Research on Interface Design of Intangible Cultural Heritage Digital Products Based on User Experience

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Abstract. Based on the digital communication and inheritance of Hubei intangible cultural heritage (hereinafter referred to as "intangible cultural heritage"), this paper studies the interface innovative design of intangible cultural heritage digital products from the perspective of user experience, in order to promote the innovative communication of intangible cultural heritage. Firstly, this paper analyzes the hierarchical framework and constituent elements of the product user experience model, and lists the key points of each constituent element in the user experience design of intangible cultural heritage app. This paper introduces the specific technical means of the digitization of intangible cultural heritage, as well as the problem of the digitization, innovation and reproduction of intangible cultural heritage, that is, to solve the problem of Intangible Cultural Heritage Inheritance with digital technology. Finally, we combined our own "Chu Ji" app interface design to carry out digital innovative design analysis and product interface design research of intangible cultural heritage culture, so as to ensure that the designed products can meet the requirements of users.

Keywords: User experience, Intangible cultural heritage, Digital design, APP interface design

1 INTRODUCTION

In the context of globalization, the protection of intangible cultural heritage has become the consensus of all countries in the world [1]. Since the 18th National Congress of the Communist Party of China, the protection of intangible cultural heritage has shifted from the basic work stage of "rescue protection and establishment of regulations" to the stage of "consolidating the achievements of rescue protection and improving the level of protection inheritance". At this stage, more attention has been paid to the innovation and inheritance of intangible cultural heritage. The information age of the 21st century is a digital information age based on electronic computers and network information. The wide application of digital technology in the field of art design is a new product of the close combination of modern science and technology and art design. With the popularity of mobile Internet in the current society, intelligent mobile terminals are accepted by people with their high penetration rate, user viscosity, convenience and other functions, providing a good carrier for the innovation and dissemination of intangible cultural heritage. At present, in the field of intangible cultural heritage communication, some scholars have combined the user experience element model to design and analyze the intangible cultural heritage app, and achieved some results. However, the existing apps still have the problems of poor visual effect, poor interactive experience and low user viscosi-

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ty. Based on the above points, the digital innovation and dissemination of intangible cultural heritage culture is very necessary.

2 Analysis of user experience elements and intangible cultural heritage app architecture

2.1 Garrett User Experience Elements

User experience is the pure subjective feeling established by users in the process of using the product. It is the main emotion of users before, after and after using the product or system, and it pays attention to the effect of practical application. It includes emotions, beliefs, preferences, cognitive impressions, physiological and psychological reactions, behaviors and achievements. The elements of user experience include the following aspects (Fig.1) .

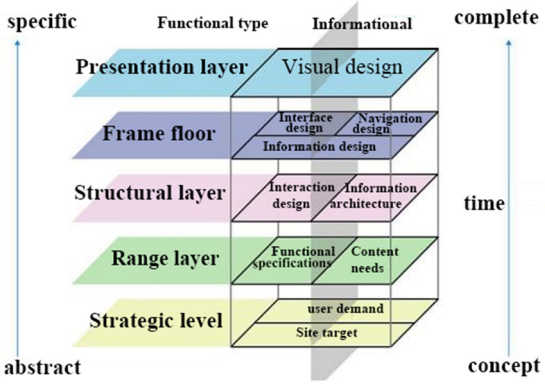

Fig. 1. User Experience Element Model (Image Source: Internet)

The user experience element model proposed by Garrett is shown in Figure 1, which is divided into strategy layer, scope layer, structure layer, framework layer and presentation layer. The strategic level sets product goals and user needs, and puts forward the purpose of product development; The scope layer analyzes the content requirements according to the objectives and requirements proposed by the strategic layer; The structure layer builds user experience through information architecture and interaction design; The framework layer determines the form and function of operation; The presentation layer solves and makes up for the perceived presentation problem of the logical layout of the framework layer.The user experience element model is divided into two aspects according to different product concerns. The left side is applicable to functional products and the right side is applicable to information products[2].

2.2 Analysis of Hierarchical Framework and Constituent Elements of User Experience Elements

In order to ensure the applicability of the model, it is necessary to define the logical relationship between the five levels in combination with the characteristics of intangible cultural heritage.

2.2.1 Strategic Level (User Needs and Product Objectives)

before product development, it is necessary to determine what value users can obtain from the product? Solving this problem can determine user needs. Determine whether the purpose of developing app is cultural communication, commodity trading, technology application, cultural and creative community? Solving this problem can determine the product goal.

2.2.2 Scope Layer (Content Demand Analysis)

After clarifying the objectives of the strategic level, the output content and scope of products should be divided. Intangible cultural heritage culture can be divided into static culture and dynamic culture, and the static culture should be summarized and sorted out; From the perspective of user experience, human-computer interaction design is carried out for dynamic design.

2.2.3 Structure Layer (Information Architecture, Interaction Design)

The scope layer has made an in-depth analysis of the content of product output. In the structure layer, it is necessary to clarify the points where human-computer interaction can occur when static culture and dynamic culture information are output, and establish human-computer interaction relations; Clarify the logic between various contents, clarify the logical order of each page, ensure the smooth user experience, and the correct content logic when switching between pages, so as to initially build the user experience.

2.2.4 Framework Layer (Navigation Design, Page Design)

The framework layer needs to concretize the content of the structure layer, make a preliminary page design, clarify the mode and order of various cultural elements in the structure layer, guide users to have a deep experience of the product through the design of the navigation bar, and determine the content layout through the interface design. The navigation design should ensure the realization of the product objectives of intangible cultural heritage app, including the home page, commodity trading page, discovery page, cultural and creative community page and personal page. The page design adopts the color related to culture as the main tone, and the form of alternate graphics and text enhances the visual experience of the picture. The layout is reasonable, with primary and secondary, and the interaction is smooth.

2.2.5 Presentation Layer (Perceptual Design)

This part of the content is the fine processing of the framework layer, the determination of UI design style, color scheme, the design of text, vector icons, picture materials, the organization and typesetting of the content, and the integration of tactile and auditory experience to improve the construction of user experience. This part is a supplement to the interface design, including page layout, color matching, improving audio-visual experience, and improving the user experience through multi perception design.

3 Digital design of intangible cultural heritage app interface

3.1 Digital Design of Intangible Cultural Heritage

"Digitization of cultural heritage" is defined as "the use of digital technologies such as digital collection, digital storage, digital processing, digital display and digital communication to transform, reproduce and restore cultural heritage into a shareable and renewable digital form, and interpret it from a new perspective, preserve it in a new way, and use it for new needs" [3]. At present, the definition of "digitization of cultural heritage" should be continued in the academic circles. The focus of intangible cultural heritage digitization is to realize and spread its cultural connotation, a systematic recording work, and integrate its cultural elements and cultural values into it. The analysis framework of intangible cultural heritage digitization needs to be in the visible and invisible range, and its material and non-material levels should be digitized [4]. For example, in the process of digitization of traditional handicrafts, taking the relationship between people, things and society as the background, we not only need to deal with the shape and material of things, but also need to present the manufacturing process, the characteristics of handicrafts and the relationship with other related artifacts; Based on the digitization of material and non-material elements, the relationship between traditional skills and people's life is presented. The goal is to preserve and display the material carrier, process characteristics, production process of traditional skills, as well as the various knowledge information and value contained therein.

3.2 Digital Interface Design of Intangible Cultural Heritage

Digital technology aided design brings changes in design thinking and expression to teachers and students majoring in art design. The integration of digital technology and intangible cultural heritage culture, "from technology to Tao" brings designers more diverse ideas, which plays a great role in enriching the connotation of works[5]. The digitization of intangible cultural heritage is the technology of computer-aided preservation, reproduction, dissemination, design and development. Leonardo da Vinci once said that "art can fly high with the help of science and technology". The integration of digital technology and local intangible cultural heritage culture can update the transmission form of traditional culture and keep pace with the times.

3.2.1 Basic Forms of Digitization of Intangible Cultural Heritage

At present, the main means of digital collection, recording, sorting and display of intangible cultural heritage are basic digital means such as pictures, words, video, audio, etc. basic digital technology can meet the demand of truly restoring the objective object itself, while retaining the most real and objective basic research materials for subsequent technological progress; Secondly, 3D scanning technology can transform the process form into digital culture form with 3D animation, realize network platform sharing, apply 3D modeling to reconstruct characters, scenes and costumes, design actions through motion capture technology, and finally integrate characters and scenes to create a virtual scene with interactive characteristics, enhance user experience and immersively understand its deep cultural connotation. At the same time, augmented reality (AR) technology can also be applied to the design of app to enhance the perception of experimenters to the real world environment with the scene of virtual reality

fusion. AR is considered as a way to effectively protect history, improve user experience and promote positive experience.

3.2.2 Digital Innovative Design of Intangible Cultural Heritage

It is an inevitable trend of regional development to try to innovate the non heritage cultural and creative design in multiple ways, open the online cultural and creative product trading platform, and promote the development of excellent local culture and economic construction. Enhance the integration of traditional culture and modern elements, and promote the non heritage products to break the shackles of the times and continue to inherit and innovate. Create a platform for the exhibition and exchange of designers' works and an online exchange platform for intangible cultural heritage heirs. Designers and intangible cultural heritage heirs integrate across borders to continue the functional value of intangible cultural heritage itself, and design "core + outer core" dual core cultural and creative products. By using modern computer technology, in the form of three-dimensional to two-dimensional design, and adding modern elements on its basis, the illustrator pattern that conforms to contemporary aesthetics and modern communication is designed as the auxiliary graphics of APP interface design, which not only conforms to contemporary aesthetics, but also injects vitality into the inheritance of local intangible cultural heritage.

4 Research on digital design of Hubei intangible cultural heritage app

4.1 Investigation and Research on Hubei Intangible Cultural Heritage

Hubei Province is located in Central China, referred to as "e" for short, and is the birthplace of JingChu culture. The geographical scope of the ancient concept of "JingChu" is roughly based on the administrative divisions of Hubei Province today. Therefore, people in Northern Hubei often call this province "JingChu land", and JingChu culture refers to the culture with Hubei local characteristics. There are mainly Tujia Nationality, Miao Nationality and minority nationalities in Hubei Province, and their cultural characteristics are diverse and different. According to the types of expression, Hubei intangible cultural heritage culture includes oral literature, traditional music, traditional dance, traditional art, traditional medicine, traditional sports and acrobatics, opera and folk art, folk handicrafts, folk beliefs, folk knowledge and other ten categories[6].

4.2 Propose Content Requirements For Target Users

4.2.1 Target User Profile

Table 1. : User portrait

	Persona1	Persona2
Full name	Ai Xiao	Cheng Lao
Age	20	45
Gender	Female	male
occupation	Students	Inheritors of intangible cultural heritage

label	Like intangible cultural heritage	Inheritor of intangible cultural heritage
Pain point	consumes a lot of time and energy in useless information database	Intangible Cultural Heritage Inheritance
Demand	Intangible cultural heritage detail drawings and derived cultural creative design cases.	Promote intangible cultural heritage through the online platform, make the intangible cultural heritage market active

Through the study of the cultural characteristics of intangible cultural heritage in Hubei and the investigation and analysis of the audience, the target user group of intangible cultural heritage app includes intangible cultural heritage enthusiasts and intangible cultural heritage inheritors (Table.1).

4.2.2 Product Demand Analysis

At present, the intangible cultural heritage information on the market is complicated, the professional standardization is not enough, the information transmission is not comprehensive, or the information is trivial. If people want to understand a certain intangible cultural heritage, they often need to spend a lot of time and energy in the useless information database. Secondly, the existing mainstream social platforms, including Weibo and xiaohongshu, do not have comprehensive and professional designs for the inheritance, innovative design, regenerative design, cultural creative design and other systematic designs of intangible cultural heritage, so Intangible Cultural Heritage Inheritance lacks a good intangible cultural heritage ecosystem. Thirdly, due to the serious aging of some inheritors of intangible cultural heritage handicrafts, the inheritance of handicrafts will lead to the public's lack of interest in intangible cultural heritage culture due to the aging of market information on intangible cultural heritage culture. The market-oriented transformation of intangible cultural heritage can stimulate the people's innovation and creation of intangible cultural heritage, activate the intangible cultural heritage consumption market, feed back the artists, and enable the inheritors or researchers to obtain labor economic benefits or honors, so as to form a good ecosystem of intangible cultural heritage. Provide an online platform for the inheritance, dissemination and innovation of intangible cultural heritage[7].

4.2.3 Information Sorting and Proposal

Through research and information sorting, this app is named "Chu trace", and its main functions are summarized into four sections. In the discovery section, the cultural background, technical features, product details, today's headlines (such as the official release of non heritage cultural and creative competitions), popular recommendations, etc. of relevant intangible cultural heritage are mainly shared and introduced in the form of video and graphics. In the mall sector, open online cloud store channels, and use AR technology to enable users to travel online intangible cultural heritage content library, commodity classification list, and commodity recommendation. At the same time, it opens channels for craft inheritors and enterprise merchants to sell their works and commodities, and its specific payment functions can be carried out by third-party platforms (such as wechat and Alipay). In the creation circle, there is mainly a technology and design exhibition area, where intangible cultural heritage inheritors can share the production process of handicrafts and show the charm of literature, drama, art, etc. Designers and students can share cultural and creative design works here to collide their

thinking and spark creativity. In my section, it includes personal data, mall orders, platform services, and personal settings. The operability of this product design is to enhance the interaction between users and products, realize the two-way transformation of intangible cultural heritage culture communication and product economy, let users establish a social circle for intangible cultural heritage research and discussion, and realize the ecological benign development of intangible cultural heritage.

5 Application and practice of Hubei intangible cultural heritage app interface design

5.1 Digital Interface Architecture Design of Hubei Intangible Cultural Heritage App

In the user experience design of the "Chu trace" app, more consideration is given to the convenience of users. At the same time, by summarizing the user demand keywords, the user demand of intangible cultural heritage heirs and the user demand of non legacy lovers, we can further find the cross analysis of user demand and function points, and then complete the function transformation from core function to pain point analysis. The goal is to determine the function architecture diagram to complete the interface design of intangible cultural heritage digital expression.

Before the design of the low fidelity prototype, the structure and content of the app can be simply combed through the topology map, for details, so as to make the logic between app pages reasonable (Fig.2). When the software starts, first enter the welcome page, which contains the cultural background introduction of Hubei intangible cultural heritage and the product features "chuangquan" and "ar online intangible cultural heritage products". Enter the app to start the login registration process and improve your personal data before entering the "Chuji"app.

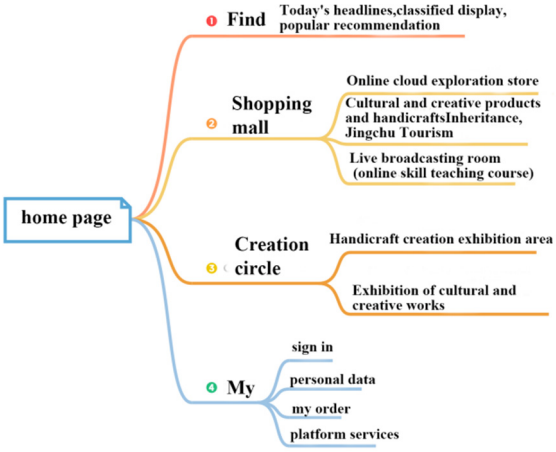

Fig. 2. Topological diagram of Chu Ji app (picture source: self drawn)

The average time that each user uses the app is 47 seconds[8]. According to the user's behavior habits, people are not used to obtaining information by reading word for word, but by scan-

ning to obtain the content of interest. Therefore, the content of the screen should be simplified as much as possible in the design, and the overall structure must be clear and logical. The product can enhance the user experience by means of human-computer interaction. For example, this design focuses on the online intangible cultural heritage in the mall layout . The user experience is enhanced by means of human-computer interaction. Users can watch the 3D display of Hubei intangible cultural heritage online, and appreciate the details of intangible cultural heritage handicraft products by pressing and holding the screen with their fingers, rotating left and right, zooming in and out.

5.2 Interface Design of Chu Ji App

5.2.1 Login Interface Design

Let users have a more intuitive understanding of the basic attributes of the product. Each time you open the app, you can see the five second open screen advertisement. For the first use, you need to register an account and set an eight digit password. After the setting is successful, you need to agree to the app agreement, read the precautions, and click agree to the agreement,Open the use of the Chu Ji trace app (Fig.3).

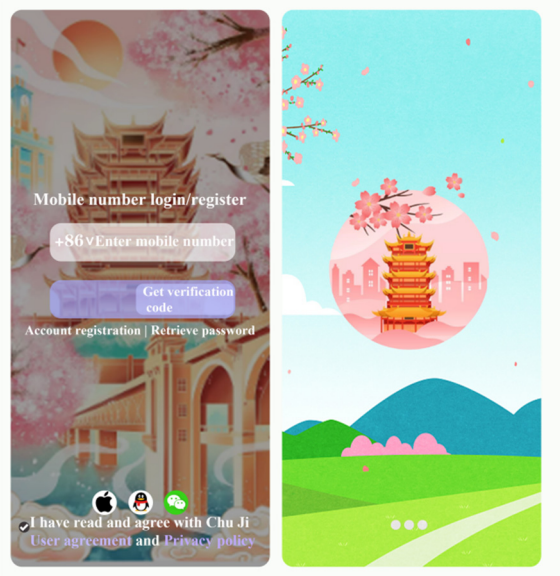

Fig. 3. Login Interface Design (picture source: self drawn)

5.2.2 Homepage Design

Using app for communication requires digital transformation, and its key work should be to realize and spread its cultural connotation, complete records from beginning to end, and integrate cultural elements and cultural values into it[5]. In terms of layout presentation, in order to facilitate users to receive more visual information in the shortest time and quickly locate the content of interest, some major hot activities are presented in the form of slide show switching or pictures, while news and information are displayed in a list (Fig.4).

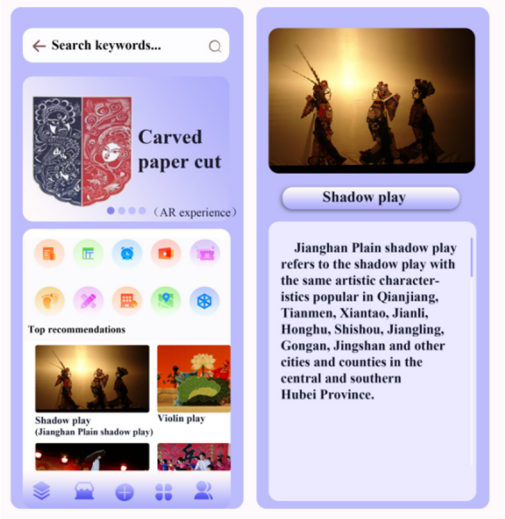

Fig. 4. Homepage Design (picture source: self drawn)

5.2.3 Create a Circle Interface Design

So that non legacy lovers and intangible cultural heritage inheritors can better and more conveniently use this app. The interface icon is a common menu bar icon. When using, the interface will refresh new content to enhance the freshness and stickiness of users to the app. Illustration form is a design method with high public acceptance (Fig.5). Intangible cultural heritage digitization can transform three-dimensional objects into two-dimensional art works, and enhance the communication attribute.

Fig. 5. Create a Circle Interface Design (picture source: self drawn)

5.2.4 Online Intangible Cultural Heritage Interface Design

When using the online mall function, in order to enable users and intangible cultural heritage merchants to better use this function, this part is displayed in different areas. Part of the interface is the intangible cultural heritage products of online ar cloud experience. The user clicks the interface and needs to open the camera permission for the first time, The user clicks and agrees to open it to enter the three-dimensional look around panel of the product, The user can easily watch the details of the product by sliding his fingers left and right. At the same time, the editing function is set on the look around panel, Users can not only select brushes and color hand-painted graphics on this panel, but also manually select fonts to input text, so that users can create improvisations anytime and anywhere, and can also save the completed works to photo albums and share them with social software (Fig.6).

Fig. 6. Online Intangible Cultural Heritage Interface Design (picture source: self drawn)

6 Conclusions

Aiming at the user experience design of intangible cultural heritage app, this paper analyzes the specific application of user experience elements in the face of topic selection, lists the focus of each constituent element in the user experience design of intangible cultural heritage app and the analysis of the innovation and reproduction of intangible cultural heritage, that is, to solve the problem of Intangible Cultural Heritage Inheritance with digital technology. Further expand the analysis of the function points of the intangible cultural heritage app, introduce the application characteristics of AR experience library and creative circle in the intangible cultural heritage app, and finally the user experience design and interface design display of the "Jingchu intangible cultural heritage" app. There are still many relevant knowledge about user experience design and interface design that we need to improve and learn. The future

design development of the intangible cultural heritage app can be based on the current development of artificial intelligence, It attempts to re create intangible cultural heritage on the basis of human-computer interaction application, and the combination of the two provides users with a creative platform for the regeneration of design, the continuation of non-material, innovation and other aspects. In the future, the author will continue to pay attention to the development of human-computer interaction in the interface design of intangible cultural heritage app.

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