

# Digital Display and Transmission of the Culture of Traditional Chinese Furniture

Xinxin Sun<sup>(✉)</sup> and Chao Li

School of Design Arts and Media, Nanjing University of Science and Technology,  
Xuanwu Area, Nanjing 210094, China  
sunxinxinde@126.com, 260082785@qq.com

**Abstract.** This paper explores the knowledge structure of traditional furniture culture, which contains aesthetic culture, technology culture, function culture, national culture and art culture. By conducting investigation on user groups via the depth interviews and personas method, established user role model and indicate the demands of different user groups for traditional Chinese furniture. And then the digitization model of display and dissemination of the culture of traditional Chinese furniture is established, according to the theories of User Centered Design and knowledge dissemination. Therefore, the interactive digitization form, which is funny and vivid, is adopted to display and disseminate traditional Chinese furniture. The purpose is to spread the culture of traditional Chinese furniture via top-down model of culture dissemination and get the culture of traditional Chinese furniture inherited and spread in a “live” status.

**Keywords:** Traditional Chinese furniture · Cultural diffusion · Digital display · Interaction design

## 1 Introduction

Cultural development is the source of life of a country and a nation. Technology and innovation, the important engine of cultural development, is the source of cultural innovation. Cultural heritage, which condenses the quintessence of national culture and shows the spirit of the regional people, is a symbol of national culture and plays a key role in the inheritance of regional culture. As one of the important components of the material and cultural heritage in China, traditional Chinese furniture is a wonderful work among world classical furniture system, especially the furnitures in the Ming and Qing Dynasties. Traditional Chinese furniture with rich varieties, exquisite material, excellent workmanship, beautiful shape and delicate patterns is an important component of the Chinese traditional culture, which carries abundant information about ancient Chinese, such as lifestyle, ideology and value orientation etc.

However, foreign culture is having an impact on the national culture in the era of globalization. The relationship between culture and the development of science and technology is inseparable [1]. With the development of Internet, cloud computing, big data and 4G, the popularity and prosperity of mobile intelligent equipment and public resources platform construction, it should be taken into consideration that how to display

the traditional culture confronted with the advanced science and technology [2]. There is a significant difference about the possession quantity of cultural knowledge in different groups of people, which brings challenges and opportunities to the protection and heritage of cultural heritage. There are also problems in the display and dissemination of traditional Chinese furniture culture: (1) the methods of gathering information about traditional Chinese furniture are single, mainly from related research institutes and museums; (2) the contents displayed are single, and the gap among the audience groups of traditional Chinese furniture culture is large while most of the display of the content currently is an explanation of physical furniture with a lack of systematic display of furniture culture relevant. (3) the form of display and dissemination of traditional Chinese furniture culture is single. Most physical furniture now is stored in museums or possessed by collectors. As a result, it is difficult for people who have an appetite for furniture around the world to learn deeply about the characteristics and cultural connotation of the furniture. Meanwhile, it is a barrier to spreading the Chinese traditional culture. (4) the display form of physical furniture is single. People usually get familiar with furniture in a static view so that there is a lack of an interaction between audience and the traditional furniture. It is more difficult to arouse people's enthusiasm for the traditional furniture culture.

**Based on the Above Problems, This Paper Launches the Following Research:**

Study on the display form of traditional Chinese furniture culture under the background of digital medium and technology; Study on characteristics and category of audience groups of traditional Chinese furniture culture; Study on the model of acquisition, display and dissemination of Information about traditional Chinese furniture culture.

**The Purpose and Significance of This Study:** By sorting out the culture of traditional Chinese furniture and carrying out stratification research on the user groups, to dig the needs of different groups of the user towards traditional Chinese furniture and establish user demand model. The interactive digitization form is introduced into the display and dissemination of furniture culture. Establish the display and dissemination model of the culture of traditional Chinese furniture and put forward the application methods and paths. The digitization medium for display and dissemination provides a good platform for traditional Chinese furniture. Therefore, the interactive digitization form, which is funny and vivid, is adopted to display and disseminate classical Chinese furniture. It will arouse people's interest in Chinese traditional culture, and make people who have an appetite for traditional Chinese furniture around the world get acquainted with the culture of classical Chinese furniture conveniently and quickly. In this way, the culture of traditional Chinese furniture will be inherited and spread in a "live" status.

## 2 Background

### 2.1 The Cultural Connotation of Traditional Chinese Furniture

**Development:** Traditional Chinese furniture has a long history, dating back to the seventeenth Century BC. After thousands of years of development, Chinese furniture

always has a unique national style. Chinese furniture has always been dominated by wooden products. And furniture modeling is affected by architectural modeling so that furniture modeling is a transformation of constructions. From the point of view of the history of the furniture development, due to the changes in people's living habits, traditional Chinese furniture experiences the process from the low-type furniture which needs kneeling on the ground from Shang and Zhou dynasty to Qin and Han dynasty, the sitting-on furniture in transition period from Wei Jin dynasty to Sui Tang dynasty, to the sitting-on furniture high-type furniture of the Northern Song Dynasty. The traditional Chinese furniture reached a historical peak in the Ming Dynasty. Whether the varieties of furniture or the making technology, furniture workshops and specialized market is in the heyday of the development of China's ancient furniture. The furniture in Ming Dynasty creates a superb furniture production technology and exquisite art form [3]. As a whole, Chinese antique furniture has experienced the process of changing from low to high with the furniture varieties becoming richer and production process level gradually increasing. It forms a relatively perfect furniture system.

**Cultural Connotation:** From a certain sense, the furniture is a cultural integration. It marks the level of the social productivity of a country or region in a certain historical period. It is the epitome of a certain lifestyle and the manifestation of a culture. On the basis of its rich cultural and historical tradition, traditional Chinese furniture is changing all aspects of human culture constantly and profoundly. Traditional Chinese furniture culture is influenced by ritual system (it reflects the political and social attributes of furniture), folk customs (such as festival and wedding feast customs), religion (for example, a large number of high-type furniture of Buddhist Tianzhu inflow into China), ancient literati, painting, architecture, hundred worker skills, society and other multiple factors. When ultimately reflected in traditional Chinese furniture culture, it is mainly manifested in three aspects: furniture technology culture, furniture humanistic culture and furniture art culture (Fig. 1) [4]. Taking the furniture of Ming Dynasty which is in its heyday as an example: in furniture technology culture, it appears to be using exquisite timber and paying attention to the natural texture fully reflecting the wood's natural color and texture, with scientific structures and sophisticated tenon and mortise; in furniture humanistic culture, it appears to be embodied for decorative patterns. The patterns must be intentional and the intention must be auspicious. The dimension of the furniture is suitable for the human body engineering; in furniture art culture, it appears to be decorated moderately. It is a combination of decoration and structure. And the modeling is minimalist with moderate proportion.

**Features:** The culture of traditional Chinese furniture is regional, professional, multiple and contemporary. Influenced by Chinese ancient philosophy, traditional Chinese furniture itself is the product of the unity of heaven and man and the material carrier of its cultural spirit, whether in furniture design, or in furniture fabrication.

The Culture of Traditional Chinese Furniture		
Technology Culture	Humanities Culture	Art Culture
Materials Science	Furniture of Sociology	Plastic Arts
Structural Science	Furniture of Psychology	Decorative Art
Process technology	National Culture	Symbol Art
Ergonomics	Aesthetics of Furniture	
	Economics of Furniture	
	History of Folkloristic	

Fig. 1. Chinese traditional furniture culture connotation

## 2.2 The Medium and the Technology of Digital Display:

As a new research method, digitization is introduced to the research on traditional furniture. The medium of digitization, which is of transmissible, Interactive and interesting, brings a new experience for the display and dissemination of traditional Chinese furniture culture. At present, there are the following medium and technology:

**PC Network Platform:** The medium of digital display, which is based on PC network platform, is one of the most traditional medium forms in the digital display medium. And it is also the earliest form of application and popularization. Based on the personal computer terminal, through the Internet online browsing furniture cultural heritage resources, digital resources can be presented via images, video, music and other imaging methods. In the meanwhile, with the development of computer technology, all kinds of interactive virtual display also tend to be more popular.

**Mobile Smart Devices:** The popularity of smart mobile devices has been gradually changed the people’s life. Beginning from smart phones, the emergence of mobile smart devices such as smart watches, smart bracelet, smart wearable device, have a great impact on human lifestyle. As a kind of new medium of the display and dissemination of the traditional furniture culture heritage, digital display medium, based on mobile smart devices, has a wider application platform and audience groups. As the medium of digital display, the application of mobile smart devices is an important channel for the display and dissemination of furniture culture.

**Public Platforms:** Traditional medium such as museums, art galleries, shopping centers and other public cultural platforms, also provides a good platform for the

dissemination of furniture culture relying on the digital construction. Taking the museum as an example, digital means are integrated into the design of exhibits display to enhance the audience's sense of participation by means of holographic projection, touch screen, 3D images, sensing devices and other interactive devices. And it can achieve the simultaneous transmission and share of images and information through the Internet.

**Virtual Reality Technology:** As a kind of digital technology, it is widely used in many fields in recent years. With the aid of the computer simulation, Virtual Reality could create a virtual environment so that the user will be immersed in the virtual environment and produce the feeling of be personally on the scene. Through specific operation, the user can be able to interact with the multi-dimensional information environment, acquire knowledge, improve awareness and germinate ideas. By means of Virtual Reality technology, the research on traditional Chinese furniture is mainly used in the demonstration of the products and virtual space of classical furniture.

The diversity of digital medium and technology provides a new opportunity for cultural display. The digital display medium of traditional furniture cultural heritage, from PC to mobile smart device application and from the social network to the public cultural platform, achieves comprehensive and three-dimensional digitization information transmission and interactive experience with multiple sensory involvement including vision, hearing and touch. In the meanwhile, digitization plays an active role in promoting the protection and inheritance of cultural heritage.

### 3 Research Method

Based on the survey and analysis of user groups whom the display and dissemination of traditional Chinese furniture culture is intended for, this study establish three types of user groups according to the knowledge level and attention degree of traditional Chinese furniture culture. In addition, this study establishes Character Model to guide the follow-up study so as to determine the models and ways of information collection and digital display and dissemination of traditional Chinese furniture culture.

The research process is divided into three steps: Firstly, start the start research and screening the information obtained to organize and form forceful user information via Interview method. Secondly, summarize similar user information and establish three types of user groups. Finally, establish Character Role Models for the three types of user group respectively.

#### 3.1 Preliminary User Investigation

Preliminary user investigation is divided into three steps: user selection, user interview and an arrangement of interview information.

**User Selection:** Nanjing is an ancient capital of China, which has a profound cultural heritage. There are many universities, large museums and communities in Nanjing. Therefore, the study is carried out in Nanjing, China. We visited University (Nanjing University of science and technology, Nanjing Forestry University), museums

(Nanjing Museum) and communities (Xiaolingwei community, Vanke community and other four residential community. Finally, 30 Chinese users is chosen as the final interviewees, including collectors, college students, primary and secondary school students, retired workers, white-collar workers and etc. These users use smart phones and have a certain cultural knowledge base.

**The Way of Interview:** This study learns the users' real thoughts and experience demands by asking questions. In the interview, the combination of structured interview and non-structured interview is adopted. At the same time, part of the users' studios and living environments is observed to understand the users' behaviors and lifestyle (Fig. 2).



**Fig. 2.** The way of interview

**Interview Contents:** Determine the Interview contents according to the subject. The contents are divided into general questions and deep questions depending on content level. Firstly, by means of Interview with basic questions, to learn the recognition degree of traditional Chinese furniture culture among users. Secondly, by means of Interview with deep questions, to dig opportunities for the display and dissemination of Chinese furniture culture.

**Sort Out the Interview Information:** Weigh and analyses the users' problems systematically. In the meanwhile, label and classify all of the data according to user viewpoint, motivation, demographics and other factors.

**Find the Common Mode:** Seize important labels of the users and describe these labels in categories.

### 3.2 The Analysis of User Roles

Through the preliminary user investigation, a lot of user information is gained, including attention degree, loyalty, and awareness degree of different user groups towards traditional Chinese furniture culture. After ordering and summing up the data of 30 users, different factors were typical combined. In the meanwhile, transform user demands into characters and establish three types of user groups from top to bottom according to the user's academic background, interest, motivation, loyalty and other important factors (Fig. 3).

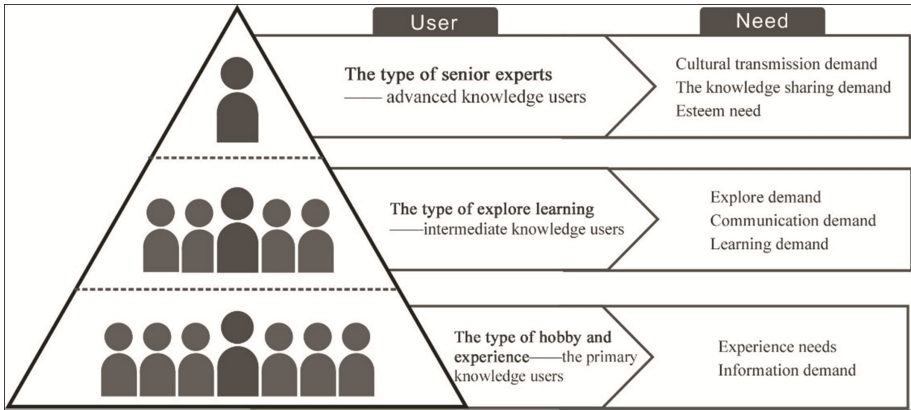


Fig. 3. User roles

**“The Type of Senior Experts”—— Advanced Knowledge Users:** The principal members are people who have a higher educational level and social status, including collectors, scholars in the direction of the furniture, researcher on traditional Chinese furniture and etc. They are in possession of abundant professional knowledge and have great enthusiasm for traditional Chinese furniture and its culture based on a deep research on traditional Chinese furniture. And they are willing to devote time and energy to the study and dissemination of Chinese traditional furniture culture. The dominant demands of this kind of user groups consist of the demand for culture dissemination, the demand for knowledge sharing, and the demand for respect.

**“The Type of Explore Learning”—— Intermediate Knowledge Users:** Students with a certain knowledge of Chinese traditional culture, white collars and people from all walks who love Chinese traditional culture. They have a bachelor degree or above with good cultural quality and eager to learn the related knowledge of traditional Chinese furniture culture. In addition, they are willing to share the spread furniture culture. The dominant demands of this kind of user groups consist of the demand for exploring, the demand for knowledge exchange and the demand for learning.

**“The Type of Hobby and Experience”—— The Primary Knowledge Users:** This type of user groups refer to people who grasp a certain cultural knowledge but don't understand the culture of Chinese traditional furniture. For these people, they are willing to learn to accept the traditional culture. These users mainly include primary and secondary school students, college students and the following education adults, parts of the elderly and other user groups. The dominant demands of this kind of user groups consist of the demand of knowledge experience and the demand for information.



Fig. 4. The User Model

### 3.3 Establish the User Model

The establishment of the User Model is to refer to transform the user in the future into lifelike people and build the future product system model for these real “people” [5]. By creating User Model, we can reduce the subjective assumptions and understand what the real users’ demands are so as to learn how to serve for different types of users better. Therefore, based on the previous research, the elements are abstracted and the above three types of user groups are built into Character Model Cards respectively. In the meanwhile, the user demands above are introduced into the User Model. Model Cards



consist of User profile, the attitude towards traditional culture, the way of knowledge acquisition, lifestyle and etc. (Fig. 4). Model Cards are the basis for the subsequent design model.

## 4 Results and Discussions

### 4.1 Establish Digital Display and Dissemination Model of Traditional Chinese Furniture Culture

According to the “user-centered” design concept, pay attention to the object of display and dissemination of traditional Chinese furniture culture, that is, “the user”. And taking it as the center, to build the model of display and dissemination of traditional Chinese furniture culture, combined with the theory of knowledge dissemination. “The dissemination of knowledge” is such a process of social activities: in the specific social environment, a part of the social members spread the specific knowledge and information to another part of the members of the society by means of specific media of knowledge dissemination, and they look forward to receiving the desired effect of the spread [6]. After being created by members of human society through social practice and creative thinking, the knowledge and information of traditional furniture culture is obtained selectively by those members of society who have the awareness of knowledge dissemination and the duty of social knowledge dissemination. After they release and encoding code, it becomes culture knowledge products that are available for dissemination. Then in specific social backgrounds and

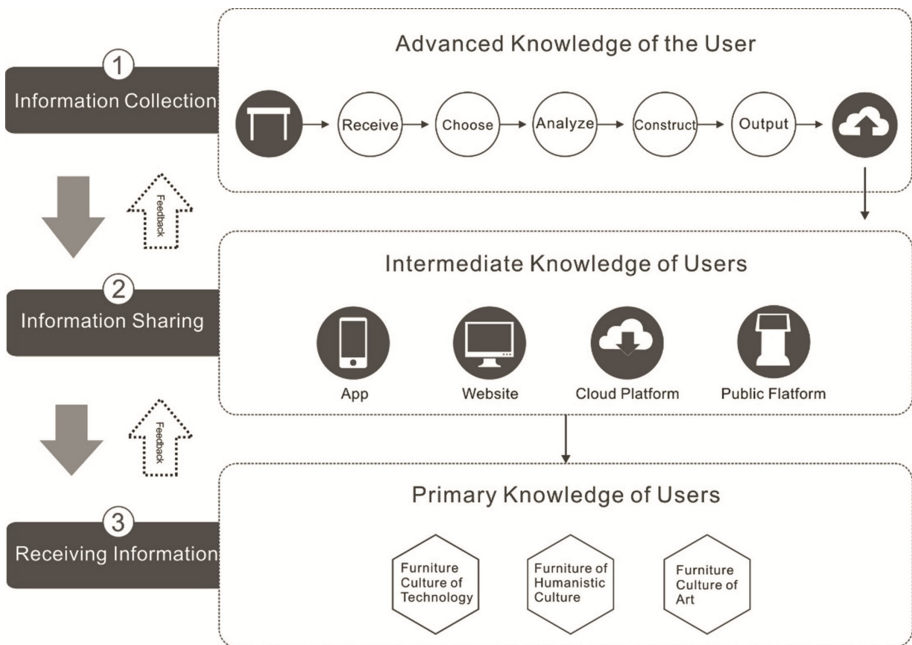


Fig. 5. Digital display and dissemination model of traditional Chinese furniture culture

environments, it will be spread to another part of society members through the specific dissemination medium of traditional furniture culture knowledge. That is the process of knowledge dissemination of traditional furniture culture. In brief, the process of digital dissemination of traditional Chinese furniture culture is: information acquisition of traditional furniture culture, information share of traditional furniture culture and information feedback of traditional furniture culture (Fig. 5). The three steps are coincident with the design demands of three user groups from experimental result. In this way, establish the display and dissemination model of traditional Chinese furniture culture.

**Information Acquisition of Traditional Furniture Culture:** The prerequisite condition of the cultural dissemination activities in the human society is to produce the cultural knowledge information which could be spread by people. The culture of traditional Chinese furniture is a huge system. As a result, the acquisition of furniture culture is an important work because it is the starting point of the whole model. “The type of senior experts”(advanced knowledge users) including collectors, furniture scholars and other professional persons, through their social practice and creative thinking, acquire abundant culture knowledge, experiences and skills of the furniture. These are the cultural knowledge of furniture, which can be spread by people. After choosing, analyzing, processing and constructing, this cultural knowledge of furniture will rise to theoretical cultural knowledge and which can be used as the contents for display and dissemination. In the meanwhile, advanced knowledge users such as collectors and furniture scholars are a relatively stable social group. They upload the cultural knowledge of furniture to the digital platform and establish information database of furniture culture to form abundant culture resources. Therefore, advanced knowledge users are important members for information acquisition of traditional furniture culture.

**Information Share of Traditional Furniture Culture:** The group of advanced knowledge users implements behaviors of knowledge dissemination to knowledge communicators through the digital medium platform [7]. After accepting knowledge, the group of intermediate level users processes it so as to decompose, restructure and reproduce the culture information. By sharing the knowledge, information and experience of traditional furniture culture via medium, the lowest level of the whole model can receive the original and processed two kinds of cultural information. In the process of dissemination, the information of traditional furniture culture could be share with the help of the network platform, social media, App, cloud platform, public terminal equipment and other dissemination channels and technology. And then the contents will be spread in a wider range.

**Information Feedback of Traditional Furniture Culture:** The receivers of the dissemination of furniture culture receive the specific contents of cultural knowledge information from the dissemination process. And then they take it into comprehensive account with the knowledge accumulated before so that it is possible to produce new knowledge and information. Then if there are new desires or demands of dissemination among the groups of intermediate knowledge users and primary knowledge users, it enters into a new knowledge dissemination process when put into practice. The original receivers of knowledge dissemination actually become the “culture disseminator”

because of their own innovation and dissemination behaviors of original furniture culture knowledge. As for the original culture disseminator, it has been converted to “the receivers of the culture dissemination” as a result of the demands and acceptance of the knowledge spread by the original receivers of the knowledge dissemination. The knowledge contents spread by the culture disseminator in this process is such an innovation based on the knowledge and information received and the knowledge accumulated before. And it is spread not only to the original culture disseminator, but also to other members of the society. Therefore, such a new process of knowledge dissemination is also the process of cultural information feedbacks.

The three links above build the process of the digitization of traditional furniture culture. In the process, the dissemination of traditional Chinese furniture culture has shown a trend of spread by groups. And furniture culture is displayed in digitization with the help of digital medium. This process is sustainable, cyclical, constantly updated. The knowledge of traditional furniture culture is able to get decomposed and restructured and meet the knowledge demands of different user groups so that the dissemination model of traditional Chinese furniture culture is formed with information collection, information sharing, and information reception and information feedback.

#### **4.2 Strategies for Digital Display and Dissemination of Traditional Chinese Furniture Culture Display in Digitization**

The display of traditional Chinese furniture culture is supposed to combine with the social environment, regional characteristics and humanistic spirit. Only create such a cultural background will the traditional Chinese furniture show its material content and spiritual culture and be known by more people. It requires us to refine, classify and summarize the contents of traditional Chinese furniture culture. In addition, it requires us to show the cultural characteristic features of “express the meaning by the form” and “reach the meaning by the scene” combined with digital display technology to embody the furniture culture. As a kind of technical means, the digital display will penetrate in all aspects of the display and dissemination of traditional Chinese furniture culture. Different display scenarios and dissemination stages need different mediums. In addition, it could be useful to exploit the advantages of the information dissemination in Internet era and the functions of information dissemination of Mobile Internet terminal products.

**Experience and Share:** After experiencing the industrial age that is characterized by material consumption and occupation and emphasizes the function of the product, the information society provides services and non-material products. As a result, the design object is from substance to substance, from the product to service, from occupation to share emphasizing the attributes of User Experience. It is the results of returning to the original aims of design, cogitating on design and understanding the relationship between user and product from a higher level. The relatively profound knowledge of traditional culture concentrate in the “Loyal Fans” in the above study. These knowledge could not only builds the “experts” experience for themselves by sharing, but also create funny experience of acquiring knowledge for other knowledge receivers.

**The Co-creation of Group Knowledge:** In the future, the entity museum may disappear and develop sustainably in other forms. There will be a more equal and mutually beneficial relationship between the entity places of furniture culture dissemination such as museums and the user. Knowledge becomes means of production shared jointly, and the driving force of innovation comes from the joint efforts of both parties. That is, the user and the museum to create together. Therefore, the user is the most valuable productive assets cultural display and dissemination in the future [8]. In the meanwhile, it will change from individual behavior to group behavior, and also transform from personal knowledge to group knowledge through tapping, building and sharing the culture resources of traditional Chinese furniture culture together by groups of all classes of society.

## 5 Conclusion and Future Works

Starting from the problems in the display and dissemination of traditional Chinese furniture culture, this paper analyses the cultural connotation of traditional Chinese furniture and points out that the display of traditional Chinese furniture culture can be combined with PC network platform, mobile intelligent equipment, public platform, Virtual Reality technology under the background of the digital medium and technology. In order to understand the characteristics of the audience of traditional Chinese furniture, this paper launches the investigation and analysis on the target user group and according to the user's academic background, interest, motivation, loyalty and other important factors, divide the audience groups of traditional Chinese furniture into three types of user groups from top to bottom: "the type of senior experts"—advanced knowledge users, "the type of explore learning"—intermediate knowledge users and "the type of hobby and experience"—the primary knowledge users. According to the "user-centric" design concept, the paper establishes the display and dissemination model of traditional Chinese furniture culture combine with the theory of knowledge dissemination. The hierarchy of this model corresponds to the demands of the three user groups for information acquisition of traditional furniture culture, information share of traditional furniture culture and information feedback of traditional furniture culture. In addition, this paper points out strategies for digital display and dissemination of traditional Chinese furniture culture: display in digitization, experience and share and the co-creation of group knowledge. What this paper discusses is not only the digital display means, but also analyses the cultural audiences and establishes different character models. What's more, the display model of furniture culture dissemination is also built from top to bottom. In the process, the digital medium is kind of means, which services for the whole model of culture display and dissemination.

The traditional furniture, which inherits from ancient advanced productive forces and advanced culture, is so abundant and bright. The designers and researchers are supposed to devote wisdom and strength into the traditional furniture. The purpose of the digital display and dissemination of traditional Chinese furniture culture is, taking advantages of modern digital media technology, to make more people make full use of the aging characteristic of network resources and mobile Internet media through the mobile

terminal devices. By taking advantages of fragmented time, to realize and learn the connotation and value of furniture culture, to establish a general national confidence and to enhance the context of furniture culture. The final purpose is to turn the protection of intangible cultural heritage into people's conscious behaviors of culture Inheritance.

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