicrafts Art protection and inheritance, this paper takes urban public facilities as the basic research object, and puts forward four design principles of HuaiRiver Wicker weaving public facilities through the analysis and comparison of willow weaving skills and interactive relationship design theory. At the same time, it is analyzed and explained with the help of design practice, which puts forward new ideas for the inheritance and development of willow weaving traditional skills in the city, which is of great significance to improve the city image and enhance the comprehensive strength of urban culture.

Keywords

Huai River Wicker Handicrafts Art; Communal Facilities; Interaction Relationship Design.

1. Introduction

Huaihe willow weaving is located in Huoqiu, Funan, Anhui and Gushi, Henan. Among them, Huoqiu and Funan willow weaving have become national intangible cultural heritage. Huaihe willow weaving originated in the Song and Yuan Dynasties and flourished in the early Qing Dynasty. Its functions and forms are diverse, which is the concentrated embodiment of the production and lifestyle of local residents. [1] With the rapid development of urbanization, the protection and inheritance of traditional skills are facing the impact of modern urban culture. Urban development provides a broad stage for the category and development of public facilities. As an important unit in the urban public space environment, public facilities represent the image, spiritual culture and artistic taste of the city to a certain extent. Urban public facilities have a wide range of applications and categories, including street lamps, electric poles, seats, garbage cans, sculptures, fountains and other items. It can be seen that public facilities not only facilitate people's health and daily travel, but also have strong artistry and appreciation. Taking the public facilities of willow weaving in Huaihe River as the basic research object and the interactive design as the research means, this paper puts forward its own design strategy for the protection, integration and development of urban culture and willow weaving skills.

2. Research Status of Willow Weaving Public Facilities in Huaihe River

Zhang Jing, Cha Tingting[2](2021) combined the Chinese Zodiac with the willow weaving skills, and proposed the way to inherit the willow weaving in Funan with the modern Chinese Zodiac willow decorative painting; Cui Xiaolei[3](2020) put forward the corresponding design strategy for the application of willow seat in public space; Chu Qingqing[4](2019) proposed the digital design of willow weaving cultural and creative products, which was illustrated with the example of willow weaving creative lamps; Zhou Zhenxing et al. [5](2018) proposed the modular design method of willow woven indoor furniture and analyzed it with a practical case. Liu gengtian and Liu Gang[6](2017) made a detailed analysis and Discussion on the willow woven facade of the Spanish Pavilion of the 2010 Shanghai World Expo; Liu Dabiao[7](2016)

analyzed and explored the willow weaving process from different angles such as material, shape and color in combination with architecture, environment and furniture, and put forward a new formal language of artistic design of willow weaving process. It can be seen that in recent years, different scholars have studied the technology, materials and innovative design of willow weaving from different dimensions, which has laid a foundation for the inheritance and development of willow weaving; At the same time, it is found that the relevant scholars' research on willow weaving public facilities is obviously insufficient, and the research on the relationship between willow weaving technology and urban public facilities from the perspective of design has great prospects.

3. Study on the Relationship between Public Facilities and Interactive Design of Willow Weaving in Huaihe River

3.1. Research on the Relationship between Interaction Design

In 1984, British bill mogrich[8] first proposed the concept of interaction design, which was initially applied to the interaction between human and computer. The development of Internet of things and science and technology provides material conditions and technical basis for interactive design. The concept of interaction continues to expand. At present, it has been widely used in architectural design, environmental design and urban planning. The research object of interaction design is "user centered" user experience and user participation, which is the gradual evolution from material logic to behavioral logic and then to emotional logic. Therefore, the focus of interaction design is to establish the emotional logic relationship between people and things through a series of effective design means, and bring users accurate emotional experience through scientific behavioral logic analysis. The National Palace Museum endows the millennium cultural relics with new characteristics of the times through the Internet, and carries out modern design and emotional interpretation on the interactive relationship between people and things, thus creating thousands of online red products.

Huaihe willow weaving, as a national intangible cultural heritage, endows traditional skills with a new interactive relationship through information technology and innovative design, puts Huaihe willow weaving public facilities into the overall environment, and reconstructs the relationship between "user product environment". As shown in Figure 1. The purpose is to find a new balance between technology and user needs, and develop interactive design facilities that are simple to use, effective and allow users to have a better use experience.

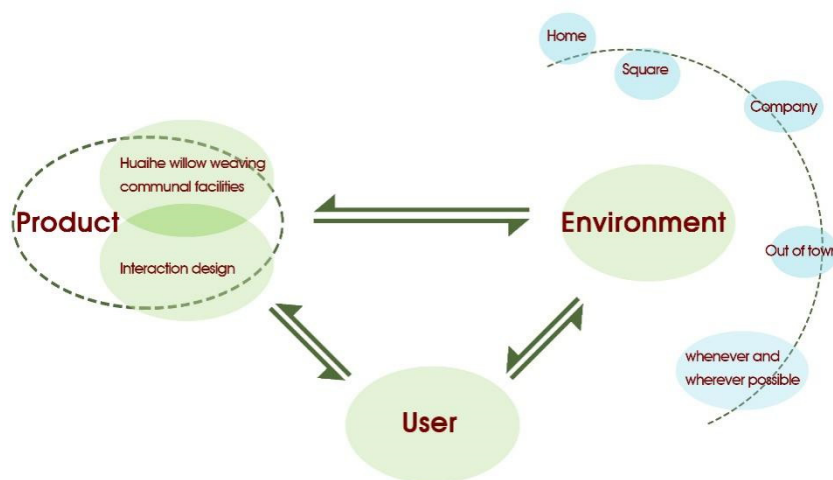


Figure 1. "User product environment" relationship diagram drawn by the author

3.2. Necessity of Integrating Interactive Design into Huaihe Willow Weaving Public Facilities

First, the need of inheriting the context of Huaihe willow weaving. Huaihe willow weaving is an important part of Huaihe culture. It is the essence of human nature and history. Since the development of Huaihe willow weaving, its inheritance mode and protection mechanism are facing new challenges. How to combine modern design to revitalize the lost Huaihe willow weaving technology is a common topic faced by scholars and local governments. Applying the exquisite willow weaving skills of Huaihe River to the design of public facilities not only increases its cultural added value and improves the cultural taste of public facilities, but also contributes to the excavation of urban cultural connotation. It is an effective way for the inheritance of traditional willow weaving skills in the city.

The second is the need of humanized design of public facilities. At present, the core problem of Huaihe willow weaving public facilities is to ignore the user-centered humanized design when following the shape and texture of products. The main body of Huaihe willow weaving public facilities service is people. In the process of use, whether public facilities can bring functional convenience and emotional pleasure to users is very important.

Third, the need for user experience of public facilities. From form following function, form following market to form following behavior and emotion, public facilities are no longer satisfied with the realization of basic functions and formal beauty in design works, but pay more attention to the emotional satisfaction of users, that is, the pursuit of higher-level emotional needs of self realization. Stimulating the participation of the public and bringing different emotional experiences to users has become the key of design.

Fourth, the need of intelligent interaction design. In recent years, developed cities at home and abroad have integrated information technology into their public facilities design. The development of information technology and Internet of things provides more perfect information guidance system and interactive service design for public facilities. At present, the design of intelligent public facilities for Huaihe willow weaving is seriously insufficient. It is necessary to enhance the interaction and communication among users, facilities and environment through scientific and technological means with the help of interactive relationship design innovation, which is of great significance to the popularization of willow weaving skills in the information age, the improvement of local urban cultural characteristics and the display of urban comprehensive strength.

4. Design Principles of Huaihe Willow Weaving Public Facilities based on Interactive Relationship Design

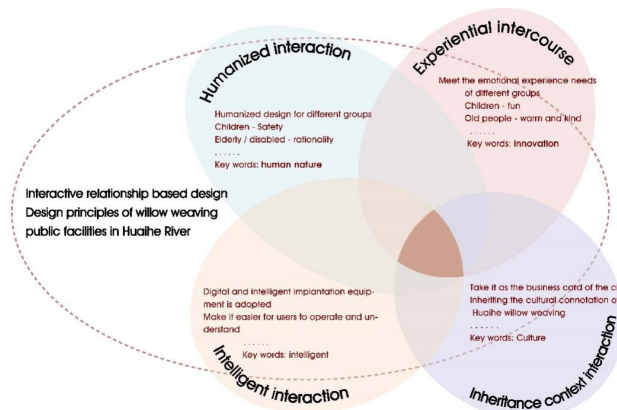


Figure 2. Design principles of Huaihe willow weaving public facilities based on interactive relationship design

According to the characteristics and theory of interactive relationship design, combined with the attributes and shortcomings of Huaihe willow weaving public facilities, this paper puts forward four principles of interactive relationship of Huaihe willow weaving public facilities: contextual interactive relationship, humanized interactive relationship, experiential interactive relationship and intelligent interactive relationship. (Figure 2).

4.1. Principle of Contextual Interaction

With the acceleration of China's urbanization process, thousands of cities are on one side, and the urban characteristics are gradually disappearing. As the carrier of urban culture, public facilities are the specific expression of urban culture. Public facilities take the urban public space as the platform, which is a kind of existence that has a relationship with the urban public, and embodies the modern and open cultural spirit and cultural connotation of the city. [9] As the external expression of urban culture, public facilities should shoulder the important responsibility of displaying the long-standing culture of the city. Contextual interaction design is an important criterion for public facilities as the city's business card. Appropriate public facilities design is of great significance to inherit the city's history and culture and enhance the city's cohesion and comprehensive strength.

Huaihe willow weaving is a national intangible cultural heritage. Its exquisite traditional skills reflect the love, diligence and simplicity of the working people on both sides of the Huaihe River for more than 1000 years. The traditional willow weaving culture and weaving technology should comply with the development of the times when facing the intelligent manufacturing in the modern big industry and information age. Combined with the different characteristics of the public space environment, with the help of intelligent and information technology, the willow weaving public facilities products loved by the public should be designed, and the public facilities should be taken as the communication point of the regional cultural characteristics of the city, from point to area, so as to enhance the participation and interaction of the public, Let public facilities truly become a new business card loved by the public and the self dissemination of urban culture.

4.2. Principle of Humanized Interaction

Interaction design has reversed the design concept of taking products as the core and paid more attention to people's sensory experience and action response. Its purpose of emphasizing "user experience" and "user participation" has become one of the core characteristics of humanism. [10] Design behavior is essentially a kind of socialized behavior. The group faced by public facilities is the majority of the public, and the interactive design center of public facilities is "easy for the public to use"[11]. Therefore, the humanized interaction relationship should first organize the information based on the user's experience, interests, interests and hobbies, in order to analyze the human cognitive law and apply it to the design practice, so that all parts of public facilities can be easily perceived by people; The second is to provide valuable interactive information, so that users have a convenient, interesting and pleasant best experience. In the information age, people's time and attention are fragmented by massive information. It is very important to provide users with efficient and simple public facilities interaction; Finally, the interactive experience of public facilities has changed from "one-to-one" to "one to many", that is, to break the traditional interactive participation experience that public facilities only serve someone, but for a group. Public facilities should use good interactive relations to inspire the participation of the public, so as to play an important role in leading urban culture and driving urban development.

For example, in the design of public toilets in Shanghai, face recognition is used to realize the automatic distribution of toilet paper. There is an electronic display outside each toilet door. When no one enters the toilet, the weather, temperature, humidity and other information of the day will be displayed. After entering the toilet, it will be automatically displayed as someone. At

the same time, the internal air conditioning system and lighting system will start automatically, which provides a very humanized design for users to enter the toilet. In order to facilitate the use of special groups such as the elderly, the disabled and parents and children, each public toilet will have barrier free and parent-child toilets, which are equipped with handrails for the disabled, tables for baby diapers and other sexual facilities.

4.3. Principles of Experiential Intercourse

Mao Xiang, Li Peng[12] and others believe that "there are two ways to use interactive design in landscape design: one is explicit interaction and the other is implicit interaction". Both explicit interaction and implicit interaction need to establish multi-directional, equal and comprehensive information feedback between people and public facilities from a higher level. The purpose is to provide scientific basis for users' good experience, create conditions for users' communication and sharing, and promote people to share information more actively to others. [13] In the design of Huaihe willow weaving public facilities, different contact designs can be carried out in the whole use process with the help of relevant concepts of service design. Stimulate users' different emotional experiences through good contact design, such as designing different nodes to contact users before use, during use and after use, and making enough articles on key contacts to bring users a good experience. At the same time, with the help of information technologies such as the Internet of things and big data, we can inspire the participation of the public at each grid node. Each node may trigger new innovation and bring new value. Only with the power of public participation can the value mission of products be continuously extended and expanded, and then promote the renewal and development of urban culture from different dimensions.

4.4. Principles of Intelligent Interaction

With the rise of smart city, the design object of public space environment is transforming from the original material logic to behavioral logic, that is, people's sensory experience mainly comes from the interaction process between people and environment, people and public facilities, and then affects people's spiritual and emotional logic. Information technology is an effective means to realize the interactive relationship between "user environment public facilities". In the intelligent interactive relationship design, the user is still the core of the whole design process, and information technology is only an important means to realize this process. Avoid putting the cart before the horse, pay too much attention to the display of science and technology, and ignore the real needs of users.

With the help of advanced technologies such as microprocessor, information technology and Internet of things, Liubian public facilities should focus on how to create valuable, efficient, convenient and interesting interactive experience for users. For example, the smart bus station in Seoul, which won the German Red Dot Design Award in 2010, and the bus media display screen composed of 36400 LED screens, with exquisite patterns and transparent glass, become an information window to display Seoul culture at any time. At the same time, users can also touch the large screen for corresponding information retrieval, find the locations of surrounding hospitals, restaurants and shopping malls, and query the arrival time of vehicles, traffic jam and other information. The bus station is fully user-centered, allowing the waiting people to quickly obtain valuable information in the fragmented time, helping users save time and improve efficiency.

5. Design Practice of Willow Weaving Public Facilities in Huaihe River based on Interactive Relationship Design

Taking Funan County, Fuyang City, Anhui Province as an example, according to the historical and cultural characteristics of the area, this paper takes the willow weaving design practice of "all the way (deer) have you" as an example to analyze the design of interactive relationship.

Funan County is known as "Lucheng". In ancient times, "deer" was regarded as a deity. It is believed that deer can bring auspiciousness, happiness and longevity. Placing deer as architectural sketches at parks, intersections or streets is a full display of the "deer culture" advocated by Funan city in the urban public space. At the same time, as a national intangible cultural heritage, willow weaving technology shows the geometric form of deer through willow weaving, so that public facilities can convey rich urban culture to the public, which helps the public obtain emotional and cultural identity.

The work adopts modern geometric modeling and outlines the overall modeling with white metal frame. The section is different geometric shapes, mainly triangles. Different sections adopt different willow weaving processes to form a certain sense of hierarchy, and integrate the traditional willow weaving skills with modern design. The natural and simple texture of willow weave complements modern metal materials, giving people a cordial, warm and fashionable feeling. At the same time, fully considering the integration of the work with the surrounding environment, taking "deer" as a basic monomer, different series can be combined according to different site environment and space size. There are "two deer walking together" to symbolize the beauty of love, "three deer walking" to represent the lasting friendship, and there are also 4-6 "deer family" series to represent the harmony and well-being of the family. The purpose is to take "have you all the way (deer)" as a business card of Funan City, and make "deer culture" and "willow weaving culture" inherit and carry forward in the city through the combination of different series and different scenes. While carrying forward the urban culture, it integrates modern technology and intelligence into the overall design. The experiential interaction and intelligent interaction presented by it have become a major feature of the work. As shown in Figure 3.



Figure 3. Public facilities scene display of "you all the way (deer)" (self drawn by the author)

5.1. Experiential Interaction

Good interaction relationship has the advantages of time continuity, historical sense of memory and reproduction of experience. Through the design of different contacts and memory points, the works can have emotional communication with users and experience pleasure.

On the one hand, the "all the way (deer) have you" series of architectural sketches combine the functions of the venue speakers, with intelligent sound inside. Especially at night, through the linkage effect of music and users, intelligent sound and light, they bring users a relaxed and pleasant interactive experience. On the other hand, it is the function of micro processing sensor. When people approach and touch the architectural sketch, the surface of the work will produce weak changes in light with the temperature of the user's hand, guiding people to observe the exquisite weaving patterns and workmanship of Huaihe willow weaving from a close distance. The public can feel the beautiful moments brought by urban culture and intangible cultural heritage culture in the light and music, so as to enhance the public's recognition of weaving technology and the emotional resonance of urban culture.

5.2. Intelligent Interaction

Putting microprocessors or chips in public facilities to realize the interaction between intelligence and automation is the development trend in the future. In this series of works, there will be a simple and fashionable electronic display screen next to each group of works, which is the basic medium for users to interact with works. The electronic screen has weather forecast, cultural display, work information, experience Interaction and other information, which makes the "all the way (deer) have you" series of architectural sketches break the traditional single display function and bring users multi-level and multi-dimensional fun experience and cultural experience through information interaction. As shown in Figure 4.

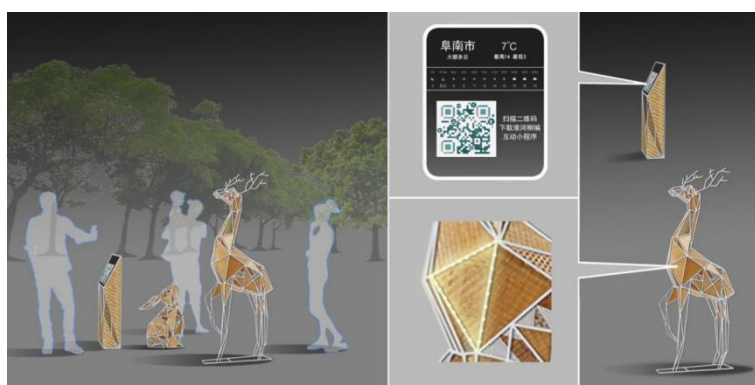


Figure 4. Detailed display of Yilu (Road) (self drawn by the author)

First, the information bar on the screen can realize voice broadcasting, so that users can understand and perceive Funan urban culture and willow weaving skills. The cultural display function displays Funan's "deer culture" and willow weaving culture in the form of pictures and texts. Users can scan QR codes with mobile phones to realize the interactive experience between mobile terminals and works. The second is the space-time continuity of the site experience. Through an interactive experience with a site of the public facility, users are more willing to pay attention to the information content provided in the screen information bar. After leaving the site, they can still pay deep attention to "you all the way (deer)" through wechat applet. So that public facilities are not limited by time and space, and realize the deep-seated continuous experience of users. In experiencing interactive information, users can have a deeper understanding of willow weaving skills through the information interface, browse different weaving types and product displays, and have positive interaction. Finally, users who recognize the willow weaving culture and are willing to participate in the inheritance of willow weaving skills can make an online reservation for willow weaving skills experience, and enable users to weave their own souvenirs with tools in a short time through simple willow weaving skills training. As shown in Figure 5. The work abides by the interaction theory of "user-centered", pays attention to the user participation and experience of implicit interaction and

explicit interaction, and endows the public facilities with continuity and interaction in time and space through information technology, which greatly enhances the citizens' sense of urban cultural identity and pride, and opens up a new path for the dissemination of traditional willow weaving skills among the urban public.

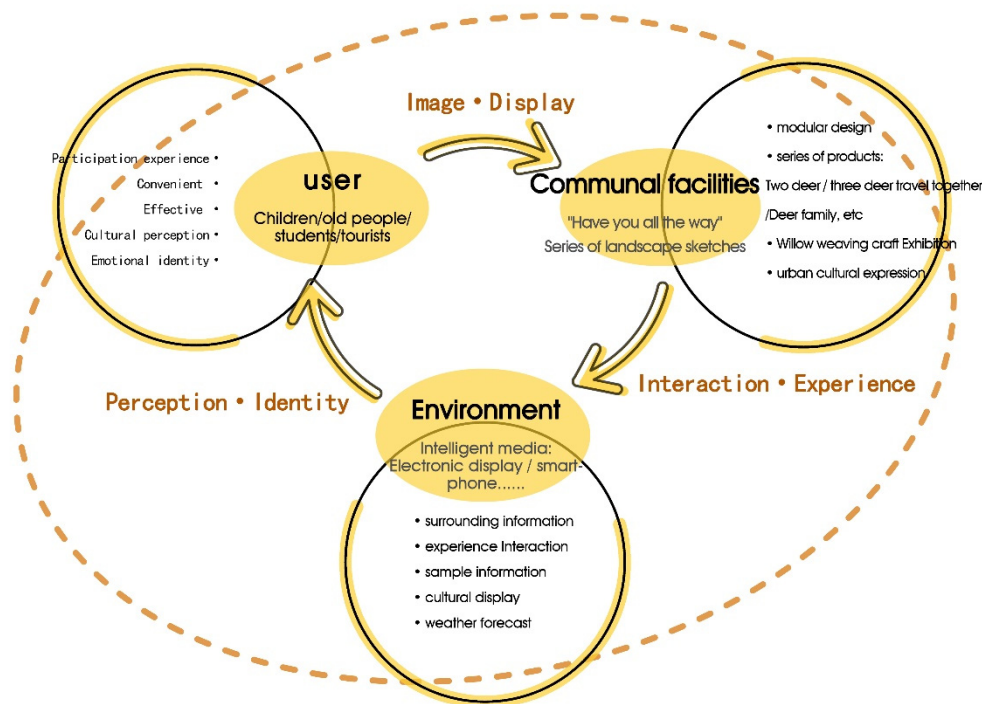


Figure 5. Thinking map of the interactive relationship of "one deer (Road) has you" in urban public facilities (self drawn by the author)

6. Result

Starting from the interactive design theory, taking the Liubian public facilities in Huaihe River as the basic research object, this paper analyzes the internal interactive relationship between "user product environment", and explores the implicit and explicit relationship between traditional skills and public facilities. On this basis, this paper puts forward four interactive relationship principles of public facilities: context, humanization, experience and intelligence, and takes Funan urban public facilities as an example for innovative design and application. Through this research, the cognition of the innovative design system of willow weaving public facilities based on traditional skills is deepened, and the multi-dimensional interaction and thinking of the interaction between users and urban public environment are strengthened, which is of great significance to the inheritance of Huaihe willow weaving traditional skills and the development of urban culture.

Acknowledgments

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