Research on Digital Integration Design of Intangible Cultural Heritage in Region of Central Shaanxi Province from the Perspective of User Experience

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Abstract—Central Shaanxi Province region (also referred to Guanzhong region) is rich in intangible cultural heritage resources. With the development of digital technology, therefore, promoting traditional culture through digital design has become a major trend. However, along with the evolution of users, how to meet the experience needs of different users in participating in intangible cultural heritage of Guanzhong region with multiple participation methods and multiple experience scenes has become an urgent problem to be solved in digital innovation. For this reason, the study first analyzes the clustering model and different needs of users through questionnaire survey based on Kano model method, then clarifies the experience dimensions and contents of intangible cultural heritage in Guanzhong region through focus group method, and finally interprets the key issues in the digital design process through case study method. Ultimately, this study proposes a multi-stage integration design strategy that integrates design content with user needs, experience scenes and touchpoints, and humanistic perceptions with Guanzhong culture under the digital trend, which provides relevant reference and meaning for the development of Guanzhong's intangible cultural heritage and traditional culture in the post-epidemic period.

Keywords-Guanzhong culture, digital design, user clustering model, experience scenarios

1 INTRODUCTION

On December 5, 2021, the 9th China Emerging Media Industry Integration Development Conference was held in Boao, Hainan. The conference aimed to discuss media integration and boost the development of cultural industry. Back on April 7, 2021, leaders of the Ministry of Culture and Tourism pointed out at the National "Internet + Tourism" Development Forum that digital technology should be effectively used to enhance the traditional cultural tourism experience. Located in central Shaanxi, the Guanzhong region is rich in intangible cultural heritage resources (hereinafter referred to as Guanzhong ICH). As of 2021, the total number of

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ICH in Guanzhong cities, represented by Xi'an, Baoji and Weinan, is 47, covering categories such as traditional handicrafts, folk life and theatrical performances. There is no doubt that these ICH contain precious values for cultural transmission and cultural inheritance.

However, in the context of industrial social development, the social as well as natural environment on which ICH depend have been increasingly eroded [1], resulting in Guanzhong ICH lagging behind in the long-term life and production process. The contemporary development and transmission strategies of Guanzhong ICH will certainly become an important issue before the world. In fact, along with the development of digital technology, several scholars have already expressed their views on the contemporary development of ICH in academic circles. As early as 2009, Wang Yaoxi (2009) proposed the concept of "digitization of cultural heritage", which aims to transform ICH into a shareable and interpretable digital form through intelligent information technology of collection, storage and display [2]. Feng Xegang and Liang Ru (2021) argued that in the context of the rise of "metaspace", digital technologies that combine virtual and reality should be used to help the contemporary development of ICH [3]. Driven by this, some scholars have proposed to introduce digital design into the application and innovation of ICH [4]. Based on the local humanities, history, ethnicity and regional characteristics, and oriented by user needs, the process of interaction between users and the inner experience touchpoints of ICH is fortified through the interplay of culture, art design and digital technology, and innovative points are sought for the development of ICH [5][6].

In fact, it is easy to find from the existing literature that relatively few regional studies have been conducted on the application of ICH, especially in the context of digitalization, where ICH in Guanzhong has been discussed as an object of study. Although Guangzhong's ICH have received protection and attention from policies and media in recent years, they still face problems such as difficulties in meeting the needs of user experience, Guanzhong ICH has limited content supply, and insufficient innovation of experience in the post-epidemic era,

Therefore, three main research questions are proposed: What are the contemporary users' experiential needs for Guangzhong's ICH? What is the way of user experience for ICH touchpoints? How to present the content through digital design?

Based on the research questions, from the perspective of user experience, Guanzhong ICH successor feedback, and digital design technology and method, the research team proposed a Guanzhong ICH digital design model suitable for user experience "Fig. 1". The model is dedicated to Mining and analyzing user data, constructing Guanzhong ICH experience content, and exploring digital design methods to meet user needs. Through this model, the strategies and application methods of digital experience design for Guangzhong ICH are explored, and relevant reference values for the contemporary reproduction, revitalization, preservation and transmission of Guangzhong ICH are provided.

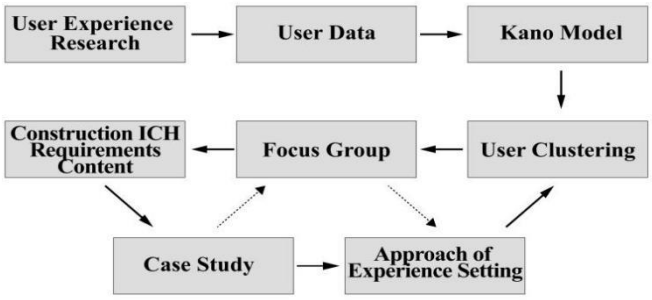

Figure 1. Guanzhong ICH digital design model

2 MATERALS AND METHODS

2.1 Research objects and methods

Based on the first (2006) and second (2008) batches of "National Intangible Cultural Heritage List", the research selects the Guanzhong ICH items: "Making Technique of Mulberry-bark Paper", "Yaozhou Kiln Ceramic Firing Craft" and "Middle Road Qinqiang Opera" from the two categories of traditional handicraft techniques and traditional theater respectively as the key research objects. In order to address the research questions, a combination of methods was used to understand contemporary users' experience of Guanzhong's ICH via user interviews, to explore the dimensions and contents of Guanzhong's ICH touchpoints through focus groups, and to interpret the digital design focus of the ICH scenes by case studies.

2.2 User questionnaire survey based on kano model

To perceive users' needs for ICH in Guanzhong, this study relied on the user questionnaire survey method of Kano model[7]. Kano model proposes five demand attributes: Basic Needs *M*, One-dimensional needs *O*, Attractive needs *A*, Indifferent needs *I*, Reverse Needs *R* "Fig. 2".

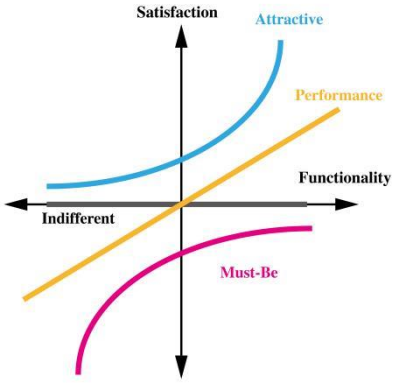

Figure 2. Kano mode

According to the Guanzhong ICH experience process, the research team set the user needs questionnaire “Table 1”, and according to the degree of user needs, set the attitude option “Table 2”.

From Chang’an Cultural Center in Xi’an, the Yaozhou Kiln Museum, and the Shaanxi Qinqiang Opera Museum, the research team conducted questionnaire surveys for tourists. The questionnaire survey subjects were 100 people, which provide design basis for Guanzhong digital ICH based on user data. The questionnaire survey followed the ethics surrounding interviewing of Allmark [8].

TABLE 1. USER NEEDS QUESTIONNAIRE

Serial Number	**Content of Service Requirements**
	Service Question
S1	Experience new digital design techniques
S2	Clear presentation of Guanzhong ICH information
S3	In-depth understanding of Guanzhong ICH cultural connotation
S4	The role of digital experience in education and entertainment
S5	Easy-to-operate digital interactive devices
S6	Accurate interpretation of Guanzhong ICH digital experience rules
S7	Reasonable display of Guanzhong ICH experience projects on different channels/platforms
S8	A clear way to guide visitors into the experience environment
S9	Stylish, informative and ergonomic digital design

TABLE 2. USER NEEDS DEGREE OPTION

User needs degree selection				
I like it	***I expect it***	***I am neutral***	***I can tolerate it***	***I dislike it***
☑[a]	☐[b]	☐	☐	☐

a. Indicates that this option is not selected. b. Indicates that this option is selected

2.3 Focus group method

To further explore the content dimensions of the contact point experience of Guanzhong’s ICH, based on the focus group method proposed by Smithson [9], the researchers constructed a focus group outline “Table 3”. Through offline organization and online meetings, the focus group participants were recruited by the researchers in batches from the “Making Technique of Mulberry-bark Paper” inheritors, “Yaozhou Kiln Ceramic Firing Craft” and “Middle Road Qinqiang opera” practitioners, and a team of cultural management staff and designers “Table 4” in June 2021 and October 2021. The group discussions were recorded in real-time video equipment and audio recording with the consent of the participants.

TABLE 3. FOCUS GROUP DISCUSSION OULINE

Type	**Research Content**	
	Attributes	***Questions***
Basic information	Demographic information	Gender/age group

Touchpoints	Background	Undertaken projects of ICH
	Touchpoints content	What are the key elements of the ICH projects you work on?
		Are these elements figurative artifacts, tools or content, or abstract information or techniques?
	Touchpoints experience	What elements can be translated into experience touchpoints for users or visitors?
		Is the content of touchpoints interest to the user or visitor?
	Digitalization	Have you thought about/seen digital ICH design works?
	Design	Can digital design work attract users and convey the core content of ICH?

TABLE 4. FOCUS GROUP PARTICIPANT INFORMATION

Projects of ICH	**Research Content**		
	Participants type	***Location***	***Name***
Making Technique of Mulberry-bark Paper	Inheritor	Bei zhang Village, Chang'an district	Songsheng Ma
			Fengxue Zhang
Yaozhou Kiln Ceramic Firing Craft	Practitioner	Li Jia porcelain workshop of Tongchuan Chenlu ancient town	Wei Zhang
			QIan Ye
Middle Road Qinqiang opera	Staff	Xi'an Guanzhong Folk Art Museum	Mr. Dong
		Chang'an District Cultural Bureau	Miss. Liu
		Shaanxi Qinqiang Museum	Professor Wang

2.4 Case study method

In order to interpret the digital design process of Guanzhong's ICH, the researchers relied on the case study method proposed by Gerring[10], and selected two representative traditional culture digital experience design projects from the perspectives of digital technology application and design scale, conducted study and analysis in terms of user experience, digital technology, presentation, thematic content, and cultural touching point extraction “Table 5”.

TABLE 5. DIGITAL DESIGN CASES OF ICH

Projects	**Research Content**			
	Experience Mode	***Digital technology***	***Presentation and Theme***	***Cultural Touching Points***
Digital Museum of Chinese Traditional Villages	User point-and-click or immersive roaming on computer or mobile	1.Digital Imaging Tech. 2.Digital Modeling Tech. 3.H5 Interaction Tech.	Online Virtual Showroom Comprehensive display of traditional villages and the traditional culture they carry	Physical touching points: such as streets, buildings, landscapes, production and living tools, etc. Intangible touching points: such as customs and traditions, living habits, etc.

Digital virtual display of Dunhuang 159 caves	Users can experience virtual reality augmentation in the physical Mogao Caves. It is also possible to tap or immerse roaming on the computer side or cell phone side.	1. Laser scanning tech. 2.Digital Modeling Tech. 3. Game engine tech.	Online Virtual Showroom Appreciate the culture and art of Dunhuang	Physical touching points: digital virtual displays of Dunhuang murals, sculptures, Dunhuang music and dance, costumes and other material symbols. Provides an immersive virtual reality experience for the audience. Intangible touching points: Dunhuang music and dance scenes, trying on Dunhuang costumes.

3 STUDY RESULTS

3.1 Differences in user types and experience issues

The Kano method is used to classify the user experience Guanzhong's ICH requirement attributes. In order to determine the specific impact of each attribute, the importance of each use requirement is ranked. Corresponds to the requirement attributes (A, O, M, I, R) in the Kano model. After the investigation, the percentage of importance of S1~S9 is calculated, and the highest value is the selected qualitative level.

TABLE 6. USER NEEDS QUESTIONNAIRE

Serial Number	**Content of Service Requirements**						
	Suspicious Result Q%	***Exciting Needs A%***	***Expected Needs O%***	***Basic Needs M%***	***Indifferent Needs I%***	***Reverse Needs R%***	***classify***
S1	0	15.7	48.3	16.3	10.1	9.6	O
S2	0	13.6	9.5	40.2	20.7	16.0	M
S3	0	16.2	13.4	17.5	49.3	3.6	I
S4	0	18.5	16.9	45.6	9.4	9.6	M
S5	0	13.5	17.4	38.9	21.5	8.7	M
S6	0	13.6	27.1	38.4	7.6	13.3	M
S7	0	19.6	47.8	16.3	12.6	3.7	O
S8	0	53.1	14.8	7.7	13.1	11.3	A
S9	0	22.3	38.7	15.6	13.2	10.2	O

From “Table 6”, it can be seen that the priority of the user's needs when experiencing Guanzhong ICH services is as follows: Clear presentation of Guanzhong ICH information（S2), The role of digital experience in education and entertainment(S4), Easy-to-operate digital interactive devices(S5), Accurate interpretation of Guanzhong ICH digital experience rules(S6), A clear way to guide visitors into the experience environment(S8), Stylish, informative and ergonomic digital design(S9), Experience new digital design techniques(S1), Reasonable display of Guanzhong ICH experience projects on different channels/platforms(S7), In-depth understanding of Guanzhong ICH cultural connotation(S3).

Use the Better-Worse coefficient index calculation formula to solve the Better (B) and Worse (W) coefficients of user demand satisfaction. The calculation method is as follows:

$$B = \frac{A + O}{A + O + M + I} \quad (1)$$

$$W = \frac{O + M}{A + O + M + I} * (-1) \quad (2)$$

According to the calculation result of formula (1), the average value of Better is calculated to be 0.51, and the average value of Worse is 0.58 according to the calculation result of formula (2), and the mean value of the survey data (0.51, 0.58) is taken as the origin "Table 7".

TABLE 7. BETTER-WORSE NEEDS SURVEY

Serial Number	**Better-Worse**	
	Better coefficient	***Worse coefficient***
S1	0.71	0.65
S2	0.24	0.60
S3	0.34	0.32
S4	0.42	0.68
S5	0.35	0.60
S6	0.47	0.71
S7	0.71	0.63
S8	0.76	0.29
S9	0.64	0.62

Taking the absolute values of Worse and Better as the horizontal and vertical coordinates respectively, the demand sensitivity matrix coordinate diagram is drawn, so as to more clearly show the attribution of user data demand"Fig. 3".

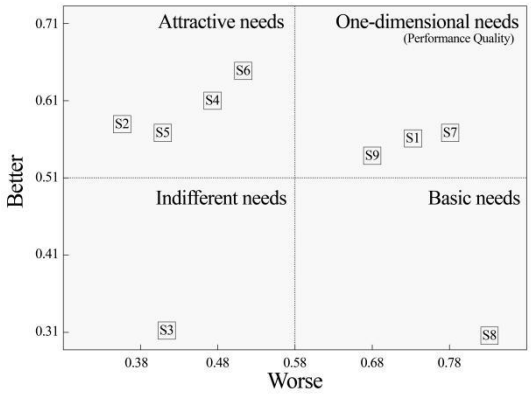

Figure 3. Better-Worse coordinates

The results of the questionnaire survey method of Kano model, there is a diverse range of users who participate in the Guanzhong ICH experience, including the general public and ICH enthusiasts, as well as ICH scholars, staff of cultural management and designers etc. The survey

results were synthesized and the user clustering models can be classified into three types based on the relevance of the needs.

1) Interest-based users model: people who are interested in digital products or services, and are keen to learn about various themes and cultures in the process of experiencing digital services “Fig. 4”.

2) Exploration-based users model: people who are enthusiastic about Guanzhong's ICH, and are keen to experience and learn about various Guanzhong’s ICH “Fig. 5”.

3) Research-based users model: People who are interested in learning and discovering the cultural connotations of Guanzhong’s ICH and are concerned about the development of ICH, and they want to know more diversified forms of traditional culture display “Fig. 6”.

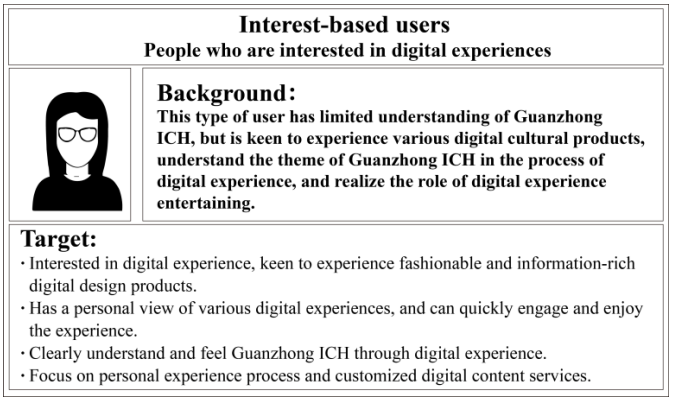

Figure 4. Interest-based users

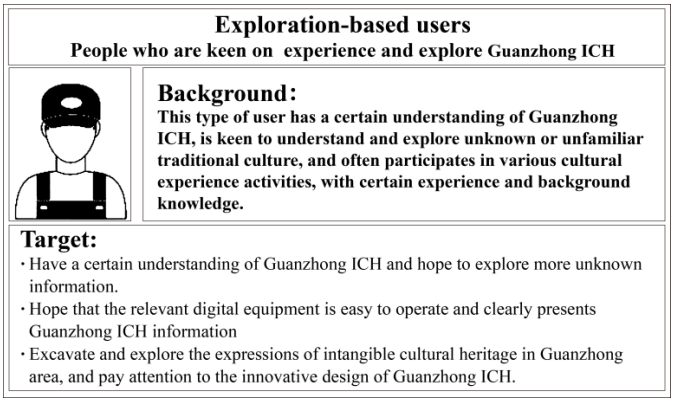

Figure 5. Exploration-based users

Figure 6. Research-based users

3.2 Dimension and content of ICH experience touchingpoints

Through a combination of focus group research and user questionnaire survey, compared to other regions, the use of digital design in ICH experiences in Guanzhong faced the following potential problems:

- In physical spaces, the exhibition item are homogeneous.
- In the experience process, the information is mostly presented in static graphic display boards.
- In the online ICH experience, most of the ICH scenes are copied and appropriated on a 1:1 basis.
- In the online Guanzhong ICH experience, the advantages of virtual experience are not effectively used to express the creation scenes and humanistic scenes of ICH.

Therefore, during the focus group, stakeholders were encouraged to express their opinions to clarify the dimensions and contents of the experiential touchpoints in Guanzhong's ICH. Based on the results of the discussion and the opinions of the participants, it was found that Guanzhong's ICH includes not only experiential nodes such as skills, materials and environment, but also various contact elements such as cultural activities, folklore, customs and traditions. On the one hand, tangible physical touchpoints, such as paper-making tools and environments, Qinqiang Face Paintings and props, porcelain-making sites and implements, are the materialized characteristics of Guanzhong's ICH. On the other hand, abstract cultural touchpoints, such as the folk stories and cultural customs behind them, represent the unique cultural symbols of different ICH "Table 8", and most practitioners believe that effective digital touchpoints can enhance the user immersive experience.

TABLE 8. ANALYSIS OF THE CONTENT OF THREE TYPES OF GUANZHONG ICH TOUCHPOINTS

Projects of ICH	**Content of Touchpoints (the touchpoint to be marked as ● when it appears)**		
	Content of touchpoints	***Entity Touch-points***	***Abstract Touch-points***
Making Technique of Mulberry-bark Paper	The craftsmen worshipped Cai Lun and recited prayers		●
	Specific papermaking process: take paper material → de-mixing →Soften the bamboo → primary steaming → crushing paper material → secondary steaming → paper material chopping → paper material pounding → a suspension of paper fibers → paper scooping→ drying paper	●	
	The folk custom activities of "cherishing words and paper"		●
Yaozhou Kiln Ceramic Firing Craft	Yaozhou kiln worship kiln god——Ceramic artist Berlin		●
	Specific porcelain making process: material → selection → weathering → proportioning → poaching mud → aging → cooked mud → kneading mud → hand-drawn billet → repairing → glaze selection → preparation → glazing → hand decoration → kiln furniture production → loading kiln → firing kiln	●	
	"The millennium furnace" is alive and well		●
Middle Road Qinqiang opera	Sentence pattern: cross sentence, seven-character sentence, five-character sentence, prose sentence		●
	Singing: "Banlu"and "Caiqiang". Board path: 26 boards, adagio, arrow board, two inverted boards, belt board, rolling board Caiqiang: Commonly known as "two-tone", octave in pitch		●
	Facial makeup of Shaanxi Opera: three tile faces, four big faces, five painted faces, spiral faces, slanting leather faces, Tongtianzhu faces, old faces, two-chamber faces, pictographic faces, symbolic faces, two-sided faces, Baba faces, big white faces, two white faces, half-cut faces and painted three pieces, painted four pieces, etc	●	

3.3 The importance of humanistic connotation in ICH

The case study found that digital design helps traditional culture focus more on user experience needs, extracting and interpreting the substantial objects and abstract culture of traditional culture in multiple scenes, and reproducing the humanistic connotations using digital technology in an artistic design way.

It is found from the above cases that many physical heritage and humanistic activity scenes have lost their relevance to the contemporary environment due to the fading of contemporary cultural resources and historical contexts. When building a digital experience, the design team pays special attention to the collection and design of humanistic symbols. It not only focuses on the traditional cultural objects themselves, but also takes into account the natural and social environments they rely on, such as tools, artifacts, environments, ruins, as well as cultural heritage, such as living scenes and cultural customs. With the help of digital means and multimedia integration, cultural symbols from cultural heritage are implanted in digital contexts, as shown in "Fig. 7" and "Fig. 8". Through the use of images, moving graphics, interactive devices and other carriers to strengthen humanistic symbols and convey humanistic

connotations, users can more comprehensively and conveniently understand cultural information and empathize with cultural heritage.

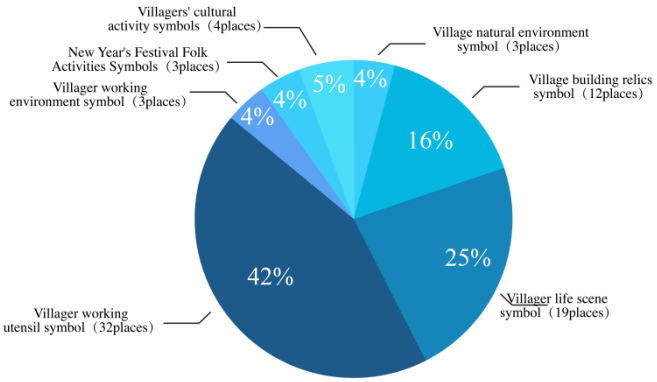

Figure 7. Types and proportions of digital humanistic design in digital museums of traditional villages

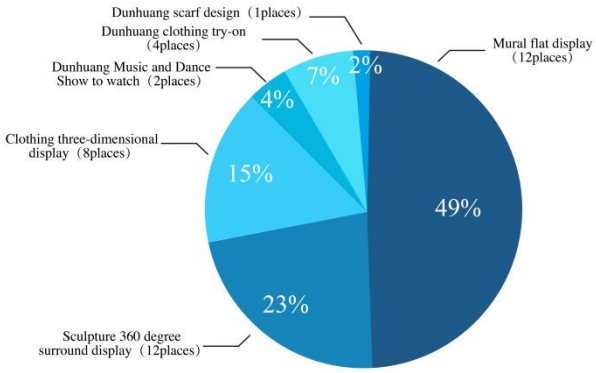

Figure 8. The types and proportion of digital humanistic design in the digital virtual display of Dunhuang Cave 159

4 DISCUSSION ON DIGITAL MULTI-STAGE INTERGRATION DESIGN OF ICH

4.1 Integration of digital design content and user needs

4.1.1 Experimental motivation

In order to validate and practice the above study results, from the perspective of user clustering, the design team explores the integration of digital design works and user needs through design experiment.

4.1.2 Experiments process

4.1.2.1 Design for Interest-based users

- Project name: The design team designed the “Guanzhong Qinqiang face painting” for “Middle Road Qinqiang Opera”.
- Participants: “Middle Road Qinqiang Opera” related practitioners, graphic designer, multimedia interaction designer.
- Design equipment: Touchdesigner interactive software, Arduino open source electronic prototyping platform, and somatosensory radar.
- Design content: The main colors and common graphics of the Qinqiang face painting sheet were collected, and the interaction between hand movements and face sheet “coloring” was established using fluidized particle design method and fixed area radar body sensing capture technology “Fig. 9”.
- Presentations: Through interactive screens, design works have been set up in public areas to guide users body movements to participate in ICH activities of Qinqiang face pattinting “Fig. 10”.

4.1.2.2 Design for exploration-based users and research-based users

- Project name: “The birth of the paper” WeChat applet for “Making Technique of Mulberry-bark Paper”.
- Participants: Related inheritor, graphic designer, h5 related technicians.
- Design equipment: Illustrator, photoshop, Adobe XD.
- Design content:Vector graphics in black and white restores the traditional papermaking process of Guanzhong handmade paper in the form of vector illustrations, including traditional papermaking tools, papermaking raw materials, and papermaking steps.
- Presentations: Users can be loaded from the WeChat applet, and the information can be viewed through touch interaction “Fig. 11”.

4.1.3 Experimental analysis

According to the way of user experience in the experiment, the experience scenes of touchpoints of ICH in Guanzhong can be divided into two categories: passive experience scenes and interactive experience scenes. Passive experience scenes are experience scenes designed in advance by designers, such as environment, props and devices, to attract target users to participate in them and spread knowledge of ICH through design works in the process of participation, guiding different types of users to understand Guanzhong ICH from surface to background information.

Figure 9. “Fluid” design of Qinqiang facial makeup is carried out with Touchdesigner

Figure 10. Users participate in the interactive coloring process of Guanzhong Qinqiang Opera face painting

Figure 11. “The birth of the paper” mobile application- mobile phone terminal digital display of Guanzhong papermaking process.

4.2 Digital scene experience and ICH touchponits are integrated into each other

4.2.1 Experimental motivation

With the help of digital design, the user experience scenes are expanded from traditional offline channels to online platforms, and the narratives of experience touchpoints are extended from active narratives to interactive narratives. Therefore, the experiment attempts to integrate Guanzhong's intangible cultural heritage through digital design The touch points of the game are combined with different experience scenarios to guide users to understand Guanzhong ICH in different experience ways.

4.2.2 Design experiments

4.2.2.1 Dynamic audiovisual experiments

- Project name: Digital virtual space “Papers” for “Making Technique of Mulberry-bark Paper” “Fig. 12”.
- Participants: Related inheritor, graphic designer, scene modeling designer, video editing designer.
- Design equipment: Illustrator, Photoshop, 3Dmax, SketchUP, lumion renderer and Premiere video editor
- Design content: the design team designed an online virtual exhibition space, which guides the users to gradually understand the environment, process and finished paper of traditional handmade paper making, by means of on-screen video experience and dynamic roaming, further extending the cultural display field of traditional handmade paper making, enhancing the target users' sense of site and forming deep memory points.
- Presentations: Using images, sounds, props, special effects and other visual elements, present a virtual display space through multimedia screens.

4.2.2.2 Virtual interaction design

- Project name: Virtual interactive space “Chen Lu Ancient Town Live Experience” for “Yaozhou Kiln Ceramic Firing Craft” “Fig. 13”.
- Participants: Related inheritor, graphic designer, scene modeling designer, virtual interactive game designer.
- Design equipment: Illustrator, Photoshop, 3Dmax, SketchUP, Unity
- Design content: According to the virtual area, users can use external control devices to visit the porcelain-making site from the first viewpoint and experience the virtual firing process along the virtual narrative line at the screen.
- Presentations: A virtual experience platform on the mobile phone or computer, where users use touch screen, keyboard, mouse and other external devices to control the perspective.

4.2.3 Experimental analysis

According to the way of user experience in the experiment, the experience scenes of touchpoints of ICH in Guanzhong can be divided into two categories: passive experience scenes and interactive experience scenes. Passive experience scenes are experience scenes designed in advance by designers, such as environment, props and devices , to attract target users to participate in them and spread knowledge of ICH through design works in the process of participation, guiding different types of users to understand Guanzhong ICH from surface to background information.

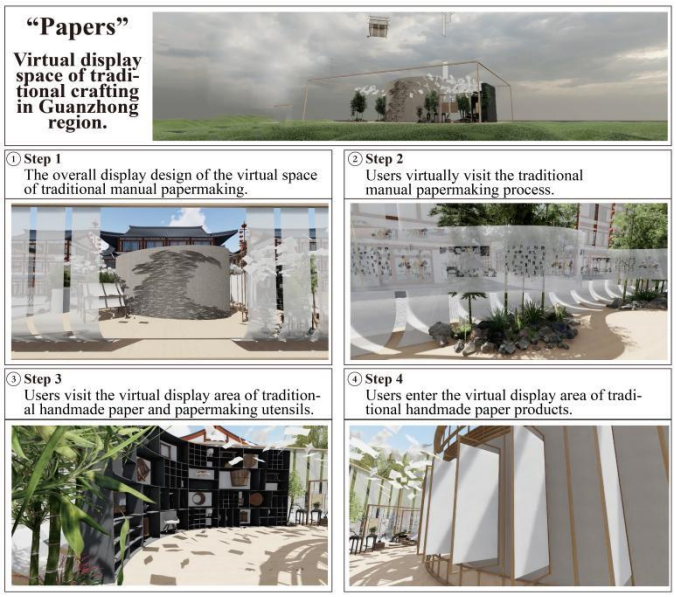

Figure 12. "Papers" - Digital virtual space

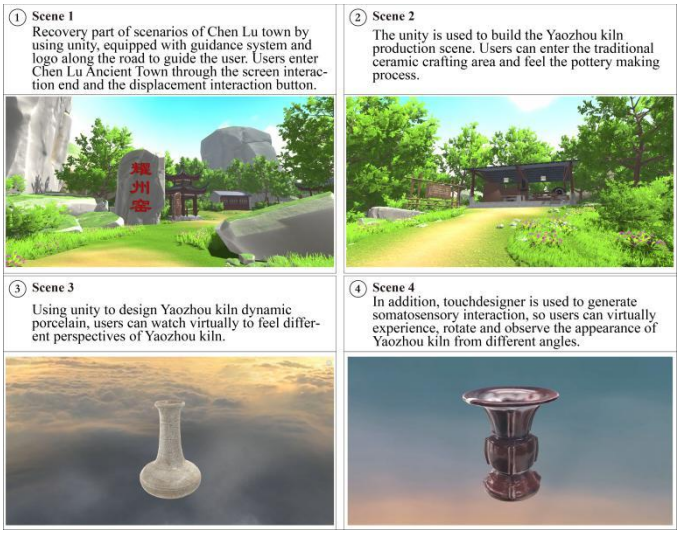

Figure 13. Virtual interactive space - "Chen Lu Ancient Town Live Experience".

4.3 The mutual integration of digital humanistic perception and Guanzhong culture

Guanzhong ICH involve a variety categories and forms, but in contemporary society, their initial cultural status and historical condition have mostly changed. Consequently, when constructing a digital experience system, it is important to focus not only on the objects of Guanzhong ICH themselves, but also to fully consider the cultural characteristics, ethnic features and customs reflected therein, and to explore the cultural symbols and local semantics

involved, and combine them with digital design to enhance the digital humanistic value of Guanzhong ICH.

Based on the process of “Making Technique of Mulberry-bark Paper”, the design team used Unity and 3Dmax digital software to design the digital work “Persistent Craftsmanship”, which is a virtual display prop in the shape of “monumen”, highlighting the complex process of papermaking with 14 large and 72 small processes. To strengthen the rigorous and meticulous creation spirit of Guanzhong paper makers “Fig. 14-15”. Another example is that based on the classic folk stories in Guanzhong papermaking, the design team adds a link of “burning paper and worshiping heaven” at the end of the digital virtual space of “Papers” to reproduce the paper-making beliefs and folk customs of craftsmen in a digital scene. By strengthening the mutual integration of digital design, “intangible” culture and local culture, users can be prompted to create resonance and use digital technology to carry on folk culture in a thousand ways, building a bridge of mutual understanding between users and traditional folk tales “Fig. 16”.

Figure 14. “Persistent Craftsmanship” -- virtual display props (view 1)

Figure 15. “Persistent Craftsmanship” -- virtual display props (view 2)

Figure 16. “Respect characters and paper” -- Virtual display of folk allusions of paper making in Guanzhong

5 CONCLUSIONS

Based on the analysis of user clustering, the design paradigm of digital multi-stage integration is explored through the synthesis of experience content and experience scenes. This design paradigm strengthens the digital design path of Guanzhong's ICH based on user experience needs, and injects new growth points for the preservation, inheritance and diversified development of Guanzhong's ICH. Furthermore, using digital design to empower the ICH of Guanzhong, which extends the application dimension of digital design methods to a certain extent and complements the possible shortcomings of the regional ICH application research.

In the following research, the changes in user volume, background and motivation will lead to changes and expansions in demand, and the existing digital design model and user clustering model is not the final form. The concept of digital gaming experience can be introduced to build Intangible cultural heritage game model, providing interesting, fun and playable experience models and digital services that meet user needs. This means that It is necessary to obtain user perceptions in all dimensions and keep continuous iteration of user Meanwhile, the focus group participant types should be expanded to jointly create a more comprehensive digital design product transformation model, enhancing the co-creation diversity of digital products and systematicness. so as to outline the Guanzhong ICH digital development direction of the times.

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